

CONDITIONS, SPECIFICATION AND RELATED DOCUMENTS FOR

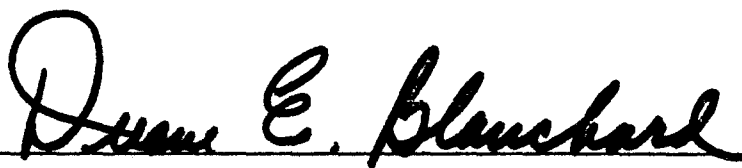
UNIT B/C - PHASE X SHELL SPACE COMPLETION
RURAL PHYSICIAN ASSOCIATE PROGRAM - FLOOR FIVE
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION

Clinton N. Hewitt Assistant Vice President for Physical Planning	University of Minnesota
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THE ARCHITECTS COLLABORATIVE, INC.	Cambridge, Massachusetts
HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC. University Park Plaza - Suite 704 2829 University Avenue Southeast (612) 378-3833	Minneapolis, Minnesota 55414

As to Architecture:

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Architect under the laws of the State of Minnesota.



Date:

Reg. No. 8397

PROJECT IDENTIFICATION

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ADVERTISEMENT FOR BIDS

UNIT B/C PHASE X
PHILLIPS-WANGENSTEEN BUILDING
RURAL PHYSICIAN ASSOCIATE PROGRAM/SEMINAR SPACE
SHELL SPACE COMPLETION - FLOOR FIVE
PROJECT NO. 144-81-0397

MINNEAPOLIS CAMPUS - UNIVERSITY OF MINNESOTA

APPROXIMATE COST:
BIDS CLOSE: 2:00 P.M., CDT, , 1981
BIDS RECEIVED AT: ST. PAUL, MINNESOTA

UNIT B/C HEALTH SCIENCES EXPANSION
DOCUMENTS DATED: 31 JULY 1981

THE ARCHITECTS COLLABORATIVE, INC.
AND
HEALTH SCIENCES ARCHITECTS & ENGINEERS
2829 UNIVERSITY AVENUE S.E.
MINNEAPOLIS, MINNESOTA 55414

Sealed lump sum bids will be received on behalf of the University of Minnesota Board of Regents, at the office of Robert James, Director of Purchasing and Stores, in the Administrative Services Building, 1919 University Avenue, St. Paul, Minnesota 55104, until 2:00 P.M., CDT, , 1981. Bids received after this time will not be accepted nor opened. Immediately after closing time, bids will be opened publicly and read aloud.

The Project is the Construction of Unit B/C Phase X, Shell Space Completion Rural Physician Associate Program/Seminar Space - Floor Five of the Health Sciences Expansion on the Minneapolis Campus of the University of Minnesota.

Bids will be received for a single lump sum contract for complete construction.

No bidder may withdraw his bid until after 30 days of the bid date.

Bidding requirements, bid and contract forms, drawings and specifications may be examined at:

Office of the Architect/Engineer, listed above.

Office of the Engineering and Construction Division,
100 Shops Building, 319 15th Avenue, S.E.,
University of Minnesota, Minneapolis, Minnesota.

Minneapolis Builders Exchange.
The Builders Exchange of Saint Paul.

F. W. Dodge Corporation Plan Room, Minneapolis, Minnesota.

UM HEALTH SCIENCES
UNIT B/C X
A1 - 1

Purchasing Department, University of Minnesota
1919 University Avenue, St. Paul, Minnesota.

One complete set of the documents for the project may be obtained from the office of Health Sciences Architects and Engineers, at the address indicated above, in accordance with the Instruction to Bidders, upon making a deposit in the form of a check in the amount of \$50.00 Sets requested to be mailed will be forwarded C.O.D.

Prime Contractor Bidders may obtain two sets of complete drawings and specifications upon making a deposit of \$100.00.

Deposits will be returned to bidders in accordance with the Instructions to Bidders, upon the return of the complete set or sets of documents in good condition to the Health Sciences Architects and engineers, within 10 days after bid date. Deposits will be returned to others in accordance with the Instructions to Bidders, upon return of the complete set of documents under the same time and conditions.

A bid security in the amount of five percent (5%) of the maximum amount of the bid, shall be submitted with each bid in such form and subject to the conditions stated in the Instructions to Bidders.

The University requires compliance with the Equal Employment Opportunity - Affirmative Action and SED Set-Aside Program as described in the Contract Documents.

The University reserves the right to reject any and all bids, except any bid it deems to be in its best interest, to waive any informalities in bids submitted and waive minor discrepancies in bidding procedures.

REGENTS OF THE UNIVERSITY OF MINNESOTA
By: Robert James
Director of Purchasing and Stores
for the Regents of the
University of Minnesota

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - INVITATION FOR BIDS

1.1 Invitation

1.1.1 The regents of the University of Minnesota, referred to as the University, invite qualified bidders to submit lump sum bids for the Project identified as:

UNIT B/C - PHASE X
PHILLIPS-WANGENSTEEN BUILDING
RURAL PHYSICIAN ASSOCIATE PROGRAM/SEMINAR SPACE
SHELL SPACE COMPLETION-FLOOR FIVE
PROJECT NO. 144-81-0397
MINNEAPOLIS CAMPUS, UNIVERSITY OF MINNESOTA

as prepared by:

THE ARCHITECTS COLLABORATIVE, INC., CAMBRIDGE, MASS.
and
HEALTH SCIENCES ARCHITECTS AND ENGINEERS, INC.
Suite 704 University Park Plaza
Minneapolis, Minnesota 55414

1.2 Types of Bids

1.2.1 Bids will be received for contract B/C X, a single lump sum contract for the entire construction described in the Contract Documents.

ARTICLE 2 - BIDDING PROCEDURES

2.1.1 Bid Time and Place

2.1.1 Bids shall be submitted to the designated location indicated in the Advertisement for Bids, by the designated time or any extension thereof made by Addendum. Bids received after the time and date for receipt of bids will not be opened.

2.1.2 Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.

2.2 Preparation of Bid

2.2.1 Bids shall be submitted in duplicate in the form included in the specification. Forms are available from the Architect/Engineer.

2.2.2 All blank spaces on the Bid Form shall be filled in by typewriter or manually in ink, expressing the sums both in words and figures. In all cases the written and numerical figures must agree, otherwise it may be cause for rejection of the Bid.

2.2.3 Any interlineation, alteration or erasure must be initialed by the signer of the Bid.

2.2.4 Not used.

2.2.5 In the event unit prices are called for, a Bid for each unit price shall be submitted.

2.2.6 The Bidder shall not make any additional stipulations or alternates, nor qualify his Bid in any other manner.

2.2.7 Bidder shall state all addenda received or considered in preparing his Bid.

2.2.8 Each copy of the Bid shall include the legal name of Bidder and a statement whether Bidder is a sole proprietor, a partnership, a corporation, or any other legal entity, and each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. If the Bidder is a partnership, the names of all partners shall be stated. A Bid by a corporation shall further give the State of incorporation and have the corporate seal affixed.

2.2.9 The signature on the Bid shall be in longhand, in ink.

2.3 SUBMISSION OF BIDS

2.3.1 All copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope.

2.3.2 The envelope shall be addressed to the party receiving the bids and shall be identified with the Project name, the Bidder's name and address, and the portion of the project or category of work for which the Bid is submitted. If the Bid is sent by mail the sealed envelope shall be enclosed in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof.

2.4 MODIFICATION OR WITHDRAWAL OF BID

2.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of bids, and Bidder so agrees in submitting his Bid.

2.4.2 Prior to the time and date designated for receipt of bids, bids submitted early may be modified only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

1. Such notice shall be in writing over the signature of the Bidder or be by telegram; if by telegram, written confirmation over the signature of the Bidder must have been mailed and postmarked on or before the date and time set for receipt of Bids; it shall be so worded as not to reveal the amount of the original Bid. If the written confirmation is not received by the party receiving bids within 48 hours after bid closing time, no consideration will be given the telegraphic modification.

2.4.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are they fully in conformance with these Instructions to Bidders.

2.4.4 Bid security, shall be in an amount sufficient for the bid as modified or resubmitted.

ARTICLE 3 - BID SECURITY

3.1 Form of Security

3.1.1 The Bid shall be accompanied by a bid security in accordance with these requirements. The bid security shall pledge that the Bidder will enter into a contract with the University on the terms stated on his Bid, in accordance with the Contract Documents, and will furnish the required Performance Bond.

3.1.2 The bid security shall be in the form of a certified or cashier's check drawn on a solvent bank, or a bid bond, drawn to the order of the "Regents of the University of Minnesota".

3.1.3 Bid bonds shall be duly executed by the Bidder as principal, issued by a corporate surety company authorized to do business in the State of Minnesota, with a current copy of Power of Attorney of the Attorney-in-Fact who executes the bond on behalf of the surety attached, as well as proper acknowledgements.

3.1.4 The amount of the bid security shall be as stated in the Advertisement for Bids, but in no event less than 5% of the maximum amount of the Bid, including add alternates, if any.

3.2 Retention of Bid Security

3.2.1 The University shall have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds required have been furnished or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected. Thereafter, bid security in the form of checks will be returned to Bidders and bid bonds returned upon request of the Bidder.

3.3 Forfeiture of Bid Security

3.3.1 Should the Bidder be awarded a contract and fail or refuse to execute and deliver the Contract and performance bonds required within 10 days after he has received notice of the acceptance of his bid, he shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid. In the event the Contract has not been prepared for signature within 10 days after notice of award, the Bidders shall have three days after it is prepared and offered to execute the Contract and provide the performance bond.

ARTICLE 4 - CONSIDERATION OF BIDS

4.1 Opening of Bids

4.1.1 Bids will be opened publicly and read aloud immediately after the time for receipt of bids.

4.2 Informalities

4.2.1 The University reserves the right to consider informal any Bid not prepared in strict accordance with requirements herein and to waive said informalities and to waive minor discrepancies in bidding procedures.

4.3 Rejection of Bids

4.3.1 The University shall have the right to reject any or all bids and in particular to reject a Bid not accompanied by any required bid security or data required by the Bidding Documents or a bid in any way incomplete or irregular.

4.4 Acceptance of Bid (Award)

4.4.1 In consideration of alternates, it is the intent of the University, if it accepts any alternates, to accept them in the order in which they are listed on the Bid Form. However, the University reserves the right to accept alternates in any order if such acceptance out of order does not change the low Bidder.

4.4.2 The low Bidder will be determined on the basis of the sum of the Base Bid and any alternates accepted.

4.4.3 In evaluating alternates which affect more than one contract, the University reserves the right to consider the total value of the alternate under all contracts and accept such alternates of the Bidders the University may deem in its best interest. In some instances it may result in additive amounts to some contracts and deductive amounts to others.

4.4.4 The University reserves the right to reject unit prices of a low Bidder if the unit prices are significantly out of balance with other bids, indicating a hardship may be imposed on the University. In such instances, the University will negotiate reasonable unit prices prior to award of the Contract.

4.4.5 The University reserves the right to award a contract it deems in its best interest and consider all factors. Maintenance costs, life cycle costs, energy conservation, interchangeability with other facilities, flexibility, uniformity of appearance and similar factors may be considered.

4.4.6 It is the intent of the University to award a contract to the lowest responsible Bidder, all factors considered, provided the Bid has been submitted in accordance with the requirements of the bidding requirements and Contract Documents, is judged to be reasonable, and does not exceed the funds available. However, the University shall not be obligated to award a contract in any event.

4.4.7 The University reserves the right to disqualify bids, before or after opening, upon evidence of collusion, intent to defraud or other illegal practices on the part of the Bidder.

4.5 Execution of Contract

4.5.1 Upon award of a Contract, the successful Bidder shall execute the Agreement within 10 days after it is offered to him, and provide the required performance bond. In the event the Agreement is not prepared, ready for execution, within 10 days after award, the Contractor shall execute the Agreement within 3 days after its preparation.

ARTICLE 5 - DOCUMENTS FOR BIDDING

5.1 Documents for Bidders for a Contract with the University

5.1.1 Prospective bidders for a contract with the University for the Work, or division of the Work, as enumerated under 1.2.1 of these Instructions to Bidders may obtain one complete set of drawings, specifications and other Contract Documents from the Architect/Engineer by making a deposit in the form of a check in favor of the Architect/Engineer in the amount of \$50.00.

5.1.2 Should Bidders wish to obtain additional sets of Contract Documents for their convenience in preparing their Bid, additional sets may be obtained from the Architect/Engineer in the same manner and amount as specified under 5.1.1 above.

5.1.3 The full deposit for the first set of Contract Documents will be refunded to Prime Contract Bidders and Mechanical and Electrical Subcontractors who submit a bona fide bid to the University, upon the return of the complete set of documents in good condition to the Architect/Engineer, within 10 days after bid date. In the event of damaged or missing documents, the cost of replacement will be deducted from the deposit.

5.1.4 The deposit for the second (and additional) sets issued to the Bidders will be returned to the Bidder, upon return of the documents as noted in 5.1.3, in the amount of \$25.00.

5.1.5 Sets requested to be mailed to Bidders will be forwarded C.O.D.

5.1.6 In the event multiple sets are requested and issued to various firms for joint venture bids, the deposit on the second and additional sets will be returned in accordance with 5.1.4 above.

5.1.7 Any sets issued and subsequently returned prior to bid date shall have the deposit returned in the amount noted under 5.1.4 above.

5.2 Documents for Subcontract Bidders, Suppliers, Manufacturers and Quantity Surveyors

5.2.1 One set of drawings, specifications and other Contract Documents may be obtained from the Architect/Engineer for the amount noted in 5.1.1 above.

5.2.2 The deposit for the set will be returned upon return of the documents in good condition within 10 days after bid date in the amount noted under 5.1.4 above. The conditions specified under 5.1.7 apply to documents issued under 5.2.

5.3 Return of Documents

5.3.1 All documents remain the property of the Architect/Engineer and shall be returned to him promptly after bid date, except a Bidder receiving a Contract with the University may retain his set and his full deposit will be returned.

5.4 Complete Sets Used in Preparing Bids

5.4.1 Complete sets of drawings, specifications and other Contract Documents, including those primarily indicating work of other Contracts or trades shall be used in preparing bids. Neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

5.5 Partial Sets

5.5.1 Partial sets, copies of individual drawings and pages of specifications may be purchased from the Architect/Engineer at the cost of \$1.50 per drawing and \$0.15 per page. The cost of these sheets will not be refunded.

5.5.2 Individual sheets or pages issued shall be used at the risk of the bidder or subcontract bidders and shall not relieve the user from examining the complete set of drawings, specifications or other Contract Documents.

5.5.3 Partial sets, as grouped sets, may be obtained from the Architect/Engineer by Bidders for a contract with the University for use as second or additional sets, and by subcontract bidders, for the deposit amount scheduled above. Refunds for these partial sets will be made as scheduled, provided within 10 days after bid date. Any partial sets issued will be used at the Bidder's risk and shall not relieve the Bidder from thoroughly examining the complete set of drawings and specifications and all other Contract Documents.

5.6 Use of Documents for Bidding

5.6.1 The University and Architect/Engineer, in making copies of the drawings, specifications or other Contract Documents available on the above terms, do so only for the purpose of obtaining bids on the Project and do not confer a licence or grant for any other purpose.

ARTICLE 6 - INTERPRETATION OR CORRECTION OF DOCUMENTS

6.1 Notice and Request for Interpretations and Clarifications

6.1.1 Bidders shall promptly notify the Architect/Engineer of any alleged ambiguity, inconsistency or error they may discover upon examination of the Contract Documents, Bidding Requirements, the site or local conditions, and existing conditions.

6.1.2 Bidders requiring clarification or interpretation of the Documents shall make his request to the Architect/Engineer.

6.1.3 All notices of alleged ambiguities, inconsistencies or errors and requests for clarification or interpretation shall be made in writing and forwarded so it is received by the Architect/Engineer at least seven (7) days prior to bid date, unless longer periods are specified elsewhere for certain conditions.

6.2 Response to Notices and Requests

6.2.1 Corrections, interpretations and clarifications involving or providing information which is not already a part of the Bidding Requirements or Contract Documents will be made only by written addenda and supplemental or revised drawings if required.

6.2.2 Corrections, interpretations and clarifications will not be made in any other manner than by addenda and unless they are included in addenda, bidders shall not rely on information provided or received in any other manner. Neither the Architect/Engineer nor the University will be responsible for, nor honor any claims resulting from, or alleged to the result of, misunderstanding by the Bidder (and subsequently the Contractor) of any discussion of the Project conditions prior to receiving bids. Any verbal communications during the bidding period are subject to inclusion in addenda; otherwise, they shall not be binding on the University nor the Architect. Any item not clarified by addenda shall be subject to interpretation by the Architect or University in accordance with the provisions of the General Conditions of the Contract or other Contract Documents.

ARTICLE 7 - ADDENDA

7.1 Issuing Addenda

7.1.1 The Architect/Engineer will issue all required addenda, in writing, which may include supplemental or revised drawings.

7.1.2 Addenda will be mailed or delivered to all prospective bidders, for a contract directly with the University, who have been issued a complete set of documents and are on record at the Architect/Engineer's office as a bidder. Bidders shall furnish the proper address for mailing of addenda.

7.1.3 Addenda will also be issued to the locations noted in the Advertisement for Bids where Contract Documents are on file for examination.

7.1.4 It is the intent that written addenda will not be issued less than 3 days to bid date.

7.2 Incorporating and Acknowledging Addenda

7.2.1 All addenda issued, and the information included therein, shall become part of the Contract Documents and shall be incorporated in all bids submitted.

7.2.2 All bidders, including those submitting subcontract or supply bids, shall be responsible to ascertain the addenda that have been issued prior to bid date, examining all of the addenda and determining the effect of addenda provisions on their bids and their work. Failure of any bidder to receive any such addendum or interpretation shall not relieve him from any obligation to complete the Work in accordance with the Contract Documents if awarded a Contract.

7.2.3 All bidders shall state on the Bid Form the number of addenda received and incorporated in their Bid.

ARTICLE 8 - CONTRACTOR'S BOND

8.1 Bond for Performance and Payment

8.1.1 A bond of faithful performance and completion of the Project and for payment for all just claims in connection with the Project is required. The cost of said bond shall be included in all bids to the University.

8.1.2 The bond shall be in the form of the University's Contractor's Bond, as bound into the Documents or available from the University, and shall meet all requirements specified in the General Conditions of the Contract, paragraph 7.5. The properly executed Contractor's Bond shall be provided to the University at the time of execution of the Agreement with the University, and shall be accompanied by a certified and effectively dated copy of the Power of Attorney for the Attorney-in-Fact.

ARTICLE 9 - QUALIFICATIONS OF BIDDERS (CONTRACTORS)

9.1 Qualifications

9.1.1 The University reserves the right to consider the competency and responsibility of a Bidder in making an award, which may include, but not be limited to: (1) Proof of financial responsibility, (2) quality of similar work, (3) amount of experience with similar projects, (4) facilities, personnel and equipment, (5) reputation for performance, including service after Substantial Completion, (6) capability to complete the work on time, and (7) integrity of the Bidder.

9.1.2 The University reserves the right to make any investigations necessary to satisfy itself that the Bidder is properly qualified to execute the work of the Project under the Contract. The University may make such investigations as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish the University all such information and data for this purpose as the University may request. The University reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the University that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

ARTICLE 10 - OBLIGATIONS OF BIDDER

10.1 Examination of Site and Documents

10.1.1 Each bidder is obligated to thoroughly examine and study all Contract Documents, Bid and Contract Forms and Bidding Requirements, and to visit the site, to fully inform himself as to all conditions, requirements and other factors which will affect his Bid or execution of the work under the Contract Documents. By submitting a Bid, the Bidder represents that he has made such examinations and study, that he understands the requirements of the Contract Documents and Bidding Requirements, that he is familiar with the site, site conditions and local conditions, and that his Bid is made in conformance with all requirements. Refer to Article 17 of the Instructions to Bidders.

10.1.2 In examining the site, the Bidder shall fully inform himself and record his own investigations as to the conditions of the site and surrounding area, locations and accessibility, existing utilities and features, relocations that may be necessary to accomplish the work under the Contract, available facilities and difficulties that may be encountered therewith, other work that may be in progress thereon at the time the bid is submitted and other relevant matters which may affect his Bid or accomplishment of the work under the Contract Documents.

10.1.3 In examining the drawings, specifications and other Contract Documents, the Bidder shall study and examine the entire set of Contract Documents, including those drawings and specifications primarily intended to portray the work which may be under another Contract with the University or for trades not normally in the employ of the Bidder, so as to be totally familiar with the scope of the entire Project and all factors which will affect the Bid or accomplishment of the work under the Contract Documents.

10.1.4 The Bidder is obligated to obtain clarifications and interpretations, as well as to notify the Architect/Engineer of alleged errors, ambiguities or inconsistencies in accordance with Article 6 of the Instructions to Bidders.

10.1.5 No allowance or extras will be granted the Bidder who is awarded a Contract as a result of misunderstanding of the extent or scope of the work as a result of his failure to study all documents and conditions and record his own findings, or for neglecting any specified instructions in the preparation of his Bid.

10.2 Labor

10.2.1 Each Bidder shall investigate and fully inform himself as to the availability, local labor and union conditions and cost of the employment of labor for the project, both skilled and unskilled, and shall consider such matters in the preparation of the Bid.

10.3 Materials, Equipment and Systems

10.3.1 By submitting a Bid, the Bidder represents that his Bid is based on the materials, equipment, systems and other similar items in full compliance with requirements and descriptions in the Contract Documents, without exception.

10.4 Sales Tax

10.4.1 Bidders shall include the cost of the Minnesota Excise and use Tax, as applicable, in their Bids.

ARTICLE 11 - SUBCONTRACTORS

11.1 Acceptance of Subcontractors

11.1.1 Bidders are advised that any person, firm or organization to whom an award of a subcontract is proposed under the Contract must be acceptable to the University and the Architect/Engineer as specified under Article 5 of the General Conditions of the Contract.

ARTICLE 12 - PROPOSED ALTERNATE MATERIALS AND EQUIPMENT

12.1 Intent

12.1.1 The intent of this Article is to encourage and permit competition on qualified products by reputable and qualified contractors, subcontractors, suppliers and manufacturers, whose products, reputations and performance warrant acceptance for the conditions, intent of design and performance considerations required for this Project. For consideration of alternate products, the procedures, time requirements and other provisions of this Article must be complied with.

12.1.2 To avoid hardships resulting from non-acceptance of a proposed product that has been bid, and to provide the equitable condition for all prime contract bidders, subcontract bidders and suppliers by their having the same knowledge of which products, in the opinion of the Architect/Engineer, will be acceptable as meeting the Project requirements, the evaluation period for proposed products shall be prior to the bid date, instead of after receipt of bids.

12.1.3 The word "product" herein means any material, equipment, system, assembly, manufacturer, brand, trade name, element, item or similar description as applicable.

12.1.4 Wherever a product is named on the drawings or in the specifications the phrase "or acceptable equal in the opinion of the Architect/Engineer" shall be implied throughout the specification, whether specifically noted or not.

12.2 Procedure

12.2.1 All requests for consideration of proposed alternate products in lieu of those specified shall be made in writing. Requests shall clearly define and describe the product for which acceptable is requested, and shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of references, model numbers, or other information necessary to completely describe and evaluate the item.

12.2.2 All requests shall be submitted to the Architect/Engineer so as to be received a minimum of 7 days prior to bid date and hour, unless a longer time period is specified for certain products. Requests received after this time will not be reviewed nor evaluated.

12.2.3 Products which the Architect/Engineer deem basically acceptable for bidding purposes will be included in addenda. Information on acceptance will be provided in no other manner.

12.2.4 Acceptance of a product for bidding purposes shall not relieve the Bidder from complying with all requirements of the Contract Documents, including the criteria established in the Contract Documents and these Instructions to Bidders.

12.3 Criteria

12.3.1 Any product or manufacturer used as basis of the specifications shall generally set the basic criteria. It shall be expressly understood that any other product or manufacturer listed in the specification, or any addenda as an acceptable alternate, will be acceptable provided they fully comply with the requirements and match the basic and essential criteria of the product used for base specification, including the level of workmanship quality, as determined by the Architect/Engineer. For final acceptance for use in the work, the Architect/Engineer shall have right to accept or reject proposed deviations. Should a proposed product be unable to meet the necessary requirements, the product shall not be used.

12.3.2 The use of references to standards, manufacturers, brands and similar designations is intended to establish the measure of quality as to minimum standards of design, function, appearance, type, strength, durability, construction, efficiency, sound level, finish, availability, service and similar characteristics, which have been determined as requisite for this Project.

12.3.3 Proposed alternate products shall also: be available in the same range of colors, textures, dimensions, gauges, types, and finishes as the material or article specified; must equal the specified item in strength, durability, efficiency, serviceability, ease and cost of maintenance; must be compatible with the building design and not necessitate design modifications; nor impose additional work or require changes in the work of any other Subcontractor, vendor, or materials supplier, nor result in any additional cost to the University. The supplier or manufacturer providing any acceptable product shall bear the cost of any required modifications to spaces, services, utilities and other features as the result of the use of his products, including but not limited to larger capacity mechanical or electrical service, devices or utilities resulting from acceptance of the product for bidding purposes, as well as to pipes, conduits, ducts, and controls for conveying, distributing, and controlling those services or utilities; as well as insulation, wrappings, coatings, or other integral features of the lines or items conveying those lines.

12.3.4 For any same or like product for this Project, only one brand, manufacturer, source or type shall be used, as approved by Architect/Engineer and the University.

12.4 Use of Products

12.4.1 Where two or more products are shown or specified, the Bidder (and Contractor) has his option of which to use, provided the product proposed will meet all requirements of the specifications and the design criteria. The right is reserved by the Architect/Engineer to accept or reject proposed deviations in design, function, construction or similar differences that will affect design intent or quality.

12.4.2 For products specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturers, trade names or similar reference, the Bidder obligates himself to submit proposals and accept award of a Contract based upon the use of such products as specified or accepted in addenda.

ARTICLE 13 - COMMENCEMENT AND COMPLETION OF THE WORK

13.1 Commencement of Work

13.1.1 By submitting a bid, and execution of the Agreement, the Bidder (and Contractor) agrees to commence work in accordance with the General Conditions of the Contract, or as otherwise specified in Division 1 of the specifications.

13.2 Completion of Work

13.2.1 By submitting a Bid, and execution of the Agreement, the Bidder (and Contractor) agrees to complete the Project within the time specified, including any separate phases, elements or parts of the entire Project which may be specified, and that time for completion is an essential condition of the Contract.

13.2.2 By submitting a Bid, and execution of the Agreement, the Bidder (and Contractor) expressly agrees the time (or times for various phases) for completion is reasonable, considering all factors. The Bidder (and Contractor) further represent he has: analyzed the Project, including the equipment, materials and methods; considered his own capabilities and work load; determined availability of qualified mechanics and unskilled labor; considered the time of year for commencement of work; made a reasonable allowance for weather variations and other potential delays encountered in the construction process; the condition of the site; considered the constraints specified; evaluated the effects of other contractors who may be on the site; and has taken these and other relevant factors bearing on the progress of the work into account.

ARTICLE 14 - LAWS AND REGULATIONS

14.1 Compliance with Laws and Regulations

14.1.1 Applicable laws, rules, regulations and ordinances of the Federal Government, the State of Minnesota and municipalities, or other authorities,

with jurisdiction over the construction of the Project shall be complied with.

ARTICLE 15 - WAGES

15.1 Minimum Wage Rates

15.1.1 The attention of bidders is drawn to the Regent's policy on minimum wages, as specified under Article 16 of the General Conditions of the Contract.

ARTICLE 16 - EQUAL EMPLOYMENT OPPORTUNITY

16.1 University Policy on Equal Employment Opportunities and Affirmative Action

16.1.1 It is the policy of the Regents of the University of Minnesota to promote equal opportunity of employment without discrimination based on race, creed, color, sex, or national origin. Henceforth, the Regents will require that all Contractors with the University, including suppliers supplying goods or services to it, regardless of where located or the form of the contractual or relationship, be equal opportunity employers, whose business is guided by the principle that there shall be no difference in the treatment of persons because of race, creed, color, sex, or national origin. The Regents will also require that the Contractor take affirmative action to ensure implementation of this policy, such action to include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship.

16.1.2 The attention of bidders is drawn to the Equal Employment Opportunity Requirements under Article 15 of the General Conditions of the Contract.

16.1.3 Monthly reports will be required of the Contractor from the start of the Project until completion.

16.2 Affirmative Action Program

16.2.1 The Affirmative Action Plan is required of the successful Contractor only and shall follow the specified requirements and the guidelines required by the University's Affirmative Action Officer, the State of Minnesota's Equal Employment Opportunity Office and interested Federal Agencies. If a bidder has a question or needs assistance they may contact the University's Office Equal Opportunity, Room 419, Morrill Hall, on the Minneapolis Campus 373-7969.

ARTICLE 17 - EXAMINATION OF EXISTING CONDITIONS

17.1 Arrangement for Examination

17.1.1 Bidders may examine exterior areas and public spaces (i.e. corridors and lobbies) in adjacent buildings at their convenience at any time from 8:30 A.M. to 4:30 P.M.

17.1.2 For all other interior areas of adjacent spaces and existing Unit B/C, the Bidder shall make arrangements to examine the areas by appointment.

Arrangements may be made to examine the areas each Monday and Wednesday, starting at 9:00 A.M. Arrangements shall be made with Mr. Paul Maupin, University Health Sciences Planning Office, telephone number: (612) 373-8981.

ARTICLE 18 - SED SET-ASIDE PROGRAM

18.1 Certification

18.1.1 The Proposal Form requires the Bidder to list the names of all SED firms which he proposes to employ and the dollar amount to be sub-contracted or purchased from each. Proposal will be subject to rejection by the University unless the following criteria are met:

- A. The proposed SED firms and the dollar amount to be procured from each must be listed.
- B. The dollar amounts listed for SED procurement must total at least 3% of the Base Bid.
- C. The proposed SED firms listed must appear on the list of self-certified SED contractors and suppliers bound in the specification or have been otherwise validated as described in Article 17, General Conditions of the Contract.

- - -

BID FORM

Bid Date

REGENTS OF THE UNIVERSITY OF MINNESOTA
Attention: Mr. Robert D. James
Director of Purchasing and Stores
Room 420, Administrative Services Center
1919 University Avenue
Saint Paul, Minnesota 55104

Project No. 144-81-0397

Gentlemen:

I (We) hereby propose to furnish all material, labor, equipment, insurance, taxes, transportation and means necessary and incidental to complete all Work for construction of Unit B/C Phase X, Phillips-Wangensteen Building, Rural Physician Associate Program/Seminar Space, Shell Space Completion, Minneapolis Campus, University of Minnesota in accordance with the Contract Documents issued to Bidders, and below listed Addenda, all as prepared by the Architects Collaborative, Inc. and Health Sciences Architects and Engineers, Inc., for consideration of the following amount:

BASE BID

_____ Dollars (\$ _____)

ADDENDA

I (We) acknowledge receipt of Addenda Numbers _____ and include in this Proposal the modifications described therein.

START AND COMPLETION

I (We) agree to actively commence work at the site within twenty-one (21) days after the date of the written Notice to Proceed, and to pursue the work continuously without interruption to substantially complete the Project ready for occupancy within the time limits established in the General Requirements.

BID GUARANTEE

I (We) agree that this Proposal is guaranteed and may not be withdrawn for a period of 30 calendar days after the date of bid opening.

BID SECURITY

Attached herewith is my (Our) Bid Bond, Certified or Cashier's Check in the amount of five percent (5%) of the Base Bid, which is to be forfeited to the University as liquidated damages in the event I (We) fail to enter into a Contract or to furnish the required Performance and Payment Bond within 30 days of acceptance of this Proposal by the University.

CERTIFICATION FOR SED SET-ASIDE PROGRAM

By submitting this proposal, I (We) agree to sub-contract or purchase no less than three per cent (3%) of the Base Bid amount from SED small business firms as specified in Article 17, General Conditions. The firm(s) I (We) agree to employ and the amount(s) to be sub-contracted or purchased from each, is (are) as follows:

<u>SED FIRM NAMES(S)</u>	<u>Amount(s) in Dollars</u>
_____	_____
_____	_____
_____	_____

I (We) understand that failure to list eligible firms and the proper dollar amounts above will constitute cause for rejection of this bid by the University.

CERTIFICATION FOR EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION

By submitting this proposal, I (We) certify that I (We) will fully comply with all requirements for Equal Employment Opportunity and Affirmative Action as specified in Article 15, General Conditions.

ACCEPTANCE

The University reserves the right to reject any and all bids, accept any bid it deems to be in its best interest, waive any informalities in bids submitted and waive minor discrepancies in bidding procedures.

By _____ Title _____ Date _____
(Signature of Bidder)

Firm Name _____ Telephone _____

Address _____
(Street) (City) (State) (Zip Code)

Bidder is: A corporation _____ a partnership _____ a sole proprietor _____

If a partnership, list name and address of all partners _____

If a corporation, affix corporate seal and list State of Incorporation _____

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and

(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of
as Surety, hereinafter called the Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of

Dollars (\$ _____),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

(Here insert full name, address and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____

day of _____

19 _____

_____	}	_____ (Principal) _____ (Seal)
(Witness)		_____ (Title)
_____	}	_____ (Surety) _____ (Seal)
(Witness)		_____ (Title)



UNIVERSITY OF MINNESOTA
CONTRACTOR'S AGREEMENT

This Agreement, made this _____ day of _____, 19____,

by and between

(hereinafter designated the Contractor), and the Regents of the University of Minnesota (hereinafter designated the Owner),

Witnesseth, that the Contractor in consideration of the agreements herein made by the Owner, agrees with the said Owner as follows:

ARTICLE I. The Contractor shall and will provide all the materials and perform all the work for the

as shown on the drawings and described in the specifications prepared by the Owner's authorized representatives which drawings and specifications are a part of this contract.

ARTICLE II. It is understood and agreed by and between the parties hereto that the work included in this contract is to be done under the direction of the Owner's authorized representatives.

It is further understood and agreed by the parties hereto that any and all drawings and specifications prepared for the purposes of this contract are and remain the property of the Owner, and that all charges for the same and for all services in connection therewith are to be paid by said Owner.

ARTICLE III. No changes shall be made in the work except upon written order of the Owner through its authorized representatives; the amount to be paid by the Owner or allowed by the Contractor by virtue of such changes to be stated in said order.

ARTICLE IV. The Contractor shall provide sufficient, safe and proper facilities at all times for the inspection of the work by the authorized representatives of the Owner and shall, after receiving written notice to that effect, proceed to remove from the grounds or buildings all materials condemned by them, whether worked or unworked, and to take down all portions of the work which, by like written notice, condemn as unsound or improper, or as in any way failing to conform to the drawings and specifications, and shall make good all work damaged or destroyed thereby.

~~ARTICLE V. Should the Contractor at any time refuse or neglect to supply a sufficient number of skilled workmen, or sufficient material of proper quality, or fail in any respect to prosecute the work with promptness and diligence, or fail in the performance of any of the agreements herein contained, such refusal, neglect or failure being certified by the authorized representatives of the Owner, they shall be at liberty, after written notice to the Contractor, to provide any such labor or material, and to deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this contract; and if the authorized representatives of the Owner shall certify that such refusal, neglect or failure is sufficient ground for such action, they shall also be at liberty to terminate the employment of the Contractor for the said work and to enter upon the premises and take possession for the purpose of completing the work included under this contract, of all material, tools, and appliances thereon, and to employ any other person or persons to finish the work, and to provide the material therefore; and in case of such discontinuance of the employment of the Contractor, he shall not be entitled to receive any further payment under this contract until the said work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under this contract shall exceed the expense incurred by the Owner in finishing the work, such excess shall be paid by the Owner to the Contractor; but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided, either for furnishing material or for finishing the work, and any damage incurred through such default, shall be audited and certified by the authorized representatives of the Owner, whose certificate thereof shall be conclusive upon the parties. Refer to General Conditions of Contract paragraph 3.5 and 14.2.~~

ARTICLE VI. The Contractor shall complete the several portions, and the whole of the work comprehended in this agreement by and at the time or times hereinafter stated, to-wit:

time being of the essence of this contract.

ARTICLE VII. Should the Contractor be delayed in the prosecution or completion of the work by the act, neglect or default of the Owner, or of any other Contractor employed by the Owner upon the work, or by any damage caused by fire or other casualty for which the Contractor is not responsible, or by combined action of workmen in no wise caused by or resulting from default or collusion on the part of the Contractor, then the time herein fixed for the completion of the work shall be extended for a period equivalent to the time lost by reason of any or all the causes aforesaid, which extended period shall be determined and fixed by the authorized representatives of the Owner, but no such allowance shall be made unless a claim therefore is presented in writing to the authorized representatives of the Owner within the time specified of the occurrence of such delay. Subject to conditions of Article VIII of General Conditions.

ARTICLE VIII. It is hereby mutually agreed between the parties hereto that the sum to be paid by the Owner to the Contractor for said work and material shall be

subject to additions and deductions as herein provided, and that such sum shall be paid by the Owner to the Contractor in current funds and only upon certificates of the authorized representatives of the Owner as follows:

Ninety (90) percent of the actual cash value of all labor performed and material furnished in place each calendar month shall be paid on proper vouchers during the next succeeding calendar month, and the balance upon the full completion of the job. Except as otherwise specified in the contract documents.

If, at any time, there shall be evidence of any claim for which, if established, the Owner of the said premises might become liable, and which is an obligation chargeable to the Contractor, the Owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify it against such claim. Should there prove to be any such claim after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging any claim in consequence of the Contractor's default.

It is further stipulated and agreed that out of any retained amounts, the Owner may at his option pay, in whole or in part, any just claim against the Contractor for labor or material furnished him by persons not parties hereto, where such labor or material has been expended in the carrying out of work covered by this agreement.

ARTICLE IX. It is further mutually agreed between the parties hereto that no certificate given or payment made under this contract, shall be conclusive evidence of the performance of this contract, either wholly or in part, and that no payment shall be construed to be an acceptance of defective work or improper materials.

ARTICLE X. The Owner, through its authorized representatives, has the power and duty to decide all questions as to the due performance of this contract.

The said parties, for themselves, their heirs, successors, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

In Witness Whereof, the parties have hereunto set their hands and seals the day and year first above written, and caused these presents to be executed in their behalf by the Vice President for Finance and Development of the University of Minnesota and the Contractor by its

In the presence of:

..... Witness Contractor
Title

..... Witness Contractor
Title

REGENTS OF THE UNIVERSITY OF MINNESOTA

By
Vice President for Finance and Development

Recommended by:

..... Date
Assistant Vice President, Physical Planning

..... Date
Director of Purchasing and Stores

..... Date
University Attorney

CONTRACTOR'S BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned _____

_____ of _____
(Corporate or firm name of contractor) (Address of contractor)

a corporation,* organized and existing under the laws of the State of _____, partnership,* individual,* duly authorized by law to do business as a construction contractor in the State of Minnesota, hereinafter called the "Principal," and _____

_____ of _____
(Corporate name of surety) (Address of surety)

a corporation organized and existing under the laws of the State of _____, and duly authorized to do a surety business under the laws of the State of Minnesota, hereinafter called the "Surety," are held and firmly bound unto *Regents of the University of Minnesota*, hereinafter called the "Obligee," in the penal sum of _____

_____ Dollars (\$ _____),
(Amount of contract price)

lawful money of the United States, for the payment of which well and truly to be made unto said Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, as follows:

The conditions of this obligation are such that, whereas on the _____ day of _____, 19____, the said Principal entered into a written Contract with said Obligee for the construction of _____
(Brief description of work to be done)

located at _____ as set forth in detail in the advertisement for bids, general conditions, information for bidders, proposal, plans and specifications, and other related contract documents referred to in said Contract, all of which are hereby made a part hereof, and by reference incorporated herein.

NOW, THEREFORE, If the said Principal shall well and truly perform and complete said project in strict accordance with said Contract, advertisement for bids, general conditions, information for bidders, proposal, plans, specifications and related documents; shall comply with all the requirements of the Laws of the State of Minnesota; shall pay as they become due all just claims for work, tools, machinery, skill materials, insurance premiums, equipment and supplies, for the completion of the Contract in accordance with its terms; and shall defend, indemnify and save harmless said Obligee against any and all liens, encumbrances, damages, claims, demands, expenses, costs and charges of every kind, including patent infringement claims, except as otherwise provided in said specifications and other contract documents, arising out of or in relation to the performance of said work and the provisions of said Contract, then this Bond shall be void, otherwise it shall remain in full force and effect.

This obligation is made for the use of the Obligee and of all persons doing work or furnishing skill, tools, machinery or materials, or insurance premiums, or equipment, or supplies for any camp maintained for the feeding or keeping of men or animals, or any combination thereof, engaged under or for the purpose of the execution of said Contract and may be sued on thereby.

The said Surety, for value received, hereby stipulates and agrees that no assignment, modification or change, extension of time for completion, alteration or addition to the terms of said Contract or to the work to be performed thereunder or the specifications accompanying the same, shall in any wise affect its obligations on this Bond or release the Surety, and it does hereby waive notice of any such change, extension of time for completion, alteration or addition to the terms of the Contract as to the work or to the specifications.

IN TESTIMONY WHEREOF, the parties hereunto have caused the execution hereof in _____ original counterparts as of the _____ day of _____, 19____.

(Seal, if any)

Attest (or countersigned):

_____, Principal
(Name of contractor)

By _____

(Title)

(Title)

(Seal)

Attest (or countersigned):

_____, Surety
(Name of surety)

By _____

(Title)

(Title)

UM HEALTH SCIENCES
UNIT B/C X

*Omit inapplicable terms.

(Acknowledgment by Natural Person)

STATE OF MINNESOTA, }
County of _____ } ss.

On this _____ day of _____, 19____, before me personally appeared _____ to me known to be the person—described in and who executed the foregoing instrument, and acknowledged that _____ executed the same as _____ free act and deed.

Signed: _____

My Commission expires _____

(Acknowledgment by Corporation)

STATE OF MINNESOTA, }
County of _____ } ss.

On this _____ day of _____, 19____, before me appeared _____ to me personally known, who, being by me duly sworn, did say that he is the _____ of _____, corporation, and that the seal affixed to the foregoing bond is the corporate seal of said corporation, and that said bond was executed in behalf of said corporation by authority of its Board of Directors, and said _____ acknowledged said instrument to be the free act and deed of said corporation.

Signed: _____

My Commission expires _____

(Justification by Sureties)

STATE OF MINNESOTA, }
County of _____ } ss.

being each duly sworn, did each for himself depose and say that he is a resident and freeholder of the State of Minnesota and one of the sureties on the foregoing bond, and that he is worth the sum hereinafter set opposite his name over and above his debts and liabilities, and property exempt from execution.

Sworn to and subscribed before me }
this _____ day of _____ }
_____, 19____ }
_____ \$ _____
_____ \$ _____
_____ \$ _____
_____ \$ _____

DIVISION C - GENERAL CONDITIONS OF THE CONTRACT

Where any Article, Paragraph, Subparagraph or Clause of the General Conditions is modified, supplemented or deleted by other provisions of the Contract Documents, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect. Where provisions of the General Conditions are modified elsewhere in the Contract Documents, any references to those General Conditions provisions shall be read as referring also to the same subject matter contained elsewhere in the Contract Documents.

ARTICLE I - THE CONTRACT DOCUMENTS

1.1 Definitions

1.1.1 The Contract Documents

The Contract Documents consist of the University-Contractor Agreement, the Performance Bond, the Instructions to Bidders, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, all Addenda issued prior to execution of the Contract, and all Modifications thereto. A Modification is (1) a written order or amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the University or Architect pursuant to Subparagraph 1.2.5, or (4) a written order for a minor change in the Work issued by the University or Architect pursuant to Paragraph 12.4.

1.1.2 The Contract

The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1, except that changes to the Contract involving the Contract Sum or Contract Time, may be made only by Change Order.

1.1.3 The Work

The term Work includes all labor and services necessary to produce and fully complete the construction required by the Contract Documents, and all materials and equipment incorporated in such construction.

1.1.4 The Project

The Project is the total construction designed by the Architect, or designed by others in consultation or collaboration with the Architect and included in the Contract Documents, of which the Work performed under the Contract Documents may be the whole or a part.

1.1.5 The Specifications

The Specifications include all Sections of Division I, General Requirements, and all Sections of the Technical Divisions for the Project.

1.2 Execution, Correlation, Intent and Interpretations

1.2.1 The Agreement shall be signed in not less than triplicate by the University and Contractor. To the extent necessary, the Architect shall identify the Drawings and Specifications of the Contract Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents and Bidding Requirements. However, he does not represent having examined conditions that are not exposed without demolition unless the necessary demolition is specified or authorized by the University. The Contractor also represents he has examined all Contract Documents for the Project, including those intended for work or trades not normally performed by the Contractor's own forces, and has become thoroughly familiar with all conditions which may pertain to or affect the Work, and its costs, under this Contract.

1.2.3 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. The intention of the Documents is to include all labor, materials, equipment and other items as provided in Subparagraph 4.4.1 necessary for the proper execution and satisfactory completion of the Work, including proper operating condition. For any of the Work that is shown, indicated, noted or referred to in any of the Contract Documents, or is reasonably inferable therefrom as being necessary to produce the intended results, and which is not covered under any heading, section, branch, class or trade of the specifications, shall be provided in accordance with the Architect's instructions without additional cost to the University or Architect. Should there be an inconsistency in the quality or quantity of Work required under the Contract Documents, it shall be interpreted that the greater quality or quantity of Work is required under the Contract, without increase in the Contract Sum. Words which have well-known technical or trade meanings are used herein in accordance with such recognized meanings. The Contract Documents generally do not set forth the basis and analysis of design and the Contractor shall obtain such information as may be necessary to satisfactorily perform and complete the Work.

1.2.4 The organization of the Specifications into Divisions, Sections and Articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade, unless it is specified that a subcontract include specific phases or elements to complete a certain part of the Work for reasons of coordination or responsibility. Where the Specification has been divided into Sections, it is for convenience in use. The Architect and the University assume no responsibility for the placement of materials, equipment or other phases of the Work into the proper Division or Section of the Specifications, nor for the arrangement of Work shown on the Drawings. Neither the Architect nor the University shall be obligated to enter into any jurisdictional or other dispute as a result of the organization, arrangement or location of parts of the Work in the Specifications or Drawings, nor serve as an arbitrator to establish subcontract limits between the Contractor and any Subcontractor.

1.2.5 Written interpretations necessary for the proper execution of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Architect or the University and in accordance with any schedule agreed upon. In general, requests for interpretation of design intent shall be directed to the Architect. Either party to the Contract may make written requests to the Architect for such interpretations. Other requests for interpretation shall be directed to the University, who may consult with the Architect at its discretion. Interpretations shall be consistent with and reasonably inferable from the Contract Documents. The Contractor is responsible to request interpretations and clarifications for those matters which appear to be inconsistencies, ambiguities or omissions in the Contract Documents. The Contractor shall execute the Work in accordance with the decision, clarification or interpretation provided to him.

1.2.6 Where a reference in the Contract Documents to an American Society for Testing and Materials standard, American National Standards Institute standard, Federal Specification or other recognized standard does not include the date of the standard, the edition current as of the date of the Contract Documents shall apply.

1.2.7 The general character and scope of the Work is called for by the Contract Documents. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all same parts of the Work. Drawings intended primarily as information for one trade may not necessarily show the work of other trades, but this shall not be construed as indicating there are no other related materials or adjacent work.

1.2.8 Figured dimensions shall be followed in preference to measurement by scale. In the event of discrepancies between dimensions, or between drawings, the intent shall be interpreted by the Architect, which shall be binding on the Contractor. Where a dimension may be missing, the Work shall be accomplished in accordance with the directions and dimensions provided by the University or the Architect. Dimensions on drawings, as well as detail drawings themselves are subject in every case to measurements of existing, adjacent, incorporated and completed work which shall be taken by the Contractor before undertaking any work depending upon such data. Dimensions pertaining to the Work or its installation shall be verified at site by the Contractor.

1.2.9 Where the Specifications are of the abbreviated or "streamlined" type, they shall be construed as complete sentences, as shall notes on the drawings. Omissions of words such as "the", "the Contractor shall", and "as shown on the drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference. Imperative or directive instructions, directions or the Specifications apply to and refer to the Contractor. The words "symmetrical" and "similar" are used in the general sense and need not mean "identical." Where a number is specified (as for gauges, weights, temperatures, an amount of time, and similar references), and the specified number cannot be obtained, the number shall be interpreted as the next better, as available.

1.2.10 The Contractor shall examine all Contract Documents and use all specifications and drawings for the Project, including those that may

primarily pertain to other work the Contractor normally does not perform with his own forces. The Contractor shall use all of the Project drawings and specifications: for a complete understanding of the Project and his Work; to determine the type of construction and systems; for coordination; to determine what other work may be involved throughout; to anticipate and notify others when their coordinated efforts will be required; and all other relevant matters related to the Project and the Contractor's Work. The Contractor shall also be bound by all the requirements to complete his Work, that are applicable to, pertain to, or affect his Work, as may be shown or reasonably inferable from the entire set of drawings and specifications.

1.3 Copies Furnished and Ownership

1.3.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, a reasonable number of copies of Drawings and Specifications, as necessary for the execution of the Work.

1.3.2 The copies of all Drawings and Specifications furnished to the Contractor are and shall remain the property of the University. They are not to be used on any other project, and, with the exception of two contract sets, are to be returned to the University on request at the completion of the Work.

ARTICLE 2 - THE ARCHITECT/ENGINEER

2.1 Definition

2.1.1 The Architect or Engineer is the design professional or organization whose name appears on the Contract Documents and identified as such in the Agreement, referred to throughout the Contract Documents as singular in number and masculine in gender. The term Architect, or Engineer, means the Architect, or Engineer, and his authorized representatives.

2.1.2 For reference ease, the term Architect is used in the General Conditions. For Contract Documents developed by the engineering disciplines, the term Engineer shall be substituted for Architect.

2.1.3 A Consultant is any person or firm who has provided specialized design services for the Project, in consultation or collaboration with the Architect or the University and whose design services are represented in the Contract Documents. The Consultant, or his representative, shall have the authority to make decisions on his design to the extent authorized by the Architect or the University.

2.1.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Architect and the Contractor.

2.2 Administration of the Contract

2.2.1 During construction the Architect will advise, and consult with, the University in the general administration of the Contract, to the extent required by the University, acting on behalf of the University to the extent provided by the Contract Documents or otherwise authorized by the University.

2.2.2 The Architect, and the University, shall at all times have access

to the Work wherever it is in preparation and progress. The Contractor shall provide safe and convenient facilities for such access.

2.2.3 Periodically the Architect will visit the site to assist the University in the administration of the Construction Contract, to generally familiarize himself with the progress and quality of Work and to consult and advise the University on questionable matters in need of interpretation or modification. The Architect will not be required to make continuous, detailed or exhaustive on-site observations to check the quality or quantity of the Work.

2.2.4 The Architect and the University will not be responsible for construction means, methods, techniques, progress, sequences or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

2.2.5 The Architect does not approve the Contractor's Request for Payment, but upon request may advise the University regarding the sums requested.

2.2.6 The Architect will, in the first instance, interpret the requirements of the Contract Documents and judge the Contractor's performance thereunder, when required by the University or the Contractor. The Architect will, within a reasonable time, render such interpretations as he may deem necessary for the proper execution or progress of the Work.

2.2.7 Claims, disputes and other matters in question between the Contractor and the University relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred to the Architect in writing for decision, which he will render within a reasonable time.

2.2.8 All interpretations and decision of the Architect shall be consistent with the intent of the Contract Documents. In his capacity as interpreter and judge, he will exercise his best efforts to insure faithful performance by both the University and the Contractor as required by the Contract Documents.

2.2.9 The Architect's decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.10 Any written decision by the Architect on a claim, dispute or other matter covered by such decision shall become final and binding on the Contractor and the University, without further appeal or recourse, thirty days after the decision is received by the parties unless written notice is served within the thirty days to the Architect and other party of the intent of further appeal or action.

2.2.11 The Architect, as well as the University, will have authority to reject Work which does not conform to the Contract Documents. Rejected Work shall be immediately removed from production or the site. Whenever, in the reasonable opinion of the Architect or the University it is considered necessary or advisable to insure the proper implementation of the intent of the Contract Documents, they shall have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.8.2 whether or not such Work be then fabricated, installed or completed.

However, neither the Architect's or University's authority to act under this Subparagraph 2.2.11, nor any decision made by them in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect or the University to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.2.12 The Architect will review Shop Drawings and Samples as required in Subparagraph 4.13.1. Additionally, certain shop drawings and samples, as determined by the University, are also reviewed by the University.

2.2.13 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.

2.2.14 The duties and limitations of authority of the Architect during construction as set forth in these General Conditions will not be modified or extended without written consent of the University and the Architect.

2.2.15 The Architect will not be responsible for the acts, procedures, programs, or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

2.2.16 In case of the termination of the employment of the Architect, the University shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

ARTICLE 3 - THE OWNER

3.1 Definition

3.1.1 The Owner is the Regents of the University of Minnesota, a State of Minnesota Constitutional and Educational Corporation, herein referred to as the University.

3.1.2 The University acts through Clinton Hewitt, Assistant Vice President for Physical Planning, or his authorized representatives, except for certain functions which are the responsibility of the University's Purchasing Agent. Unless otherwise indicated, all papers and formal written notice required to be delivered to the University shall be delivered to Clinton Hewitt, Assistant Vice President, Room 340, Morrill Hall, University of Minnesota, Minneapolis, Minnesota 55455.

3.1.3 The University Purchasing Agent functions to receive bids for construction contracts and issues the Notice to Proceed to the successful Contractor.

3.1.4 The administration of the construction contract is performed by the Director of the Engineering and Construction Division of the University of Minnesota, or his authorized representatives.

3.1.5 At the commencement of the Work, the representatives of the University will be identified to the Contractor by name, function and authority.

3.2 Information and Services Provided by the University

3.2.1 Except as may otherwise be required by the Contract Documents, the University shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the Project.

3.2.2 The University shall secure and pay for easements for permanent structures or permanent changes in existing facilities.

3.2.3 For building projects, the University will establish a point locating one corner of the building on the site and furnish the location and elevation of a bench mark, all of which shall be verified by the Contractor.

3.2.4 The University shall select the appropriate testing agencies for the required tests, unless otherwise specified.

3.2.5 Information or services under the University's control shall be furnished by the University with reasonable promptness to minimize delay in the orderly progress of the Work.

3.2.6 During progress of the Work, the University will generally issue instructions to the Contractor, except for those instructions the University delegates to the Architect.

3.2.7 The foregoing are in addition to other duties and responsibilities of the University enumerated in the Contract Documents and especially those in respect to Payment and Insurance in Articles 9 and 11 respectively.

3.3 Administration of the Construction Contract

3.3.1 The University through its authorized representative will provide the general administration of the Construction Contract, functioning through a general, routine review and examination of the work to (1) judge the Contractor's performance of the Work under the Contract; (2) assist in avoiding defects, deficiencies and omission in the Work; (3) assist the Contractor in interpreting the Contract Documents, when necessary; (4) make determinations on questionable or ambiguous matters relating to the Work; (5) determine amounts due the Contractor for periodic payments; (6) make other judgments and determinations as may be necessary for the satisfactory completion of the Work to fulfill the intent of the Contract Documents.

3.3.2 The University will consult with the Architect at its discretion for interpretations, decisions on the quality of materials and workmanship, intent of the Contract Documents, progress of the Work and similar Contract matters, when necessary.

3.3.3 The University will receive and review the Contractor's submittals of the Performance Bond and insurance evidence.

3.3.4 The University will review the Contractor's progress schedule and reserves the right to question the schedule, comment on the schedule and require changes in the schedule to help assure proper scheduling to complete

the Work on time or benefit the overall progress of the Project. The University will provide the general coordination of schedules of separate contractors to assist in resolving possible conflicts of activities or priorities, but will assume no responsibility for the progress and completion of the Work by the Contractor.

3.3.5 The University will review certain shop drawings submitted to the Architect by the Contractor, prior to their being returned to the Contractor and the Contractor's timing of shop drawing submissions shall allow for the University review.

3.3.6 The University shall at all times have access to the Work, as provided in Subparagraph 2.2.2.

3.3.7 The University will be continuously represented at the site or, at its option, will visit the site and review the Work at such times and frequency it deems necessary to be familiar with the general progress and to generally determine if the Work is in accordance with the Contract Documents. The University will not be responsible to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work, which shall be the Contractor's responsibility.

3.3.8 The University, in consultation with the Architect when appropriate, will decide on proposed Changes in the Work.

3.3.9 The University will review the Contractor's Request for Payment and determine the amounts due the Contractor, based on the Contract requirements and the University's evaluation of the progress of the Work.

3.3.10 Requests for required interpretations, clarifications and similar matters arising out of the Contract Documents, or the construction, shall first be made to the University, who will consult with the Architect when necessary or advisable. The University's interpretation and decisions shall be consistent with the intent of the Contract Documents.

3.3.11 The University shall have the right and authority to reject any of the Work and to order special inspections or testing, in accordance with Subparagraph 2.2.11.

3.3.12 The University will conduct inspections to determine compliance with the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by the Contractor.

3.3.13 The University shall not be responsible for the Contractor's activities as specified under Subparagraph 2.2.4. Neither the titles nor functions of the University, or the Architect, and their representatives shall be construed as (1) assuming or imposing any of the Contractor's responsibilities on the University or Architect; (2) supervising the Work under the Contract Documents; (3) being responsible in any way for the performance, acts, omissions or inaction of the Contractor, his Subcontractors, anyone employed directly or indirectly by any of them or any one for whose acts they may be liable.

3.4 University's Right to Stop the Work

3.4.1 If the Contractor fails to correct defective Work or persistently fails to supply materials or equipment in accordance with the Contract Documents, does not allow others sufficient time to perform their work or otherwise is in substantial violation of the Contract, the University may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

3.5 University's Right to Carry Out the Work

3.5.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the University may, after seven days' written notice to the Contractor and his Surety, require the Surety to assume the obligations of the Contractor to complete the Work under the terms of the Contract. Should the Surety fail to assume the obligations within ten days after receipt of the written notice, the University, without prejudice to any other remedy it may have, may make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor, or the Surety, the cost of correcting such deficiencies, including the cost of the Architect's additional services made necessary by such default, neglect or failure. The Architect shall approve both such action and the amount charged to the Contractor. If the payments then or thereafter due the Contractor, or the Surety, are not sufficient to cover such amount, the Contractor or his Surety shall pay the difference to the University.

ARTICLE 4 - THE CONTRACTOR

4.1 Definition

4.1.1 The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the University any error or alleged error, inconsistency or omission he may discover. The Contractor shall obtain necessary drawings, specifications or instructions when required to satisfactorily complete any of the Work which is questionable.

4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences, programs, safety and procedures and for coordinating all portions of the Work under the Contract.

4.4 Labor and Materials

4.4.1 Unless otherwise specifically noted, the Contractor shall provide all labor, material, equipment, facilities, systems, tools, temporary

facilities, services and related items to properly execute and satisfactorily complete the Work.

4.4.2 The Contractor shall employ and assign labor that is skilled and competent in the assigned tasks and shall maintain order and discipline among his employees.

4.4.3 The Contractor shall provide and perform all Work to comply with the requirements of the Contract Documents.

4.5 Warranty

4.5.1 The Contractor warrants to the University and the Architect that all materials and equipment furnished under the Contract, as a permanent part of the Project, will be new unless otherwise specified, and that all Work will be of first quality as acceptable to the University and Architect, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective. If required by the University or the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

4.6 Taxes

4.6.1 The Contractor shall pay all sales, excise, consumer, use and other similar taxes required by law.

4.7 Permits, Fees and Notices

4.7.1 The Contractor shall obtain and pay for all permits, fees, licenses or other charges required or bearing on the conduct of the Work, where property other than University property is involved (i.e. municipalities, other governmental unit, utilities) including connections to water, sewer or other utilities, or where sidewalks, streets and alleys not on University property must be disturbed or used. Other required permits and licenses applicable to University property will be obtained or provided by the University without cost to the Contractor.

4.7.2 The Contractor shall give all notices and comply with all codes, laws, ordinances, rules and regulations of any public authority having jurisdiction which bears on the performance of the Work.

4.8 Cash Allowances

4.8.1 By executing the Agreement, the Contractor represents the Contract Sum includes all cash allowances stated in the Contract Documents.

4.9 Superintendent

4.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The Superintendent shall be satisfactory to the University and Architect, and shall not be changed except with the consent of the University, unless the Superintendent proves to be unsatisfactory

to the Contractor and ceases to be in his employ. The Superintendent shall be the executive representative of the Contractor and all communications given to the Superintendent shall be as binding as if given to the Contractor. When requested by the Contractor, important communications will be confirmed in writing.

4.9.2 Unless specifically approved by the University, the Contractor's Superintendent shall be constantly present during all working hours from start to completion of the Work, including those times when only Subcontractors are performing work at the site or minor activity is in progress. During the final stages of completion of the Work, the Superintendent shall continue to be constantly present at the site during all working hours to expedite, coordinate and direct the Work to final completion.

4.10 Responsibility for Those Performing the Work

4.10.1 The Contractor shall be responsible to the University for the acts and omissions of all his employees and all Subcontractors, their agents and employees, and all other persons performing any of the Work under a contract with the Contractor.

4.11 Construction Schedule

4.11.1 The Contractor shall prepare and submit for University approval, the Construction Schedule required by the Contract Documents.

4.12 Drawings and Specifications at The Site

4.12.1 The Contractor shall maintain at the site for his use and that of the University one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other Modifications, in good order and marked to record all changes made during construction. These shall be available to the University and the Architect.

4.13 Shop Drawings and Samples

4.13.1 The Contractor shall provide and submit all shop drawings and samples required by the Contract Documents.

4.14 Use of Site

4.14.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents or the University's directions and shall not unreasonably encumber the site with any materials, equipment or debris.

4.15 Cutting and Patching of Work

4.15.1 The Contractor shall do all cutting, fitting or patching of his Work that may be required to make its several parts fit together properly, and shall not endanger any work by cutting, excavating or otherwise altering the Work or any part of it.

4.16 Cleaning Up

4.16.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.16.2 At the completion of the Project, the Contractor shall perform all cleaning to leave the Work "thoroughly clean" as required by the Contract Documents, unless otherwise specified.

4.16.3 If the Contractor fails to maintain the premises or clean up as specified, the University may do so after two days notice, with the cost paid for by the Contractor.

4.17 Communications

4.17.1 The Contractor shall provide to the Architect a copy of all communications to the University.

4.18 Indemnification

4.18.1 The Contractor shall indemnify and hold harmless the University and the Architect and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

4.18.2 In any and all claims against the University or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Architect, his agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the University or the Architect, their agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 5 - SUBCONTRACTORS

5.1 Definition

5.1.1 A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the Work at the site, or to furnish materials, equipment or systems specifically fabricated for the Work. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

5.1.2 A Sub-subcontractor is a person or organization who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site or to furnish materials, equipment or systems specifically fabricated for the Work. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the University or the Architect and any Subcontractor or Sub-subcontractor.

5.2 Award of Subcontracts and Other Contracts for Portions of the Work

5.2.1 Unless another time is specified in the Contract Documents, within 14 days after notice of award of the Contract, letter of intent to award, Notice to Proceed, or execution of the Contract, whichever occurs first, the Contractor shall furnish to the Architect in writing, for acceptance by the University and the Architect, a list of the names of all Subcontractors, and their Sub-subcontractors where appropriate, he proposes to use for the Work. No subcontracts shall be finally executed until the list has been reviewed by the University and Architect and the Contractor notified of the acceptance or non-acceptance of those listed. The Architect shall, with reasonable promptness, notify the Contractor if either the University or the Architect does not accept any Subcontractor or Sub-subcontractor on the list. At the request of the University or the Architect, the Contractor shall submit the names of proposed Subcontractors or Sub-subcontractors for portions of the Work not on the list. The listed Subcontractors or Sub-subcontractors will be deemed acceptable unless the Contractor is notified of the University's or Architect's objection or non-acceptance within a reasonable time established by the Contractor and the Architect.

5.2.2 The proposed Subcontractors or Sub-subcontractors shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with the type work and/or items proposed to be provided or furnished by them. Where specifically named Subcontractors may be specified for certain portions of the Work, only the specified Subcontractors will be acceptable for those parts of the Work.

5.2.3 The right to reject any Subcontractor or Sub-subcontractor will be exercised by the University or the Architect when, in their opinion, it is believed the proposed Subcontractor or Sub-subcontractor: (1) cannot provide, or proposes deviations in, materials, equipment, systems, methods,

facilities or other Work as required by the Contract Documents; (2) cannot provide labor and skill necessary to accomplish the part of the work for which he is proposed, including but not limited to quality of workmanship; (3) lacks experience appropriate to the proper execution and completion for that part of the Work for which he is proposed; (4) has previously failed to perform satisfactorily, including cooperation and necessary services after project completion; (5) cannot satisfactorily perform the part of the Work for which he is proposed within the time schedule, due to financial status, size of organization, existing work load, or other considerations; (6) cannot demonstrate his ability, through examples of representative work, to perform the part of the Work for which he is being considered; (7) is of questionable integrity; or (8) there are other considerations bearing on the probability of unsatisfactory performance.

5.2.4 The Contractor shall not contract with any Subcontractor, nor use any Sub-subcontractor or any person or any organization (including those who are to furnish materials, equipment, systems or other items fabricated specially for the Work) who has been rejected by the University or the Architect. Except whereby the submission of the bid by the Contractor under the conditions of the Contract Documents indicates or implies he has accepted the use of a particular specified Subcontractor, the Contractor will not be required to contract with any Subcontractor or person or organization against whom he has a reasonable objection.

5.2.5 If the University or Architect refuses to accept any Subcontractor or person or organization on a list submitted by the Contractor in response to the requirements of the Contract Documents or the Instructions to Bidders, the Contractor shall submit an acceptable alternative.

5.2.6 If the University or the Architect requires a change of any proposed Subcontractor, Sub-subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. No increase in the Contract Sum will be allowed where the change is a result of subsequent evidence of any of the reasons for rejection under 5.2.3.

5.2.7 The Contractor shall not make any substitution for any Subcontractor, Sub-subcontractor or person or organization who has been accepted by the University and the Architect, except for just cause acceptable to the University and the Architect, and unless the substitute is acceptable to the University and the Architect. In the event of a proposed change, the Contractor shall submit, in writing, the reasons for the change and the proposed substitutions. No change will be allowed for the improvement of the schedule where the Contractor, or his Subcontractors, have failed to properly order or schedule delivery or installation of materials and equipment. The proposed change is subject to all conditions of Paragraph 5.2.

5.3 Subcontractual Relations

5.3.1 All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

- .1 Preserve and protect the rights of the University and the Architect under the Contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

- .2 Require that such Work be performed and guaranteed in accordance with the requirements of the Contract Documents.
- .3 Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Article 9;
- .4 Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to sub-contracted portions of the Work shall be submitted in writing to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like claims by the Contractor upon the University;
- .5 Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.2, except such rights as they may have to the proceeds of such insurance held by the Trustee for the insurance proceeds, and
- .6 Obligate each Subcontractor specifically to consent to the provisions of this Paragraph 5.3.

5.4 Payments to Subcontractors

5.4.1 The Contractor shall pay each Subcontractor, upon receipt of payment from the University an amount equal to the percentage of completion allowed to the Contractor on account of such Subcontractor's Work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to his subcontractors.

5.4.2 If the University fails to make payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay that Subcontractor on demand, made at any time after the payment should otherwise have been made, for his Work to the extent completed, less the retained percentage.

5.4.3 The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor under Article 11, and he shall require each Subcontractor to make similar payments to his subcontractors.

5.4.4 The University may, on request and at its discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to the Contractor on account of Work done by such Subcontractors.

5.4.5 Neither the University nor the Architect shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor.

ARTICLE 6 - SEPARATE CONTRACTS

6.1 University's Right to Award Separate Contracts

6.1.1 The University reserves the right to award other contracts in

connection with other portions of the Project under these or similar Conditions of the Contract.

6.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall be the Contractor who signed each separate contract.

6.2 Mutual Responsibility of Contractors

6.2.1 The Contractor, and his Subcontractors, shall cooperate with and coordinate their work with each other and all other contractors and the University to facilitate general progress of the Project and to prevent delaying the progress of other contractors. The Contractor shall give reasonable notice and afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the installation or execution of their work, and shall properly connect and coordinate his Work with theirs. The Contractor, and his Subcontractors, shall obtain layout drawings, roughing-in detail sheets and other pertinent information directly from the other contractors to coordinate all phases of the Work, and all contractors shall within a reasonable time provide such necessary information. For coordination with the University's equipment or materials, information shall be obtained from the University. After timely notification by the Contractor of the need to accomplish a particular phase or element of the Work, the other contractors shall, within a reasonable time, perform their work so as not to delay or impede the Contractor.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect, including measurements and inspection of work already in place, and shall promptly report to the University any apparent or alleged discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work.

6.2.3 Should the Contractor cause delay or damage to any work which is not insured under Article 11.2 or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement or arbitration, if he will so settle. If such separate contractor sues the University on account of any delay or damage alleged to have been so sustained, the University shall notify the Contractor who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the University arises therefrom the Contractor shall pay or satisfy it and shall reimburse the University for all attorney's fees and court costs which the University has incurred.

6.3 Cutting and Patching Under Separate Contracts

6.3.1 The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete his Work except as otherwise

specifically provided in the Contract Documents. The Contractor shall not endanger any work of any other contractors by cutting, excavating or otherwise altering any work and shall not cut or alter the work of any other contractor except with the written consent of the Architect or the University.

6.3.2 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

6.4 University's Right to Clean Up

6.4.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by Paragraph 4.16, or elsewhere in the Contract Documents, the University may clean up and equitably charge the cost thereof to the several contractors.

ARTICLE 7 - MISCELLANEOUS PROVISIONS

7.1 Governing Law

7.1.1 The Contract shall be governed by the laws of the State of Minnesota.

7.2 Successors and Assigns

7.2.1 The University and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the University.

7.3 Written Notice

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice. Written notice to the University shall be addressed as noted under Sub-paragraph 3.1.2.

7.4 Claims for Damages

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 Performance/Guaranty Bond

7.5.1 At the time of execution of the Agreement between the University and the Contractor, the Contractor shall furnish a Bond in the full amount of the Contract Sum, signed by the Contractor and a Corporate Surety authorized to provide bonds in the State of Minnesota and approved by the University. A valid and enforceable Bond shall be maintained by the Contractor throughout the life of the Contract and its Guarantee Periods.

7.5.2 The minimum requirement for University approval of the Surety shall be that the Surety is listed by the United States Treasury Department as acceptable for bonding Federal projects and that the bond amount is within the limit set by the Treasury Department as the net limit on any single risk. There shall be no affiliation between the Contractor and the Bonding Agent or Agency.

7.5.3 The Bond shall guarantee the Contractor will perform each and every part of the Contract, cover all guarantees called for and insure prompt payment to all persons furnishing material or labor required in prosecution of the Work under the Contract. In the event of additions to the Contract, the University reserves the right to require evidence of additional bond.

7.5.4 The Bond shall provide: (1) for additions or deductions from the Work in any amount; (2) that completion time shall not be extended by reason of such changes, unless agreed to at time of change; (3) that no notice of aforesaid alterations, additions or omissions need be given the Surety; and (4) permit occupancy by the University at any time.

7.5.5 Unless otherwise stipulated in the Contract Documents or Bidding Requirements, the form of bond shall be provided by the University. (Contractor's Bond, Business Administration Form 204).

7.5.6 If it shall at any time appear that the Contractor has unlawfully, fraudulently or through collusion with any representative of University, supplied inferior materials or workmanship or has departed from the terms of the Contract, or should the University make a claim under the Guarantee provisions, the final inspection and acceptance of the Work shall not be binding on the University and the University shall have the right to cause the Work to be properly performed and satisfactory material supplied to the extent the University may deem necessary, all at expense of the Contractor or his Surety. The University shall have right to recover against the Contractor, or his Surety, such damages as may be incurred by the University therefrom.

7.5.7 Final acceptance of the Work shall not relieve the Contractor nor his Surety from their obligations under this Contract, including guarantees of materials, equipment, installation or service.

7.6 Rights and Remedies

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.7 Royalties and Patents

7.7.1 The Contractor shall pay all royalties and license fees and shall secure to the University for all times the free and undisputed right to the use of any and all patented design, process, method or product used in performance of the Work. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the University harmless from loss on account thereof.

7.8 Tests

7.8.1 If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or instructions of the University or Architect requires any of the Work to be inspected, tested or approved, the Contractor shall make all arrangements for the tests, inspections or approvals and notify all appropriate parties in ample time to make the inspections, tests or approvals. The Contractor shall give the University and Architect timely notice of readiness for testing and inspection and the dates set for tests, inspections and approvals by public authorities so they may observe such tests and inspections if they choose. The Contractor shall bear all costs of such inspections, tests or approvals except as otherwise specified in the Contract Documents. Any of the Work requiring testing, inspection or approval which is covered or otherwise made inaccessible without the consent of those requiring or making the inspection or test, shall be uncovered or made accessible by and at the expense of the Contractor.

7.8.2 If after the commencement of the Work the University or the Architect determines that any Work requires special inspection, testing, or approval which Subparagraph 7.8.1 does not include, the University may instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as in Subparagraph 7.8.1. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including the Architect's additional services made necessary by such failure; otherwise the University shall bear such costs, and an appropriate Change Order shall be issued.

7.8.3 Certificates of required inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the University and the Architect.

7.8.4 Neither the observations by the University or the Architect, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

7.9 Use of University Personnel and Property

7.9.1 Unless the Contract Documents call for University property to be supplied to the Contractor, or installed or connected by the Contractor under the Contract, no property, supplies, equipment or personnel of the University shall be used by the Contractor in the performance of the Contract.

7.10 University Use or Occupancy of the Premises

7.10.1 The University reserves the right to jointly use the premises with the Contractor in the performance of his duties and functions. The University reserves the right to: (1) enter into the Project and premises at all

times; (2) make installations of materials and equipment at appropriate times as the Work progresses; (3) store property in essentially completed areas; (4) install furniture and furnishings when spaces are at appropriate stages of completion; (5) and use the premises for other similar activities. The Contractor shall coordinate the Work with the work of the University or other contractors and shall cooperate with them, to minimize undue interferences. Such activities shall not be construed as occupancy.

7.10.2 If any part, unit or the entire Work or Project is Substantially Complete or ready for occupancy, the University may, upon notice to the Contractor, enter into and make use of the Work that is Substantially Complete or otherwise suitable for the University's purposes.

7.10.3 If the Work is not complete at the time included in the Contract, but the Work is to a state of readiness to permit partial or full use or occupancy by the University, the University reserves the right, upon notice to the Contractor, to enter into and make use of those parts that are suitable for his needs. The Contractor shall cooperate with and coordinate his operations in completing the Work with the University to minimize disturbance of the University's programs and functions.

7.10.4 The University's beneficial use or occupancy, as provided for in 7.10.1 through 7.10.3 shall not be construed as acceptance of the Work or any of its materials and equipment. Such use and occupancy shall be subject to any corrections or deficiencies, damage or omissions noted. Damage occurring after occupancy, not caused by the Contractor, will be the responsibility of the University or other contractors causing the damage.

7.10.5 To the extent applicable to the Work, as determined by the University, the Contractor shall conform to the provisions of this Subparagraph. Upon occupancy by the University, complete and usable facilities of light, power, exits, heat, ventilation, air conditioning, utilities, toilets and similar facilities necessary for safety, comfort and University's functions shall be available at all times, so the Work can be used without hazards, discomfort or inconvenience. After occupancy by the University, its program, functions or normal use shall not be unnecessarily interrupted nor interfered with and unnecessary inconvenience will not be permitted. The Contractor shall schedule and arrange the Work with the University to accomplish this objective. If the Work is not complete by the time in the Contract, and if necessary, work shall be scheduled on weekends, or other times when the Work is not in use, without additional cost to the University. The Contractor will be allowed reasonable access to the areas as necessary to complete the Work. All operations or activities relating to electrical, heating, air conditioning, ventilation, plumbing services and phases shall be accomplished in accordance with a sequence schedule planned with the University so that complete facilities are maintained.

7.11 Additional Definitions

7.11.1 The term "provide" shall mean to furnish and install complete, including as applicable all connections to utilities or service, complete anchorage and suspension, fastening or anchor devices, controls, trim, supports, standard accessories, finishes, adjustments for proper operation and other related items or labor, unless specifically specified otherwise.

7.11.2 The terms "Approved," "Satisfactory," "Equal to," "Proper," and similar terms shall mean the decision is vested in the Architect and the University, which shall be binding upon the Contractor and Subcontractors. For decisions relating to artistic effect or interpretation and intent of the Contract Documents, the Architect's decision will be final.

7.11.3 The terms "Project," "Work," "Job", as may be used in the technical sections of the Specifications or on the drawings, may be used interchangeably and are synonymous. They shall mean the facility, construction and/or improvement within the intent or scope of the Contract Documents. The terms shall mean the entire facility, or separable parts as appropriate to the use of the term.

7.11.4 The term "Notice to Proceed" shall mean written notice by the University to the Contractor to commence his work of the Contract, issued either before or after execution of the Contract. In issuing the Notice, stipulations may be included in the Notice, or in the Contract Documents, as to time and other requirements that may condition commencement of the Work at the site. In the absence of a specific Notice to Proceed, the execution of the Agreement shall be deemed as such Notice, conditional upon the submission of a proper Performance Bond and proper insurance evidence.

7.11.5 The term "Substantial Completion" shall mean the Work of the Contract (or separable units or phases as provided in the Contract Documents or otherwise determined by the University) is essentially and satisfactorily complete in accordance with the Contract Documents, as modified by approved Change Orders or other written orders, ready for full occupancy or use by the University in the manner intended without inconvenience or discomfort. The determination by the University on the status of Substantial Completion shall be final. As may be applicable to this Project and Work of this Contract, it is the intent that Substantial Completion shall generally mean: all materials, equipment, systems, controls, features, facilities, accessories and similar elements are installed in the proper manner and in operating condition; spaces and surfaces (except minor areas or spaces) have been painted or otherwise finished throughout; masonry and concrete cleaned with any sealer or other finish applied; casework installed, complete with tops, sinks, fittings and other related items installed and services connected; utilities and systems connected and functioning; sitework essentially complete; permanent heating, ventilating, air conditioning and other systems properly operating with proper controls; lighting and electrical systems installed, operable and controlled; and other work to a similar state of essential and satisfactory completion. A minor amount of work, as determined by and at the discretion of the University, such as installation of minor accessories or items, a minor amount of painting, minor replacements of defective work, minor adjustment of controls, completion or correction of minor exterior work that cannot be completed due to weather conditions, will not delay determination of Substantial Completion. For the purposes of Substantial Completion, specified areas of the entire Work or Project (or as otherwise determined by the University) may be individually judged as Substantially Complete.

7.11.6 The terms "Complete", "Completion" or "Final Completion" shall mean when all of the Work of the Contract fulfills all of the terms of the Contract Documents in all respects.

7.12 Or Equal

7.12.1 Wherever materials, products, articles, equipment, systems or similar items are identified by reference to proprietary terms, model numbers, catalog numbers, trade names, manufacturers or similar reference, it is intended to establish the minimum standard or measure of quality that has been determined as requisite or intended for the Work. During bidding competition is encouraged from contractors, subcontractors, suppliers, manufacturers and producers whose products, systems, reputation, performance and service warrant acceptance for the conditions, intent of design, requirements and other considerations of the Work under the conditions specified in the Instructions to Bidders. Where not specifically stated, the phrase "or acceptable equal as determined by the Architect" shall be implied throughout. The Architect consults with the University in the determination of products to be used and their acceptable equals.

7.12.2 The determination of products for use may be based on the construction, design, function, type, size, capacity, performance, strength, durability, efficiency, sound level, finish, aesthetic quality, service, matching existing work, the University's standards for repair, replacement and maintenance or other characteristics and criteria. Acceptance or rejection of proposed alternate or similar products, equipment or system may be based on any of the factors and criteria. The final decision on acceptance or rejection of proposed alternate or similar products, equipment or system shall be vested in the Architect and his determination may or may not express the reason for the decision, at his option.

7.12.3 The product, equipment, system, or manufacturer used as the basis for the design or specification shall generally set the criteria. It shall be expressly understood that any product, equipment, system or manufacturer listed in the Contract Documents as acceptable shall meet and be in full compliance with the requirements and criteria, including those established by the product, equipment, system or manufacturer used as the basis for the specification. The Architect and the University shall have the right to reject any proposed deviations from specified criteria or characteristics, or deviations from the criteria and characteristics of the product, system or manufacturer used as the basis of the Contract Documents.

ARTICLE 8 - TIME

8.1 Definition

8.1.1 The Contract Time is the period of time allotted in the Contract Documents for completion of the Work.

8.1.2 The date of the commencement of the Contract Time is the date of the University's Notice to Proceed or the date of the Agreement, whichever is first. In the absence of a time or date established in the Notice to

Proceed or in the Contract Documents, work at the site shall commence within 21 days after the Notice to Proceed or Contract execution, whichever occurs first, unless a later time is agreed to or directed by the University.

8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date determined by the University when construction is sufficiently complete, in accordance with the Contract Documents, so the University may occupy the Work or designated portion thereof for the use for which it is intended and the Work meets the requirements of Subparagraph 7.12.5. The date of Final Completion shall be determined by the University when the Work meets the requirements of Subparagraph 7.12.6.

8.1.4 The term day as used in the Contract Documents shall mean calendar day.

8.2 Progress and Completion

8.2.1 All time limits or dates stated in the Contract Documents are essential conditions of the Contract. In executing the Contract, the Contractor agrees the Contract Time is reasonable for the Work.

8.2.2 The Contractor shall begin the Work in accordance with Subparagraph 8.1.2. No work at the site shall be commenced until proper evidence of the required insurance has been submitted to the University. The Contractor shall carry the Work forward expeditiously with adequate forces to maintain progress in accordance with the Progress Schedule and to complete the Work within the Contract Time.

8.2.3 Except for constraints which may be specified for certain part of the Work or otherwise imposed by the University, the Work shall not be suspended or shut down, but shall progress continuously and expeditiously, unless otherwise approved by the University. The Contractor shall assemble materials and equipment in advance of the need and, as may be appropriate to the progress, shall prefabricate assemblies which will comply with the Contract Documents, as may be specified, or if not specified as may be permitted by labor agreements, to expedite the Work and insure completion on time.

8.2.4 If completion dates or times are specified or otherwise included in the Contract, it shall mean the date of Final Completion as defined under Subparagraph 7.12.6, unless otherwise specified in the Contract Documents.

8.2.5 If the Contractor shall neglect, fail or refuse to complete the Work within the time specified, or any proper extensions thereof granted by the University, unless liquidated damages are specified, the Contractor will be subject to paying actual damages suffered by the University resulting from non-completion on time and default under the Contract.

8.3 Delays and Extensions of Time

8.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the University or the Architect, or by any employee of either, or by any separate contractor employed by the University,

or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties or any causes beyond the Contractor's control, or by any other cause which the University determines may justify a delay, the Contract Time may be extended by Change Order for such reasonable time as the University may determine. Claims for extensions of time will be considered valid only under the following conditions:

- .1 Only those enumerated conditions over which the Contractor has no control will be considered. The burden of proof to substantiate the claim for an extension of time shall rest with the Contractor, including evidence that the cause was beyond his control. It shall be deemed the Contractor has control over the supply of labor, materials, equipment, methods, techniques and over his Subcontractors.
- .2 A delay in the progress of the Work actually occurred as a result of one of the valid causes for time extension.
- .3 Any unusual delay in transportation is solely due to transportation. An extension of time will not be granted for delays in deliveries where said delivery was not properly scheduled or when orders were not promptly and properly placed.
- .4 With respect to a claim for an extension of time as result of climatic conditions, the Contractor shall consider the location of the site and recognize the existence, as normal, of variations from "average" conditions. Foul weather in itself will not be a valid reason for time extension. Requests for time extension because of delay resulting from weather extremes will not be considered unless a substantial variation from usual weather conditions occurs for a significant period of time and operations necessarily were suspended to a significant degree when they would otherwise have been in progress. In considering the time extension, the weather conditions both before and after the period in which the delay is claimed will be evaluated.
- .5 For Changes in the Work which significantly affects the time and progress of the entire Work, any time extension shall be made no later than when the Change is authorized by the University. Any claim shall be made at the time the Change is requested. For Changes in the Work which do not affect the progress of the entire Work, the University reserves the right to grant a time extension only for the area, phase or element of the entire Work affected by the Change.
- .6 Delays resulting from a labor dispute will result in a time extension no longer than the dispute period, in addition to a reasonable mobilization period that is unavoidable, and may be less depending on the actual affect the dispute had on the overall progress and the operations that were actually curtailed or suspended. Lockouts, over which the Contractor has control, will not be a valid reason for a time extension.

- .7 No time extension will be granted as a result of improper scheduling or for failure to have shop drawings or samples submitted in ample time for review under a reasonable schedule.
- .8 Delays caused by Subcontractors will be valid reasons for time extension only under the same conditions as Paragraph 8.3.

8.3.2 Except for Changes in the Work, all claims for extension of time shall be made in writing to the University no more than ten days after the beginning of the occurrence of the delay; otherwise they shall be waived. In the case of a continuing cause of delay only one claim is necessary.

8.3.3 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 1.2.5 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after demand stating a delay will result is made for them, and not then unless such claim is reasonable.

8.3.4 All extensions of time shall be determined by the University, in consultation with the Architect when necessary, and its decisions shall be final and binding.

8.3.5 In the event of separate contractors for the Work, if a time extension is granted to one or more contractors for a valid delay, a time extension may also be granted other contractors if, in the opinion of the University, their progress or work schedule is materially affected by the time extension granted. If no time extension is allowed to the Contractor, or should the Contractor decline a time extension offer, the Contractor shall make no claim against the University for damages alleged to be the result of any time extension granted to others.

8.3.6 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 Contract Sum

9.1.1 The Contract Sum is stated in the Agreement and is the total amount payable by the University to the Contractor for the performance of the Work under the Contract Documents.

9.2 Schedule of Values and Cash Flow Schedule

9.2.1 Unless otherwise specified, the Contractor shall submit a Schedule of Values (cost breakdown) at least 14 days prior to the first Request for Payment, in such form and detail as required by the Contract Documents and as directed by the University.

9.2.2 Upon request of the University, the Contractor shall prepare and provide a schedule of estimated periodic requests for payment for the University's guidance in its financial planning to have funds available.

The schedule shall indicate the anticipated amount that will be requested each month, taking into consideration the work schedule, expected deliveries and the retained amount. The Contractor will not be bound to the estimated amounts, but should the actual requested amounts tend to vary substantially from the estimates, the Contractor shall revise the schedule, at the request of the University.

9.3 Progress Payments

9.3.1 As the Work progresses, after a bona-fide start at the site, the Contractor may make periodic Requests for Payment, but no more often than monthly, for work satisfactorily completed or materials suitably stored and protected at Project site, or as otherwise provided under Subparagraph 9.3.5. With the Request for Payment, the Contractor shall provide such supporting data as may be required by the University to substantiate the Contractor's right to payment.

9.3.2 Requests for Payment shall be submitted to the University in five copies on forms provided by the University. Each periodic payment request shall be in itemized detail form, following the Schedule of Values accepted by the University and as directed by the University. The processing procedures and time for submitting Requests for Payment shall be as directed by the University.

9.3.3 Payment will be made only for the Work that has been satisfactorily executed or accomplished and, except as provided for under Subparagraph 9.3.5, only for materials and equipment that are on the job site and adequately protected from the elements, pilferage, vandals or other damage. Requests for Payment which are incorrect, incomplete or are based on anticipated progress and deliveries will be rejected.

9.3.4 For payments that are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the University to establish the University's title to such materials or equipment or otherwise protect the University's interest, including applicable insurance. No payment will be made for materials until a bona fide and substantial on-site start has actually been made.

9.3.5 Where there is limited storage area on the site of the Work of this Contract, and it will improve the schedule or benefit the progress of the Work, the University will consider making payment for certain materials and equipment which are stored off the site. The University shall be the sole judge as to the types of materials and equipment it will pay for while in off-site storage and the conditions for the payment. The University will not pay for items in off-site storage which are: (1) damaged or otherwise defective; (2) off-the-shelf type materials; (3) held at the producer's plant; (4) produced over a period of time and normally would be installed to a schedule over a period of time as they are delivered, unless the University has caused a significant change in the schedule. For consideration of payment for items stored off-site, at the start of the Work the Contractor shall submit a proposed list to the University for review and concurrence, provide the reasons for each, the proposed storage locations and the anticipated delivery time. The list shall include: (1) the item; (2) proposed storage location; (3) anticipated delivery time to the off-site storage. To qualify for consideration, the material or equipment shall be:

- .1 A major item.
- .2 Specially fabricated or produced for the Work of this Contract and shall be in accordance with the Contract Documents; or
- .3 A critical material which is in short supply or which has an uncertain long lead time delivery schedule.
- .4 Properly stored and protected as approved by the University, including marking with the Project name.
- .5 Paid for in full by the Contractor (or by the Subcontractor purchasing the item) with the evidence of a paid receipt submitted with the Request for Payment. The Contractor (or Subcontractor) shall also certify the item is in storage and will be immediately available when required.
- .6 Examined by the University at the place of storage.
- .7 Furnished at no additional cost or expense to the University except the time required to examine the items.

9.3.6 The Contractor warrants and guarantees that title to all Work, materials and equipment covered by a Request for Payment, whether incorporated in the Project or not, will pass to the Owner upon the receipt of such payment by the Contractor, free and clear of all liens, claims security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, Materials, or equipment covered by a Request for Payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the Seller or otherwise imposed by the Contractor or such other person.

9.3.7 Unless otherwise specified in the Contract Documents, progress payments will be made for ninety five percent (95%) of the value of the Work satisfactorily executed, or for materials and equipment furnished, installed or suitably stored in an approved manner, including all additions or deductions to the Contract Sum approved by Change Order, and less any previous payments made to Contractor or payments made for his account. No payment for engineering, shop drawings or other similar costs will be made until materials are delivered and satisfactorily stored or incorporated in the Work.

9.3.8 By submitting any Request for Payment the Contractor attests to the accuracy of the amounts requested, represents that the Work has been satisfactorily executed in compliance with the Contract Documents and he is entitled to the amount shown. By submitting the second or any subsequent

Request for Payment, the Contractor attests that he has paid all just claims for labor, materials, equipment, subcontracts or other expenses represented by all previous Requests for Payment.

9.3.9 No progress payment, nor partial or full use or occupancy of the Project, shall be construed as acceptance of any Work not in accordance with the Contract Documents. All Work is subject to an evaluation for conformance with the Contract Documents upon Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to Completion, and to any specific qualifications stated by the University or Architect. The making of a payment by the University shall not thereby be deemed to represent that it has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that it has reviewed the construction means, methods, techniques, sequences or procedures, or that it has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.3.10 Full or partial payment on the Contract Sum, or in reducing the retained amount (percentage) shall not relieve the Contractor or his Surety from fulfilling all obligations of this Contract, including guarantee of the Work. Under the conditions of the Contract, the Contractor and his Surety agree that they waive any actual or alleged rights of subrogation or action against the University and Architect as a result of such payments being made. The Surety at any time may examine the status of the Work, as well as any payments and may request the University withhold additional sums as they consider appropriate to protect their interests.

9.3.11 In the event the University is unable to approve payment in the full amount requested, due to work not satisfactorily complete in the amount represented by the Request for Payment, it may revise the amount indicated as due, process for payment and advise the Contractor of the change.

9.3.12 At the time any request is made to make full payment on a periodic Request for Payment or to reduce the retained percentage, the Contractor shall submit a written "Consent of Surety" to said reduction, without invalidating any obligation under the Bond.

9.4 Payments Withheld

9.4.1 The University may decline to approve a Request for Payment in whole or in part, to the extent necessary to reasonably protect its interests. The University may also decline to approve any Request for Payment or, because of subsequently discovered evidence or subsequent inspections, it may nullify the whole or any part of any Request for Payment previously issued, to such extent as may be necessary in its opinion to protect the University from loss because of:

- .1 Defective work not remedied,
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims,
- .3 failure of the Contractor to make payments properly to Sub-contractors for labor, materials or equipment,

- .4 reasonable doubt that the Work can be completed for the unpaid balance of the Contract Sum,
- .5 damage to another contractor,
- .6 reasonable indication that the Work will not be completed within the Contract Time, or
- .7 unsatisfactory prosecution of the Work by the Contractor.

9.5 Substantial and Final Completion

9.5.1 As applicable to the Work of this Contract, Substantial and Final Completion shall be as defined under Subparagraph 7.11.5 and 7.11.6.

9.5.2 When the Contractor determines that the entire Work, or a specified or designated area or part thereof as established by the University, is Substantially Complete, the Contractor shall submit to the University and Architect a written statement that the Work meets the requirements for Substantial Completion. At the same time, the Contractor shall submit to the University and the Architect a list of all items and Work to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Based on observations at the site, if the University agrees to the status of the Work, it will schedule and make an inspection of the Work and provide the Contractor with a list of any additional items to be completed, replaced or corrected. If the Work is not Substantially Complete, in the University's opinion, the Contractor will be advised and a subsequent date set for the inspection. In the absence of any other date established by the University, the day on which the University completed its inspection of the Work, or part, and determined the Work, or part, as Substantially Complete, will be the Substantial Completion date.

9.5.3 When the entire Work, or specified or designated area or part thereof as established by the University, is determined as Substantially Complete, or upon the University's full occupancy of the entire Work or established area or part thereof, the Contractor and the University shall review and agree on necessary changes in responsibilities as may be provided in the Contract Documents which are related to the Work, such as insurance, cost of services and utilities, heating and air conditioning, maintenance and similar matters. In no case shall Substantial Completion or occupancy relieve the Contractor from his obligations under the Contract. Unless otherwise specified, the change in responsibilities shall be effective the day after the Work is determined as Substantially Complete, or if full occupancy occurs earlier, on the first day of full occupancy.

9.5.4 The Contractor shall recognize the need for proper procedures and diligence to complete the Work and shall continuously prosecute it to completion, including the period after Substantial Completion. The Contractor shall organize and methodically prosecute all phases of completing the Work according to a schedule acceptable to the University.

9.5.5 Upon receipt of written notice from the Contractor that the Work is complete, all corrections made, all reports and other data filed, all equipment and systems tested and there is no other unfinished Work, the University will make one final inspection on the items previously noted to be completed or remedied. Final payment will not be made until the University has been fully and properly instructed in use and operation of all of the Work, equipment and systems under the Contract and all manuals, bonds and similar items have been provided.

9.6 Final Payment

9.6.1 Final payment, including any retained amount on the Contract Sum, will not become due until the Contractor provides any submittals the University may require to substantiate the Contractor's right to payment, such as: (1) affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the University or his property might in any way be responsible, have been paid or otherwise satisfied; (2) consent of surety, if necessary to final payment and (3) other data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designed by the University. If any Subcontractor refuses to furnish a release or waiver as may be required by the University, the Contractor may furnish a bond satisfactory to the University to indemnify it against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the University all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.6.2 Prior to final payment, the Contractor shall file with the University the certificate, Form 134, "Affidavit for Obtaining Final Settlement of Contract with the State of Minnesota", showing he has complied with M.S.A. 290.92 requiring withholding of income tax on wages at the source.

9.6.3 If after Substantial Completion of the Work, Final Completion thereof is materially delayed through causes not under the control of the Contractor, or a very minor amount of the Work remains incomplete or uncorrected due to weather, unsuitable conditions for testing or other circumstances, and the Architect so confirms, the University may, without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. In such case, the University will retain at least 3 times the value of the incomplete or uncorrected parts of the Work. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims, nor termination of the Contract.

9.6.4 The making of final payment shall constitute a waiver of all claims by the University except those arising from:

- .1 Unsettled liens;
- .2 faulty, defective, missing, substandard or improperly installed work previously noted or appearing or found after Substantial Completion;

- .3 failure of any of the Work to comply with the requirements of the Contract Documents; or
- .4 terms of any standard of special guarantees required by the Contract Documents.

9.6.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. All of the Work shall be performed in a safe manner.

10.2 Safety of Persons and Property

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

- .1 all employees on the Work and all other persons who may be affected thereby;
- .2 the public, including University staff and employees;
- .3 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors;
- .4 materials, equipment, supplies or construction of other contractors; and
- .5 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other improvements and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall comply with all applicable codes, laws, ordinances, rules, regulations and lawful orders of any public authority, including the University's Environmental Health and Safety Division, having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.3 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents and

other safety or protection measures. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the University.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel. No explosives shall be used without the permission of the University.

10.2.5 The Contractor shall provide and maintain adequate fire extinguishers or other fire fighting systems or devices in and around the construction area, available to all workmen, but shall not use extinguishers that are to be installed in the Work.

10.2.6 The Contractor shall not load or permit any loading which will endanger the safety of or in any way damage the Project, the Work, or any existing or adjacent facilities.

10.3 Emergencies

10.3.1 In any emergency at the site affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss and shall immediately notify the University. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11 INSURANCE

11.1 Contractor's Liability Insurance

11.1.1 The Contractor shall purchase and maintain such insurance as will protect him from claims which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable; such insurance shall, as a minimum, cover:

- .1 claims under workmen's compensation, disability benefit and other similar employee benefit acts;

- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person; and
- .5 claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

11.1.2 The insurance required by Paragraph 11.1 shall be written for not less than the limits of liability specified in Subparagraph 11.1.10, other requirements of the Contract Documents, or required by law, whichever is greater. The Contractor is solely responsible to purchase and provide adequate and additional insurance for work under the Contract, subject to the specified minimum requirements. The insurance shall be written on a Combination Comprehensive Liability Form with Broad Form Property Damage coverage.

11.1.3 Unless otherwise specified in the Contract Documents, as a minimum the liability coverage shall include:

- .1 General Public Liability.
- .2 Workmen's Compensation, with All States or Universal endorsement.
- .3 Employee's Liability, with All States or Universal endorsement.
- .4 Premises and Operations.
- .5 Contractor's Protective Contingent Liability.
- .6 Elevators (if any under this Contract).
- .7 Personal Injury, Groups A, B, and C.
- .8 Explosion, Collapse and Underground Property (The University will consider the exclusion of one or more of these hazards only if the Contractor provides a sworn statement which certifies no work involving these hazards will be performed under the Contract by the Contractor, any Subcontractor or anyone employed by them.)
- .9 Contractual Liability.
- .10 Completed Operations, which shall be maintained a minimum of one year after final completion.
- .11 Automobile, including owned, non-owned and hired vehicle coverage.

11.1.4 The Contractor's Contractual Liability insurance shall cover the Contractor's obligations under Paragraph 4.18. Insurance for said agreement shall, as a minimum, provide limits as specified for any claim arising out of the hold harmless agreement and said limits shall not be reduced as the result of any claim made under the Public Liability Insurance.

11.1.5 If any insurance policy is written to cover more than one exposure, the minimum limit specified for each exposure shall be available for claims under each of the exposures.

11.1.6 The insurance companies for all policies shall waive the right to assert immunity of the University as a defense to any claim made, and endorsements to policies or the certificate shall indicate the waiver.

11.1.7 Within 14 days after receipt of the Notice to Proceed or Contract execution, whichever occurs first, and prior to commencing the Work at the site, the Contractor shall submit to the University three copies, with one copy to the Architect, of a certificate of Liability Insurance indicating all coverages. The certificates shall be one Minnesota CICC Form 701, latest edition.

11.1.8 The Contractor shall not allow insurance to be cancelled, lapse, change by decrease in limits or coverage during the life of the Contract, including guarantee periods. In event of any such change or termination, 15 days prior written notice shall be given the University, the Architect, and all insured parties. Certificates shall bear acknowledgement of the notice requirement.

11.1.9 The Contractor's Surety for the Bond specified under Paragraph 7.5 shall be held until all claims against the insurance (including claims under Paragraph 4.18) have been settled and suitable evidence of the settlement has been provided to the University.

11.1.10 Unless otherwise specified in the Contract Documents, the minimum limits for liability insurance shall be as follows, unless higher limits are required by law:

- | | |
|--|---|
| .1 Workmen's Compensation: | As required by law |
| .2 Employee's Liability: | \$100,000 |
| .3 Bodily Injury - For each of Public Liability and Automobile | \$300,000 each person
\$500,000 each occurrence
\$500,000 aggregate |
| .4 Property Damage - Public Liability | \$250,000 each occurrence
\$500,000 aggregate |
| .5 Property Damage - Automobile | \$100,000 each occurrence |
| .6 Personal Injury | \$300,000 each person
\$500,000 each occurrence |
| .7 Contractual Liability | Same limits as .3 and .4 above |

- .8 Umbrella Excess Liability: If such policy is used to supplement the underlying limits, it shall be written for not less than \$1,000,000 and both the underlying policy and the umbrella policy shall provide for X-C-U coverage.

11.2 Property Insurance

11.2.1 The University insures its buildings under a master Property Insurance policy. Unless otherwise provided in the Contract Documents, the Work under this Contract will be included as insured under the master policy, to 100% of the insurable value of the Work, including specified allowances, plus debris removal and architectural/engineering fees for services which may be required as a result of a loss. If required by the University, the Contractor shall assist in establishing the insurable value of the Work under this Contract.

11.2.2 Coverage will be provided in accordance with the terms of the master policy of the University. Upon request, the Contractor may obtain a certificate indicating the coverage, terms and exclusions of the "Builders Risk" provisions of the University's master policy. For the Work under construction the policy will insure against all risks of direct physical loss or damage to the property insured from any external cause except for the exclusions contained in the policy. In general, the policy will provide "Builders Risk" type coverage and as a minimum will insure against loss from perils of Fire, Extended Coverage, Vandalism and Malicious Mischief, Theft, and Surface Water, except for the exclusions of the policy.

11.2.3 The policy does not insure:

- .1 Contractor's machinery, tools and equipment (except temporary structure) not destined to become a part of the completed Project;
- .2 Accounts, bills, currency, deeds, evidences of debt, notes, money or securities;
- .3 Land, trees, shrubs, plants or lawns;
- .4 Licensed motor vehicles;
- .5 Licensed aircraft;
- .6 Nuclear reactors;
- .7 Loss of use or occupancy, penalties for non-completion of or in delay in completion of the Contract, or non-compliance with the Contract Documents.

11.2.4 The policy does not insure against the following perils, which are listed here for general information, but shall not be construed as superceding or altering the actual policy exclusions:

- .1 Loss or damage caused by or resulting from:
 - a. Earthquake, landslide, mudflow, or earth sinking, rising or shifting;
 - b. Flood, surface water (except to property under construction), waves, tidal water or tidal wave, overflow of streams or other bodies of water, all whether driven by wind or not;
 - c. Water which backs up through sewers or drains;
 - d. Water below the surface of the ground including that which exerts pressure on or flows, seeps or leaks through sidewalks, driveways, foundations, walls or floors; unless fire or explosion ensues and then the Company shall be liable only for such ensuing loss. This exclusion does not apply to personal property off premises or in transit.
- .2 Loss or damage to hot water boilers, steam boilers, steam pipes, steam turbines or steam engines caused by any condition or occurrence within such boilers, pipes, turbines or engines; nor explosion of steam boilers, steam pipes, steam turbines or steam engines if owned by, leased by, or operated under the control of the Insured;
This exclusion does not apply to direct loss resulting from the explosion of accumulated gases or unconsumed fuel within the fire box, or combustion chamber, of any fired vessel or within the flues or passages which conduct the gases of combustion therefrom;
- .3 Infidelity or dishonesty of the Insured or its employees; nor any unexplained loss, mysterious disappearance, or loss or shortage disclosed on taking inventory;
- .4 Loss or damage caused by electrical current artificially generated unless fire or explosion ensues and then the Company shall be liable only for such ensuing loss, but electrical arcing is not a fire or explosion within the meaning of this policy.
This exclusion does not apply to electronic data processing equipment;
- .5 Loss or damage from freezing to plumbing, heating, air conditioning or other equipment (except fire protective systems) or the resulting leakage or overflow unless the Insured shall have exercised due diligence in maintaining heat or such equipment had been drained and the water supply shut off;

- .6 Loss to real property in process of construction caused by or resulting from error, omission or deficiency in design, specifications, workmanship or materials. This exclusion does not apply to loss by fire, lightning, windstorm, hail, explosion, riot or civil commotion, aircraft, vehicles, smoke or discharge from fire protection or building service equipment to the extent that such perils are insured against in this policy.
- .7 Loss caused directly or indirectly by enforcement of any local or state ordinance or law regulating the construction, repair, or demolition of buildings or structures;
- .8 Loss caused by or resulting from power, heating or cooling failure, unless such failure results from physical damage to power, heating or cooling equipment situated on the premises where the property covered is located, caused by perils not otherwise excluded;
- .9 Loss caused by or resulting from rain, snow or sleet to personal property in the open (other than property in the custody of carriers for hire).
- .10 Loss or damage to live animals or birds except the risk of mortality only, directly caused by fire, lightning, explosion, windstorm, hail, or collision or overturn of a transporting vehicle;
- .11 Loss or damage to watercraft while waterborne.
- .12 Loss or damage caused by mechanical breakdown, wear and tear, deterioration, contamination, change in temperature, humidity, inherent or latent defects; and settling, cracking, bulging, shrinking or expansion of pavements, foundations, walls, floors or ceilings unless loss by a peril not otherwise excluded ensues and then the Company shall be liable only for such ensuing loss.
- .13 Loss or damage caused by or resulting from:
 - a. Hostile or warlike action in time of peace or war, including action in hindering, combating, or defending against an actual, impending or expected attack, (a) by any government or sovereign power (de jure or de facto), or (b) by military, naval or air forces, or (c) by an agent of any such government, power, authority or forces;
 - b. Any weapon of war employing atomic fission or radioactive force whether in time of peace or war;
 - c. Insurrection, rebellion, revolution, civil war, usurped power, or action taken by governmental authority in hindering, combating or defending against such an occurrence; seizure or destruction under quarantine or customs regulations, confiscation by order of any government or public authority, or risks of contraband or illegal transportation or trade;

.14 Loss or damage by nuclear reaction or nuclear radiation or radioactive contamination, all whether controlled or uncontrolled, or due to any act or condition incident to any of the foregoing, whether such loss be direct or indirect, proximate or remote, or be in whole or in part caused by, contributed to, or aggravated by any of the perils insured against by this policy except that:

- a. The Insurance Company shall be liable for direct loss or damage caused by sudden and accidental radioactive contamination including resultant radiation damage resulting directly from the following perils except as excluded elsewhere hereunder: fire, lightning, windstorm, hail, explosion, riot and civil commotion, vandalism and malicious mischief, water discharged accidentally from sprinkler equipment, impact of falling aircraft or objects falling therefrom, impact of vehicles (except aircraft) moving on land or tracks, heat from molten metal which shall have accidentally escaped from equipment, sonic shock waves (generally known as sonic boom), and smoke except accumulative damage resulting from the sudden, unusual and faulty operation of stationery furnace located on the described premises; provided such radioactive contamination arises from materials used or stored or from processes conducted on the described premises, and provided at the time of loss there is neither a nuclear reactor nor any new or used nuclear fuel on the described premises;
- b. If fire or sprinkler leakage ensues, liability is specifically assumed for direct loss by such ensuing fire or sprinkler leakage but not including any loss due to nuclear reaction, nuclear radiation or radioactive contamination.

11.2.5 The University's policy contains a loss deductible clause. For any loss which may occur, the Contractor shall be responsible for payment of the first \$1,000. of each and every loss occurrence, except the Contractor shall be responsible for the first \$5,000. of each and every loss occurrence resulting from surface water. The Contractor shall be responsible for any loss not covered by the University's insurance, including any loss under the deductible amounts specified, and the Contractor may self insure or obtain insurance to cover any losses, at his option. The University will be responsible for and pay the amount of any loss occurrence above the deductible amounts specified herein, up to the deductible amount of the policy as it may be applied to the loss under this Contract. The insuring Company is responsible to pay for the insured loss above the deductible amount of the policy as it is applied to a loss under this Contract.

11.2.6 For the Work under this Contract, the Architect/Engineer, the Contractor and all his subcontractors and lower tier sub-subcontractors, and other agents shall be as insured jointly under the "Builders Risk" coverage of the University's master policy.

11.2.7 Any property not covered by the University's insurance policy, such as the Contractor's tools, machinery or equipment and property of a similar nature not destined to become a part of the Project, shall be the Contractor's responsibility and the Contractor may self-insure or provide other insurance at his option. The University or Architect/Engineer shall not be responsible for any loss or damage to property of any kind owned or leased by Contractor, his subcontractors, his or their employees, servants, or agents. Any policy of insurance covering the Contractor's and subcontractor's owned or leased machinery, tools, and equipment against loss by physical damage shall provide that Underwriter's waive their rights of subrogation against the University, Architect, Contractor and all subcontractors.

11.2.8 Any property owned by any of the insureds and destined to become a permanent part of the Project, shall be covered while off the premises or in transit to a maximum of \$250,000. per loss occurrence, subject to the same payment for losses under the deductible as specified under 11.2.5 above.

11.2.9 The University, the Architect, the Contractor, other separate Contractors, and the subcontractors and lower tier sub-subcontractors of all Contractors automatically, upon entering into construction agreements in connection with this Project, waive all rights, each against others, for damages caused by fire or other perils insured under the University's Property and Boiler and Machinery Insurance, to the extent of the insurance coverage, except such rights as they may have to proceeds of insurance held by Trustees, the University or the insurer. It is a part of this Contract that no insured shall be held responsible for damage to property of another if the loss is caused by a peril insured under the University's Property and Boiler and Machinery Insurance. The Contractor shall arrange for, and require, similar waivers by Subcontractors and Sub-subcontractors in accordance with Clause 5.3.1.5 of these General Conditions, if necessary.

11.2.10 In addition to the coverage at the actual site of the Project, equivalent coverage will be provided to include any nearby work site established by the University or Contractor for use by the Owner, Architect, Contractor or Sub-contractors for office space or exclusively for delivery or storage of materials or equipment, or for the fabrication of materials to be used on the Project, but excluding fabrication at the Contractor's or any subcontractor's permanent facilities. Such nearby work or storage sites shall be deemed the Project Site and property will not be subject to off-premise or in-transit limitations.

11.2.11 The University's policy provides coverage after the Project is complete. Coverage under the "Builder's Risk" period of coverage will not be invalidated or negated in the event of partial occupancy by the University or other occupants. The University will notify the insurance carrier when the Project is substantially complete.

11.2.12 All losses, whether they appear to be below the specified deductible loss amounts the Contractor is responsible for or not, shall be immediately reported to the University and the Property Insurance carrier, under loss notice procedures as directed by the University.

11.2.13 In the event of a loss which is less than deductible amounts the Contractor is responsible for, the Contractor shall take immediate steps to repair, replace or otherwise remedy the loss to prevent or minimize a delay in progress of the Project. In the event of a loss in excess of the deductible amounts the Contractor is responsible for, the University will provide authorization and/or obtain permission of the insurance carrier to allow the Contractor to immediately replace, repair, rebuild or remedy the loss so the work is accomplished as quickly as practicable and to prevent or minimize any delay in progress of the Project. The University will arrange to compensate the Contractor for the replacement, repairs, rebuilding or other remedy. The Contractor shall cooperate with the University and the insuring company's adjuster to determine the value of the loss. Payment for losses which are satisfactorily rebuilt or remedied shall be made promptly to the Contractor and in the event the work to remedy a loss extends for a period over 30 days, partial payments shall be made at the same time as other Requests for Payment are paid. Any claim for an extension of time as a result of a loss shall be approved by the University.

11.2.14 All losses shall be adjusted by and be payable to the University. Should any insured party have objection to the University adjusting a loss, a committee of the insured parties shall be named to cooperate with and assist the University in settling the loss, with all subcontractors represented by one of the insured subcontractors. After the Contractor has received payment on a loss the Contractor shall pay each Subcontractor a just share of any uninsured loss the Contractor is responsible for (including deductible amounts) and of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.2.15 In the event of a loss, the University shall act as Trustee for any proceeds paid by insurance. The University shall deposit money received from insurance in an account separate from other funds and shall distribute it in accordance with such agreement as parties in interest may reach, or under an award of arbitrators. However, the University shall have no liability for the division, application and payment of proceeds from the insurance except for any improper management, allocations or disbursements made as a result of intentional or willful misconduct. If, after loss, no special agreement is made, replacement of damaged work may be ordered and executed, as provided for under Changes in Work.

11.2.16 After substantial completion of the Work, or upon full occupancy by the University, whichever occurs first, the University's insurance will become permanent property insurance on the Work or the Project under the master policy. When the permanent property insurance is in effect, the University hereby waives all subrogation rights (as required under paragraph 11.2.9 above) under the permanent insurance for any loss due to an insured peril which may occur during the remainder of the Contract.

11.2.17 With respect to Work under this Contract in existing buildings, the University hereby waives any claim against the Architect/Engineer, the Contractor, and all subcontractors and lower tier Sub-subcontractors on the Work or the Project for possible damage to his existing properties from fire or any other peril insured under the University's Property Insurance during construction and any specified guarantee periods under this Contract.

11.2.18 The University's insurance company may advise and assist the Contractor in establishing a loss prevention program and in eliminating potential loss hazards. While this service shall be advisory only, the Contractor shall comply with all reasonable requests and requirements of the insurance company's loss control engineer. The Contractor's Fire Safety Director, shall consult and cooperate with the insurance company's loss control engineer in developing procedures and regulations, as well as the enforcement of these.

11.3 STEAM BOILER AND MACHINERY INSURANCE

11.3.1 Under a separate master policy, the University has insurance to cover loss or damage to hot water boilers, steam boilers, steam pipes, steam turbines or steam engines caused by any condition or occurrence within such boilers, pipes, turbines or engines; as well as explosion of steam boilers, steam pipes, steam turbines or steam engines if owned by, leased by, or operated under the control of the University as the Insured.

11.3.2 Prior to the testing, use or start up of any equipment of item as enumerated under 11.3.1 which is provided under the Contract, the Contractor, or appropriate subcontractor, shall advise the University in ample time so it may arrange for any required inspections.

11.3.3 The Waiver of Subrogation as provided for under Sub-paragraph 11.2.9 of the preceding Paragraph 11.2 Property Insurance shall also apply to the insurance under this Paragraph 11.3, the same as though repeated herein.

11.4 Loss of Use Insurance

11.4.1 The University at its option, may purchase and maintain such insurance as will insure it against loss of use of its property due to fire or other hazards, however caused, except delay caused by the Contractor.

11.5 Other Insurance

11.5.1 If other insurance is required by the University or the Contractor to insure against particular hazards not specified under Article 11 or elsewhere in the Contract Documents, they shall effect and pay for such special coverage as they may individually require or wish to carry.

11.5.2 If construction or any of the Work entails special hazards, the Contractor shall provide a rider or riders to be attached to the appropriate policies specified to cover such special hazards.

11.5.3 If any government agency required special coverage for work on or adjacent to public streets or property, the Contractor shall comply with and provide such insurance, endorsements or extensions as may be required by the agency.

ARTICLE 12 CHANGES IN THE WORK

12.1 Change Orders

12.1.1 The University, without invalidating the Contract, may order Changes in the Work consisting of additions, omissions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, or other

established written procedures, and shall be executed under the applicable conditions of the Contract Documents. Such Changes in the Work may be made without notice to the Surety on the Bond given under the Contract. The University reserves the right to require additional security when additions are made if, in its judgment, such security is necessary to protect its interests.

12.1.2 A change Order is a written order to the Contractor signed by the University, issued after the execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum or the Contract Time. A Change Order may also be signed by the Contractor if he agrees to the adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order.

12.1.3 The cost or credit to the University shall be determined in one of the following ways and, unless otherwise approved or directed by the University, in the precedence of the order listed:

- .1 By an accepted Unit Price proposed in the Contractor's original bid and incorporated in the Contract or a Unit Price comparable to unit costs in the Contractor's Schedule of Values.
- .2 By a lump sum cost acceptable to the University, based on the Contractor's detailed, itemized breakdown of the actual basic cost, with allowance for the Contractor's profit and overhead, as provided for under Subparagraph 12.1.5.
- .3 By mutually agreeable Unit Prices for the actual cost, with allowance for the Contractor's profit and overhead, computed in a similar manner as provided for in Subparagraph 12.1.5.
- .4 On the actual basic cost of the Change, as determined by payroll records and paid receipts, plus allowance for the Contractor's profit and overhead as provided for in Subparagraph 12.1.5, subject to a predetermined maximum amount.

12.1.4 The Contractor shall provide or perform additional work, make other Changes in the Work and comply with the provisions of a Change Order, the same as though the Changes had been a part of the original Contract Documents, when and as ordered in writing by the University.

12.1.5 Except for Unit Prices included in the Contract, and unless otherwise approved by the University, for proposed Changes in the Work the Contractor shall submit an itemized list of quantities with the applicable unit cost and extended price for each, in such form and detail as required by the University or Architect.

- .1 As a minimum the detailed breakdown shall include and indicate the items enumerated below. Items (a) and (b) constitute the cost of labor and items (a), (b), (c) and (d) constitute the actual "basic costs" referred to under this Article 12.

(a) Actual labor costs, itemized by each trade involved showing the hourly rates for each. Labor rates shall be the same for extra and credit computations.

(b) Burden on labor, which shall be the actual costs of mandatory fringe benefits, taxes on labor, workmen's compensation, insurance on labor as affected by payroll, unemployment taxes, including FICA AND FUTA.

(c) Actual quantities of material and equipment, with their actual unit costs.

(d) The cost of subcontracted work, computed in the same way as provided for under this Subparagraph 12.1.5.

(e) Overhead, profit or commission.

(f) Applicable sales tax on materials.

- .2 The maximum that will be allowed for overhead, profit or commission shall be as follows, expressed as a percentage of the actual basic cost of the change. The percentages for profit, overhead and commission allowed by the University may be less, depending on the nature, extent or complexity of the change, where the percentage is not commensurate with the responsibility and administration involved (such as the Contractor merely processing a substantial Change Order to a Subcontractor) but in no event shall they exceed the following:

Overhead Profit Commission

(a) To the Contractor and/or his Subcontractor for work performed with his own forces	10%	10%	---
(b) To the Contractor for work performed by other than his own forces	---	---	10%

- .3 The burden on labor may be indicated as a dollar/cents addition to the hourly rate or may be expressed as a percentage of the extended hourly rate costs. If required by the University or Architect, the Contractor shall provide a detailed breakdown to justify the labor burden. The University reserves the right to reject any labor burden which is inconsistent with other similar contractors.
- .4 Material costs shall be at the actual cost to the Contractor, or Subcontractor. Upon request, the Contractor (or Subcontractor) shall submit evidence to substantiate the costs. Materials shall be quoted at trade discount prices, with quantity discounts also applied where the quantities warrant. Cash or prompt payment discounts need not be credited. In any proposal with material credits, the credit shall be based on the actual Contract cost of the material (including trade and quantity discounts) less any charges actually incurred for handling or returning a material which has been delivered. No "cancellation" charge will be allowed when material has not been shipped.

- .5 The percentages allowed for overhead, profit or commission under Clause 12.1.5.2 shall be deemed to include: (1) field and office supervision and administration, including the field superintendent and administrative foremen; (2) general insurance, except that listed as the labor burden; (3) use of small tools; (4) shop burden; (5) equipment rental (other than required additional hoisting equipment or required excavating equipment necessary solely as a result of the Change); (6) engineering and estimating costs; (7) performance (guaranty) bond; (8) cost of safety measures (including those imposed by OSHA); (9) shipping, drayage and demurrage; (10) and all other costs except those enumerated under Clause 12.1.5.1.
- .6 Except for changes based on Unit Prices included in the Contract, cost changes shall be computed by determining the actual basic costs enumerated under Clause 12.1.5.1, to which the overhead may be added, then the profit figure may be added and finally adding the sales tax on materials.
- .7 Subcontractors shall compute their costs in the same way and are subject to the same maximum percentages for overhead and profit. To the Subcontractor's price, the Contractor may add up to 10% commission.
- .8 Not more than three percentages for overhead, profit and commission will be allowed. The mark-up on any part of the Work a Subcontractor subcontracts will be limited to one overhead figure and one profit figure, in addition to the Contractor's commission. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.
- .9 For Changes involving extra cost by a Subcontractor and the Contractor, the commission shall be applied directly to the Subcontractor's price, with the overhead and profit figure applied only to the Work the Contractor performs with his own forces.
- .10 For Changes involving both extra and credit amounts, the overhead and profit, or commission, shall be applied only to net difference where the extra exceeds the credit.
- .11 For Changes resulting in a credit in the basic costs, a reasonable allowance for overhead, profit or commission shall be credited the Owner, as determined by the University. In general no credit for overhead, profit or commission will be required where the net change credit is minor or where the Change in Work indicates it is reasonable for no credit be allowed to the University. In the event of substantial subcontract credits, or for Work performed by the Contractor, a reasonable overhead, profit or commission credit shall be allowed to the University, in an amount acceptable to the University.

12.1.6 On Changes where the value or extent of Work cannot be reasonably pre-determined or agreed upon, the University, at its sole discretion, may

authorize Work to proceed on an agreed upon cost plus basis, not to exceed a pre-determined maximum amount. In such cases, the basic costs and mark-up for overhead, profit and commission will be in accordance with this Paragraph 12.1.

12.1.7 Unit Prices proposed on the bid form and included in the Contract are not subject to further profit, overhead or commission adjustments, nor the conditions of Subparagraph 12.1.5. The Contract Sum will be adjusted by the direct extension of the number of units and the Unit Prices.

12.1.8 The University may, at its discretion, initiate procedures for Modifications for Changes in the Work involving the Contract Sum, prior to preparation of a formal Change Order. Such Modifications shall be signed by authorized representatives of the University, shall be subject to the same conditions and cost proposals as Change Orders, shall order and authorize the Contractor to proceed with the Changes in the Work and shall have the same effect as a Change Order, except the Contract Sum or Contract Time will not be changed until the Modification has been incorporated in a subsequent Change Order.

12.1.9 Except in an emergency endangering life or property, the Contractor shall make no Changes in the Work affecting the Contract Sum or Contract Time unless in pursuance of a Change Order or other written order from the University, or from the Architect and approved by the University, whereby the scope of the change and the cost, or basis of payment, is agreed upon.

12.1.10 Should Contractor find during progress of the work that, in his judgment, existing conditions or requirements make desirable, or beneficial, a Modification in the Contract requirements, he shall promptly report such matters to University and Architect, in writing, for decision and instruction.

12.1.11 If Unit Prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed that application of the agreed unit prices to the quantities of Work proposed will create a hardship on the University or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship.

12.1.12 Should concealed or subsurface conditions encountered in the performance of the Work be at significant variance with the conditions indicated by the Contract Documents, or in other information available to the Contractor including his own investigations, or should a significant variance from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the University and the Architect shall be notified immediately before the conditions are disturbed. Upon the determination that a significant difference exists, such changes shall be made as determined to be necessary and the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within fourteen days after the first observance of the conditions.

12.2 University's Right to Perform Changes in the Work

12.2.1 If the University does not accept proposals of the Contractor for additional Work or Changes in the Work and no agreement is reached, or if

it does not seem advisable or expedient to proceed on the basis of the Contractor's proposal, the University reserves the right to perform additional Work or Changes in the Work with its own personnel or to employ others for Changes in the Work.

12.3 Claims for Additional Cost

12.3.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the University and the Architect written notice thereof within fourteen days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor and approval to proceed issued prior to the Contractor proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 10.3.1. No such claim shall be valid unless so made. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.3.2 If the Contractor claims that additional cost is involved because of (1) any written interpretation issued pursuant to Subparagraph 1.2.5, (2) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, the Contractor shall make such claim as provided in Subparagraph 12.3.1.

12.4 Minor Changes in the Work

12.4.1 The Architect and the University shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. The University and Architect also reserve right to make minor changes in dimensions, locations, arrangements, or details to accommodate changes in other materials and equipment, improve the Work or prevent unforeseen interference with structural or other features. Such changes shall be made without change in the Contract Sum.

ARTICLE 13 - UNCOVERING AND CORRECTION OF WORK

13.1 Uncovering of Work

13.1.1 If any Work should be installed or covered contrary to the provisions of the Contract Documents or request of the University or Architect, it must, if required by the University or Architect, be removed or uncovered for observation and replaced at the Contractor's expense. The Contractor shall give timely notice to the University and Architect of the readiness of work for observation.

13.1.2 If any other Work has been covered which the Contract Documents, University or Architect has not specifically requested to observe prior to being covered, the University or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be paid by the University. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by a separate contractor employed as provided in Article 6, and in

that event the separate contractor shall be responsible for the payment of such costs.

13.2 Correction of Work

13.2.1 The Contractor, all Subcontractors, and Subsubcontractors shall be bound by the conditions of this Paragraph 13.2. The Contractor shall promptly correct all Work rejected by the Architect or the University as defective or as failing to conform to the Contract Documents whether observed before or after Completion and whether or not fabricated, installed or completed, unless the University elects to accept the Work as provided for under 13.3. The Contractor shall bear all costs of correcting such rejected Work, including the cost of the Architect's additional services thereby made necessary. Work rejected before Final Completion shall be corrected prior to final payment.

13.2.2 If, within one year after date of Substantial Completion, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the University to do so unless the University has previously given the Contractor a written acceptance of such condition. The University shall give such notice promptly after discovery of the condition.

13.2.3 Except as provided under Subparagraph 13.2.5 the commencement of the specified guaranty or correction of Work periods covered by this Article, or any other special specified period, shall be the date of the inspection for Substantial Completion of the last unit, part or phase of the Work, except for any work then noted as incomplete or unsatisfactory. The guarantee period for said incomplete or unsatisfactory work shall start on the date of final correction or remedy and the acceptance of these features by the University. In the absence of specifically noted dates of inspection for Substantial Completion (or of acceptance, in writing, by the University of corrected work), the date of the final payment on the entire Contract will be the start of the guarantee period. Occupancy or use of the Work shall not be construed as commencing guarantee periods at any earlier date.

13.2.4 The specified correction of Work or general guarantee periods, or other special guarantees specified for other periods of time, or by law, shall not be limited by any warranty of a manufacturer, producer, supplier or Subcontractor or other source. The specified guarantees shall be provided by the Contractor, who shall make his own arrangements with the manufacturer, producer, supplier, Subcontractor or other source as he may choose. Where a manufacturer, producer, supplier or Subcontractor guarantees or provides warranties in excess of the general guarantees, the extended guarantees and warranties shall be passed to the University, the same as though they were specified under this Article 13.

13.2.5 Should special circumstances indicate an earlier commencement of guarantee or correction of Work periods than on Substantial Completion is reasonable for certain parts of the Work, in the opinion of the Architect or University, the University may consider such earlier start provided suitable credit is given the University. An earlier start of the periods

shall be only with the University's written approval of the time and acceptance of the credit by Change Order.

13.2.6 The expiration of any guarantee or correction of Work period shall not relieve the Contractor of the obligation to correct, at his own expense, any latent defect in the Work or deficiencies which are not readily ascertained, including but not limited to defective materials and workmanship, defects attributable to substitutions for specified materials, substandard performance or any of the Work otherwise not in compliance with the Contract Documents. Such latent defects or deficiencies shall be corrected as provided in this Paragraph 13.2. Following the correction or replacement of any of the Work, as above specified, the Contractor shall correct any defects or deficiencies in the corrected or replaced materials and workmanship, which is found within one year after the date of correction or replacement.

13.2.7 All such defective or non-conforming Work under Subparagraphs 13.2.1 and 13.2.2 shall be removed from the site if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the University or Architect.

13.2.8 The Contractor shall bear the cost of making good all work of separate contractors destroyed or damaged by such removal or correction.

13.2.9 If the Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from the University or the Architect, the University may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the University may upon ten additional days' written notice sell such Work at auction or at a private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the University.

13.2.10 If the Contractor fails to correct such defective or non-conforming Work, the University may correct it in accordance with Paragraph 3.5.

13.3 Acceptance of Defective or Non-Conforming Work

13.3.1 If, in the opinion of the University, it is expedient, or in its best interest, or should the University choose to accept defective or non-conforming Work for convenience, it may do so instead of requiring the removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Sum for the difference in value together with an allowance for damage or loss of quality. If the amount is determined after final payment, it shall be paid by the Contractor or his Surety. The amount shall be determined by the University.

ARTICLE 14 TERMINATION OF THE CONTRACT

14.1 Termination by the Contractor

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor for University's failure to make payment within 30 days after payment is due then the Contractor may, upon ten days' written notice to the University and the Architect, terminate the Contract and recover from the University payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit. Such right to termination, however, shall not extend to material shortages as a result of market conditions, diminishing resources or other causes except a formally declared emergency specifically restricting or preventing the use of materials.

14.2 Termination by the University

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials to satisfactorily prosecute and complete the Work according to schedule and within the Contract Time, or if he fails to make prompt payment to Subcontractors or for materials or labor, or disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the University, with the advice of the Architect, may, without prejudice to any right or remedy and after giving the Contractor and his Surety seven days' written notice, require the Surety to promptly take over and complete the Work under the terms of the Contract. Should the Surety fail to assume the obligations of completing the Work within ten days after receipt of the written notice, the University may, upon seven days' additional notice, terminate the Contract (except the obligations under the Bond) and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method it may deem expedient. In such case the Contractor or his Surety shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the University completes the Work and the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including the University's additional costs, attorneys' costs and compensation for the Architect's additional services, an amount shall be paid to the Contractor only to the extent as will compensate him for the Work the Contractor actually performed, based on the actual basic costs as defined under Clause 12.1.5.1. If such cost for the University to complete the Work exceeds such unpaid balance, the Contractor or his Surety shall pay the

difference to the University. The costs incurred by the University as herein provided shall be certified by the University.

ARTICLE 15 - EQUAL EMPLOYMENT OPPORTUNITY

15.1 Non-Discrimination, Equal Employment Opportunity

15.1.1 Unless other Equal Employment Opportunity provisions are included in the Contract Documents, the Contractor shall comply with the University of Minnesota Construction Contract Non-Discrimination requirements of Subparagraphs 15.1.2 through 15.1.12 throughout the life of the Contract.

15.1.2 The Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, national origin, or sex. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

15.1.3 The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the University of Minnesota setting forth the provisions of this non-discrimination clause.

15.1.4 The Contractor shall designate an Equal Employment Opportunity Officer, who shall have authority and responsibility for the implementation of equal employment opportunity and affirmative action programs under this Contract. The Contractor shall submit for approval a written copy of its program within fifteen (15) days after receipt of notice from the University of Minnesota.

15.1.5 The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, national origin, or sex.

15.1.6 The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contracts or understanding, a notice to be provided by the University of Minnesota advising the labor union or workers' representatives of the Contractor's commitments under this policy and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

15.1.7 The Contractor shall be required to give evidence of persistent and prolonged efforts to increase the number of minority group employees. The Contractor shall make maximum use of apprentices to develop qualified minority personnel. The Contractor shall seek to fill labor shortages for apprentices and skilled journeymen by upgrading present employees including qualified minority employees.

15.1.8 The Contractor shall furnish to the University of Minnesota information and periodic reports necessary to substantiate his compliance with the requirements of this policy during the duration of the Contract. These reports shall include an appraisal of the effectiveness of the Contractor's equal employment opportunity and affirmative action programs, and shall list any factors and conditions which impede, restrict, or account for less than complete success of the program. The Contractor shall permit access to his books, records, and accounts by the University of Minnesota for purposes of investigation to ascertain compliance with these provisions.

15.1.9 Non-compliance with any requirements of these provisions shall be a breach of a condition of the Contract and will afford the University any and all rights otherwise described under the terms of the contract as applying to the breach of condition.

15.1.10 The Contractor shall include the provisions of Subparagraphs 15.1.2 through 15.1.10 in every subcontract, unless exempted by the provisions of this policy, so that provisions will be binding on each Subcontractor. The Contractor shall take such action as may be required to enforce such provisions.

15.1.11 Contracts and subcontracts not exceeding \$10,000 are exempt from the reporting requirements of this Article.

15.1.12 Except in the case of subcontracts for the performance of construction work at the site of construction, provisions of Subparagraphs 15.1.2 through 15.1.10 shall not be required to be inserted in subcontracts below the second tier.

ARTICLE 16 - WAGE RATES

16.1 Minimum Wage Rates

16.1.1 Unless other Wage Rates are included in the Contract Documents, the Contractor shall comply with the provisions of Subparagraph 16.1.2. If other Wage Rates are included in the Contract Documents, such other rates that are higher than required under Subparagraph 16.1.2 and 16.1.3 shall be paid by the Contractor for labor on the Work.

16.1.2 For any Contract for construction, alteration, or repair of University buildings or other major structures, financed in whole or in part by State appropriation and which exceeds \$2,500 in total cost, the Contractor and his Subcontractors shall pay to their respective laborers and mechanics employed directly on the Work at the site at least the wage rates as determined by the Minnesota Department of Labor and Industry and issued by the Department in their Wage Rate Determination schedules. The Contractor shall comply with the requirements of the Minnesota Department of Labor and Industry's Wage Determinations with respect to any Contract which exceeds \$2,500, in lieu of the Contract Amount Conditions stated in Minnesota Statute 177-43 (1974) as amended (Chapter 191 Laws of Minnesota for 1975). Subdivision 7.

16.1.3 A copy of the Wage Rate Determinations provided by the Minnesota Department of Labor and Industry, applicable to the County in which the Project is located,

is hereinafter bound in the specifications for reference. The Contractor shall examine any wage rate schedule included in the Contract Documents for completeness or accuracy. If any trade which will be used for the Work is omitted, or any wage rate shown is incorrect from prevailing wages of the area, such omission and discrepancies shall be reported to the University. If the only applicable wage rate schedule is that of the Minnesota Department of Labor and Industry, and any rate is missing or appears incorrect, the Contractor shall obtain the proper rate from the Department of Labor and Industry. If necessary, the Contractor shall assist in obtaining decisions on incorrect or missing rates.

16.1.4 By requiring the Contractor to pay the wages under Subparagraph 16.1.2 and 16.1.3, or to pay any other minimum wage rates, neither the University nor the Architect represent that labor may be employed at the minimum hourly wage called for. The Contractor shall investigate and verify the conditions at the location of the Work to satisfy himself as to the availability and cost of labor required to perform the Work.

16.1.5 The Contractor shall post and maintain the Wage Rate Schedule in a conspicuous place accessible to all employees working on the Project.

ARTICLE 17 - SED SET-ASIDE PROGRAM

17.1 Chapter 086, Minnesota Statutes 1979, requires the University to set aside three per cent (3%) of its procurement volume for award to small businesses owned and operated by socially and economically disadvantaged persons as defined by State law. To satisfy this requirement, the Contractor shall subcontract or purchase no less than three per cent (3%) of the Base Bid cost of this contract from one or more qualifying SED small business firms.

17.2 A copy of the current list of small business firms that have self certified their SED qualifications to the University is hereinafter bound in the specifications for reference. Other eligible firms may qualify by either of the following methods:

(1) by filing a completed SED self-certification form with the University Set-Aside Coordinator prior to the date of receipt of bids. Interested bidders may verify the validation of firms in this category by contacting the Set-Aside Coordinator at the address listed below.

(2) by submitting a completed SED self-certification form as an attachment to the bid of a Prime Bidder for this project. All such forms are subject to validation by the University Set Aside Coordinator. Any bid dependent upon such validation for acceptance by the University will be rejected if the SED self-certification form submitted cannot be validated, for any reason.

17.3 A sample SED self-certification form is furnished with this specification for information. Forms for use by interested firms, or any further information regarding the SED Set-Aside Program, may be obtained from the Set-Aside Coordinator, Room 420, Administrative Services Center, 1919 University Avenue, St. Paul, Minnesota 55104. Telephone (612) 373-2073.

SET ASIDE CONSTRUCTION LIST - Contractors & Suppliers
June 5, 1981

ARTISTIC CONSTRUCTION

NEW ENVIRONMENT DESIGN, 49 SE Williams Av, Minneapolis, MN 55414
Mary and Joan Slettehaugh (612)378-9200

ASBESTOS REMOVAL

DUNSHEATH CONSTRUCTION & ENGINEERING, INC., Rt. 2, Box 98,
Delano, MN 55328 - Heather Dunsheath, (612)479-2816

BLOCK/BRICK - See Masonry

BUILDING MATERIALS

ANISHINABE BUILDING CENTER, INC., Hwy 2, P.O. Box 308, Cass
Lake, MN 56633 - Hartley White (218)335-2207

BPC., INC., 12000 Riverhills Rd., P.O. Box 237, Rockford, MN
55373 - Murad R. Bhanji (612)477-6314

COULOMBE CONSTRUCTION, Rt. 4, P.O. Box 184, Bemidji, MN 56601
Lottie F. Coulombe (218)335-6673

DUNSHEATH CONSTRUCTION & ENGINEERING, INC., Rt. 2, Box 98,
Delano, MN 55328 - Heather Dunsheath, (612)479-2816

GEMINI INDUSTRIES, 161 N. Victoria Av, St. Paul, MN 55104
Merle Harris (612)225-8813

REDLAKE INDIAN MILLS, Redby, MN 56670
Red Lake Band of Chippewa Indians (218)679-3346

THE RENOVATORS, 5140 Bloomington Av S., Minneapolis, MN 55417
Joyce Van Haren or Nancy Walsdorf (612)824-0594

SARAH, INC., 14853 Square Lake Tr. N., Stillwater, MN 55082
Sally Healy (612)439-6224

STOCKBRIDGE CONSTRUCTION & SUPPLY, INC., 245 East 6th St.,
St. Paul, MN 55101 - James W. Wilson (612)298-0056

CARPENTRY

GLANTON CONSTRUCTION CO., 4001 15th Ave. S., Minneapolis, MN 55407
Wayne Glanton, (612)825-6822

CEMENT

AZTLAN CONSTRUCTION INC., 785 Dayton Av., St. Paul, MN 55104
Gregorio Guzman - (612)226-1048

BROWN'S CONTRACTING, 112 West 4th, P.O. Box 580, Duluth, MN
55802 - Clinton Brown Jr., (218)722-5142

DAVIES, INC., 13503 Oakland Drive, Burnsville, MN 55337
Susan S. Davies (612)435-8155

GLANTON CONSTRUCTION CO., 4001 15th Av S., Minneapolis, MN 55407
Wayne Glanton (612)825-6822

CERAMIC/QUARRY TILE

GUARANTEE CERAMIC TILE, 2014 Queen Av N., Minneapolis, MN 55411
(Sales & Installation) Willie Byrd (612)588-1477

CLEAN-UP (Site)

GENERAL BLDG. MAINTENANCE, 563 Payne Av., St. Paul, MN 55101
Joseph Vasquez (612)771-9741

CLEARING (Site)

BATTLE WRECKING & CONTRACTING, 880 Ashland Av., St. Paul, MN
55104 - Nate Battle (612)221-1979

CONSULTANTS

ENERGY CONSERVATION CONSULTANTS, INC., 9001 E. Bloomington
Freeway, Bloomington, MN 55420 - Jack M. Lynch (612)888-5633

DEMOLITION

A-1 EXCATATING, INC., 1631 Hubbard, St. Paul, MN 55104
Anne Carmouche (612)646-3696

B & H DISMANTLING, INC., 3454 Georgia Av N, Crystal, MN 55427
James Henrie, (612)537-5002

BATTLE WRECKING & CONTRACTING, 880 Ashland Av., St. Paul, MN
55104 - Nate Battle - (612)291-1979

ROY-AL LIMITED, INC., 1017 W. Broadway, Minneapolis, MN 55411
Alfred A. Johnson (612)521-7289

(Demolition cont....)

THISTLE CONSTRUCTION, P.O. Box 1341, Mankato, MN 56001
Genette Carleton (507)625-1327

EDWARD WATSON CONSTRUCTION CO., INC., 521 N. Lyn Park Circle,
Minneapolis, MN 55411 - Edward Watson (612)588-2465

DRYWALL

DULUTH DRYWALL, INC., P.O. Box 6671, Duluth, MN 55806
Richard Zabukover - (218)722-5174

ELECTRICAL CONTRACTORS

BATTLE ELECTRIC CO., INC., 496 Laurel Av, St. Paul, MN 55102
Burnie Battle (612)224-7871

H & M CONSTRUCTION, INC., 432 S. Wabasha St., St. Paul, MN 55107
Morris Wilson (612)224-5391

JOHNSON'S ELECTRIC, 109 Riverview, P.O. Box 429, Warroad,
MN 56763 - Curtiss L. Johnson (218)386-2663

HARVEY JOHNSON ELECTRIC, INC., 315 W. Michigan St., Duluth,
MN 55802 - Molly R. Johnson (218)722-3739

M & M ELECTRIC, INC., R.R. 1, Box 149A, New Richland, MN
56072 - Dorean Mucha, (507)684-2221

NORTHTOWN ELECTRIC, INC., 744 10th Av NW, New Brighton, MN
55112 - Margaret A. Joyce (612)636-9990

QUALITY ELECTRIC, 1313 NE 7th St., Grand Rapids, MN 55744
Lucille A. Olson (218)326-9122

STOCKBRIDGE CONSTRUCTION & SUPPLY, INC., 245 E. 6th St.,
St. Paul, MN 55101 - James W. Wilson (612)298-0056

TIM'S ELECTRIC, INC., Rt. #1, Box 135, Kilkenny, MN 56052
Timothy W. Kletschka - (507)362-8875

TODD'S CONSTRUCTION & ELECTRIC, INC., 2344 Nicollet Av,
Minneapolis, MN 55404 - Jerry W. Pemberton (612)871-5940

WILSON ELECTRIC COMPANY, 2901 Lyndale Av S, Minneapolis, MN
55408 - Jeanne Wilson (612)827-5575

ELECTRICAL SUPPLIES

ED BARBER ELECTRIC SUPPLY, INC., 451 Grove St., St. Paul, MN
55101 - Edward L. Barber (612)225-1609

D & M ELECTRIC, INC., 6009 Wayzata Blvd., Minneapolis, MN
55416 - Walter C. Little (612)546-4650

LAMPCO, 2657 Florida Av., St. Louis Park, MN 55426
Akmed Khalifa (612)920-7375

NORTHTOWN ELECTRIC, INC., 744 10th Ave NW, New Brighton, MN 55112
Margaret A. Joyce (612)636-9990

TIM'S ELECTRIC, INC., Rt. #1, Box 135, Kilkenney, MN 56052
Timothy W. Kletschka (507)362-8875

ENGINEERS

GLANTON ENGINEERING CO., INC., (Civil), 3255 Hennepin Av S.,
Minneapolis, MN - John Glanton (612)871-0508

F. A. VILLELA AND ASSOCIATES, INC., 308 Walker Av., Wayzata,
MN 55391 - Frank A. Villela (612)475-0848

ERECTION

BPC, INC., 12000 Riverhills Rd., P.O. Box 237, Rockford, MN
55373 - Murad R. Bhanji (612)477-6314

INFIELD WELDING & ERECTION, INC., Rt. 3, Box 790, Cambridge,
MN 55008 - Geraldine L. Brandt (612)375-1363, metro

EXCAVATING

A-1 EXCAVATING, INC., 1631 Hubbard, St. Paul, MN 55104
Anne Carmouche (612)646-3696

BPC, INC., 12000 Riverhills Rd., P.O. Box 237, Rockford,
MN 55373 - Murad R. Bhanji (612)477-6314

BATTLE WRECKING & CONTRACTING, 880 Ashland Av., St. Paul, MN
55104 - Nate Battle (612)221-1979

C.S.I. EXCAVATING, INC., 15430 58th St. N., Stillwater, MN
55082 - Steve Chaves (612)439-2906, 439-2786

GLANTON CONSTRUCTION CO., 4001 15th Av S, Minneapolis, MN 55407
Wayne Glanton - (612)825-6822

UM HEALTH SCIENCES

(Excavating cont....)

THISTLE CONSTRUCTION, P.O. Box 1341, Mankato, MN 56001
Genette Carleton (507)625-1327

THOR CONSTRUCTION, INC., 8500 Edison Av N., Blaine, MN 55434
Richard A. Copeland (612)473-1332

VEIT CONSTRUCTION, INC., Rt. 2, Box 222, Buffalo, MN 55313
Gae Veit - (612)425-2186, metro

FLOORS

SPECTRUM ANALYSIS COMPANIES, 1009 W. 80th St., Bloomington,
MN 55420 - Michael A. Taylor (612)888-3016

TECHNICAL SURFACING, INC., 9803 Valley View Rd., Eden Prairie,
MN 55344 - John L. Brown (612)941-0750

GENERAL CONTRACTING

A-1 EXCAVATING, INC., 1631 Hubbard, St. Paul, MN 55104
Anne Carmouche (612)646-3696

AZTLAN CONSTRUCTION, INC, 785 Dayton Av., St. Paul, MN 55104
Gregorio Guzman, (612)226-1048

B & K CONSTRUCTION COMPANY, INC., 1277 Charles Av., St. Paul,
MN 55104 - Robert A. Bruyere (612)646-5313

BLUFORD & STEELE CO., INC., 1617 Xerxes Av. N, Minneapolis,
MN 55411 - Joe N. Bluford (612)522-8466

CALAMITY J. CONTRACTING, INC., 2407 Lyndale Av S, Minneapolis,
MN 55405 (612)872-8828

COULOMBE CONSTRUCTION & SUPPLY INC., Rt. 4, P.O. Box 184,
Bemidji, MN 56601 - Lottie F. Coulombe (218)335-6673

CRUSE REMODELING, 3064 Clinton Av S, Minneapolis, MN 55409
Lester Cruse (612)824-9344

DULUTH-SUPERIOR ERECTION, INC., 9800 Old W. Hwy 61, Duluth,
MN 55810 - Donald J. Frye - (218)624-1176

DUNSHEATH CONSTRUCTION & ENGINEERING, INC., Rt. 2, Box 98
Delano, MN 55328 - Heather Dunsheath (612)479-2816

GLANTON CONSTRUCTION CO., 4001 15th Av S, Minneapolis, MN 55407
Wayne Glanton - (612)825-6822

H & M CONSTRUCTION, INC., 432 S. Wabasha St., St. Paul, MN
55107 - Morris Wilson (612)224-5391

(General contracting cont...)

HOUGH COMPANY, 313-9th, R. 3, Box 31, Bagley, MN 56621
Alden E. Hough (218)694-6167

L.J.R. INC. (Formerly Empire Construction), P.O. Box 3715,
St. Paul, MN 55165 - George S. Robinson (612)227-8726

LEECH LAKE RESERVATION CONSTRUCTION CO., INC., Hwy 2,
P.O. Box 308, Cass Lake, MN 56633 - Hartley White (218)335-2207

MINNEWASKA CONSTRUCTION, INC., Rt. 3, Box 27, Glenwood, MN
56334 - Linda L. Sievert (612)634-3592

DOROTHY A. MOORE, 1613 Ridgewood Ln., St. Paul, MN 55113
Dorothy A. Moore (612)631-0947

PETERSON PAINTING & DECORATING, Box 515, Bagley, MN 56621
Lee Peterson (218)694-2186

QUADRA CONSTRUCTION AND DESIGN, 898 Gorman Av., W. St. Paul,
MN 55118 - Claudia J. Tischler (612)771-5471

REHABITAT, INC., 1078 Ashland Av., St. Paul, MN 55104
Susan J. Moore (612)225-7690

S, L & K CONSTRUCTION CO., INC, 650 Sexton Bldg., Minneapolis,
MN 55415 - Fred Shaw (612)332-5357

SARAH, INC., 14853 Square Lake Tr. N., Stillwater, MN 55082
Sally Healy (612)439-6224

SHE PAINTERS & CONTRACTORS, 3522 Harriet Av S., Minneapolis, MN
55408 - Dara Everson (612)824-6502

SOMBRERO CONSTRUCTION & SUPPLY, INC., 7241 County Rd #116,
Hamel, MN 55340 (612)478-6026

STOCKBRIDGE CONSTRUCTION & SUPPLY, INC., 245 E. 6th St.,
St. Paul, MN 55101 - James W. Wilson (612)298-0056

STEELE CONSTRUCTION CO., INC., 3585 N. Lexington Av, Suite 275,
St. Paul, MN 55112 - Edgar Steele (612)482-9500

SYMA BUILDERS & SUPPLY, INC., 5633 Aldrich Av S., Minneapolis,
MN 55419 - Sylvester C. Formey (612)788-9248

TCM CONSTRUCTION INC., 7700 Morgan Av S, Richfield, MN 55423
William E. Moore (612)869-0786

(General contracting cont...)

THE TEXTURE MASTER, 6745 Queen Av S, Richfield, MN 55423
Walter Peterson (612)866-4828

TODD'S CONSTRUCTION & ELECTRIC, INC., 2344 Nicollet Av.,
Minneapolis, MN 55404 - Jerry Pemberton (612)871-5940

UNITED ERECTION, INC., 628 Erie Court, Eagan, MN 55123
Jeanne H. Graves (612)454-7797

VESEL CONSTRUCTION, INC., 1801 W. Pioneer Rd, Duluth, MN 55803
Mabel Vesel (218)721-4106

DAVID N. VOLKMANN CONSTRUCTION, INC., 3009 Harding St NE,
P.O. Box 18051, Minneapolis, MN 55418 - David Volkmann (612)781-3486

GRAVEL - See Sand & Gravel

HAULING/TRUCKING

A-1 EXCAVATING, INC., 1631 Hubbard, St. Paul, MN 55104
Anne Carmouche (612)646-3696

BPC, INC., 12000 Riverhills Rd., P.O. Box 237, Rockford, MN
55373 - Murad R. Bhanji (612)477-6314

C.S.I. EXCAVATING INC., 15430 58th St. N., Stillwater, MN 55082
Steve Chaves (612)439-2906, 439-2786

COPELAND CARTAGE COMPANY, 13916 Cty Rd 6, Plymouth, MN 55447
John F. Copeland - (612)473-1332

GLANTON CONSTRUCTION CO., 4001 15th Av S, Minneapolis, MN 55407
Wayne Glanton (612)825-6822

JESSE'S TRANSFER, INC., 13000 Overlook Rd., Dayton, MN 55327
Jesse B. Miller (612)427-8813

LEECH LAKE SOLID WASTE CO., INC. Hwy 2, P.O. Box 308,
Cass Lake, MN 56633 - Hartley White (218)335-2207

ROY-AL LIMITED, INC., 1017 W. Broadway, Minneapolis, MN 55411
Alfred A. Johnson (612)521-7289

THOR CONSTRUCTION, INC., 8500 Edison Av N, Blaine, MN 55434
Richard A. Copeland (612)473-1332

INSULATION - Installation

MASTERS INSULATION COMPANY, Route 2, Box 18, Akeley, MN 56433
Marjorie C. Bearden (218)652-2000

INSULATION - Mechanical

ED. H. ANDERSON COMPANY, 390 W. Cty Rd D, P.O. Box 2759,
St. Paul, MN 55112 - Lorraine O. Anderson (612)645-3570

GENERAL PIPE COVERING, INC., 708 Vandalia St., St. Paul, MN
55114 - Donna M. Dingley (612)645-6168

KELLER INSULATION, 6064 McKinley St NE, Minneapolis, MN 55432
Jill Vivian Keller (612)571-3747

INSULATION - Sales

SPECTRUM ANALYSIS COMPANIES, 1009 W. 80th St., Bloomington,
MN 55420 - Michael A. Taylor (612)888-3016

LANDSCAPING AND DESIGN

C & L LANDSCAPE & GARDEN CENTER, INC., 4000 4th Av S,
Minneapolis, MN - William M. Little (612)824-3133

GRYGELKO CO., 4141 Welcome Av N, Robbinsdale, MN 55422
Karen Grygelko - (612)534-4072

LEE'S LAWN & LANDSCAPES, 734 Range St., N. Mankato, MN 56001
Leora Ann Steinbach (507)625-5892

NEW ENVIRONMENT DESIGN, 49 SE Williams Av, Minneapolis, MN 55414
Mary and Joan Slettehaugh (612)378-9200

THOR CONSTRUCTION, INC., 8500 Edison Av N., Blaine, MN 55434
Richard A. Copeland (612)473-1332

EDWARD WATSON CONSTRUCTION CO., INC., 521 N. Lyn Park Circle,
Minneapolis, MN 55411 - Edward Watson (612)588-2465

LANDSCAPE SUPPLIES

C & L LANDSCAPE & GARDEN CENTER, INC., 4000 4th Av S, Minneapolis,
MN - William M. Little (612)824-3133

CARLSON'S NURSERY, Hwy 28 & 59, Morris, MN 56267
Barbara Carlson (612)589-1600

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LUMBER - See also Building Supplies

COULOMBE CONSTRUCTION & SUPPLY, INC., Rt. 4, P.O. Box 184,
Bemidji, MN 56601 - Lottie F. Coulombe (218)335-6673

FOSTER WOOD PRODUCTS, P.O. Box 1005, Cass Lake, MN 56633
Nancy M. Foster (218)335-2083

GEMINI INDUSTRIES, INC., 161 N. Victoria, St. Paul, MN 55104
Merle Harris (612)225-8813

RED LAKE INDIAN MILLS, Redby, MN 56670
Red Lake Band of Chippewa Indians (218)679-3346

SPECTRUM ANALYSIS COMPANIES, 1009 W. 80th St., Bloomington,
MN 55420 - Michael A. Taylor (612)888-3016

MASONRY

CON'S MASONRY INC., Rt. 3, Box 260, Bemidji, MN 56601
Conrad Beaulieu (218)751-2212

DAVIES, INC., 13503 Oakland Drive, Burnsville, MN 55337
Susan S. Davies (612)435-8155

EDWARD WATSON CONSTRUCTION CO., INC., 521 N. Lyn Park Circle,
Minneapolis, MN 55411 - Edward Watson (612)588-2465

H & M CONSTRUCTION, INC., 432 S. Wabasha St., St. Paul, MN
55107 - Morris Wilson (612)224-5391

HOUGH COMPANY 313-9th, R. 3, Box 31, Bagley, MN 56621
Alden E. Hough (218)694-6167

KUMAR MECHANICAL, INC., 84 Second Av SE, New Brighton, MN
55112, Vinod B. Kumar (612)636-6564

L. J. R., INC., P.O. Box 3715, St. Paul, MN 55165
(Formerly Empire Construction Co.) George S. Robinson (612)227-8726

M & L WELDING & MECHANICAL, 3237 Humboldt Av N, Minneapolis,
MN 55412 - Milton Lumbar (612)888-8066

SBS MECHANICAL INC., 7160 Madison Av W., Minneapolis, MN
55427 - Gunvant R. Bhatt (612)544-3471

NURSERY SUPPLIES - See Landscaping Supplies

PAINTING, Interior or Exterior, Also Wallpapering

ALLIED PAINTING & RENOVATING, INC., 13721 S. 34 St., Afton,
MN 55001 - Ralph Ruiz (612)436-7194

B & B PAINTING, INC., 247 Third Av S, Minneapolis, MN 55415
William Captain (612)340-8200

HUE-BAR PAINTING & DECORATING, 682 E. Geranium St., St. Paul,
MN 55106 - Jean Ryder (612)776-6018

JESSE F. JAMES, 4821 4th Av S., Minneapolis, MN 55409
Jesse F. James (612)822-8341

LEGARDE PAINTING & DECORATING, 2114 W. 3rd St., Duluth, MN
55806 - Gerald L. LeGarde (218) 727-1063

MASTERS INSULATION COMPANY, Route 2, Box 18, Akeley, MN 56433
Marjorie C. Bearden (218)652-2000

PAINTED SKY ENTERPRISES, INC., 416 E. Hennepin Av., Minneapolis,
MN 55414 - Richard W. Martin (612)378-0282

PETERSON PAINTING & DECORATING, Box 515, Bagley, MN 56621
Lee Peterson (218)694-2186

R & M PAINTING, 9024 47½ Ave. N., New Hope, MN 55428
Roger T. Gardner (612)537-8460

REHABITAT, INC., 1078 Ashland Av., St. Paul, MN 55104
Susan J. Moore (612)225-7690

RODRIGUEZ PAINTING CO., INC., 1151 Burr St., St. Paul, MN
55101 - Manuel J. Rodriguez (612)774-8342

SHE PAINTERS & CONTRACTORS, 3522 Harriet Av S, Minneapolis,
MN 55408 - Dara Everson (612)824-6502

PIPE COVERING - See Insulation, Mechanical

PIPEFITTING

M & L WELDING & MECHANICAL, 3237 Humboldt Av N., Minneapolis,
MN 55412 - Milton Lumbar (612)588-8066

PLASTERING

DULUTH DRYWALL, INC., P.O. Box 6671, Duluth, MN 55806
Richard Zabukover (218)722-5174

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PLUMBING

BARDWELL PLUMBING CO., 412 E. Minnehaha Pkwy., Minneapolis,
MN 55419 - Braxton Bardwell (612)824-5529

STOCKBRIDGE CONSTRUCTION & SUPPLY, INC., 245 E. 6th St.,
St. Paul, MN 55101 - James W. Wilson (612)298-0056

RECREATIONAL CONSTRUCTION SUPPLIES

MINNESOTA PLAYGROUND, INC., P.O. Box 27328, Golden Valley,
MN 55427 - Gail F. Lehman (612)546-7787 (Bleachers, swimming
pool accessories, playground & recreation equipment, sports lighting,
netting, litter & trash receptacles)

RENTALS, Equipment

A-1 EXCAVATING, INC., 1631 Hubbard, St. Paul, MN 55104
Anne Carmouche (612)646-3696

BPC., INC., (Crane Rental), 12000 Riverhills Rd., P.O. Box 237,
Rockford, MN 55373 - Murad Bhanji (612)477-6314

DULUTH-SUPERIOR ERECTION, INC., 9800 Old W. Hwy 61, Duluth, MN
55810 - Donald J. Frye (218)624-1176

ROAD CONSTRUCTION

MINNEWASKA CONSTRUCTION, INC., Rt. 3, Box 27, Glenwood, MN
56334 - Linda L. Sievert (612)634-3592

ROOFING

MASTERS INSULATION COMPANY, Route 2, Box 18, Akeley, MN
56433 - Marjorie C. Bearden (218)652-2000

OXFORD SHEETMETAL & ROOFING CO., 6600 Oxford St., Minneapolis,
MN 55426 - Patricia F. Nielsen (612)925-3934

RELIABLE SHEETMETAL & ROOFING, P.O. Box 565, Mt. Iron, MN
55768 - Larry Glass (218)735-8232

THE RENOVATORS, 5140 Bloomington Av S., Minneapolis, MN 55417
Joyce Van Haren or Nancy Walsdorf (612)824-0594

RUBBISH REMOVAL

JAMES SOLID WASTE DISPOSAL, INC., 1700 Oliver Av N, P.O. Box 11215, Minneapolis, MN 55411 - John A. James (612)529-1539

SAND AND GRAVEL

ARSENAL SAND & GRAVEL CO., INC., P.O. Box 12707, New Brighton, MN - Sylvia R. Immel (612)633-5510

SANDBLASTING

ALLIED PAINTING & RENOVATING, INC., 13721 S. 34 St., Afton, MN 55001 - Ralph Ruiz (612)436-7194

SECURITY SYSTEMS

ARMOR SECURITY INC., 2313 Hennepin Av S., Minneapolis, MN 55405
Margarita Del Carmen (612)374-1826

SHEETMETAL INSTALLATION

KUMAR MECHANICAL, INC., 84 Second Av SE, New Brighton, MN 55112 - Vinod B. Kumar (612)636-6564

RAY LARSON CONSTRUCTION CO., 14555 Genesee Av., Apple Valley MN - Ray Larson (612)432-1177

SODDING - See Landscaping

STEEL ERECTION

AMERICAN RIGGING & ERECTION, INC., 3032 Centerville Road, St. Paul, MN 55117 - Henry A. Downham (612)484-7967

STEEL FABRICATION

M & L WELDING & MECHANICAL, 3237 Humboldt Av N., Minneapolis, MN 55412 - Milton Lumbar (612)588-8066

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STEEL SUPPLIES

ALLIED STEEL & ENGINEERING CORPORATION, 3400 Meridian Drive,
Minneapolis, MN 55422 - Freda Levine (612)588-4644

SUPPLIES: See Building Materials, Ceramic Tile, Electrical,
Floors, Landscaping, Lumber, Plumbing, Recreational, Sand &
Gravel, Security, Sheet Metal, Steel, Water and Sewer

TEXTURING

DULUTH DRYWALL, INC., P.O. Box 6671, Duluth, MN 55806
Richard Zabukover (218)722-5174

THE TEXTURE MASTER, 6745 Queen Av S, Richfield, MN 55423
Walter Peterson (612)866-4828

TRUCKING - See Hauling/Trucking

TUCKPOINTING

LINDQUIST TUCKPOINTING CO., 857 84th Av NE, Minneapolis, MN 55432
B. James Lindquist (612)784-8058

UNDERGROUND TANKS

NORTHLAND EQUIPMENT INC., 4210 W. Second St., Duluth, MN
Merian Fitzsimmons (218)628-2261

WATER & SEWER

C.S.I. EXCAVATING INC., 15430 58th St. N., Stillwater, MN
55082 - Steve Chaves (612)439-2906, 439-2786

WATER & SEWER SUPPLIES

NORTHLAND EQUIPMENT INC., 4210 W. Second St., Duluth, MN
Merian Fitzsimmons (218)628-2261

WELDING

INFIELD WELDING & ERECTION, INC., Rte 3, Box 790,
Cambridge, MN 55008 - Geraldine L. Brandt (612)375-1363 metro

Page 14

Welding cont.

M & L WELDING & MECHANICAL, 3237 Humboldt Av N, Minneapolis,
MN 55412 - Milton Lumbar (612)588-8066

A. TREJO & SONS WELDING, 20315 Quamme Av E, R.R. 1,
Hastings, MN 55033 - Andy J. Trejo (612)437-6599

WELL DRILLING

MCCARTY WATER & WASTE, 6250 Highway 12, Maple Plain, MN 55359
Mary Kay McCarty (612)479-2593



SET ASIDE PROGRAM FOR SMALL BUSINESS (FOR MINNESOTA FIRMS)

See definitions for Small Business, and Small Business owned and operated by socially or economically disadvantaged persons on the back of this page.

Application for Designation: Small Business
 Small Business owned and operated by socially or economically disadvantaged person(s) which include racial minorities, women and persons who have suffered a substantial physical disability. Percentage of ownership must be 51%.

If you checked Small Business owned and operated by socially or economically disadvantaged person(s), please provide information indicating the basis of claim for this designation below. (If this information is not provided, your application will not be considered, the responsibility of determining the classification type for your business is yours.) Female Ethnic Minority—Indicate Type _____

(American Indian Tribal Number _____)

Other _____

Note—Minnesota statutes recognize as minority the following categories as a guide, but not as all inclusive: Black Americans, Native Americans (American Indian, American Eskimo), Asian Americans, Hispanic Americans, female persons, substantial physical disability, labor surplus area persons, and other persons who may qualify pursuant to the Set Aside Law.

Certificate of Compliance—Dept. of Human Rights: Yes No Applied For

Date Certified _____

Business Identification

Legal Structure

Firm Name			<input type="checkbox"/> Corporation	<input type="checkbox"/> Broker
Street	P.O. Box	County	<input type="checkbox"/> Partnership	
City, State, Zip	Phone (Inc. Area Code)		<input type="checkbox"/> Proprietorship	
			<input type="checkbox"/> Other _____	

Principal Product(s) or Service(s):

_____	<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Construction—Special
_____	<input type="checkbox"/> Non-manufacturing	<input type="checkbox"/> Service/Parts
_____	<input type="checkbox"/> Construction—General	<input type="checkbox"/> Other

Dates: Established under current ownership _____ Minnesota State Withholding Tax and/or Registered with Secretary of State _____ Sales Tax Number _____
Withholding Sales

Method of Acquisition: Bought existing business Secured franchise Secured concession
 Started new business Other _____

Number of Fulltime Employees: Office and Administrative _____ Labor Force _____

Principal(s) (Owner or Majority Stock Holder(s))

Name	Phone	Name	Phone
Address		Address	
		UM HEALTH SCIENCES	
Title		UNIT B/C X	
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Percent of Ownership		Percent of Ownership	

SAMPLE-SED SELF CERTIFICATION FORM
STATE OF MINNESOTA

ARTICLE

Chapter File No. 931

CHAPTER 361

(The excerpts below are from the above law and are the definitions necessary to help applicants in type of classification and eligibility.)

28 "Subd. 2. 'Small business' means a business entity
29 organized for profit, including but not limited to any
30 individual, partnership, corporation, joint venture,
31 association or cooperative, which entity:
32 (a) is not an affiliate or subsidiary of a business
33 dominant in its field of operation; and ..."

1 "(b) Has 20 or fewer full time employees or not more
2 than the equivalent of \$1,000,000 in annual gross revenues
3 in the preceding fiscal year.

4 Subd. 3. "Dominant in its field of operation" means
5 having more than 20 full time employees and more than
6 \$1,000,000 in annual gross revenues.

7 Subd. 4. "Affiliate or subsidiary of a business
8 dominant in its field of operation" means a business which
9 is at least 20 percent owned by a business dominant in its
10 field of operation, or by partners, officers, directors,
11 majority stockholders, or their equivalent, of a business
12 dominant in that field of operation.

13 Subd. 5. "Socially or economically disadvantaged
14 person" means a person who has been deprived of the
15 opportunity to develop and maintain a competitive position
16 in the economy because of social or economic conditions.
17 This disadvantage may arise from cultural, social or
18 economic circumstances, or background, physical location if
19 the person resides or is employed in an area designated a
20 labor surplus area by the United States department of
21 commerce, or other similar cause. It includes racial
22 minorities, women, or persons who have suffered a
23 substantial physical disability ..."

SET ASIDE PROGRAM FOR SMALL BUSINESS (FOR MINNESOTA FIRMS)

Gross Volume of Business Last Year: _____

Major Clients (List at least 3): _____

Affiliate or Subsidiary of a Dominant Business in the Same Field of Operation:

Yes No

Type of Equipment: _____

Ownership in Other Firms: If any of the owners have ownership or partial ownership in any other firms or stores, etc., please check Yes or No; if your response is Yes, list names and addresses as well as other owners, individual or company.

Yes No

<u>Name</u>	<u>Address</u>	<u>Percent of Ownership</u>	<u>Annual Gross Revenue Last Fiscal Year</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Additions may be made on separate sheet and attached. _____ pages attached.

CERTIFICATION FOR SET ASIDE PROGRAM

I certify that my company is eligible for the program as defined in this form and law applicable to the program I am applying for.

Certified By:

Name _____ Title _____ Date _____
(must be owner or officer of company)

The University of Minnesota reserves the right to request any additional information deemed necessary.

Return the White, Pink, and Blue copies to the University of Minnesota, Purchasing Department, 1919 University Ave, St. Paul, Minnesota 55104

STATE OF MINNESOTA/DEPARTMENT OF LABOR AND INDUSTRY

Minn. Stat. §§ 177.41 - 177.44 (1978)

CERTIFIED PREVAILING WAGES FOR COMMERCIAL CONSTRUCTION

THIS NOTICE MUST BE POSTED ON JOBSITE
WHEN PERFORMING STATE CONTRACTS

County of Hennepin Effective Date of Determination SEP 29 1980

Classifications not listed herein were not reported by contractors during the survey.

Wage rates and classifications not listed below are not affected by this survey.

NOTICE TO BIDDERS - WAGE DETERMINATIONS

The wage determinations include classifications which the Commissioner of the Department of Labor and Industry has determined to be the classes of labor and mechanics commonly employed in commercial construction work. Additional classifications may develop between certifications by the Commissioner. No inference may be drawn from the omission of classifications which have local usage. The state will not be liable for increased labor costs if additional classifications are subsequently certified and wage rates increase prior to awarding of contracts.

PREVAILING HOURS OF WORK

The "prevailing hours of labor" for all classes of laborers and mechanics to be employed on state contract commercial construction work are eight hours per day and forty hours per calendar week.

* Indicates that adjacent county rates were used for this classification determination due to insufficient data being received for this county.

Code Number & Classification	Basic Wage Rate Per Hour					Prevailing Hrly. Rate Which Must Be Paid
	Basic	HAW	Pen-sion	Vac.	Other	
101 Laborer, common (general labor work)	9.40	.60	.45	.40	.00	10.85
102 Laborer, skilled (assisting skilled craft journeyman)	7.10	.85	.35	.00	.07	8.37
103 Laborer, Landscaping (gardner, sod layer and nurseryman)	9.85					9.85
109 Underground and open ditch laborer (8 ft. below starting grade level)	9.50	.60	.45	.40	.00	11.05
203 Dragline and/or other similar equipment with shovel type controls	12.00	.70	.55	.00	.05	13.30
204 Bituminous spreader and finishing operator	11.25					11.25
207 Concrete distributor and spreader operator, finishing machine, longitudinal float operator, joint machine or spray operator	12.19	.55	.25	.70	.13	13.82
210 Curb machine	11.43	.70	.55	.00	.05	12.73
211 Front end loader operator up to and including 1 cu. yd.	10.55	.70	.55	.00	.05	11.85
213 Forklift operator	11.78	.70	.55	.00	.05	13.08
214 Front end loader operator	11.43	.70	.55	.00	.05	12.73
218 Grader operator (motor patrol)	11.43	.70	.55	.00	.05	12.73
220 Hoist engineer	11.90	.70	.55	.00	.05	13.20
222 Mechanic or welder	7.00	.29	.00	.13	.00	7.42

Code Number & Classification	Basic Wage Rate Per					Prevailing Hrly. Rate Which Must Be Paid
	Hour	H&V	Pen- sion	Vac.	Other	
223 Oilers (power shovel, crane, dragline)	11.90	.70	.55	.00	.05	13.20
227 Roller operator, up to and including 6 tons for bituminous finishing and/c. wearing courses	10.65					10.65
229 Roller operator, over 6 tons for bituminous finishing and/or wearing courses	10.65	.70	.55	.00	.00	11.90
231 Rubber tired tractor, back hoe attachment	11.43	.70	.55	.00	.05	12.73
234 Turnapull operator (or similar type)	9.30	.70	.55	.00	.05	10.60
235 Tractor operator, D2, TD6 or similar h.p. with power take-off	11.43	.70	.55	.00	.05	12.73
236 Tractor operator, over D2, TD6 or similar h.p. with power take-off	11.43	.70	.55	.00	.05	12.73
238 Truck crane oiler	10.85	.70	.55	.00	.05	12.15
302 Dumpman	9.15	.60	.45	.40	.00	10.60
305 Truck driver (hauling machinery for contractors own use including opera- tion of hand or power operator winches)	10.40	.65	.50	.00	.00	11.55
306 Single axle or 2 axle unit	7.00					7.00
309 Five axle unit	10.35	.70	.55	.00	.05	11.65
403 Ericklayers	11.16	.66	.73	.70	.06	13.31
404 Carpenters	12.46	.55	.55	.00	.02	13.73
405 Carpet layers (linoleum)	10.73	.71	.64	.88	.04	13.00
406 Cement Masons	11.63	.60	.60	.00	.00	12.83
407 Electricians	12.15	.85	.73	1.28	.09	15.10
408 Elevator Constructors	8.30	1.05	.69	.50	.03	10.57
409 Glaziers	11.30	.45	.50	.35	.01	12.61
410 Lathers	13.31					13.31
412 Ironworkers	12.20	.85	.80	.00	.04	13.89
414 Millwright	11.26	.70	.55	.55	.02	13.08
415 Painters	10.81	.65	.40	.50	.11	12.47
417 Pipefitters - steamfitters	11.70	.57	.53	1.52	.10	14.42
418 Plasterers	11.55	.50	.45	.70	.17	13.37
419 Plumbers	11.24	.70	.63	1.75	.10	14.42
420 Roofer	10.75	.85	.35	1.00	.07	13.02
421 Sheet metal workers	11.41	.79	1.00	1.15	.20	14.55
422 Sprinkler fitters	13.73	.75	1.05	.50	.00	16.03
423 Terrazzo workers	12.02	.64	.25	.00	.00	12.91
424 Tile setters	11.40	.72	.50	.00	.08	12.70

1.1 DIVISION ONE

A. The requirements of all Sections of Division apply to and shall govern the Contractor and all Subcontractors for this Project. Where provisions and requirements are referred to as the responsibility of a particular Contractor, or a Subcontractor, he shall have the primary responsibility to accomplish, provide, assume, and enforce; but all Contractors and all Subcontractors shall be governed by the requirements and cooperate fully in fulfilling the requirements.

1.2 GENERAL SUMMARY OF WORK UNDER THE CONTRACT DOCUMENTS

A. Location: The Project site is located in the Unit B/C of the Health Sciences Complex on the Minneapolis Campus of the University of Minnesota, on Delaware Street, bounded generally on the east by the VFW Hospital and Masonic Memorial Research Center, on the north by Unit A of the Health Sciences Complex, on the west by Mayo Court and Mayo Hospital and on the south by Diehl Hall.

B. General Scope: The Project under these Contract Documents consists of the finishing of certain "Shell" space on Floor 5 of Unit B/C within the scope of the Contract Documents. Singular notations and specifications shall be considered plural where plural application is required for completion. Mention or indication of extent of work under any work division or specification section is done only for the convenience of Contractor and shall not be construed as describing all work required under that division or section.

C. Contract Under These Documents: The construction will be accomplished under a single contract.

1. The index to drawings is on the first sheet of the architectural drawings; the mechanical and electrical drawings primarily apply to those trades and the remainder of the drawings to the General Construction trades; however, Contractor and all Subcontractors shall be bound by the information and requirements provided by the complete set of drawings.

1.3 RELATED WORK NOT UNDER THESE CONTRACT DOCUMENTS

A. In addition to the work under these Contract Documents, and the previously awarded contracts, the Owner has, and will continue to award contracts for work to complete the Unit B/C Project, for work that is related to this Project or related to the progress of the entire Health Sciences Complex. A listing of anticipated work is provided for the general information of the Contractor; do not construe the list as complete, nor affecting the Owner's rights in any way. Items marked with an asterisk (*) indicates work in progress, or anticipated to be in progress prior to the on-site commencement of work under this Contract.

1. By University

*a. Maintenance of exit ways from adjacent buildings.

b. Maintenance of heating, ventilating and air conditioning systems and electrical distribution systems of Unit B/C and adjacent buildings as they are completed and placed in service by other B/C Contractors.

*c. Providing energy for construction heat, light, and power for B/C Phase XIII after completion of other B/C Contracts.

d. Equipping University's field office and utilities for same.

2. By Utility Companies or Other Contractors

*a. Construction of Unit F, north and east of the northeast corner of Unit A.

*b. Completion of other "shell" spaces in Unit B/C.

1.4 ADDITIONAL DEFINITIONS

A. B/V IV-C Otolaryngology Contractor: Arkay Construction, who is under a separate contract with the University.

B. Unit F General Contractor: Kraus-Anderson of Minneapolis, Inc., who is under a separate contract with the University.

C. Unit F Mechanical Contractor: Axel Newman Heating and Plumbing Company, who is under a separate contract with the University.

D. Unit F Electrical Contractor: Electric Repair and Construction Company, who is under a separate contract with the University.

E. B/C I-A Diehl Hall Contractor: ABJ Enterprises, Inc.

F. B/C V-2 Lab Medicine and Pathology and Department of Surgery Contractor: Sheehy Construction Company.

G. B/C V-3 Medical Oncology Outpatient Clinic including sitework adjacent to and east of Unit C. Contractor: Arkay Construction.

H. B/C V-4 Addition of Elevators Contractor: Sheehy Construction Company.

I. B/C XI Department of Pediatrics and Department of Medicine Contractor: Sheehy Construction Company.

J. B/C XIII Department of Dermatology Offices: Contractor to be identified upon award of Contract.

K. Test and Balance Consultant: An independent firm specializing in testing and balancing services of air and hydronic systems in building construction, which will be retained by the University to perform the services outlined in Section 15010.

L. Owner: Where used, the term is synonymous with the University.

M. Construction Site Limits: The area within the limits indicated on the drawings, which are the ultimate or maximum limits, except for related isolated work which must be accomplished outside the limits to complete the contract. The construction limits are variable, up to the indicated maximum. The specified requirements to maintain access, constraints as to when certain phases or areas of the work can be accomplished or other restrictions shall mean the construction limits will be necessarily otherwise located, or restricted to other locations, resulting in staged construction limits. The Construction limits and site fencing shall not infringe on access to adjacent buildings, existing streets or pedestrian traffic until work in the specific area is scheduled to commence. At various times during construction, the University reserves the right, in consultation with the Contractors, to designate other actual construction limits to accommodate the phases and areas of work in progress.

N. Prior to utilizing any street or sidewalk area, obtain approval from the University and abide by their restrictions. The location of the work and the requirement to maintain normal functions dictates close coordination with the University, carefully planned operations, and cooperation by all parties.

1.5 PRECONSTRUCTION CONFERENCE AND SITE MEETINGS

A. After award of contracts at time designated by the University, the Contractor and major subcontractors shall attend a pre-construction Conference at a location in the Metropolitan Twin Cities area. Government requirements, procedures to be followed, coordination efforts and similar matters will be reviewed.

B. During construction, periodic site meetings will be held under the supervision of the University at times directed by the University. These meetings will be held every other week (unless job conditions do not warrant) and may be held more frequently if job progress and needs indicate. Except when excused as being not necessary due to the status of work, Contractor and major subcontractors shall have one or more responsible for recording "minutes" of the meeting and distributing them to all interested parties. A separate monthly meeting may be held after the Construction Schedule periodic up date. In addition to the above meetings, the Contractor and subcontractors when appropriate, shall hold his own coordination meetings, involving other Contractors when appropriate.

1.6 PERMITS AND FEES

A. Refer to Paragraph 4.7 of the General Conditions. The University will obtain and pay for all permits and connection charges of the State, City of Minneapolis and utility companies, at no cost to the Contractors, except as noted in C following.

B. The University will pay all fees to the State, as may be required for review and inspection services.

C. The Contractors shall make their own arrangements, and pay any charges including parking costs and bonds, for use of public streets or roads in transporting, loading/unloading or use of construction equipment on the streets.

1.7 INSURANCE

A. Contractor's Liability Insurance: Refer to General Conditions, Subparagraph 11.1.10, Clause .8. Each Contractor shall provide Umbrella Excess Liability Coverage to supplement the Specified underlying limits of all required coverages. The minimum excess liability amounts of the umbrella policy of each Contractor shall be:

General, Mechanical and Electrical Contractors \$5,000,000.

B. Property Insurance: Refer to General Conditions, Paragraph 11.2.

1.8 SITE MANAGEMENT - SUMMARY OF SITE RESPONSIBILITIES UNDER THIS AND OTHER CONTRACTS

A. Refer to Division C, General Conditions for general requirements; in particular Articles: 4.3, and 4.9 for superintendence on the site; 4.14 and 7.10 for use of site and premises; 10 for protection safety and storage; 3, 4, 5 and 5 for coordination and cooperation in general, 4.16 for condition and care of site; and other Articles of this Section 01010 for more specific requirements.

B. The B/C Phase X Contractor shall assume site management of his assigned portions of the building within seven days after award of Contract and shall carry responsibility for the site management until final completion of his contract. The B/C Phase X Contractor shall cooperate and coordinate his own site management activity with those of the earlier contract.

C. Site management and maintenance shall include, but not be limited to: maintenance of existing construction fence gates, temporary building entrance and plaza planking to remain in good condition; providing and maintaining temporary facilities as specified; fire safety management, as specified in this section; general security of his project areas; and similar overall or general management of site and adjacent public and other property to fulfill the obligations of this Contract.

D. Site management shall include all areas of the site, including access and storage/staging areas.

1.9 CONTRACT DOCUMENTS PROVIDED TO THE CONTRACTORS

A. The Contractors will be provided, free of charge, the number of sets of drawings and specifications as scheduled below. Additional sets may be obtained at the cost listed in the Instructions to Bidders as the "Deposit" amount. (No refunds will be given.) Subcontractors shall obtain sets from the Prime Contractor; free sets will not be issued to Subcontractors by the Architect/Engineer or University.

B. Schedule of sets:

<u>Contract</u>	<u>Complete Sets Including All Trade Areas</u>	<u>Sets Which are Primarily for Work of Major Trade Areas</u>	
		<u>Drawings</u>	<u>Specs</u>
General Construction	3	14	14
Mechanical Work	2	10	10
Electrical Work	2	10	10

1.10 TEST AND BALANCE SERVICE

A. Under a separate contact, the University will retain a qualified consultant to provide test and balance services of the HVAC and piped/pumped systems of the Project, as further specified under Article 1.18 of Section 15010.

B. All Contractors shall coordinate and cooperate with the test and balance consultant, including permitting access to the work as necessary to properly test and balance all systems.

C. In addition to the work under the Mechanical Contract, all Contractors shall provide the test and balance consultant with any required shop drawings other data and characteristics the consultant may require to complete the services.

1.11 CONDITION AND CARE OF SITE AND PROJECT

A. Refer to Article 4.14 of General Conditions. From the time the Contractors for this project commence work at the site until their Contracts are completed, each Contractor is responsible for the care of the site and project to the extent his work, acts, operations or use of the site affects the site and project, subject to the rights of the University and the University's workmen thereon.

B. The Contractor shall confine his apparatus, materials, equipment, and operations of workmen to the site and construction limits indicated on drawings or otherwise imposed by law or ordinance. The site and project shall not be unreasonably encumbered with materials and equipment. Neat and orderly stockpiling and other operations shall be maintained and debris shall be regularly removed from the site. Before any work is started, Contractors shall meet with the University and agree to the use of available areas for storage. The Contractors shall then confine their storage and operations to said agreed limits and to University directions.

C. All improvements on or about the site and adjacent property which are not shown to be altered, removed or otherwise changed shall be restored to the conditions which existed previous to starting work. All existing buildings, structures, or other features shall be protected from damage by any operation in connection with the project. Contractor shall replace or repair, at his own expense (and to the satisfaction of the University), all damage to existing buildings, sidewalks, curbs, drives, lawns, plants, trees, shrubbery, and other property resulting from work of his Contract, from whatever cause.

D. The General Contractor shall protect existing trees and features of adjacent buildings (including Unit A) which are to remain and are susceptible to damage from ordinary operations of the Contractors, trucking, or other activity.

E. Utilities or other services which are shown, nor not shown but encountered or otherwise found, shall be protected by the Contractor from any damage from excavation or other work and operations of this Contract, unless or until they are abandoned. If the utilities or services are not abandoned, or to be abandoned, the Contractor shall immediately restore any damage from his work or operations to place the utilities and service in an equal or better condition to that which existed. Where utilities or services are shown to be abandoned or moved, they shall remain in service, and be protected by the Contractor, until new utilities and services have been provided, tested and are ready for use.

F. The normal functions of the University and Campus shall not be disturbed, except within the construction limits and storage/staging areas of this Contract. Except when work is in progress at areas indicated for work to be performed, or as otherwise necessary to complete the Contract, all walks, driveways, park areas, and entrances shall be kept clear and free of all Contractor's equipment, material and debris at all times. Remove debris promptly.

G. The University will continue to occupy the surrounding buildings and continue the normal functions, including parking and delivery. The University's employees and staff shall have full access to surrounding areas and shall be allowed to performed their duties therein without any restriction.

1.12 LAYOUT OF THE WORK

A. The General Contractor shall locate and layout his work with relation to existing reference points. The Contractor shall consult with the University and demonstrate to the University's satisfaction the significant points and elevations are correctly established.

B. Each Contractor or Subcontractor shall correctly locate his work in relation to the building and site features, to all requirements imposed by the drawings and good construction practice. Each Contractor shall verify the locations of all existing work to which his work must fit and all grades, lines, levels and dimensions shown on the drawings and report any errors or inconsistencies in above to University before commencing work.

C. As the work progresses, the General Contractor shall lay out the exact location of grids, partitions and similar features, as guide to all trades. Partitions shall be laid out (marked) by using permanent color paint, before any materials are stored on the floors. Grids shall be laid out as may be required, using temporary marking methods unless floor covering will be installed.

D. The Contractor shall recognize that the drawings necessarily are diagrammatic, in many instances. All work and in particular exposed piping, ducts, conduit and similar items shall be neatly and carefully laid out to provide the most useful space utilization and the most orderly appearance. Piping and similar work shall be installed as close to ceilings and walls as conditions permit, located to prevent interference with other work or with the

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use of the spaces in the manner required by the functions of the room and staff. Valves shall be located in inconspicuous places. Before proceeding with any work, particularly where exposed, the Contractor shall carefully plan the layout and review it with the University for acceptability of location.

1.13 REFERENCES TO STANDARDS AND CODES

A. If the Contractor observes that the drawings and specifications are at variance with any applicable code or regulation of a governmental unit having authority, he shall promptly notify the University and Architect in writing, and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the University, he shall bear all costs and damages arising therefrom.

B. The standards referred to, such as ASTM, Federal Specifications and similar standards, shall have full force and effect as though printed in the specifications, except as modified in the specification. These standards are not furnished to bidders and the Contractor as it is assumed that manufacturers and trades involved are familiar with their requirements.

C. Any material specified by reference to the number, symbol or title of a specific standard, such as ASTM, Commercial Standard, a Federal Specification, a trade association standard, or other similar standard, shall comply with the requirements in the latest revision thereof and an amendment or supplement thereto in effect on the date of the Contract Documents, unless otherwise noted.

D. For products specified in accordance with a Federal Specification, ASTM Standard, American National Standards Institute or similar association standards, upon request the Contractor shall provide an acceptable affidavit by an independent testing laboratory, or other source approved by the University and Architect, certifying that product furnished for this project complies with particular standard specifications. Where necessary, requested or specified, supporting test data shall be submitted to substantiate compliance. The manufacturer is subject to Architect's acceptance.

1.14 CHARACTER OF WORK, MATERIALS AND INSTALLATION

A. The work shall conform in all respects with requirements of all Contract Documents, and workmanship shall be first quality, the best obtainable at the present state of the crafts. Incompetent or careless workmanship shall not be permitted by the Contractor and will not be accepted by the University.

B. If, in opinion of the Contractor (or any Subcontractor) any work is indicated on drawings or specified in such manner as to make it impossible to produce work of highest quality, within space shown, or which may be considered improper for use and conditions, including the effects of expansion and contraction, or should discrepancies appear between drawings, or drawings and specifications, the Contractor shall refer same to the University and the Architect before proceeding. If the Contractor does not request such interpretation, no excuse will be entertained thereafter for failure to carry out and guarantee the work in a satisfactory manner. Elements of the work intended to protect against weather shall be guaranteed weather and water tight.

C. Proper performance of the Contract shall imply, among other things, correct and proper placement, proper or published results for products and equipment, fitting and operation of fixed or movable and operating parts of the work, including doors, windows, hardware and all systems and equipment. All materials and equipment shall be complete in every respect, with all parts, connections, anchors, devices, backing, fittings and other necessary items, and shall be completely installed, anchored, fitted and placed in operating condition. Before buying, constructing or installing work, the Contractor shall notify the University and the Architect of any conditions which may exist in the Contract Documents which will affect proper operation or first quality installation.

D. Throughout project, various materials and pieces of equipment are fitted to others various materials are applied to which other materials attach and similar installation relationship. Each manufacturer, Contractor and Subcontractor shall take all reasonable precautions to insure his materials, devices, items, equipment or other products can be satisfactorily applied or installed to each other or work of others and he shall make necessary adjustments during preparation of shop drawings or in advance of field or shop work to accommodate other work to prevent unsatisfactory items or installation.

E. All materials or equipment shall be installed or applied according to directions of the manufacturer or recommendations of an association dealing primarily with materials, unless specifically designated otherwise. In no case shall the installation, including any temporary work necessary (i.e. shoring), be below the standard recommended by the manufacturer. Where specified requirements exceed the manufacturer's standards, the specification shall govern. Fabrication (including reinforcing and accessories) and installation shall be provided to insure proper placement and use of the item or material under the location, use, condition and available space to serve intended function and to meet code requirements.

F. Equipment and devices shall be provided and installed to "fail safe" in all circumstances and it shall be Contractor's obligation to provide and install work in such manner.

1.15 PROPOSED MATERIALS AND EQUIPMENT

A. Refer to Article 12 of the Instructions to Bidders, Paragraph 7.12 of the General Conditions and Article 2.3 of Section 01300, Submittals. The Contractor shall provide materials, articles, equipment, systems and other items (products) that have been specified, or listed in adenda, under the specified conditions and criteria. Requests for the use of alternate products after bids have been received will not be considered, nor changes allowed in the accepted list of products, except when the specified or accepted product subsequently is determined as not meeting the requirements of the Contract Documents or the product becomes unavailable, and then only under the following conditions:

1. The Contractor (or subcontractor) has placed orders for the specified materials and equipment (products) promptly upon award of contract and acceptance of list. No excuse or proposed substitution will be considered for products due to unavailability unless proof is submitted that firm orders were placed immediately.

2. The reason for unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to prolonged strikes or lockouts which will seriously delay the entire Project to an extent the University finds unacceptable, bankruptcy, discontinuance of manufacture of a product or Acts of God.

3. The request for the use of an alternate product is submitted in writing within 10 days after the date the Contractor has ascertained the product does not comply with the specifications or has become unavailable, accompanied by supporting evidence.

4. The Contractor proposed to use an alternate product that was specified or listed in an addendum, along with complete data on the product.

5. There is no extra cost to the University.

6. The alternate product is acceptable to the University and Architect.

B. If, after acceptance of the Contractors proposed list of materials, required under Section 01300, by subsequent evidence or investigation the University or Architect determines a product has been misrepresented and will not comply with, or perform in accordance with, the Contract Documents, they shall have the right to require a change to a complying product without increase in cost to the University.

1.16 CONSTRUCTION FENCE

A. The existing construction fence gates and temporary building entrance and plaza planking will remain and shall become the shared responsibility of all shell space construction Contractors when they assume site management. When the Contractor assumes site management, he shall maintain the gates, entrance and planking as may be required during the progress of the project.

1.17 DOCUMENTS OF OTHER CONTRACTS

A.. Documents of other contracts provide for constraints that may relate to the work of this Contract.

B. Copies of these documents are on file in the Unit B/C University Project Office and may be examined there for coordination with this Contract.

1.18 SECURITY AND FIRE SAFETY SURVEILLANCE

A. The University will provide any remaining surveillance service as it may require inside the building but will not provide such services to the B/C Phase X Contractor's materials or equipment and will not be held responsible for Contractor or Subcontractor losses.

B. The B/C Phase X Contractor shall provide all surveillance and security precautions as he deems necessary to protect the material and equipment of his work. He shall cooperate fully with the University with respect to its security measures for buildings and contents.

1.19 FIRE SAFETY DIRECTOR

A. The B/C Phase X Contractor shall appoint a responsible member of his organization to act as Fire Safety Director, whose duty it shall be to minimize fire hazards and to enforce fire safety precautions. The Fire Safety Director shall develop procedures and regulations acceptable to the University, to guide all Contractors.

B. Contractors and Subcontractors shall conform to and abide by all reasonable requirements of recommendations of the Fire Safety Director and the University. The Fire Safety Director shall consult and coordinate with the Fire Department of the City of Minneapolis in the development of the fire protection planning.

1.20 FIRE SAFETY PRECAUTIONS

A. The Contractor shall exercise extreme care to maintain and exercise adequate fire safety precautions throughout the work. This shall include providing sufficient fire fighting devices, watchmen, standby helpers or other precautions during construction, in use of temporary heat, welding, brazing, sweating, testing or other phases of work. Refer to Section 01500 for temporary fire fighting devices to be provided under the Contract.

B. All welding, brazing, cutting and sweating operations performed in vicinity of or accessible to combustible materials shall be adequately protected to make certain that sparks or hot slag do not reach the combustible materials and start a fire.

C. Materials shall be protected from sparks, hot slag or hot splatter. All glass, glazed materials and other finishes, in the vicinity of welding, brazing and cutting, shall be masked by the Contractor performing the welding work.

D. When necessary to do cutting, welding, brazing, sweating and similar work in vicinity of wood, in shafts or vicinity of any combustible material (and the combustible material cannot be removed), the materials shall be adequately protected with asbestos blankets or similar approved coverings. In addition, a helper shall be stationed nearby with proper fire extinguishers (provided by the Contractor performing the work) to guard against sparks and fire.

E. Whenever combustible materials have been exposed to sparks, molten metal, hot slag or splatter, a man shall be kept at the place of work for at least two hours after completion to make sure that smoldering fires have not been started.

F. Whenever cutting or welding operations are carried on in a vertical pipe shaft a man to act as a fire guard shall be employed to examine all floors below the point of cutting or welding. This fire guard shall be kept on duty at least two hours after completion of work to guard against fires and he shall examine each level after this time, prior to leaving. There shall be no exceptions to this requirements and failure to comply will be construed as negligence.

G. Before starting work involving cutting, welding, brazing or sweating operations, consult with the Fire Safety Director and the University as to particular precautions to be employed.

1.21 PROTECTION OF SPRAY-ON FIREPROOFING

A. Refer to Section 01500 for temporary heat and Section 01200 for anticipated sequence of work. At all times, the sprayed-on fireproofing shall be protected from damage. The General Contractor shall protect the fireproofing from water or weather damage.

B. Contractor shall exercise extreme care to prevent damage and to avoid removal of the fireproofing, including accidental knocking-off of the fireproofing. The General Contractor shall remove and replace any damaged fireproofing and at no cost to the University.

C. Where fireproofing is removed to make an attachment, or where fireproofing is removed from attachments to make connections, the General Contractor shall reapply the fireproofing as required to maintain full thickness and fire rating, with the cost of such re-application paid for by the Contractor responsible for the attachment.

1.22 EQUIPMENT LAYOUTS AND ROUGH-IN

A. It is the intent that for equipment for this Contract, full layout and rough-in data is to be provided by the Contractor or Subcontractor supplying the equipment, to the Contractor or Subcontractor requiring the data, in sufficient time to facilitate proper and accurate rough-in, in so far as practicable. For existing equipment of the University, the University will provide the rough-in data.

B. When rough-in details are not available at the time service systems are being installed (either from the University or from other Contractors) the final rough-in shall be postponed until the data is available. At all times, prior to roughing-in for equipment (by University) the Contractors shall consult with the University to verify the status of rough-in data.

C. When equipment rough-in data is not available at the time the service systems are being installed, the services shall be run to the approximate locations and temporarily capped, for later extension. For down-feed services in service chases the services may be stubbed down below the ceiling line, for later completion even after walls and ceilings are installed. The face panels of service chases shall temporarily be left off, if the service work is incomplete, when the remainder of the wall surfaces are installed, to permit later completion of the rough-in. The panel faces shall be installed when the rough-in is complete.

D. When a horizontal run of services may be necessary between a service chase and the equipment, with the permission of the University, the service may be run exposed along the wall. The exposed piping will be permitted, however, only: If job progress requires the wall finish to be applied prior to the piping; if the piping will be concealed behind equipment; the equipment installation allows for such exposed work; and the necessary final rough-in data is not available.

E. For waste and other services passing through the floor, with the permission of the University, core drilling for other holes may be done to facilitate job

progress or to more accurately locate the holes, with such core drilling done without additional cost to the Owner.

F. At core drilled holes, the specified sleeves will generally be required, except where the omission is specifically approved by the University. Refer to Article 1.25 this section. Where omission of a sleeve is approved, the hole shall be drilled approximately one inch larger than the outside diameter of the pipe or conduit, or one inch larger than the outside diameter of the insulation, where insulated. When the pipe is installed, centering wedges shall be inserted to insure the pipe remains in the center of the hole, with the wedges held down one inch minimum below the floor line. An approved rod-stock backing for sealant shall be inserted around the pipe, held down 1/2 inch below the floor. Sealant shall then be applied, level with the floor at the concrete edge, sloped up about 20 degrees to the pipe to form a watershed. The sealant shall be Sonneborn Sonolastic, Pecora Synthecalk GC-5, or approved equal, color as selected by Architect. All sealant work shall be provided by the Contractor installing the pipe or conduit and shall be installed in accordance with the manufacturer's directions.

1.23 FIELD DIMENSIONS FOR CASEWORK AND EQUIPMENT

A. The need to obtain accurate field dimensions in ample time to permit fabrication of casework and equipment, for delivery and installation in accordance with the schedule, shall be recognized. Contractor shall cooperate in completing work phases to accommodate the schedule for obtaining dimensions and to prevent fabrication delay. In the event it is impractical to have work in place to permit field dimensions, the Contractor shall guarantee necessary dimensions, before construction, to the various fabricators and be responsible to insure the dimensions.

1.24 COORDINATION REQUIREMENTS

A. Refer to Paragraph 6.2 of the General Conditions, Section 01200 - Contract Time, and Construction Schedule, Section 01500 - Temporary Facilities and other articles of this Section 01010.

B. The nature of the project makes it imperative that each Contractor and all subcontractors coordinate their work and cooperate with each other and the University and other contractors from the start of the Project to completion. The Contractor shall be the Prime Coordinator for the project and shall establish the general overall schedule for the progress of the project, the sequence of completion and general use of the site.

C. With the restricted site, the Contractors are encouraged to utilize off site fabrication as much as possible and schedule deliveries so materials and equipment can be installed immediately after delivery. The Contractors shall alert and advise subcontractors and suppliers of the need to hold deliveries until they are notified the materials are required.

D. Contractors shall cooperate with each other with due respect of the methods and schedules of the other and shall work in close coordinated effort to the benefit of the completion of the Project and so as not to delay or impede the

work of others. In the event of conflict or need to establish priority, the University shall make the determination of the precedence or other required decision to the benefit of the overall project and its progress, which shall be binding on all.

E. As prime coordinator, the Contractor shall give adequate and timely notice of various work phases and operations which will affect the work of other Contractors or the University.

F. Special coordination and cooperation efforts are required for certain interrelated phases of the work, such as: removals and relocations of existing services and facilities; the integrated ceiling work; installation of equipment which receive connections by others; installation of new equipment; and maintaining temporary facilities; and similar work.

G. All necessary information required for coordination and proper execution of the work shall be provided by the appropriate Contractor or Subcontractor. Shop drawings, layout drawings, rough-in details, service requirements, product data, equipment details and similar information shall be provided to Contractor (or Subcontractor) who have an interest in, and need for, the data or have other material or equipment that attaches to, or otherwise involved in, the particular item or layout. Such information shall be provided free of charge to the interested party. It shall be the responsibility of each Contractor or Subcontractor to request, obtain or exchange shop drawings and other pertinent data directly from or with each other (not from the University or Architect) to properly coordinate the Work. Such data shall be requested in sufficient time to allow reasonable time for preparation of the data and to prevent any delay to a Contractor or Subcontractor. For coordination with the University's equipment or materials, the information shall be obtained from the University.

H. With respect to mechanical and electrical features of equipment of other Contracts, complete data must be exchanged directly between Subcontractors as the progress of the Project requires. The person requesting the information shall advise when it will be required. The Subcontractors for casework and equipment are expressly required to provide large scale layout drawings showing the required rough-in locations of all services (dimensioned from building features) service characteristics, and locations of studs where the location is critical to mounting or otherwise installing equipment and casework. Mechanical and Electrical Contractors are expressly required to furnish sizes and spacing required for cutouts, and a complete brochure of trim, sinks, outlets, or other information to provide complete data on the items and accessories being furnished. In the event of incorrect, incomplete, delayed or improperly identified information, the Contractor (or Subcontractor) causing the delay or error shall be responsible and pay for any modifications or replacements necessary to provide a correct, proper and new installation, including relocations required.

1.25 ANCHORAGE, SUPPORTS AND SLEEVING

A. The requirements of technical sections of the specifications or as shown on drawings, which are more specific or in excess of the general requirements herein, shall take precedence over these general requirements.

B. The Contractor and his Subcontractors shall furnish and install proper anchorage devices to securely and in the best manner, fasten, hang, mount, anchor, support all work in a neat and substantial way. Unless otherwise specified, subcontractors shall furnish all devices for fastening their work together and for fastening to the structure.

C. The Contractors and each Subcontractor shall furnish and install all their own sleeves, anchors, inserts and other devices as work progresses to accommodate their own materials or work. Methods and devices, as well as location, may be subject to the Architect's and University's approval and shall not impair, violate or alter structure, water integrity or aesthetic value of the work.

D. In general, provide bolts and shields for anchorage to solid materials, toggle bolts into hollow construction or through bolts and washers where necessary, unless otherwise shown or specified. Wood plugs into solid materials, toggle bolting to vertical lath and plaster, or bolting into shields at hollow units, will not be acceptable. The Contractor shall provide adequate backing for all fastenings and supports to prevent pull-out, deflection or undue stresses. For concrete, anchorage devices shall generally be cast-in, not drilled in later, unless otherwise specified.

E. At concrete, shot or drilled-in anchor devices will be permitted where casting-in may be difficult to coordinate, provided they will not damage the concrete or cause any spalling around the anchor. Shot anchors will not be permitted in bottoms of joists, in the underside of slabs 4" or less in thickness nor where spalling may result. Any shot anchors at concrete joists shall be at the side of the joist, above centerline. A representative number of anchors shall be field loaded about anticipated loads to insure their adequacy. Drilled-in expansion anchors, which have the same hole size as the bolt size, such as "Kwik-Bolt" or "Wej-it" will be permitted provided there is no spalling around the holes, the holes are neatly drilled and approved test reports indicate adequate shear and pull-out strength with ample safety factor.

F. Sleeves shall be provided for all pipes, conduit and similar features that pass through walls, floors, roof slabs, concrete joists, concrete beams or girders, or concrete bridging, whether specifically indicated or not. (No sleeves permitted thru columns.) Sleeves shall be provided by the Contractor including concrete over metal deck, sleeves shall be uncoated or galvanized pipe, not less than Scheduled 40 steel pipe. At exposed or concealed masonry walls, sleeves shall be same as for concrete penetrations. Unless otherwise called for, sleeves passing through walls, slabs, beams, bridging, shall be 1/2" greater in inside diameter than external diameter of pipe (including insulation), or conduit passing through the sleeves. All sleeves shall be of new material, cut square, reamed. Sheet metal sleeves may be used only where specifically approved. Unless otherwise called for: Sleeves through walls shall extend full thickness of wall and be cut flush with finished surface; sleeves through exterior building walls, finished surface; sleeves through floor slabs for piping where piping or conduit will be exposed shall extend 1/2" above finished floor; where concealed, sleeves through floor shall extend 1-1/2" above finished floor. Where sleeves occur in rows or clusters, a minimum of 4" of concrete shall be left between sleeves and if the normal spacing of reinforcing bars cannot be maintained, or are interrupted because of sleeve size or cluster

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locations, extra reinforcing shall be provided as directed by the Architect. In no case shall sleeves impair the structural capability of the work.

G. Sleeves at core drilled holes shall conform in dimension, material and height to the requirements of paragraph F above. The sleeves shall provide a good fit to core drilled hole and shall be set in place with a full coating of approved epoxy adhesive to insure remaining in place and a good seal between the hole and the sleeve.

H. As pipe, conduit or other feature is installed through a sleeve, it shall be wedged to keep in the center of the sleeve, with wedges held 1" back from end of sleeve. Pipe, conduit or other features through floors and roofs shall be caulked at the top in all cases, and at the bottom there exposed in a finished space. An approved rod stock backing for sealant shall be inserted around the pipe, shall then be applied, sloped up about 20 degrees to the pipe to form a water shet. The sealant shall be Sonneborn Sonolastic, Pecora Synthacalk GC-5, or approved equall, color as selected by Architect. All sealant work shall be provided by the Contractor installing the piping or conduit. At all penetrations through roof and floor slabs, fire and smoke rated walls or partitions and shaft or core enclosing walls the space between the sleeve and pipe shall be provided with an approved fire stop. Prior to placing the rod stock backing backing and sealant, insert Johns-Mansville, Cerablanket-FS ceramic fiber blanket insulation filling the entire space between sleeve and pipe or conduit, a minimum of 1-1/2" in depth. Hold back from edge of sleeve to allow for rod stock backing and sealant. Installation shall be made to maintain an effective fire stop.

1.26 PENETRATION OF METAL DECK

A. The requirements apply to non-cellular floor decking. Sleeves shall be provided as specified.

1. Openings through metal deck:

a. All cutting of metal decking shall be reviewed with the University and the Architect before any cutting is done.

b. For all cases, the openings must be adequately spaced to avoid a weakening of the floor in the vicinity of the openings. In general no more than one opening is to be cut in a 24 inch wide deck unit and the adjacent 24 inch wide units straddling the opening shall remain free of openings for proper load distribution.

1.27 OWNER'S EXISTING EQUIPMENT

A. Refer to the drawings for Owner's existing equipment; i.e., chalkboards and projection screens, installed as part of these Phase X Contract Documents.

B. The University will remove the existing equipment from its present location and deliver those items to the locations indicated on the drawings at a mutually agreed upon time.

C. The University will prepare a written description of the condition of each item. This description will be signed by the Owner and Contractor at the time the Contractor accepts each item of equipment. The Owner will retain the original and provide the Architect and Contractor with one copy each.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Refer to Sections 01010, 01200, and 01500 for special requirements, protection, constraints, timing of work, scheduling of work, enclosures and similar requirements relating to this section.

C. This section covers cutting, demolition, removal work, patching and restoration of work as necessary to accomplish and complete all work under the Contract, including and relocation of reuse of existing materials, equipment, systems or other work, as well as the disposition of salvaged materials or debris. This section governs all contracts.

D. It is the intent that, unless otherwise specifically shown on the drawings or specified, each Contractor (i.e. General, Mechanical, Electrical) shall be responsible for all cutting, demolition, removal, patching or restoration as may be required to complete his work.

E. Except for general demolition of entire areas it is the intent that at each area, or space, each Subcontractor shall make the removals, perform demolition and accomplish relocations of work normal to his Contract (i.e. Mechanical Subcontractor removes or relocates piping, ductwork and similar; Electrical Subcontractor removed or relocates panelboards, conduit, lighting, and similar). At areas of general demolition of the entire spaces, the Mechanical and Electrical Subcontractor shall make removals of work normal to their contract or as may be called for, for reuse or relocation, make any necessary relocations and cut-off, terminate, cap or other discontinue services that will abandoned or removed in the space. The General Contractor shall then demolish or remove all abandoned or unwanted electrical or mechanical materials, items or elements in the area.

F. All work under this section shall be coordinated with the other Contractors and the University and shall be accomplished at times acceptable to the University.

PART 2: DISPOSITION OF MATERIALS

2.1 UNSALVABLE MATERIALS

A. All unsalvable materials shall be removed in a manner that will avoid damage to materials or equipment to remain and shall be completely removed and legally disposed away from the site.

2.2 SALVABLE MATERIALS TO BE RE-USED IN THE WORK

A. Salvable materials designated for re-use or relocation shall be removed by the applicable trades, stored (off site if required) and protected from damage until they are incorporated into the new work.

B. Carefully remove, salvage, clean and preserve materials and equipment indicated to be reused or needed for reuse to match existing work. Exercise extreme care in removals to prevent damage or to make materials unsuitable to reuse. For materials shown on called for to be reused and which are damaged, replace with equivalent and matching work.

2.3 SALVABLE MATERIALS TO BE STORED FOR THE UNIVERSITY

A. Salvable materials not designated for reuse in the work are hereby designated to remain the property of the University. These shall be carefully removed by the applicable trades, protected from damage and stored as directed on the site until removed by the University.

B. Consult the University for any salvage the University may wish to retain and the salvagability of all items. Carefully remove and salvage any materials the University wishes to retain. Remove finish hardware from the item or material taken out of the building and turn over to University. Cleaning or restoration of the University's salvage materials is not required.

C. Removal from the site storage to University storage will be by the University.

PART 3: EXECUTION

3.1 TEMPORARY PROTECTION

A. Provide temporary bracing, shoring, needling and support during demolition, cutting, remodeling and related new construction as necessary for the execution of the work and the protection of persons and property. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, with loads properly distributed including to lower levels, if necessary.

B. Provide protective coverings necessary to prevent damage to existing spaces and materials to remain.

3.2 SKILLS REQUIRED

A. Accomplish all work of cutting, removal, demolition, patching or other restoration using only mechanics skilled in the trade. If necessary, sublet the work to skilled contractors or subcontractors.

3.3 DEMOLITION AND CUTTING

A. Demolish and remove existing construction as shown, indicated or required

to be removed. Where new work is to be installed in or adjacent to existing construction or existing work is to be replaced, remove or cut the existing construction as necessary to complete the work of the project.

B. Execute work with care. Existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced as a result of the work and is unsuitable for use intended shall be removed and replaced at no additional cost to the University.

C. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in such a manner so as to prevent spread of dust. Use covered chute or other approved means to transport debris from upper levels, no free-fall debris removal permitted.

D. Moisten debris with spray where practical. Take all precautions to minimize dust. Promptly remove debris from site as demolition progresses and debris accumulates. Do not store or permit debris storage at site. Keep adjacent areas unencumbered and clean. Keep all areas broom clean.

3.4 PATCHING, REMODELING AND RESTORATION

A. Patch or otherwise restore disturbed existing construction as indicated on the drawings, or as otherwise required to restore the work and surfaces. Patching or restoration shall be carried to natural breaks (i.e. corners) wherever reasonable. Where existing construction is removed, cut, exposed or otherwise disturbed by work of the project, patch defective and incomplete surfaces. Repair any damage to existing construction which is to remain.

B. Patching work shall be done by skilled mechanics experienced in the particular type of work involved. Patching work shall conform to the standards of the specifications where applicable, and where not specified, work shall conform to the highest standards of the trade.

C. Patch existing construction to match existing work (unless otherwise called for) except provide new materials and accomplish as for new work. Examine existing surfaces to be patched before proceeding with the work. Report all conditions where existing materials, colors and finishes cannot be matched to the University, and do not proceed until the University has issued instructions.

D. Existing construction that has been damaged as a result of the work shall be repaired to an extent and as required to match adjacent existing undamaged construction.

E. Thoroughly clean and prepare all surfaces to receive new finish or covering. Completely remove dirt, dust, grease, oil, paint, loose materials and soil. Clean, etch where necessary, and place surfaces in most suitable condition for the finish as approved by University.

3.5 MECHANICAL AND ELECTRICAL WORK EXPOSED

A. Where unknown mechanical piping or electrical conduit is exposed during

removal of partitions or walls, removal or rerouting shall be accomplished by the Mechanical or Electrical Subcontractor as applicable. Rerouted piping shall be located where directed and shall be connected to maintain all functions in proper operation. Abandoned piping may be left in place where it is concealed in floors or walls, (not in chases or concealed spaces) providing that it is disconnected from its source. There shall be no "dead end" water, sewer, or vent piping existing in the completed work. Abandoned piping, ductwork, conduit or other Mechanical or Electrical items in chases, vertical enclosures or concealed above ceilings shall be completely removed.

3.6 WORK OF EACH CONTRACT

A. Each Subcontractor shall carefully review the Contract Documents including for other Contracts, with respect to the coordination of the demolition, removal and remodeling work and perform such removals normal to their Contract as may be shown, noted or otherwise required. Cutting and patching incidental to demolition, removal and or remodeling of general construction work shall be construed as the work of another trade when specifically noted or called for on documents primarily for another trade or the cutting and patching is done solely to accomplish work of another trade. Mechanical, Electrical Subcontractors shall perform their own cutting and patching to accomplish their work unless indicated on architectural drawings as being done by the General Contractor.

3.7 PAINTING

A. Mechanical or Electrical Subcontractor shall be responsible for painting or repainting of patched or remodeled areas where he has performed work, except for those areas shown or required to be remodeled under the General Contract, in which case the new, patched and remodeled paintable surfaces shall be repainted by the General Contractor. It is the intent the Mechanical and Electrical Subcontractors paint or repaint surfaces at locations where demolition, cutting and patching is accomplished only for their work.

B. Painting, including preparation, materials, workmanship and number of coats shall comply with Section 09900. Painting of surfaces patched shall extend to natural breaks, such as corners, as approved by the University.

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PART 1: GENERAL

1.1 BASIS FOR PAYMENT

- A. Refer to the Bid Form and General Conditions Article 9.
- B. The basis for payment is a lump sum for all work under the Contract, to be paid in increments as the progress of the work permits. Adjustments in the lump Contract Sum will be made only pursuant to, and upon approval of Change Orders in accordance with Article 12 of the General Conditions.
- C. The University will make payment directly to the Contractor in accordance with the General Conditions and the conditions specified herein.

1.2 SCHEDULE OF VALUES

- A. Refer to the General Conditions, Paragraph 9.2.
- B. The form and detail of the Schedule of Values (cost breakdown) shall be acceptable to the University and shall provide the means for simple ready monitoring of the work satisfactorily completed and eligible for payment. The schedule shall provide the means for evaluating the extent of completion of each line item and the quantities of products, equipment or materials, all whether in the Contractor's storage or delivered to the project site, as well as determining the state of completion of other costs incorporated into the Contract Sum.
- C. The Contractor shall develop a Schedule of Values for review and acceptance by the University and revise as may be required by the University. The Schedule of Values shall bear a sworn, notarized statement by an officer of the contracting firm that the Schedule of Values represents a true and accurate allocation of costs of the Contract Sum and that each item includes its proper share of overhead and profit.
- D. The costs of General Conditions and Division 1 items (i.e. bond, insurance, temporary facilities, etc.) and similar non-material costs shall be listed individually, with unit or increment quantities and their prices where applicable.

1.3 PROGRESS PAYMENTS

- A. Refer to General Conditions, Paragraph 9.3. The University may at its option, utilize the values of cost impacted work activities and monthly progress schedule input data, as specified under Section 01200, to evaluate monthly requests for payment.
- B. On the first Request for Payment, the University will make payment for the value of the Performance Bond and similar lump sum cost items which must be paid in full by the Contractor at the start of the work. Thereafter, no further payments will be made until a bona-fide and substantial on-site start has been made.

C. Progress billings (Requests for Payment) shall indicate the detailed and itemized costs of the work for which the current Request for Payment is made and a summary total of costs previously billed and payments made.

1.4 RETAINAGE

A. Refer to General Conditions subparagraphs 9.3.7 through 9.3.12.

B. Five percent (5%) of the satisfactorily completed work of all line items of the Schedule of Values, as approved by the University on Requests for Payments, will be retained until substantial completion of the Project. Thereafter, no additional sums will be retained for that line item provided the following criteria are met.

1. The portion of the line item of the work completed is satisfactory to the University.

2. All remedies of known defective work related to the line item have been completed.

3. There are no claims by any party against the line item work completed.

4. The Contractor shall make payments to his Subcontractors and suppliers in the same proportion, including amounts retained, as allowed to the Contractor on the line item, and there is no evidence of failure of the Contractor to make timely payment to Subcontractors or for labor, materials or equipment for which payment has previously been received from the University.

5. The University is satisfied that the line item work can be completed for the unpaid balance of the item.

6. There is no evidence of damage or delay to another Contractor or Subcontractor, or to the further progress of the work of the contract.

7. The University is satisfied that the Contractor and his Subcontractors have prosecuted and will continue to prosecute the work satisfactorily and on schedule.

8. There are no unsettled liens against the project.

C. If at any time after the reduction in any retained percentage, there appears reasonable evidence that any of the above requirements are not being met, the University may again retain such amounts as it deems necessary to protect its interest until such time as all requirements for reducing or eliminating further retainage are again satisfied. In the event the above criteria is not continually met by a Subcontractor, the University reserves the right to again withhold 5% of any line item affecting the Subcontractor. In addition, should the Contractor's general performance and progress, not specifically related to subcontract work only, be unsatisfactory, the University reserves the right to withhold on the aggregate amount requested such sum as will equal 5% of the completed work without changing the amount allowed on any line item. In event

of the latter retained amount, the Contractor shall continue to pay his Subcontractors and suppliers the proportionate share allowed on the line items.

D. Final payment of retained amounts will be made after final completion of the work of the contract except as provided in paragraph 9.7.5 of the General Conditions.

1.5 UNIVERSITY EXAMINATION

A. Refer to General Conditions, subparagraph 9.3.5. Any materials or equipment the University agrees to pay for in off-site storage, shall be stored in the Metropolitan Twin City Area. Upon submittal of a Request for Payment for materials in the Contractor's off-site storage, the University will examine the materials, with travel cost, any subsistence and time of University personnel paid by the University. The Contractor shall provide access, facilities and assistance to verify the accuracy of the materials claimed as complete, relating to the Schedule of Values.

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PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

A. Refer to General Conditions, Article 8, for general requirements and conditions relating to the contract time, commencement of work, progress, completion and delays. Refer to Sections 01010 - General Requirements, Section 01300 - Submittals, Section 01500 - Temporary Facilities, Section 01700 - Project Closeout and Articles of this section which relate to the commencement, schedule, progress and completion of the work.

B. The work shall be prosecuted regularly, diligently, without interruption or shutdown at such rate of progress as will insure substantial and final completion within the contract time. By execution of the Contract, the Contractor represents he has analyzed the project, the materials and methods involved, the systems of the building, availability of qualified mechanics and unskilled labor, restrictions of the site, constraints imposed, his own work load and capacity to perform the work and indicates his agreement that the specified completion times are reasonable considering the project conditions, usual industrial conditions, climatic conditions prevailing in the locality of the project, and other factors, with reasonable allowance for variations from average, typical or ideal conditions.

PART 2: COMMENCEMENT AND COMPLETION OF PROJECT

2.1 COMMENCEMENT OF WORK

A. The Contractor shall commence the work at the site as soon as possible after required and proper insurance evidence has been submitted to the University. All submittals shall be prepared and submitted by the specified times and the schedule data provided as specified herein.

B. The Contractor shall assume the site management within 7 days after the University's Notice to Proceed or execution of the Contract, whichever occurs first. The Contractor shall also commence construction work at the site within 21 days after Notice to Proceed or execution of the Contract.

2.2 COMPLETION OF THE PROJECT

A. Refer to General Conditions subparagraphs 7.11.5 and 7.11.6 for definitions of substantial completion and completion. Within the framework of the general definitions, the University shall be the judge of the status of completion. The definitions shall apply to the Project as a whole as well as separable spaces or areas where the University may assume beneficial occupancy for use of the facilities.

2.3 EXTENSION OF TIME

A. Refer to General Conditions, paragraph 8.3, for requirements for time extensions. Time extensions will be allowed only for the portions, phases or

elements of the work affected by the enumerated conditions for valid delay. Extension of the time for completion of the entire project will be allowed only for such valid delays as will affect all work of the Contract.

PART 3: TIMING OF WORK

3.1 UNIVERSITY ESTABLISHED CONSTRUCTION CONSTRAINTS AND COMPLETION TIMES

A. The constraints and completion times specified under this article which have been established by the University, shall be essential conditions of the Contractor and must be met in developing and establishing the Construction Schedule of the Contractor.

B. Substantial completion of the project shall be accomplished within 240 days.

C. Final completion of the entire project shall be accomplished with 30 days after substantial completion. Final completion of any area or space occupied or used by the University prior to completion of the entire project, shall be accomplished within 15 days after the specified or scheduled substantial completion, unless otherwise approved by the University.

PART 4: CONSTRUCTION SCHEDULE

4.1 SCOPE

A. This part specifies procedures for planning, coordinating, monitoring and managing the schedules of all work on the project and supercedes the General Conditions requirements regarding schedules.

B. Refer to various parts of this section for a general description of the anticipated construction logic and for established "construction constraints". The dates indicated for starting and/or completing the activity or area of work are critical to the orderly prosecution of work and to the University's functions and use of existing facilities or this project. The established constraints are supplementary to other specified constraints, phasing requirements or work timing included in the Contract Documents.

C. Starting and/or completing specified work on the established constraint dates on time, as well as other constraints, phasing and timing of work specified, are essential conditions of the contracts. Each Contractor shall plan and manage his own work so as to satisfy these conditions.

4.2 RESPONSIBILITIES

A. The Contractor shall be responsible to provide all data to develop and update and manage his schedule, and manage all work activities to maintain progress in accordance with the schedule.

4.3 PHASES OF THE CONSTRUCTION SCHEDULE

A. Phase I - Initial Construction Schedule

1. Contractor shall, within 15 days after award of Contract, provide Construction Schedule, as hereinafter specified, such that the schedule shall reflect the actual plan of operation for the project.

2. Subject to the approval of the University (being provided within 15 days) the Contractor will, within 45 days after award of Contract, prepare and distribute an initial construction schedule to the appropriate Subcontractors, University and Architect/Engineer. The detailed schedule will contain specific dates. The initial schedule shall then be determined as the Construction Schedule of the Contractor.

B. Phase II - Scheduling Updating

1. The University will monitor progress of the project. Contractor shall periodically update and otherwise modify the Construction Schedule and distribute updated printouts, network diagrams and reports to the appropriate Subcontractors, University and Architect/Engineer. The Contractor and Subcontractors shall supply all data and other information required for input to these updates. The Contractor also shall cooperate with the University in evaluating this information.

4.4 GENERAL REQUIREMENTS AND INFORMATION

A. As a minimum, each Contractor, and appropriate Subcontractors, where subcontractor data and information necessary for the schedule, shall:

1. Provide all required basic and detailed information for the preparation of the initial construction schedule.

2. Provide the dollar value of the various cost impacting activities, as later specified.

3. Provide proper and accurate periodic data for updating the schedule.

4. Attend periodic meetings to develop, analyze and updating the schedule.

B. Contractor and his Subcontractors shall comply with the schedule, and periodic updated revisions of the schedule.

C. Sufficient copies of schedules, network diagrams, printouts and reports, will be distributed to all parties, and as a minimum will be:

Owner - 3
Architect - 2
Each Prime Subcontractor - 2

4.5 TYPE OF SCHEDULE

A. The form of schedule is at the option of the Contractor, but shall be a form acceptable to the University.

4.6 SCHEDULE CONSIDERATIONS

A. In addition to the final completion time the schedule shall be developed to accommodate various other constraints, including, but not limited to: lead time required to accommodate the Owner moving into the project by the specified established constraint dates; timing of various elements of work specified in the General Conditions, Section 01010 and 01200; requirements of Temporary Facilities, Section 01500; the work of separate Contractors for work of this project; and all other specified constraints.

B. As required, alternate construction sequences, alternate sized crews and other methods to improve the schedule shall be projected into the schedule until all established constraint dates and other timing constraints have been achieved and maintained.

PART 5: SCHEDULE AND UPDATING

5.1 INITIAL SCHEDULE

A. Immediately after issuance of Notice to Proceed or Award of the Contract by the University whichever comes first, the Contractor shall proceed to prepare the Construction Schedule for scheduling and management of the project.

B. The Construction Schedule shall provide such information as is required for the preparation of a complete detailed plan which shall be based on a sufficient number of activities to fully and realistically set for the complete construction in full detail, including but not limited to the following:

1. Detailed representation of all significant aspects of the construction plan, including, but not restricted to, mobilization, temporary facilities, construction plant and equipment, site preparation, interior finishing, electrical and mechanical work, casework, equipment, shop drawings and materials delivery, on-site labor and acquisition and installation of special equipment and materials, and project close out.

2. Sufficient detail as required such that, in general, on-site construction activities can be scheduled so they do not exceed a duration of 10 working days.

3. Dollar value (cost) applicable to each cost impacted work activity of the Contractors. The cost shall include labor, material and contribution to overhead and profit. The sum of all activity cost shall equal the total Contract price. The University may, at its option, utilize this data in evaluating progress payments.

C. A Contractor's scheduled earnings curve (time versus scheduled earnings) shall be developed to reflect the schedule earnings in percentages (amounts)

for both the earliest and the latest completion of all activities for the initial submittal only. The earnings curve will serve as the schedule of estimated payments required under General Conditions subparagraph 9.2.2.

5.2 PERIODIC SCHEDULE UPDATING

A. After confirmation of the initial schedule as the Construction Schedule, there shall be a weekly Schedule Management Meeting. This meeting shall be attended by management and a field representatives of Contractor, management and a field representatives of each currently affected subcontractor and representatives of the University. This meeting will be held at a time and place to be determined by the University.

B. Any changes in the Construction Schedule varying sequence, logic or duration dictated by circumstances or requested by the Contractors to improve the Construction Schedule will be incorporated at the same time. All delivery dates shall be checked and verified at the same time.

C. The Contractor shall promptly thereafter process the information received, make network revisions (if sequence logic of network has changed) and calculate an updated schedule.

D. On a set date each month, as established by the University, the Contractor representatives of the Contractor and appropriate Subcontractors shall meet at the jobsite for the purpose of evaluating progress input data to be used for the next Request for Payment.

E. The University shall have the option to utilize the monthly progress input data on the activities in evaluating the Contractor's Requests for Payment.

F. In the event conditions beyond the control of a Contractor impact the construction schedule, the Contractor shall advise the University of the impact of the conditions upon the Construction Schedule.

G. In addition to the regular periodic up date, in the event of any significant shut down of the project, for valid reasons as during labor disputes, upon resumption of work, the Contractor shall immediately update the schedule to reflect the effects of the shut down.

5.3 MISCELLANEOUS PROVISIONS

A. Control of the use of float in the construction schedule shall rest with the University.

B. In the event a Contractor fails to meet any interim specified date (including constraints) or scheduled finished date, he shall immediately advise the University of corrective action the Contractor will take to return to the Construction Schedule on the succeeding work item (S.W.I.). In the event that a Schedule Report should indicate that an interim specified date (including constraints) or scheduled finish date is projected not to be met, the Contractor shall immediately advise the University of corrective action he will take to return to the Construction Schedule on the succeeding work item (S.W.I.).

C. The second and subsequent Request for Payments will not be processed by the University unless all required schedules have been satisfactorily provided by the Contractor, as acceptable to the University.

D.. Failure of the Contractor to maintain progress in accordance with the Construction Schedule, or to take prompt and adequate action to restore the progress to the schedule, including any directions as may be issued by the University, will be deemed unsatisfactory prosecution of the work by the Contractor.

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PART 1: GENERAL

1.1 SCOPE

A. This section defines procedures for the following submittals required of the Contractor.

PART 2: REQUIRED SUBMITTALS

2.1 SHOP DRAWINGS, EQUIPMENT BROCHURES AND PRODUCT DATA

A. Required submittals of shop, fabrication, or erection drawings, equipment brochures and/or product data composite systems (including those by one or more subcontractors or suppliers) and similar information shall be submitted in accord with this Article.

B. "Shop Drawings" shall mean all similar types of product data, including specially prepared drawings, standard prints, brochures and other descriptive data.

C. Drawings submitted, including transparencies, shall be marked with name of project, Contractor, Architect, whether "preliminary" or "final" in nature, and shall bear stamp of approval of the Contractor, as evidence that drawings have been checked (including field dimensions) by the Contractor. The Contractor shall field verify or otherwise determine interferences or conflicts between various materials and resolve dimensions or methods resulting therefrom as approved by the Architect. Any drawings submitted without the Contractor's approval will not be considered or reviewed and will be returned to the Contractor. It is not intended that field verified dimensions are required prior to the Architect's acceptance of shop drawings. If, however, field dimensions require changes in the shop drawings in size, detail and similar considerations, revised shop drawings shall be submitted for review and acceptance.

D. The Contractor shall submit shop drawings to the Architect with such promptness as to cause no delay in his work or the work of any other contractor or subcontractor on the project. Adequate time shall be allowed for checking by the Architect and University.

E. Prepared shop drawings shall be submitted in the form of clear, sharp reproducible transparencies until acceptable to the Architect. Each drawing shall have a clear space of not less than 20 square inches for Architect's stamps and be transmitted in mailing tubes. After the drawings have been checked, the Architect will obtain prints of the transparency for his records and the University's records and return the transparency to the Contractor. Transparencies returned "Accepted" or "Accepted as Noted" shall be printed by the Contractor in quantity required for his use. When drawing transparencies are returned "Not Accepted" or "Resubmit", the Contractor shall correct the drawing and resubmit a new transparency of the corrected original until final acceptance is obtained. The final shop drawings shall show field verified dimensions, where possible; see paragraph C above.

F. Transparencies are not be required for product data (catalog cuts, equipment brochures or similar items); however, transparencies of layout drawings shall be submitted where necessary or required by the Architect. Cuts, equipment brochures and similar items shall be submitted in a minimum of 7 copies unless otherwise specified. If acceptable, the copies will be so stamped and all but 3 copies returned to the Contractor. If notations indicate revision of data is required, resubmit as directed. The Contractor shall not furnish, fabricate, proceed with, or install work until shop drawings receive final acceptance.

G. Checking and acceptance of shop drawings by the Architect is for general conformance with design intent and Contract requirements and does not relieve the Contractor of responsibility to verify accuracy of dimensions, obtain field dimensions, coordinate dimensions with work of others, and prevent interference with other equipment and other features of the Work. If a drawing as submitted is in accordance with Contract requirements, or specifically indicated deviation from Contract requirements which Architect finds to be in interest of University and to be so minor as not to involve a change in contract price or time for performance, Architect will accept drawings.

H. Acceptance of shop drawings and setting drawings will be general and, except as otherwise provided in preceding paragraph, shall not be construed as: (1) permitting any departure from contract requirements, (2) relieving Contractor of responsibility from errors in details, dimensions or otherwise that may exist, (3) accepting departures from additional details or instructions previously furnished by Architect and, (4) confirming clearances or lack of interference.

I. Checking and acceptance by Architect shall not relieve Contractor of responsibility for deviations from drawings and specifications unless such deviation is specifically called to Architect's attention by a specific indication of "note deviation" or similar clear and bold indication at time of submission, nor shall it relieve him of responsibility for errors or omissions in shop drawings.

J. Refer to Article 6 of General Conditions and to Section 01010 for coordination and cooperation of contractors. This Contractor shall cooperate with all other contractors as may be required to coordinate the work of all contractors and their subcontractors. Shop drawings shall be provided or exchanged as necessary or beneficial to the coordination effort, with the exchange directly by the contractors involved, not through University or Architect.

2.2 SAMPLES

A. Deliver samples of materials, equipment, assemblies and components as required by specifications to Architect (or other designated location) with delivery costs prepaid. At Architect's direction, remove samples after approval. Samples shall be of like kind to the product to be provided for building and shall have finish and other characteristics required by work. Samples shall indicate type of construction and quality proposed for installation in the Project.

B. Where the Contractor requires approved samples to be returned, submit the

number of samples required by the Contractor plus two which shall be retained by the Architect and University. Submit all other samples in duplicate.

2.3 LIST OF MATERIALS

A. Within 14 days after award of the Contract (notice to proceed or letter or intent), the Contractor shall submit 5 copies of a complete list of all materials, products, and equipment proposed to be used in construction to the Architect for acceptance. Materials shall not be ordered until the proposed listed materials are accepted.

B. Where two or more makes or kinds of items are named in the specifications (or additional names are listed in an addendum), the Contractor shall state which particular make or kind of each item he proposed to provide. If the Contractor fails to state a preference, the University shall have the right to select any of the makes or kinds named without change in price.

C. This list shall be submitted on the form prescribed by the Architect and arranged in order of specification sections. The items listed shall fully conform to project requirements and specifications. All materials are subject to the Architect's and University's acceptance. After acceptance, there shall be no changes or substitutions, except as provided in Article 7 of the General Conditions and Article 1.15 of Section 01010.

D. The list shall clearly identify the material, product or equipment by manufacturer and brand by listing the names for all items, including those where only one material or product is specified. Each and all materials, products and equipment shall be specifically named, not listed "as specified".

2.4 LIST OF SUBCONTRACTORS

A. Within 14 days after award of the Contract (notice to proceed or letter of intent), the Contractor shall submit 5 copies of a complete list of all subcontractors (and major material suppliers) he proposes to use in performance of the Contract to the Architect for review and acceptance by the Architect and University. The list shall be in the form prescribed by the Architect. When appropriate, or when requested by the Architect, the list shall include proposed sub-subcontractors. No subcontracts shall be executed until the proposed list subcontractors are accepted.

C. The proposed subcontractors or sub-subcontractors shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with the type work and/or items proposed to be provided or installed by them. Only those subcontractors (and sub-subcontractors when appropriate) who are acceptable to the Architect and University shall be used on the Work.

2.5 PHOTOGRAPHS OF PROJECT

A. Progress photographs are not required.

2.6 RECORD SET OF DRAWINGS

- A. Contractor shall provide a record set of transparency drawings to the University at the completion of Contract.
- B. During construction, Contractor shall maintain a clean set of drawings for the sole purpose of recording changes and actual "as installed" information.
- C. Marking of the record set shall be done methodically as work progresses, clearly and neatly.
- D. As a general guide, the type of information to be recorded on the record set includes: (1) revisions made except minor or non-critical dimensions; (2) omissions, including work omitted by accepted alternates; (3) dimensioned locations of major or main utility lines, such as main conduit runs, piping mains and similar work; (4) locations of control valves; (5) additions to the work; (6) changes in significant details (i.e. for water protection); (7) other similar data.

2.7 OTHER SUBMITTALS

- A. Provide other required submittals as specified. In particular, refer to:

Construction Schedule	Paragraph 4.11 of General Conditions, and Section 01200
Performance Bond	Paragraph 7.5 of General Conditions
Schedule of Values	Paragraph 9.2 of General Conditions and Section 01150
Request for Payment	Paragraph 9.3 of General Conditions and Section 01150
Contractors' Liability Insurance	Paragraph 11.1 of General Conditions and Section 01010
Equal Employment and Prevailing Wages	Articles 15 and 16 of General Conditions
SED Set-Aside Program	Article 17 of General Conditions
Testing and Inspection	Section 01400 and Technical Sections
Form 134 Affidavit	Subparagraph 9.6.2 of General Conditions
Reports Certificates Samples Guarantees	Technical Sections

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PART 1: GENERAL

1.1 TESTING

A. Refer to the technical specifications for specific testing requirements and methods.

B. Unless otherwise provided in the specifications, the Contractor shall provide all materials, samples, mock-ups or assemblies for all tests specified in various sections of specifications or as directed by Architect or University and pay shipping costs of such samples to laboratory or other testing location and facility. Unless specifically specified otherwise, all tests shall be made by an approved independent testing laboratory and reports shall be provided to Architect and University.

C. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criterion are specified. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods.

1.2 QUALIFICATIONS OF TESTING AGENCY

A. "Approved independent testing laboratory" shall mean an independent testing agency acceptable to the University and the Architect and possessing the professional qualifications and equipment to perform the specified tests and to evaluate and report the results.

1.3 PAYMENT FOR TESTS

A. Where specifically specified, the University will pay for the costs of tests (field or laboratory), directly to the laboratory. The University will also select the testing agency and advise the Contractor.

B. The cost of all other tests shall be paid by the Contractor, including any retesting required when initial tests indicate non-compliance.

1.4 TESTS TO DEMONSTRATE QUALIFICATION

A. In addition to tests specified, should the Contractor propose a product, material, method or assembly that is of unknown or questionable quality to Architect, the Architect or the University, may require and order suitable tests to establish a basis for acceptance or rejection. Such tests will be paid or by the Contractor, or by the Subcontractor requesting approval. "Standard" test reports or reports on "similar" material will not be accepted.

B. The University and Architect reserve the right to require certification or other proof that the material, assembly, equipment or other product furnished, or proposed to be furnished, for this Project is in compliance with any test or standard called for. The certificate shall be signed by a representative of the independent testing laboratory.

C. Any tests required to qualify the Contractor or any of his workmen for any phase of the work, and any test of a method, system or equipment that may be required by specification or law to qualify the item for use, shall be made or taken without cost to the University or Architect.

1.5 INSPECTIONS

A. Should the specifications, Architect's instructions, laws, ordinances or any public authority require any work to be inspected or approved, the Contractor shall give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency or the University's representatives, it must be uncovered for examination at Contractor's expense.

1.6 OWNER'S INSPECTION OF FABRICATION

A. The University reserves the right to inspect the fabrication facilities and the fabrication of products for this project. The producer shall permit such inspections and cooperate with the University to facilitate the inspections.

B. For such inspections of fabrication and fabrication facilities, the University will pay for its own travel and subsistence. The Contractor and producer shall cooperate in such inspections and make the facilities and products available on time so the University does not incur any other costs.

1.7 CERTIFICATES

A. Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the specifications shall be signed by authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the University.

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PART 1: CONSTRUCTION HEAT, LIGHT AND POWER, WATER, TELEPHONE

1.1 TEMPORARY (CONSTRUCTION) HEAT

A. Temporary Heat: As used in this specification, temporary heat shall mean all heat required and provided during construction, whether by temporary heating units and devices, or the permanent heating system and devices, until the Project is occupied or accepted by the Owner.

B. Existing Heating System:

1. The existing heating systems shall be kept operative throughout the entire construction. Contractor shall cooperate with University personnel to effect any required modifications to systems with minimum interruption to building services.

2. In existing spaces, the University will make no charge for temporary heat. Contractor and subcontractors, however, shall not waste University furnished heat. Openings cut and windows removed for transfer of material (if any) shall be provided with insulated and secure temporary closures until permanent closure is installed and sealed.

C. Electrical Energy: Cost of energy for using temporary systems will be paid as specified under Article 1.2 of this Section. Electric heaters will not be permitted for temporary heat. Electrical lines furnishing temporary current to pumps and other equipment of heating system shall be adequately sized to deliver the required rated voltages and amperage to equipment.

D. Ventilation: During construction and particularly during painting work, and similar finishing operations, adequate ventilation shall be provided. Windows shall remain closed and latched to avoid imbalance in ventilation system.

E. Miscellaneous Requirements:

1. Provide temporary heat such that no damage results to the building, materials or installed work as may be caused by dampness, cold, thermal shock, smoke or similar damage related to heat. Maintain adequate and continuous temperatures to prevent any such damage.

2. All ductwork from the existing permanent heating system into construction areas is presently capped. If caps are removed for any reason a temporary filter must be provided for each open duct, supply, return or exhaust, and maintained until such time as the duct is recapped or incorporated into the new permanent heating system.

1.2 CONSTRUCTION LIGHT AND POWER

A. Reference: Refer to Section 16010 for additional details.

B. Energy Costs and Objectives: Except as otherwise specified, the University will furnish electrical energy free to Contractors and Subcontractors throughout the construction of the project, provided usage is within the capacity of the existing and new services described in Division 16 and provided the privilege is not abused. However, the University will assume no responsibility or liability for power outages, or damages resulting from outages, and the Contractors shall hold the University harmless from all claims and costs from outages. Not only the conservation of energy but minimum expense to the University are objectives, within the intent to provide good lighting conditions and adequate working conditions for high quality workmanship, as well as safety and security measures. The Contractor's shall comply with University directions on the temporary installations, lighting conditions and use of energy.

C. General:

1. Except as otherwise specified, throughout construction each Contractor and Subcontractor shall provide his own temporary wiring, cords, outlets, lamps, devices and connections as required. Installation, service, wiring and devices shall be safe, substantially supported and adequately connected and meet all codes. Demand shall not exceed the service and any damage resulting from misuse, faulty equipment or overloading shall be paid for by responsible persons.

2. Electric heaters shall not be used for heating unless approved by the University as the only reasonable solution.

3. Electrical service for cranes, hoists, large welders and similar heavy loads shall be provided and energy costs paid for by Contractor and Subcontractors requiring such service and they shall arrange for their own service and meters. Limited use of energy and service, when being paid for the University will be permitted for loads of others for such equipment as grinders and pipe threaders provided their use does not limit the service for normal lighting and power tool loads. In the event such equipment use indicates the available service may reach capacity the Contractor and Subcontractors requiring such service shall provide their own service after being advised by the University when such condition is likely to exist.

D. Existing Service: During "down" time in any area, procedures for temporary building service specified in paragraph E, below shall be used.

E. Temporary Building Service: As work progresses, the Electrical Subcontractor shall install and energize the permanent secondary electrical system to the work areas as soon as practicable and when approved by the University. Permanent service characteristics are specified in Section 16300.

1. The Electrical Contractor shall continue to provide temporary wiring, sockets and outlets for lighting and hand tools, as specified above and in Section 16010.

2. Permanent convenience outlets shall not be used, and permanent fixtures shall not be installed until finish operations are in process but fixtures shall be installed prior to casework installation. Other temporary wiring and devices

shall be provided by each contractor as required, safe, substantially supported and adequately connected. Electrical Subcontractor shall install the permanent convenience outlets when approved by the University, just prior to occupancy.

F. Lamps, Incandescent Bulbs and Fluorescent Tubes: Throughout the construction period, lamps in temporary lighting systems shall be provided, including replacements, by the General Contractor and installed by the Electrical Subcontractor. In general, lamps shall not be over 200 watts, except where necessary. The Electrical Subcontractor shall also remove and replace burned out lamps as they occur.

1. As work progresses and permanent incandescent light fixtures are used for lighting, the General Contractor shall provide the bulbs and the Electrical Subcontractor shall install and replace as specified in preceding paragraph. Just prior to final inspection the Electrical Subcontractor shall remove all construction bulbs and install proper new bulbs. The University shall be advised when this replacement is being made so they may verify the installation of new bulbs.

2. In permanent fluorescent fixtures, the Electrical Subcontractor shall install new lamps as the fixtures are installed. The Electrical Subcontractor shall replace tubes as they burn out during construction and replace all burned out lamps just prior to final inspection so all lamps are good at the time of inspection.

1.3 CONSTRUCTION WATER

A. General: Contractor, and Subcontractors where appropriate, shall provide their own hoses (or piping), connections and other equipment to use water, and protect their own equipment. Needless and wasteful running of water, when provided through the University's service, will not be permitted. When water is being used, the service shall be protected from freezing and damage at all times.

B. Temporary Service: During periods when water service to the work areas is shut down or in otherwise not available to accommodate the remodeling work the General Contractor shall arrange for a source of water from other areas (coordinate with University) have all connections made to provide water for use of all trades. The University will pay for water used. The Contractor shall provide all connections and valves to utilize the water service, which shall include outlet connections to which other contractors may connect piping or hoses. Contractor shall be responsible for preventing any damage to water service, including damage from freezing.

C. This is not permanent water service under this Contract.

D. The Owner will allow free use of water, provided the privilege is not abused and unnecessary running of water is prevented.

PART 2: FIRE SAFETY

2.1 FIRE SAFETY DEVICES AND SYSTEM

- A. General: Contractors shall be alert to fire hazards and remove or protect against their own hazards and shall comply with directions of the University on hazards and fire safety.
- B. Fire Extinguishers: Except for units in individual Contractors offices, the General Contractor shall provide and maintain adequate and proper fire extinguishing devices in and about the construction area, available for use by all workmen. The devices shall not be the units to be later installed in the project. Appropriate devices shall be provided for the class of the potential hazard (i.e. oil, electrical) at those areas where unusual hazards may exist, including in mechanical rooms. Fire hoses shall be connected to adequate sized water lines. As construction proceeds, or materials which create a hazard are moved onto various floors, extinguishing devices shall be available on each floor. The number and distribution of devices shall be adequate for effective fire control, to the satisfaction of the University.
- C. Fire Hydrants: The area fire hydrants and existing fire hose cabinets must be accessible at all times.

PART 3: OFFICE, TOILETS, STORAGE ENCLOSURES

3.1 OFFICE

- A. The University will provide office space for Contractor's use on Floor 6.
- B. The University will provide all necessary heat and power as required to utilize the space.
- C. University reserves the right to construct additional offices for future contractors on the 6th floor and to require joint usage of corridors, toilets, and conference facilities by the Contractor and future contractors.
- D. Additional partitioning beyond existing shown partitions, within the designated offices, shall be at the cost of the occupant and subject to the prior approval of the University. Additional partitioning shall be installed so as not to restrict fire protection, egress, lighting and ventilation of space. Added costs necessary to meet code requirements shall be paid for by the occupant.
- E. Contractor shall maintain his offices, elevator lobby and public corridors, public toilet and conference room in a clean and sanitary condition. University shall be responsible for maintenance of its space and toilet facilities. Corridors shall not be used for storage and shall be maintained free of obstructions.
- F. Contractor Access: Shall be via designated construction elevators only. Contractor shall refrain from entering areas outside construction limits without the approval of the University except in the event of an emergency.

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G. Contractor shall repair all damage to his space, corridors, toilets and conference room, and leave in clean condition at completion of the project.

H. Furnishings: University shall provide and install its own furnishings. Contractor shall provide his own furnishings and remove them at completion of the project.

3.2 TELEPHONE

A. Contractor's Telephones: Contractor shall arrange and pay for telephone service to his own construction office space (that assigned to him). Contractor's telephone service shall be separate from University's telephone service.

B. Contractor shall be reimbursed costs of long distance telephone calls made on his service by the party making call.

3.3 SANITARY FACILITIES

A. The University has designated a toilet room in the existing building for the use of Contractor and his employees. Contractor shall require proper use and care of these facilities and be responsible for replacement of damaged fixtures due to operations performed under this contract. University will provide tissue and towels.

3.4 STORAGE

A. General: Refer to drawings for areas of storage. The Contractor (and each subcontractor) shall provide adequate enclosures and coverings to protect and preserve the materials stored at and off the site. Materials such as wood, finished metal, cement, masonry materials, equipment of any type, conduit and similar materials, shall not be piled directly on ground. Any material subject to damage, deterioration or weathering when exposed shall be covered or in protective enclosures. The University reserves the right to direct such protection which shall be complied with by the Contractor. Covering shall be durable, watertight, fully cover sides as well as top, substantial and well anchored to prevent blowing away.

1. When no longer required, The Contractor shall be remove the storage enclosures.

B. Limited Area: With the extremely limited storage area, the Contractor shall carefully schedule material deliveries for immediate installation to minimize the need for storage area. Any storage structures required shall be located on the Contractor's allocation of site space. Inside existing building, storage shall be restricted to the areas being remodeled and designated on the drawings.

C. After final completion, clean-up storage area and restore to its original condition.

PART 4: MISCELLANEOUS PROVISIONS

4.1 PARKING AND LOADING - UNLOADING

A. General: All campus regulations, signs and directions regarding parking and loading - unloading shall be followed. The Contractor is responsible to instruct his workmen. For unusual conditions, the Contractor shall consult with the University on proposed procedures and locations, should a temporary variance be required, and follow the instructions issued.

B. Absolute Zones: All zones which are marked NO PARKING - NO STOPPING ANY TIME, must be strictly adhered to. All deliveries and pickups by contractors, subcontractors and suppliers must be made on side streets, alleys, or on University driveways and loading zones.

C. Parking: Parking for the Contractor's foreman and workmen working on campus is available in University parking lots at regular parking rates.

4.2 PROTECTION IN GENERAL

A. Refer to Article 10 of the General Conditions, other Articles of this Section 01500 and Section 01010 for more specific requirements. The University reserves the right to require the Contractor to provide additional protection where protective measures appear inadequate, but assumes no obligation to do so nor accepts any responsibility to the Contractor to provide all protection required for persons or property.

B. When it is noted or specified for Contractor to provide protection, it is the intent that Contractor provide the basic routine or normal protection, but shall not be construed to establish the total responsibility, as other Contractors shall have the protection responsibility as affected by their work, labor, operations, materials, equipment spaces and similar conditions.

C. Contractor shall provide protection for all his own equipment, hoists, and other facilities used in the prosecution of the work, to prevent operation by unauthorized personnel.

D. Any work on the roof or other membranes, shall be done over planking, plywood or other suitable protection, to spread loads under walkways and at all work areas, including around ventilating bases, with the protection provided by the Contractor whose work is being done over the membrane. There shall be no exceptions to this requirements and the Contractor shall advise the University of any violations by other contractors.

4.3 SIGN

A. Job Sign: Custom job sign not required.

B. Office Sign: Contractor may provide a sign to identify the work area and directional signs for access from street to project area; only professional lettered signs will be acceptable. Place signs so as not to interfere with vehicular and pedestrian traffic.

C. No other signs permitted, including signs on structure.

PART 5: ACCESS TO WORK AREAS AND TEMPORARY CONTROLS

5.1 GENERAL

A. Refer to Drawing Sheet A-2 for access plans.

B. All vertical transportation of materials and workmen shall be limited to the designated elevator shown on the drawings. Stairs shall not be used by construction personnel for interfloor traffic except in an emergency or if specifically authorized by the University to complete work outside of the construction limits.

5.2 ELEVATOR SERVICE, GENERAL

A. The University has designated Elevator No. 1 (shown on drawings) as construction elevator. Contractor may use this elevator free of charge. Contractor shall limit all construction use (passengers and freight) to this elevator. Elevator No. 1 will also be used by other Contractors under Contract with the University. Contractors shall coordinate and cooperate elevator use.

B. University will maintain elevator equipment without charge.

C. Contractor shall provide all necessary protection to car interior and entrances.

D. Contractor shall provide and pay for elevator operator. Elevator operator may be jointly utilized and paid for with other on-site contractors.

E. The University, the Architect/Engineer and their representatives shall be allowed use of construction elevator during the entire time of this Contract. It is the intent of the University to move its materials, equipment and furnishings by way of other elevators as far as possible to minimize the use of the construction elevator.

5.3 CONSTRUCTION ELEVATOR

A. Contractor shall install and maintain adequate protection for elevator interior and entrances on Floors 3, 5, and 6.

B. Protection: All permanent elements, subject to damage, shall be protected from damage or defacement during construction use. The Contractor shall provide and install the protection. Walls, floors and ceilings shall be lined with not less than 1/2" plywood, with a cushion board between the plywood lining and car enclosure at the walls. Lining shall not be fastened to the permanent enclosure. The protection shall be in addition to any pads used.

5.4 CONTRACTOR'S ACCESS AREA AND STAGING AREA

A. Areas designated on the drawings as Contractor's access and staging area are designated passage ways for use as access to the shell space to be finished.

Contractor access to the work areas shall be confined to the access routes. It is acknowledged that additional access is required by the Contractor to complete certain limited work shown on the Contract Documents. Access to areas outside the construction limits shall be scheduled with the University before beginning the work.

B. Under no circumstances shall work be done outside of the construction limits without advance approval and scheduling with the University. Materials shall have been prefabricated and/or immediately available to complete the work without delay. The University reserves the right to require the work be interrupted or completed on overtime basis at no change in Contract Sum, if it is not completed on the prior arranged schedule.

C. Staging and storage by the Contractor shall be confined to the designated areas on the drawings and the shell space to be finished.

D. In general, Contractor shall plan deliveries to correspond with job progress and installation due to limited site storage facilities.

E. Contractor shall take precautions to protect ceiling, walls, light fixtures, outlets, doors, etc. along access routes. Any damage shall be repaired to like new condition or replaced with new materials. Contractor assumes full responsibility for the care and condition of all existing work along the access routes and staging areas and shall correct any damage at no additional cost to the University.

5.5 SITE ACCESS, USE OF STREETS AND ALLEYS, ACCESS TO BUILDINGS

A. Access to the building site shall be only from Delaware Street.

B. There shall be no trucking or deliveries through the adjacent alleys and drives, across plaza areas or through existing buildings. The use of existing loading docks shall not be restricted by the Contractor's operations.

C. The alley west of the Masonic Memorial Hospital and the VFW Hospital shall generally be kept open and unencumbered to permit deliveries to these units and their loading docks.

D. Fire truck access must be maintained at all times to Mayo Hospital.

5.6 USE OF EXISTING PLAZA SHARED CONTRACTOR STORAGE AREA

A. Stockpiling in the area shall not endanger the structure and all loads are subject to approval of the University and the Architect/Engineer.

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PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

A. The nature of the Project, the schedule of substantial completion and final completion as specified in Section 01200, the time necessary for the University to move in and occupy the Project and the urgent need for the University to commence the programs scheduled for the Project requires careful and efficient planning to facilitate an orderly completion process within a short period of time. The Contractor shall organize and schedule a coordinated completion process and prosecute the work efficiently and diligently. The Contractor shall organize and schedule the work of subcontractors, as well as his own work, obtain firm commitments from subcontractors on completion of their work and coordinate his effort with other Contractors and the University to achieve completion on time.

B. As applicable, the specified requirements shall apply to substantial completion specified in Section 01200. Where appropriate or possible, the specified requirements shall be accomplished at the date of substantial completion.

C. After substantial completion, the Contractor shall continue to diligently prosecute all remaining work in an organized, efficient manner.

D. As may be appropriate, the requirements of this section applies to, and shall be accomplished for any individual area, floors, spaces or other parts of the total Project the University may take over and assume beneficial occupancy of use.

PART 2: PROJECT CLOSE OUT

2.1 REQUIREMENTS SPECIFIED ELSEWHERE

A. Insurance: Refer to General Conditions, Article 11.

1. Upon completion of last phase of the work and and final payment, provide a certificate of insurance that indicates the specified Completed Operations will be provided a minimum of one year after the University's acceptance of the entire Project.

B. Change Orders: All Change Orders shall be resolved prior to final payment, including the adjustment of any allowances.

C. Consent of Surety: Refer to Amendments of General Conditions, paragraph 9.6.1. The consent of the Surety must be obtained prior to any reduction in retained percentage and prior to final payment.

D. State Income Tax Withholding Certificate: Refer to General Conditions, Sub-paragraph 9.6.2.

E. Guarantees - Warranties: Refer to General Conditions, Sub-paragraph 13.2.2 for the general guarantee requirements.

1. In addition to the general guarantee, provide all written guarantees specified in the technical sections of the specifications. Where the guarantee terms are included in the specifications or a specific guarantee is referenced, submit guarantee in the specified form. Submit guarantees prior to final payment. The Contractor shall provide a check list of required guarantees, by section numbers.

F. Test Reports and Certificates: Provide all test reports and certificates required in the technical sections, prior to final payment. The Contractor shall provide a check list of required reports and certificates, by specifications sections.

G. Retention of Records: Retain all records as required by law and good business practice.

H. Project Photographs: Not required.

I. Record Set of Drawings: Refer to Section 01300, Article 2.6. Deliver the record set to the University upon final completion of the Project. Review the set with the designated personnel of the University, to clarify or explain changes that may be necessary. Obtain a receipt for the set.

J. Temporary Utilities: Refer to Section 01500.

1. Remove all temporary facilities and utilities as the job progress permits.

K. Sanitary Facilities: Refer to Section 01500.

L. Elevators: Refer to Section 01500.

M. Temporary Facilities:

1. As the job progresses and facilities are no longer needed, they shall be removed by the Contractors, at a time approved by the University.

2. Prior to final payment, the Contractor shall remove all offices, surplus materials, debris and other material or items not part of the Project.

N. Extra Materials: Prior to final completion, deliver all extra materials specified in the various technical sections. These materials shall not be allowed to "collect" in various parts of the Project, but shall be delivered to the designated representatives of the University, as directed. Obtain receipt for the specified extra materials and without such evidence of delivery, no credit will be given for fulfilling the specified requirements. The Contractor shall provide a check list of the specified extra materials.

O. Construction Cores and Keys: At the time of substantial completion, just prior to occupancy, the University will replace the construction cores and

install the permanent cores in the locks. Thereafter, access to the spaces will be by having the University open the doors.

P. Identification of Equipment: Prior to substantial completion, the Contractor shall provide the identification tags or plates, or other identification means, as specified under the technical sections of the specifications, such as at valves, panelboards and similar items. Plates with directions, circuit data and similar information shall also be affixed.

2.2 INSTRUCTIONS TO THE UNIVERSITY

A. Requirements herein supplement any specific requirements provided under individual specification sections. The intent is the Contractor thoroughly and properly instruct the University in the use, operation, care and maintenance of the Project, especially the various systems and equipment installed under the Contract. The instructions shall be methodically given, cover the various phases of the Work and be in sufficient detail so the University fully understands.

B. As construction progresses, and particularly in the later stages, the Contractor shall permit and shall assist designated representatives of the University to become familiar with the locations, methods, materials, uses and intended operation of the systems and equipment, as well as any specialized materials installations installed under his Contract. The explanations and instructions shall be provided by qualified representatives of the Contractor or his specialty subcontractors.

C. As work nears completion, the Contractor shall instruct (and demonstrate to) designated representatives of the University in the full use, operation, sequence or function and similar information to fully acquaint the University in the proper use, care and control of all equipment, systems and devices under the Contract. Precautionary measures and dangers of misuse shall specifically be explained. To qualify as completion this phase of instructions, specific and agreed upon periods of time shall be established with the University and the University will record length of time and number of days spent in the instructions.

D. When the foregoing specified instructions are being provided, the Contractor shall provide two copies of neatly edited and typed manuals of instructions, organized by classes or types of equipment and systems, to explain the use, function and control of equipment and systems. Printed information shall cover all instructions and explanations and shall enumerate common errors not to do as they will "abuse" the equipment or system. Contractor shall keep and turn over to University, clean installation data and pamphlets, which are not to be left at the equipment, but collected and put in the manuals. Manuals shall also include maintenance instructions, noting the recommended frequency and type of the various maintenance procedures.

E. Instructions specified herein shall be provided before acceptance of project and before final payment is made. The Contractor shall be alert to collect information and data in advance of completion so that complete manuals are

provided in sufficient time to permit review prior to the time for final payment.

F. No manuals are required for normal matters of routine as: Cleaning of normal floor and wall finishes; maintenance of light fixtures; cleaning of radiation; and similar housekeeping matters.

2.3 SYSTEMS AND EQUIPMENT TESTING

A. The Contractors are responsible for testing all equipment and systems of their contract and demonstrating they are correctly installed and operating properly, in the intended and planned manner. The Contractors shall operate and test each system and provide a written record of the tests and the results.

B. The operation and testing of the systems may be concurrent with instructing the University's representatives, specified in 2.2 above, provided a representative of the University is present.

2.4 CLEAN-UP

A. Refer to General Conditions, Article 4.16, for general requirements of cleaning during construction. Contractor shall be responsible for cleaning the materials and equipment and the removal (hauling away) of all his own debris, cartons, crates, surplus materials and maintaining his work neat and orderly.

B. It is intended the general "final" cleaning be accomplished just prior to the inspection for substantial completion and occupancy, typically within the week prior to the inspection. Cleaning shall be planned, organized effort to avoid working in spaces after they have been cleaned. The Contractor shall schedule the cleaning sequence. In general, the Mechanical and Electrical Subcontractors shall perform their cleaning and debris removal from the spaces first, with the General Contractor last.

C. The following requirements are a general guide to the required cleaning; do not construe as a complete description of all the cleaning required, as the work of the entire Project shall be thoroughly cleaned, including any specific cleaning required under other sections. As an area is cleaned, each Contractor shall remove the accumulated dust, dirt and debris.

D. Contractor shall thoroughly clean the materials, equipment or other items. Cleaning shall be done by appropriate methods (scrubbing, washing, damp mopping, dusting, vacuuming) to leave surfaces, areas, spaces and interiors free from stains, discolorations, oil, grease, dirt, dust or other soil to leave the work in a clean and streak-free condition, except for floors and walls where "broom clean" is later specified. All labels shall be removed, except those labels, plates or tags that are necessary to leave for the proper use of the equipment or item, or have data and characteristics that are necessary to leave.

E. Just prior to substantial completion, at a time approved by the University, the Contractor shall wash both sides of all glass (except glass in work provided under other Contracts).

F. The General Contractor shall vacuum or otherwise clean the interiors of cabinets and clean all surfaces of cabinets and equipment installed under the Contract, including washing of glass.

G. The Electrical Subcontractor shall clean the interiors of cabinets, panelboards and other equipment provided under his Contract and clean light fixtures which have become dusty and lenses which are dirty.

H. The Mechanical Subcontractor shall: Replace filters that have been used during construction and install the permanent filters so filter efficiency is that of new filters; clean any ductwork that has become dirty or dusty; clean all fixtures and fittings; clean the insides of convectors, unit heaters or similar units; clean any dirty or dusty radiation; dust and clean piping and equipment in equipment rooms; and clean other work.

I. Shafts, air shafts, air plenums that are not constructed of ductwork, and similar areas shall be free of dust and dirt. Contractor shall clean these areas to "broom clean" condition.

J. At normally occupied areas, service areas, passages and corridors and similar spaces, the General Contractor shall: Clean all his work to the "thoroughly clean" condition previously specified; provide floors (including concrete) that are free of stains and discoloration, adjust hardware and polish any that has become discolored; and perform such other cleaning as required to turn the Project and its spaces over to the University in a new, well maintained building condition, ready for full use and occupancy.

K. At spaces with vinyl asbestos floor tile, the floors shall be thoroughly cleaned and given the final waxing, specified under Section 09650, just prior to final inspection of the space.

L. After cleaning for inspection for substantial completion and occupancy, any subsequent work in any space shall likewise be cleaned upon the completion of the work by the Contract.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this Section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Miscellaneous and ornamental work of this section includes, but is not necessarily limited to, the following:

1. Steel bar brackets.
2. Miscellaneous steel members of all types.
3. Stainless steel nosing - cut pipe.

C. Related work specified elsewhere:

1. Special Formed Metal: Section 05750.
2. Custom Steel Frames: Section 08113.
3. Ceiling service panels and other metal occurring at integrated ceiling: Section 13070.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings of all items furnished under this Section in accordance with Section 01300. Show all gauges and weights of metals, type of metal, finish, fastening, welds, joinings, reinforcements, supports, anchors, relation to adjacent material, accessories and other pertinent data.

1.3 PRODUCT HANDLING

A. Protect, handle, deliver and store in a manner that will avoid damage or deformation. Store metal off ground and provide covering for metal in storage.

1.4 COORDINATION

A. Coordinate work directly with Contractor and other Subcontractors. Provide and obtain necessary dimensions, clearances and similar data for work related to items provided under this section.

1.5 FIELD DIMENSIONS

A. Obtain and verify all necessary dimensions in field to accurately fit to conditions as constructed.

1.6 QUALITY OF WORK

A. General: All work shall be fabricated and provided by a fully qualified, experienced firm with a history of providing satisfactory metal work of the types included herein, and which is acceptable to Architect.

B. Standards in General: Conform to standards of Architectural Metal Manufacturers Association in absence of project specification or drawing requirements.

PART 2: PRODUCTS

2.1 MATERIALS

A. General Metals: Metals shall be free from defects impairing strength or durability and be of best commercial quality for use.

B. Steel: Hot rolled mild steel 0.15% to 0.25% carbon range. For structural steel, provide ASTM A36-77. Provide full length pieces, no built-up lengths, crops or stubs.

C. Fastenings: Best, most appropriate type for connections to be made, of sufficient number and strength for intended use. Provide all fastenings and holes for joining work of this section together and to other building components.

D. Stainless Steel: 18-8 type 304, with #6 polished finish where exposed.

PART 3: EXECUTION:

3.1 FABRICATION IN GENERAL:

A. General: Fit and assemble in shop, ready for erection so far as possible. Fabricate and erect square, plumb, level, straight and true. Fit accurately with tight joints and intersections.

B. Joints: Provide joints, connections, intersections in best miscellaneous or ornamental practice as appropriate. Provide splined, doweled, shouldered, pinned or similar positive joints.

C. Edges: Ease sharp edges or corners, as approved, that might be source of injury.

3.2 WELDING

A. General: Conform to American Welding Society's Code for Welding in Building Construction, latest edition as applicable, using skilled welders. For "Structural" type welds, use care to provide welds which will develop proper stresses in bends, using licensed welders, inspected by qualified welding inspectors. Conform to other requirements specified elsewhere herein.

B. Field Welding: Welds made in field subject to same requirements. Field weld where indicated on drawings or as required to provide positive connections.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installing custom fabricated special formed metal items, including the following:

1. Radiation enclosures including primary and secondary supports and baffles.
2. Insulated closure panels over radiation where partitions occur.
3. Window side panels and interiors soffits, including supports.
4. Grille and blind pocket.
5. Exit light housings.
6. Formed metal base.
7. Accessories for radiation enclosures, including sheet lead sound barriers, acoustical coating and aluminum bar grilles.
8. Accessories for insulated closure panels including sound gaskets, gaskets required at end of partition walls (which shall be supplied to partition subcontractor for installation) and insulation.
9. Fastenings for work.
10. Shop finishing of items.

C. Related work specified elsewhere:

1. Metal Fabrications: Section 05500.
2. Custom Steel Frames: Section 08113.

D. Furnished but not installed under this section:

1. Sound gasket and backing plate at ends of partitions abutting exterior walls; installed under Section 09250.

E. Related work in place:

1. Fin tube radiation and carriers.

1.2 SUBMITTALS

A. Shop Drawings: Submit fabrication and installation drawings of special formed metal items in accordance with Section 01300. Show features of construction, dimensions, anchorage to adjacent construction, accessories, finishes, and other pertinent data.

B. Samples: Submit to Architect one (1) 8" x 8" sample of finish and color as selected, applied on specified metal. Provide for steel and aluminum.

1.3 JOB CONDITIONS

A. Inspection: Installer shall examine the existing radiation installation and the conditions under which the work is to be erected. Do not proceed with the erection until satisfactory conditions have been corrected in a manner acceptable to the installer.

1.4 QUALIFICATIONS OF SPECIAL FORMED METAL FABRICATOR

A. Special formed metal fabricators will be considered for approval in accordance with Article 12 of the Instructions to Bidders and the following:

1. Prospective Bidder shall have been regularly engaged in the production of custom special formed metal systems for not less than five years.

2. Prospective Bidder shall submit a listing of projects (building, location, Owner and Architect) of a similar type and size which have been completed during the last five years.

3. Approval for submission of a bid will be granted by the Architect by written addenda. All bidders will at the same time be advised of this approval and any variances allowed.

4. All such requests for consideration shall be submitted a minimum of 21 days in advance of the date set for receipt for bids.

B. The following manufacturers are acceptable as special formed metal fabricators subject to complying with the design requirements of drawings and conforming to the specifications herein:

1. Custom Enclosures, Inc.

2. Mark Hot, Inc.

1.5 PRODUCT HANDLING

A. Package, handle, deliver and store in a manner that will avoid damage or deformation.

1.6 COORDINATION

A. Coordinate work directly with Contractor and other Subcontractors. Provide and obtain necessary dimensions, clearances and similar data for work related to items provided and installed under this Section.

PART 2: PRODUCTS

2.1 MATERIALS

A. Steel: Cold formed, prime quality, pickled, annealed stretcher leveled steel, free from scale, pitting or other surface defects. Unless otherwise indicated on drawings, provide not lighter than 16-gauge steel.

B. Fastenings: As indicated. Provide Phillips head screws where screws are indicated. Fabricate steel clips of spring steel.

C. Acoustical Coating: "Aquaplas F-102A" by H.L. Blackford, Inc., 1855 Stephenson Hwy., Troy, Michigan, 48084, or similar by 3M Company, St. Paul, Minnesota, Sound Coat Company, 505 Madison Avenue, New York, New York or Sound Off by Quaker State Oil Company.

D. Sheet Lead: "Acoustilead" sheet, 1/64" thickness, 1 lb./sq.ft. by Asarco, Federated Metals Corporation, Somerville, New Jersey.

E. Aluminum Grilles: Bar Grille, consisting of linear bars at 5/8" on centers with crossbars one inch from each end and equally spaced intermediate cross bars at maximum 6" o.c. Notch crossbars to fit around primary and secondary bracket. Provide turn catch (CAM) to secure grilles to primary bracket. Provide without border. Provide proper alloy required to produce integral "hardcoat" colors of architectural class 1, AA-A42 designation, color as selected by Architect. Provide grilles within a single unit in one piece. Match existing Unit B/C bar grilles.

F. Sound Gasket Materials: Closed cell polyvinyl chloride, approximately 35 pcf density, extruded to profiles and shapes as indicated.

G. Filler Material at Sound Gasket: Vinyl covered polyurethane foam rod strips, "Foamedge" by Sterling Alderfer Division of Teledyne Monarch Rubber Company, Hartsville, Ohio, or equal. Foam rod to be minimum 3/4" diameter. Vinyl cover to be minimum 4 mill vinyl, color as selected by Architect, with minimum 3/8" self adhesive back tab.

H. Tapesound Gaskets: Similar to paragraph G above, except shape, size and type shall be as indicated.

I. Insulation: "Thermafiber" Sound Attenuation Blanket, 1-1/2" thickness, 3.0 pcf density mineral fiber by United States Gypsum or approved equal.

2.2 STEEL FINISHING

- A. Material: M&T Coating B-65, vinyl organosol, by M&T Chemicals, Inc., Subsidiary of American Can Company, Rahway, New Jersey, or approved equal.
- B. Finish and Color: Satin finish, custom color as selected by architect. Only one color will be selected for all finished metal, unless noted otherwise. The intent is to carefully match the finish of all special formed metal items to produce a continuity of design and color.
- C. Metal Preparation: Phosphate treatment, providing surface free from grease, soil or residual salts.
- D. Coating Procedure: In accordance with manufacturers instructions. Coat clean, phosphated surface with approximately 5 mils of spray applied coating: air-dry 1 to 5 minutes and bake 12 to 15 minutes at 250-300°F. to obtain desired satin finish.

2.3 FABRICATION

- A. General: Fabricate to profiles and dimensions as indicated. Consider and provide for erection procedures. Shop assemble to greatest extent possible, considering shipping and erection. Completely shop assemble and disassemble prior to shipment, marking pieces for proper field assembly. Provide all supports, anchoring devices, anchor bolts, screws, clips, seals and gaskets and other accessories.
- B. Formed Corners: Neat, sharp, continuous, free of break marks. Corner radius shall be twice the metal thickness.
- C. Flat Surfaces: Free of waves, buckles, dents, hollows, oil-canning.
- D. Acoustical Coating: Where acoustical coating is indicated, apply in accordance with manufacturer's direction over clean surface, to thickness as indicated or a minimum of 1/8" thickness.
- E. Sheet Lead: Apply vertically in radiation enclosure metal chase where partitions occur as detailed. Fit tightly to head, jambs and sill to retard the passage of sound.
- F. Insulation: Completely fill interior of closure panels with insulation, adhesively adhered to one side of panel to prevent settlement.
- G. Welding: In accordance with appropriate recommendations of American Welding Society using proper procedures. Welds behind finished surfaces shall be accomplished so as to minimize distortion and discoloration from finished side. Remove weld spatter and welding oxides from finished surfaces by descaling and grinding. Grind and polish weld beads on exposed surfaces to match and blend with finish on adjacent parent metal.

PART 3: EXECUTION

3.1 INSTALLATION

- A. General: Erect in accordance with approved erection drawings by workmen skilled and experienced with this type of metal installation.
- B. Assembly: Completely assemble, install in proper places, using concealed anchorage system, and fully complete installation, ready for final use. Secure units to prevent movement and displacement.
- C. Presentation: Erect plumb, level, rigid and in proper alignment complete with all fastenings secured. Form tight joints with gasket material in firm, uniform contact with adjacent surfaces to form effective sound barrier.
- D. Defective Components: Do not install component parts which are observed to be defective in any way, including warped, bowed, dented, abraded, and broken units. Remove for replacement any components which have been damaged during installation. The cost of replacing the units or components damaged during installation shall be a part of the responsibility of this section.

3.2 CLEANING, TOUCH-UP, AND PROTECTION

- A. Cleaning: Exercise care to keep items clean, unstained and free of debris. Upon completion clean all surfaces of all dirt, grease, or other soil to turn work over to the University in a clean, unstained, and streak-free condition, ready for use. Clean all work.
- B. Touch-Up: Field touch-up all scratches and abrasion with finish as approved by the fabricator and the Architect to match finish of adjacent surface. Return items which cannot be refinished in the field to the shop for replacement or alterations in the shop by the fabricator and refinishing of the entire unit.
- C. Protection: General Contractor shall provide protection from damage until space is occupied or accepted by University.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this Section: The following outline is a general listing of the type and character of work required under this Section. Do not construe as listing all work, materials or areas, nor describing each part of the work.

1. Nailers and blocking for casework, wood grounds (permanent and temporary) and similar wood and carpentry items.

2. Install wood doors and wood transoms furnished, ready-to-hang and prepared for hardware, specified under Section 08200, Wood Doors.

3. Install all finish hardware specified under Section 08700.

4. Furnish and install rough hardware.

5. Install Owner's existing chalkboards and projection screens.

6. All other carpentry and miscellaneous work required.

C. Related work specified elsewhere:

1. Special Formed Metal: Section 05750.

2. Glass and Glazing: Section 08800.

3. Gypsum Wallboard System: Section 09250.

4. Custom Steel Frames: Section 08113.

5. Finish Hardware: Section 08700.

6. Plastic Laminate Casework: Section 06412.

7. Integrated Ceiling System: Section 13070.

1.2 GENERAL INFORMATION

A. Wood Doors: Wood doors (Section 08200) are specified to be factory pre-fit to opening size, factory machined to receive applied hardware, factory marked for specific opening. Hardware location tolerances are specified to be $\pm 1/64$ ".

PART 2: MATERIALS

2.1 GENERAL LUMBER

A. Dimension and Framing Lumber: Douglas Fir, "Construction" and "Select Structural" as applicable. Where any piece may be exposed, it shall be clean and smooth (sand if necessary), sound and straight.

B. Other Non-Finish and Non-Framing Board Lumber: Douglas Fir, "Construction". Equivalent grades of Ponderosa Pine, Sitka Spruce or White Pine acceptable.

C. Grounds, Stripping and Furring: #1 Common Ponderosa Pine, or equivalent Idaho White Pine, Northern White Pine, KD, surfaced.

D. Grading: All lumber graded according to WCLIB Standard 16, "Dry". Where part of a member may be exposed (i.e. at reveals), provide clean, sanded, smooth and sound members.

E. General: All lumber shall be surfaced four sides (unless otherwise indicated), each piece grade marked. Provide new wood for all lumber used as permanent part of the work (unused during construction).

2.2 ADHESIVES

A. General Adhesive: As recommended by manufacturer of the product to be applied for the surface material to which it is applied, guaranteed to give permanent adhesion, with material remaining flat to back surface.

2.3 ROUGH HARDWARE

A. Provide all rough hardware required, including nails, screws, spring bolts, pins, bolts, lag screws, grommets, toggle bolts, shot anchors, and similar items. Provide proper size and type for use intended and for materials to be fastened. Provide fastening for existing equipment installed as part of this Contract.

PART 3: WORKMANSHIP AND INSTALLATION

3.1 FURRING, STRIPPING, GROUNDS AND BACKING

A. Install plumb, level, true and square. Anchor substantially for permanent installation. Set and shim to a straight edge so finish wall is true and straight. Fasten wood to metal studs with bugle head screws.

3.2 FINISH HARDWARE AND WOOD DOORS

A. General: Carefully install hardware, using skilled finish carpenters. Fit before painter's finish is applied, remove and install after finish is complete. Install hardware so that all operating parts operate smoothly, close tightly and do not rattle.

B. Doors: Hang doors so they will stand in any open position. Verify condition for stops prior to installation. Closers shall be set to allow full 180° swing where possible by jamb/wall conditions. All closers shall be set to permit swing over 90°.

C. Wood Transoms: Anchor wood transoms into hollow metal frames with six #14 x 3" F.H. wood screws, three 5/16" round x 1-1/2" steel pins and three #14 x 3 F.H. wood screws or six Stanley #1697 spring bolts. Refer to door schedule and transom panel anchor detail. Do not install transoms with particle board edges.

3.3 OWNER'S PROJECTION SCREENS

A. Attach Owner's existing projection screens to aluminum main runners of integrated ceiling system.

3.4 GENERAL WORKMANSHIP

A. Provide all workmanship to meet highest standards, accomplished by skilled mechanics. For finished millwork use experienced finish carpenters only. All exposed wood shall be free of hammer marks, abrasions, splinters, gouges, etc. Set all nails at exposed wood surfaces.

3.5 WORK OF OTHERS

A. Examine all sections of Specifications and drawings so as to properly anticipate work which must be built into, attached to, butted against, concealed by, etc. work of others and furnish and install such bucks, backing, supports, openings and other items as may be required.

3.6 PROTECTION

A. Protect all lumber and casework at job site from exposure to moisture and weather. Protect casework from damage, dust and dirt. Stack doors in flat position, with spacers as recommended by manufacturer.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7, of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installing all plastic laminate items indicated on the drawings and specified herein and not provided under other sections. The work includes, but is not limited to, the following:

1. Plastic laminate casework including floor mounted base cabinets, face, end and back panels, filler panels and scribe members, and all other items indicated by "Plastic Laminate Casework" supplier.

- a. Fixed shelving.
- b. Coat hook assemblies.
- c. Coat rod and shelf assemblies.
- d. Wall mounted adjustable shelves.

2. Provide surface mounted hanging system and all accessories required for anchorage.

3. Countertops, as indicated, with backsplashes where shown, of laminated plastic on particleboard core, with backing sheet and edge banding.

4. All hardware, including the following but not limited to: butts, pulls, catches, locks where noted; drawer slides, adjustable shelf standards and brackets, and all accessories required to complete.

5. Hardwood hook strip.

C. Related work specified elsewhere:

1. Steel Bar Brackets: Section 05500.

2. The following work is specified under Division 15.

- a. Sink, supply service, and trim.

3. The following work is specified under Division 16.

a. Electrical outlets, switches, conduit, wiring, boxes and similar electrical work.

1.2 QUALIFICATIONS

A. Quality Standards: Except as otherwise shown on Drawings or specified herein, comply with requirements of Section 400, Premium Grade, Quality Standards of Architectural Woodwork Institute (illustrated, copyrighted 1975) and by reference they are made a part of this specification.

B. Competence: Casework shall be manufactured by a well-established and experienced firm, acceptable to Architect, with satisfactory record of similar size and quality installations. Architect reserves right to reject any Subcontractor if it is Architect's opinion that (1) shop capacity, experience of workmen, equipment or supply of material will not result in the required quality or within the time required for completion, or (2) previous performance by manufacturer has been unsatisfactory.

C. Owner must receive notification 10 days prior to the start of casework construction.

1.3 COORDINATION

A. Cooperate and coordinate work with all other contractors and subcontractors concerned, including coordination for installation of sinks, fixtures, fittings, outlets, conduit and piping by others. During installation, cooperate with other contractors and, allow sufficient time for connections, installation and services required at proper time. Do not install or close up areas until utilities have been installed. Obtain all locations and size requirements for holes and other features directly from the contractors.

B. Resilient base on floor mounted casework shall be furnished and installed as follows:

1. At resilient flooring, install casework prior to installations of (VAT) flooring. Resilient flooring (VAT) by Section 09650 will stop at the base of the casework and will not continue underneath. Resilient base will be applied to the casework base by Section 09650.

C. Wall-mounted fixed shelving and adjustable shelving (including adjustable brackets and standards) as follows:

1. Provide adjustable plastic laminate shelving as detailed and as shown on plan and elevations.

2. Shelf Standards: KV #83
Brackets: KV #170

3. Heavy Duty Standards: KV #87
Heavy Duty Brackets: KV #187
Shelf Rests: KV #211 and #212

1.4 SUBMITTALS

A. Shop Drawings: Submit reproducible shop drawings for all work in accordance with Section 01300. Show work in related and/or dimensional positions with elevations shown in not less than 3/4" scale except detail sections shall generally be shown in 1-1/2" scale. Competent personnel shall neatly organize and produce drawings. Tracing of Architect's details will not be accepted as adequate shop drawings. Submit to other interested contractors, subcontractors.

1. Take field measurements and verify field conditions.

1.5 DELIVERY, HANDLING AND STORAGE

A. Deliver products under cover. General Contractor shall not permit delivery until job conditions, including humidity, are suitable. Do not deliver plastic laminate until building is sufficiently dry to insure no damage will result; as a minimum, relative humidity shall be less than 50%.

PART 2: MATERIAL

2.1 PLASTIC LAMINATE AND CORE

A. Quality Grade: Material and workmanship of plastic laminate work shall conform to Section 400, Premium Grade requirements of AWI Quality Standards.

B. Provide where shown on drawings and as specified herein.

C. Components.

1. Plastic Laminate: General Purpose Grade .050" high pressure laminate plastic for all exposed surfaces, both horizontal and vertical, including shelves and edge-banding.

2. Core: Thickness as noted on drawings, particle board (40-45 pound density).

3. Backing Sheet: Polyester overlay NEMA class II (vertical) off-white putty color at all semi-concealed cabinet interiors, unless otherwise noted.

4. Balancing Sheet: .025 Cabinet Liner Grade (white) on all concealed surfaces with exposed exterior surface of laminated plastic.

5. Phenolic Overlay: Used as backing sheet at all concealed surfaces where polyester overlay or backing sheet is used on opposite side of panel.

6. Hardboard: 1/4" for cabinet backs and drawer bottoms. Prefinished.

7. Softwood or plywood: 3/4" for sub-bases, toe boards.

8. Red Oak: 1/2" oak lumber for drawer sides, backs, and subfronts.

9. Adhesive: Modified ureaformaldehyde, Urac-185, or approved equal.

D. Plastic Laminate: As manufactured by Formica, Micarta, Nevamar, Consoweld, Wilson Art, or approved equal. Selected from full range of colors (including white), plain or other patterns, satin finish.

E. Fabrication: By experienced fabricator, approved by Architect. Eliminate seams where possible. Machine pressure bonded using waterproof adhesive, shear strength shall not be less than 300 pounds per square inch. Unless specifically shown otherwise, apply matching laminate to all exposed edges (including back edge not tight to wall) and providing approved bevel at edge. Seal all core surfaces not laminate-faced with clear synthetic resin sealer.

F. Plastic Laminate Assembly: Assemble work in factory so far as possible. If necessary to insure best results, complete units shall be assembled in factory and then partially disassembled into workable sections for shipping and job installation. Necessary joints for shipping shall be approved types. Factory assembly shall include, but not be limited to: laminated items, shelving assemblies, cabinets, and similar items.

2.2 COUNTERTOPS

A. Plastic Laminate Countertops and Backsplash:

1. Quality Grade: Comply with Section 400, Premium Grade, Quality Standards of AWI (illustrated, copyrighted 1975).

2. Plastic Laminate: General Purpose Grade .050" thick, or post forming grade .042" thick. Provide colors as selected by Architect from full range of patterns and solid colors, satin finish.

3. Balancing Sheet grade: .060" thick as made by laminate manufacturer. Apply to concealed side of work.

4. Core: Particle board as specified herein.

5. Adhesive: Modified ureaformaldehyde Urac 185 or comparable equivalent.

6. Fabrication: By experienced fabricator, using hot press method (no exceptions) in work area conditions conforming to adhesive manufacturer's specifications. Glue joints in shop, using hardwood spline, except where field joints are necessary for shipping or placing in work, prepare counter field joints in shop using bolt-up Tite-joint fasteners at spacing recommended by fastener manufacturer.

2.3 HARDWARE

A. Provide and install all hardware required for complete installation. One manufacturer is named in each of the following items, approved equal which conforms to these specifications will be acceptable.

B. Finish: US26D.

C. Drawer Glides: Grant #329, full extension slide, positive mechanical stop. Drawers with drawer faces which are less than 20" wide and less than 5" high may have the #329 Grant slides or #328 Grant slides; drawers with faces which are 20" wide or wider, or 5" deep and deeper shall have the #329 slides.

D. Door and Drawer Pulls: At each drawer and door provide one pull, Colonial Bronze Company No. 752, or Stanley No. 4483-1/2, US26D, except provide 2 pulls on drawers over 24" wide.

E. Butts and Catches: Unless noted otherwise, provide as follows:

1. Hinges for 3/4" to 7/8" cabinet doors - two pivot hinges; Stanley 331 or 332 as required, Finish US26D.

2. Catches for 3/4" to 7/8" cabinet doors: Ives 325.

F. Locks: Provide locks where indicated on casework elevations. Locks for the purpose of coordinating keying systems, shall be Illinois "Duo", Type A, or approved equal, offering 2 sets of 5 primary tumblers and one set of 4 secondary tumblers. Provide locks with 90 degree turn, key withdrawing when locked or unlocked. Locks shall be Grand Master keyed to owner's existing GM Key System. Controlled key blanks and registered key plan shall be used to assure a complete security system. Locks offering other than a non-duplicating system will not be accepted. Keying as directed by Owner. Casework contractor shall meet with Owner to establish keying schedule.

G. Elbow Catches: Cadmium plated steel elbow catches and strike plates shall be used on left-hand doors of double door cases where locks are used. Ives No. 2.

H. Adjustable Shelf Standards and Supports in Casework: K&V #233 standards and #256 supports. Provide at adjustable shelves in casework. Standards behind solid (opaque) doors may be up to 6" shorter than total side height and surface mounted.

I. Wall mounted adjustable standards and brackets: See Article 1.3 herein.

2.4 MISCELLANEOUS ACCESSORIES

A. Provide all anchors and accessories as indicated or required to provide all plastic laminate items complete.

2.5 HARDWOOD HOOK STRIP

A. Hardwood: Mill option hardwood for paint.

2.6 COAT HOOK ASSEMBLY

A. Custom fabricated coat hooks and plastic laminate assembly as detailed, complete with coat hooks, Model No. 923 by Raymond Engineering, Inc., St. Paul, Minnesota or equal. Securely anchor assembly as indicated. Hooks finished in bright aluminum.

2.7 COAT ROD AND SHELF ASSEMBLY

A. Custom fabricated plastic laminate assembly as detailed, complete with one inch diameter natural anodized aluminum pipe. Wire hangers of 3/16" heavy plated wire, adult size, with closed loop top for attachment to aluminum pipe, equal to Raymond Engineering #967.

PART 3: EXECUTION

3.1 INSTALLATION

A. Plastic laminate casework, doors, assemblies, and accessories shall be installed in accordance with reviewed shop drawings. Casework shall be installed by skilled mechanics experienced in this type of work.

B. Coordinate installation with the Mechanical Contractor, Electrical Contractor and other contractors and subcontractors so that piping and wiring may be completed and service fixtures and equipment can be set in place and connected in the proper sequence.

C. Erect casework plumb, true, square and level in a substantial manner. Fasten adjacent units together, and securely anchor casework to floors and walls as required. Install all doors, drawers, shelves and other accessories.

D. Install scribe strips and filler panels accurately scribed to abutting construction.

E. Level tops, and anchor in place.

F. Adjust hardware for proper operation. Tag keys and turn over to Owner as directed.

G. Touch up scratches and other damage to casework finish.

3.2 CLEANING

A. Exercise care to keep items clean, unstained and free of debris. Upon completion clean all surfaces (including casework interiors) of all dirt, grease or other soil such that work is turned over to Owner in a clean, unstained and streak-free condition.

3.3 GUARANTEE

A. Guarantee all work against warping, racking, shrinkage, opening of joint, cracking, delamination and other defects for a period of one year.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes interior custom steel frames, including the following:

1. All rough bucks and frame reinforcing.
2. Standard and special anchors, clip angles, etc., required for installation. Jamb, head and floor anchorage, rubber silencers.
3. Extensions of frames to secure frames to structure above as shown or required.

C. Related work specified elsewhere:

1. Grouting of Frames: Section 09250.
2. Special Formed Metal: Section 05750.
3. Metal Fabrications: Section 05500.
4. Installation of Wood Doors and Finish Hardware - Carpentry: Section 06100.
5. Wood Doors: Section 08200.
6. Finish Hardware: Section 08700.
7. Field Painting: Section 09900.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings of hollow metal items in accordance with Section 01300. Show all features of construction, dimension, gauges, reinforcements, cutouts, anchorage to adjacent construction and other pertinent data.

B. If requested by Architect, prior to fabrication submit samples to job site of 1/4 of a frame showing reinforcing, construction, and workmanship. If approved, samples will be retained as a comparison with delivered hollow metal.

1.3 PRODUCT HANDLING

A. Handle, transport and store hollow metal work in a manner that will prevent damage and deterioration. Provide proper packaging to protect all items. Store at the project site in an upright position under cover and on wood sills.

PART 2: PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

A. This specification is based on Trussbilt Custom Steel Frames.

B. Comparable products manufactured by Overly Mfg. Co., or Curries Manufacturing, Inc., or approved equal which conforms to these specifications will be acceptable.

2.2 FABRICATION

A. Construct all work in a first class manner in accordance with details and approved shop drawings. All joints and mortises shall be to hairline accuracy, with all welds continuous and ground smooth and with all items square and true.

B. Factory assemble frames in the largest size units permitted by shipping restrictions for minimum assembly of related parts at the job site.

C. Frames:

1. Provide one piece welded unit type construction formed to the profiles shown on details. Construct frames of hot-rolled pickled and annealed steel. Use 16-gauge for all frames. Label frames, 16 gauge or heavier if required by label.

2. Miter all corners, including stops, to hairline accuracy continuously arc welded on the back side. Grind frame faces smooth for invisible joint. At mullion intersections of special frames, arc weld faces of frames and stops. Welding and grinding to flush, smooth surfaces shall be done to preserve the original profile of the frame and to maintain crisp square corners. Spot welding of reinforcement shall be invisible on exposed surfaces. The welding at mitred corners, including stops, shall not be visible on the exposed side of frame. The exposed corners shall be crisp, clean and true.

3. Provide at least three anchors at each jamb for anchoring frame to adjacent construction. Type of anchor shall be determined by the type of construction and as recommended by the frame manufacturer. Provide 2" x 3-1/2" x 12 gauge floor clip angles.

4. Provide all special reinforcing called for on the drawings and as required to provide rigid, straight and adequately strengthened frames for the conditions.

D. Hardware Preparation:

1. Mortise, reinforce, drill and tap frames for hardware using templates furnished by the hardware supplier. Provide the following minimum reinforcements and components:

a. Frames:

Hinge reinforcements - 3/16" x 1-1/2" x 9"

Strike clips - 3/16" x 1-1/2" x 9"

Closer and holder - 12 gauge

Spreader - 16 gauge channel arc-welded.

Cover boxes - full enclosed steel boxes over mortises.

2. Provide three Glynn-Johnson GJ64 moulded, non-staining rubber mutes for all interior door frames. Provide four silencers to align transom panel with door.

E. Underwriters Construction:

1. Provide Underwriter's construction of the classifications required by the drawings.

2. The hollow metal manufacturer shall submit a certificate that doors and frames called for as labeled construction only have actually been constructed in accordance with U.L. construction requirements.

2.3 PAINTING

After fabrication, thoroughly clean all items of rust, oil, grease or other impurities, spot glaze where necessary to correct defects and apply one coat of red oxide primer, baked on.

PART 3: ERECTION

3.1 ERECTION

A. Erect frames in position plumb, rigid and in true alignment. Provide the necessary bracing and spreaders to prevent displacement or distortion until adjacent construction is completed. Securely attach frames to floor and adjacent construction.

B. Drill and tap for field splices and connections after erection. Caulk splices and connections and leave finished work smooth and free from warps and buckles.

C. After erection, touch up field splices, connections, welds and abrasions with specified primer.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing all 1-3/4" wood doors and transom panels. Label and non-label doors. Prefit and machine all doors.

C. Related work specified elsewhere:

1. Installation of doors: Section 06100.
2. Custom Steel Frames: Section 08113.
3. Finish Hardware: Section 08700
4. Field Finishing: Section 09900.
5. Glass and Glazing: Section 08800.

1.2 GENERAL INFORMATION

A. Coordination: Coordinate work directly with appropriate subcontractors (i.e. Hardware, Hollow Metal) as necessary to insure proper fitting, opening sizes and clearances to other work. Door manufacturer shall be responsible for coordination of information to insure proper fit of doors.

B. Field Dimensions: Field measure building features as required to insure proper fitting of work.

C. Samples: Provide Painting Subcontractor with two unfinished samples of project veneer. samples shall be uniform in size, approximately one square foot. Identify Project in ink directly on one surface of sample. Provide sample pieces which will be representative for each species.

1.3 JOB CONDITIONS

A. General Contractor shall not permit delivery until job conditions, including humidity, are suitable. Do not deliver until building is sufficiently dry to insure no damage to doors will result; as a minimum, plastering and similar moisture shall have been out of entire building for at least ten days, relative humidity shall be less than 50%.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Package, handle, deliver and store at the job site in a manner that will avoid damage. Damaged doors will be cause for rejection.
- B. Store doors flat and support in such a way as to prevent marring or crushing.
- C. Store doors in unopened containers until ready to hang.

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings of all wood door items in accordance with Section 01300. Show all features of construction, dimensions; and all other pertinent data.
- B. Door Certification: Where 20 minute doors are indicated, door manufacturer to provide certification that interior doors have not less than 20 minute fire protection rating when tested in accordance with U.B.C. Standard #43-2 without hose stream test.

1.6 GUARANTEE

- A. Guarantee interior doors for five years. Guarantee shall cover faulty workmanship, materials, delamination or splitting of veneer or warp in excess of 1/4" for doors up to 7'-0" and warp in excess of 3/8" for doors over 8'-0". Replace doors complete including fitting, hanging, and finishing.

PART 2: PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Wood Door Manufacturers: Doors by Algoma Hardwoods, Weyerhaeuser, or approved equal, conforming to the below specifications will be acceptable.

2.2 WOOD DOORS AND TRANSOM PANELS

- A. Quality Grade: Except as otherwise specified herein, provide Premium Grade, as defined in AWI Quality Standards, Section 1300.
- B. Transom panels to be same construction as doors, see details for support, and stops. Those with particle board edges will be rejected.
- C. Flush Door Construction: Solid core, wood flake board core, 28 to 32 lb. per cubic foot density; or single thickness slab of 3-ply particle board; conforming to Commercial Standards CS236-66, Type 1, Density C, Class 1. Stile edges 1-3/8" to 1-1/2", top and bottom edges 1-1/4" thick, overlays as specified under 2.3 herein.

D. Label Construction Only: Solid, mineral core, joined together in accordance with Underwriters' Laboratories procedure manual, Class "C" (3/4 hour) openings. Overlay as specified under 2.3 herein. Provide approved vision panels and astragal with prime paint.

1. The door manufacturer shall submit a certificate that doors and frames called for as labeled constructed only have actually been constructed in accordance with U.L. construction requirements.

2.3 FACE VENEER OR OVERLAY

A. Refer to Door Schedule for doors and transom panels that receive paint finish.

B. Overlay for Paint Finish: Medium-density overlay sheet of phenolic resins and cellulose fibers laminated over a sound grade hardwood face veneer.

2.4 PREFITTING AND PACKAGING

A. Prefitting: Factory prefit and bevel, to net opening size less approximately 1/4" in width and 3/8" in height for doors occurring over hard surface floors and 3/4" height for doors occurring over carpet (unless otherwise required by drawings or specification). Slightly ease vertical edges.

B. Machine for Hardware: Machine for all hardware requiring cutting of door, except hardware applied by surface application. General Contractor shall provide door manufacturer with hollow metal shop drawings, hardware templates, floor plans, opening schedules, hardware schedule and physical samples, if required, not less than 120 days prior to desired delivery date of doors.

C. Openings: Manufacturer shall cut for glass or louvers where required, if any, as shown. Openings shall have mouldings tacked in place for field glazing. Seal all cutout openings at mill prior to setting louvers or tacking in mouldings. Prevent any stains on face of door.

D. Numbering: Provide door opening number on either top or bottom edge of door. Location of numbers shall be consistent.

E. Packing: Pack doors individually in heavy cardboard cartons; paper bag packaging not acceptable. Provide door opening number on shipping carton.

PART 3: EXECUTION

3.1 INSTALLING AND FINISHING

A. All doors are hung and installed under Section 06100 and finished under Section 09900.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing of all finish hardware shown on drawings and specified herein except for that specified under other sections.

C. Related work specified elsewhere:

1. Hardware built into plastic laminate casework: Section 06412.

2. Custom Steel Frames: Section 08113

3. Wood doors: Section 08200.

4. Other finishing hardware specifically included with manufactured items or under specific fabrication or erection specifications: Applicable sections.

5. Rough hardware: Section 06100.

D. Furnished but not installed under this section:

1. Finish hardware is installed under Section 06100.

E. Outline and schedules contained herein have been listed to indicate scope of work. Under this Section provide all work reasonably required by the general scope as outlined herein, and all work shown on drawings. Provide items, articles, materials, operations and methods listed, mentioned or scheduled herein or on drawings, in quantities as required to complete the project. Provide hardware which functions properly and advise Architect of any items that will not operate properly and are improper for conditions or will not remain permanently anchored before hardware is furnished.

1.2 SUBMITTALS

A. Schedule: Submit in accordance with Section 01300 and the following:

1. After award of contract, prior to preparation of schedule, successful bidder is required to deliver an outline of products of all proposed items to the Architect for acceptance. For proposed substitutions provide samples in specified finishes, identified as to manufacturer and catalog number. Accompany samples of substitute items with samples of specified item for comparison.

2. Submit three copies of a complete vertical type detailed hardware schedule with doors listed in numerical order and sequentially identified by specification hardware group.

3. Resubmit six correct copies.

4. Submit a brochure of all approved items to facilitate Architect's checking of catalog items.

5. Include schedule of mounting heights of hardware. Verify that no conflicts exist in mounting heights specified. If discrepancies are uncovered call to architect's attention for direction about how to proceed.

B. Templates: Furnish a final hardware schedule and accurate templates to the door and frame supplier. If required, furnish physical hardware to the door and frame manufacturer for application. All reinforcements required to adapt hardware to metal doors or frames are specified in door and/or frame specifications.

C. Operating and maintenance manuals, three ring loose leaf, hard cover binders, in five copies.

D. Letter certifying to final hardware adjustments.

1.3 DELIVERY, STORAGE, HANDLING

A. Properly and carefully pack items to guard against damage in transit. Pack each group separately and mark clearly to show its contents and place in building for which it is intended. Do not deliver hardware until General Contractor has suitable locked storage space.

1.4 GUARANTEE AND ADJUSTMENTS

A. The hardware distributor shall replace and make good hardware found defective in workmanship and material within a period of one year after substantial completion. The Contractor shall be responsible for faulty application.

B. Where hardware indicates improper operation, hardware supplier or manufacturer shall visit job and make necessary adjustments and corrections. Where hardware is inadequate for required function, exposure or use, replace with suitable hardware as directed.

C. Shortages and/or incorrect items (based on plans and specifications and approved schedules) shall be furnished and/or replaced with correct material by the hardware distributor at no additional cost to the owner.

D. At completion of project, General Contractor shall notify hardware subcontractor, who shall have a qualified factory representative make inspection of closer installations. Final adjustments of closers shall be made by representative and a letter sent to Architect reporting conditions and that final adjustments have been made.

PART 2: PRODUCTS

2.1 GENERAL QUALITY

A. Furnish new hardware, free from defects, scratches, mars, etc. Furnish hardware complete with necessary screws, shields, grommets, etc., for correct installation onto door, frame or other supporting surface for which each item is intended.

B. Unless specifically called for herein, furnish no hardware with aluminum components.

C. All like items of hardware shall be of the same manufacturer.

2.2 FINISH AND MATERIALS

A. Unless otherwise indicated in the specification groups, all finishes shall be used as follows:

Hinges	US26D
Locksets	US32D
Closers	Sprayed alum.
Push, Pulls, Kickplates & Armorplates	US32D
Overhead Stops and Holders	US26D
Door Stops and Holders	US26D
Miscellaneous Items.	US26D

2.3 LOCKS AND KEYING

A. Provide locks and latch sets of "heavy duty" mortise locks, equal to Sargent 8200 series with lever handles and escutcheons. Locks shall have adjustable armored fronts and anti-friction latch bolts with minimum 3/4" throw. Provide wrought boxes and curved lip strikes with proper lip length to protect trim but not to project more than 1/8" beyond trim, frame or inactive leaf. For labeled fire doors all locks and latchsets shall be UL listed. Number in hardware group indicates required lock function.

B. Unless otherwise specified, provide Sargent lever handle trim, 1446F special (all edges eased), stainless steel. Escutcheons to be 7-5/8" x 1-5/8" cast stainless steel, through bolted top and bottom (concealed outside), Sargent LEI.

C. For all key operated lockets provide Best Universal Lock Company 7 pin-tumbler cylinder with Best's interchangeable cores, typically IE74, US26D.

D. Keying will be determined by Owner in conjunction with representatives of Best Universal Lock Company. Ship permanent cores directly to University of Minnesota, for installation by Owner. If contractor desires temporary construction cores for certain locksets during construction, Owner will, upon application, furnish and install a reasonable number of such cores without charge.

2.4 HINGES

A. Each door leaf shall be supplied with hinges fabricated of planished and plated contract grade materials and shall have:

1. Flat button tips.
2. Non-rising loose pins.
3. Steel pins.
4. Inner edge of hinge need not be beveled.

B. Hinges shall be fabricated to template for use with steel frames.

C. Non-removable loose pins are required on all locked outswinging doors.

D. Hinge material shall be as follows:

1. All hinges shall be steel.

E. Weight and bearing of hinges shall be determined by door width and type as follows:

1. Interior doors less than 44 inches wide - standard weight ball-bearing hinges.

2. Interior doors wider than 44 inches - extra heavy hinges with four ball-bearing races.

F. Size of hinges shall be determined by door thickness as follows:

1. Doors 1-3/4" thick - 4-1/2" x 4-1/2"

G. Number of hinges per door, shall be determined by door opening height, width and location as follows:

- | | |
|-------------------------------------|----------|
| 1. 60 inches and under | 2 hinges |
| 2. 61 through 90 inches | 3 hinges |
| 3. 91 through 120 inches | 4 hinges |
| 4. Doors 40 inches or more in width | 4 hinges |

H. Acceptacle Hinges:

<u>Type</u>	<u>Lawrence</u>	<u>Stanley</u>	<u>McKinney</u>	<u>Hager</u>
Plain Bearing-steel	4181	F179	T2714	1279
Standard Weight BB Steel	BB4101	FBB179	TB2714	BB1279
Extra Heavy 4-BB Steel	BB5151	FBB168	T4B3786	BB1168

2.5 CLOSERS

A. Door closers shall be cast of iron and arms shall be forged. Closers shall be complete with all accessories to correctly mount closer.

B. Closers shall be of a surface type with full cover and narrow projection. Closers shall have full rack and pinion mechanism with backcheck, 50% adjustable spring power where indicated and separately adjustable controls on 'sweep', 'latch' and 'backcheck' speeds.

C. Locate closers as follows unless details or special conditions require otherwise.

1. Room side of corridor doors.
2. Do not mount closers to limit door swing.

D. Typical Closers:

1. Interior doors swinging into corridors from rooms opening 180°: 4020 or 4110 Series.

2. Typical Interior Doors:

a. 2'-8" or less in width any degree opening or 3'-0" or less in width 90° opening: 4030 Series.

b. Wider doors, corridor doors or doors with greater degree opening than "a": 4010 Series.

3. Acceptable Closers LCN 4010, 4020, 4030.

E. Furnish closers for all doors as noted in groups and in addition, furnish closers for all labeled and/or labeled construction doors whether or not specifically noted in group.

F. Hardware schedule shall show the manufacturer, type, size, finish, accessories and degree of opening for each closer. Final closer mounting position may be determined during review of the hardware schedule.

G. Size of door closer shall be as recommended by the closer manufacturer. Provide closer of larger size if required by special conditions such as door seal, latching resistance, internal building pressure and wind conditions.

2.6 KICK PLATES

A. Kick Plates: 14" high generally, stainless steel, .050 thickness with countersunk screw holes. Width shall be 1-1/2" less than door width on stop side of doors and 1/2" less than door width on hinge side of doors. Where one kick plate is specified per door, install on stop side of door. Packaging, workmanship and quality equal to Hiawatha hardware.

2.7 STOPS AND HOLDERS

A. Provide door holders for doors where listed in hardware groups. Provide a stop type WB50X or GJ300 Series, as required for all doors not equipped with holders or other specified stop. Furnish WB50X wherever possible. Furnish GJ300 series for all doors shown not to swing against walls. Stops by Ives,

Glynn Johnson, Baldwin or Quality. Secure stop or holder to wood blocking within all steel stud partition locations. Use surface type stops at labeled doors, roller bumpers for interfering doors and projection type stops where knob or lever does not contact the wall.

2.8 MOUNTING HEIGHTS

A. All dimensions up from finished floor:

Lever	40" to C/L
Kickplate	Bottom within 1/8" of door bottom

PART 2: HARDWARE GROUPS

Group 1

Lockset	8205
Cylinder	1E74
Stop	WB50X

Group 2

Lockset	8205
Cylinder	1E74
Closer	4110
Stop	WB50X
Kick Plate	

Group 3

Lockset	8205
Cylinder	1E74
Closer-Stop	4110-CUSH
Kick Plate	

Group 4

1 Lockset	8205
1 Cylinder	1E74
2 Flush Bolts	458B
1 D.P. Strike	489B
2 O.H. Stops	GJ310

Group 5

Lockset	8205
Cylinder	1E74
Closer	4034
Kick Plate	
Stop	WB50X

Group 6

1 Lockset	8205
1 Cylinder	1E74
2 Closers	4110
2 Auto Bolts	902RL
2 Kick Plates	
2 Stops	WB50X
1 Coord.	1237

Group 7

Exit Device	6634K x 375L
Cylinder	1E74
Closer	4110 CUSH
Kick Plate	

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all interior glass and related glazing and setting materials.

C. Related work specified elsewhere:

1. Installation of Wood Doors - Carpentry: Section 06100.
2. Custom Steel Frames: Section 08113.
3. Vision Panels: Section 08200.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings showing all features of construction, dimensions and all other pertinent data.

B. Submit any proposed variations from specification requirements in writing before starting glazing. Incorporate such variations only upon written approval of Architect.

C. Submit prior to starting glazing, complete outline of materials and methods, showing all products in full size detail of each glazing condition and listing step-by-step, all operations.

1.3 GUARANTEE

A. General: Guarantee all materials, installation and other work of this Section for minimum of two years after project acceptance, covering: faulty materials and workmanship; compatibility of materials; other deficiencies. In event of necessary corrective work, promptly replace or remedy the installation in approved manner to equal a new installation.

PART 2: PRODUCTS

2.1 GLASS

A. Provide glass of type and thickness indicated on drawings and of manufacture and quality specified.

1. Wired Glass: In accord with UL Guide HOVR, "Glazing for Fire Windows and Doors." Wired glass with diamond mesh.

PART 3: EXECUTION

3.1 GENERAL

A. Accomplish work in accordance with project specifications. In absence of project specification requirements, follow recommendation of glass manufacturer, glazing material manufacturer and Glazing Manual of Flat Glass Marketing Association. Obtain Architect's written direction, before proceeding with work, in the event project specifications are at variance with manufacturer's recommendations. In no case shall installation be below standard recommended by manufacturer.

B. Field measure to determine conditions and dimensions.

C. Clean, just prior to glazing, rabbets, stops and glass free of dirt, rust, oil, grease, temporary protective films or other foreign matter. Notify Contractor of any unsuitable conditions. Glaze when all surfaces are clean, dry.

D. Follow manufacturer's recommendations for protection of edges. Examine each piece of glass for nicked or otherwise damaged edges and install only glass free of such damage.

E. Set glass with factory attached labels in place.

F. Set glass with reams (waves) running horizontally.

3.2 CLEANING

A. Remove all surplus materials. Final cleaning of glass and mirrors shall be done by the Contractor at or near substantial completion.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing all gypsum lath and plaster ceilings, accessories, and associated support system.

C. Related work specified elsewhere:

1. Metal suspension and furring for other than plaster ceilings: Section 13070.

2. Gypsum Wallboard: Section 09250.

1.2 REFERENCE STANDARDS

A. Fire Resistance Design Manual, Gypsum Association FA-600-78, 1978 Edition.

B. Standard specification for installation of Interior Lathing and Furring: ANSI/ASTM C 841-76.

C. Standard Specification for Application of Interior Gypsum Plaster: ANSI/ASTM C 842-76.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver packaged materials in their original, unopened packages, containers or bundles with labels intact. Deliver, store and handle materials to prevent damage. Protect from water and the elements.

1.4 JOB CONDITIONS

A. No gypsum lath, or plaster shall be applied when the temperature is below 55°F. and a minimum temperature of 55°F. shall be maintained throughout the curing period.

B. Protect finished surfaces by placing adequate coverings over such surfaces before starting work. Damaged, stained or soiled surfaces shall be replaced or restored.

C. Provide adequate ventilation during and after installation throughout curing period to avoid uneven drying.

PART 2: PRODUCTS

2.1 PARTITION MATERIALS

A. Furring channels and runners shall be 3/4", 1-1/2" or 2" cold rolled steel channels. Minimum weight per lineal foot shall be 0.300 pounds for 3/4" channels, 0.475 pounds for 1-1/2" channels and 0.590 pounds for 2" channels. Channels shall be coated with rust inhibitive paint after forming.

B. Cornerrite and strip lath shall be 2.5 pound flat expanded metal lath. Cornerrite shall be bent at right angles with 3" wide legs each side. Strip lath shall be 6" wide.

C. Tie wire and clips shall be galvanized, soft annealed steel. Hanger wire shall be galvanized steel wire, #9 gauge except in fire rated ceilings where #8 gauge shall be used.

D. Gypsum lath and accessories shall be manufactured by National Gypsum, U.S. Gypsum, or approved equal.

1. Gypsum lath shall conform to ASTM C37, Plain Gypsum Lath, 3/8" and 1/2" thick, 16" wide. Fire retardant gypsum lath shall be type 'X'.

2. Clips for attachment of gypsum lath to furred and suspended ceilings shall be National Gypsum Wire-Tite Clips, U.S. Gypsum Brace-Tite Clips, or approved equal. Other clips, screws and accessories for the attachment of gypsum lath shall be manufacturer's standard type for intended use.

2.2 PLASTER MATERIALS

A. Plaster materials shall conform to ASTM standard specifications as follows:

- 1. Gypsum Plaster: Gypsum neat plaster conforming to STM C28.
- 2. Gauging Plaster: ASTM C28.
- 3. Keene's Cement: ASTM C61.
- 4. Hydrated Lime: ASTM C206, Type S.
- 5. Sand: ASTM C36.

a. Sand for sand float finish coats shall be a white silica sand graded as follows:

Passing #16 sieve	100%
Passing #30 sieve	50-80%
Passing #50 sieve	30-50%
Passing #100 sieve	0-20%

B. Water shall be clean, potable and free of deleterious amounts of acids, alkalies or organic materials.

2.3 PLASTER MIXES

A. Base Coat Proportions.

1. Scratch coat for three-coat work over gypsum lath shall be mixed in proportions of 100 pounds gypsum neat plaster to 200 pounds (2 cubic feet) damp, loose sand. Brown coat shall be mixed in proportions of 100 pounds gypsum neat plaster to 300 pounds (3 cubic feet) damp loose sand.

B. Finish Coat Proportions.

1. Gypsum-Lime Putty Trowel Finish shall be mixed in proportions of 1 part gypsum gauging plaster to not more than 3 parts lime putty by volume.

C. Mixing.

1. Accurately measure materials.

2. If mixing by hand, mix plaster and aggregate to a uniform color at one end of the box before adding water, hoe into water at the other end and thoroughly mix to the proper consistency. Clean tools and mixing box after each batch.

3. If using a power mixer, add approximate amount of water, approximately half the sand, all the plaster and the remainder of the sand, in that order, while the mixer is in continuous operation, and mix to proper consistency adding additional water as necessary. Clean mixer after discharging each batch.

4. Plaster shall be accelerated, if necessary to provide a setting of not more than 4 hours after addition of mixing water.

5. Discard material which has partially set. No retempering will be permitted.

PART 3: EXECUTION

3.1 INSPECTION

A. Examine supporting materials and surfaces to receive work of this section before commencing work. Do not proceed until conditions which would result in a less than first class installation are satisfactorily corrected. Commencing work shall be construed as acceptance of the surface by this Contractor as satisfactory to receive furring, lath or plaster.

3.2 SUSPENDED CEILING GRILLAGE

A. Securely attach hanger wires to structure above. Space hangers along direction of main runners not over 48" on center, and locate hangers not more than 6" from ends of runners. Use #8 gauge hanger wires where ceilings require fire rating.

B. Main runners shall be 1-1/2" furring channels spaced not over 36" on center. Locate main runners within 6" of parallel walls. Keep end of main runners at least 1" away from walls. Install main runners level, true to plane, at the required elevation with hangers saddle tied.

C. Where hanger spacing must exceed 48" on center, use #8 gauge hangers spaced not over 60" on center and 2" furring channels spaced not over 36" on center.

D. Where main runners are spliced, lap ends with channel flanges interlocked not less than 12", and tie each end of the lap with double loops of #16 gauge wire.

E. Cross runners shall be 3/4" furring channels or metal furring channels spaced 16" on center maximum and saddle tied to main runners with 16-gauge wire or a double strand of #18 gauge wire at each crossing. Locate cross runners about 1" from parallel walls, and keep ends at least 1" away from walls.

F. Where main runners or cross runners are interrupted by light fixtures, grilles and registers and other openings, install additional runners to frame openings. Reinforce grillage as necessary to support light fixtures, grilles and registers and other items mounted in the ceiling with a maximum allowable deflection of 1/360 of the span.

G. Grillage shall not be suspended from ductwork or piping. Where hanger spacing and spans exceed the specified spans, use hangers with a larger capacity, larger main runners or additional reinforcing members, hangers, stiffening or bracing as necessary to support the loads without exceeding the specified deflection.

3.4 INSTALLATION OF GYPSUM LATH

A. Install gypsum lath at right angles to the 3/4" furring channel cross runners. Butt joints together. Locate end joints between runner channels with clips installed strictly according to manufacturer's instructions. Support end joints with clips. Cut lath neatly around light fixtures, grilles and registers and other openings.

B. Reinforce corners of openings with not less than 12" long self-furring strip lath installed diagonally across corners.

3.5 MISCELLANEOUS LATHING AND FURRING

A. Install miscellaneous lathing and furring according to ANSI A42.4.

3.6 APPLICATION OF PLASTER

A. Thickness and number of coats.

1. Gypsum plaster on plain gypsum lath supported 16" on center maximum shall be applied in 2 coats, and gypsum plaster on perforated gypsum lath and gypsum lath supported more than 16" on center shall be 3 coats. Thickness of plaster including the finish coat shall be not less than 1/2".

B. Two Coat Work. Apply base (first coat with sufficient material and pressure to form a good bond and cover well. Do not scratch. Before the material has set, double back with material of the same proportions to bring plaster out to grounds. Straighten to a true surface without application of water, and cross rake or scratch to receive the finish (second) coat.

C. Three Coat Work. Apply scratch (first coat with sufficient material and pressure to form full keys with the lath, cover well and have enough depth to allow for scratching. Before coat hardens, scratch to a rough surface. After scratch coat has set firm and hard, apply brown (second) coat. Bring out to grounds, straighten to a true surface without application of water and cross rake or scratch to receive the finish (third) coat.

D. Finish Coats. Dampen the surface of the base coat evenly by brushing or spraying as necessary to produce uniform suction before applying the finish coat. Avoid excessive use of water in applying finish coats.

1. Trowel Finishes. Apply finish coat approximately 1/16" to 1/8" thick. Scratch in thoroughly, double back fill out to a true, even surface. Allow to draw a few minutes, and then trowel well with water to a smooth finish, free of cat-faces and other blemishes or irregularities.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, and requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing all metal stud partition systems, metal furring, and all gypsum wallboard work indicated or specified.

C. Related work specified elsewhere:

1. Integrated Ceiling System: Section 13070.
2. Special Formed Metal: Section 05750.
3. Custom Steel Frames: Section 08113.
4. Gypsum Lath and Plaster: Section 09200.

D. Installed but not furnished under this section:

1. Sound gasket assembly at ends of partitions abutting exterior walls: furnished by Section 05750.

1.2 REFERENCE STANDARDS

A. Fire Resistance Design Manual, Gypsum Association GA-600-78, 1978 Edition.

B. Recommended Specifications for the Application and Finishing of Gypsum Board: Gypsum Association GA-216-78r.

C. Installation of steel framing members to receive screw-attached gypsum wallboard, backing board, or water-resistant backing board: ASTM C-754-74.

D. Specifications for Gypsum Wallboard: ASTM C36-78.

E. Specification for Non-Load (axial) Bearing Steel Studs, Runners (track), and Rigid Furring Channels for Screw Application of Gypsumboard: ASTM C645-76.

F. Specification for Steel Drill Screws for the Application of Gypsum Sheet Material to Light-Gauge Steel Studs: ASTM C646-78.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver packaged materials in their original, unopened packages, containers or bundles with labels intact. Deliver, store and handle materials to prevent damage. Protect from water and the elements. Store gypsum wallboard indoors in dry locations, neatly stacked flat on wooden pallets. Protect metal items from rusting and damage to painted finishes. Do not unwrap gypsumboard until ready for actual use.

1.4 JOB CONDITIONS

A. Protect wood, glass, metal and other finished surfaces by placing adequate coverings over such surfaces before starting work. Damaged, stained, or soiled surfaces shall be replaced or restored.

B. Provide adequate ventilation during and after installation and throughout curing period. Avoid uneven drying.

PART 2: PRODUCTS

2.1 FRAMING AND FURRING MATERIALS

A. Metal studs shall be screw type, channel studs formed from 20 gauge galvanized steel with knockouts for pipe and conduit. Runners shall be channel shaped with 1" minimum legs formed from 20 gauge galvanized steel. Studs and accessories shall be manufactured by Natinal Gypsum, U. S. Gypsum, Milcor-Inland Ryerson, Wheeling, Penn Metal, or approved equal. Furnish studs in widths indicated on the drawings.

B. Compressible gasket for steel stud partitions shall be Norton Norseal V730 series low density PVC foam with pressure sensitive adhesive one side or approved equal. Install double for 30% compression.

C. Sound insulation for steel stud partitions shall be a semi-rigid, spun mineral or glass fiber mat conforming to Federal Specification HH-I-521c, Type 1, Class A or B; Fiberglas Noise Barrier Batts, U. S. Gypsum Thermafiber Sound Attenuation Blankets. Unless otherwise indicated, sound insulation shall be 2" thickness.

D. Screws for attachment to acoustical ceiling main runners and cross runners shall be stainless steel or cadmium plated steel screws, 5/16" diameter by 18 threads per inch, 5/8" maximum length.

E. Acoustical sealant shall be Pecora BA-98, Tremco Acoustical Sealant, Presstite 579.64, USG Acoustical Sealant, or approved equal.

F. Acoustical tape shall be a 2" wide, pressure sensitive, permanently resilient, non-drying, non-shrinking plastic tape; Norton No. V734, 1/8" thick acoustical tape or approved equal.

G. Cell closures for tops of plenum sound barrier abutting steel deck; preformed neoprene closures minimum 1" thick of proper profile to match deck profile.

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H. Clips, screws and other accessories for the attachment of metal studs, runners and drywall furring channels shall be manufacturer's standard type for intended use.

I. Continuous hollow metal channel formed from 16 gauge hot-rolled pickled and annealed steel. Formed to profile shown on drawings.

2.2 GYPSUM WALLBOARD

A. Gypsum wallboard, accessories and related materials shall be manufactured by National Gypsum, U. S. Gypsum or approved equal. Materials shall be as follows:

1. Gypsum wallboard shall be 48" wide wallboard with tapered edges conforming to ASTM C36.

2. Water resistant wallboard shall conform to ASTM C630, Federal Specification, Type VII Grade W.

3. Fire-retardant gypsum wallboard shall be 48" wide wallboard with tapered edges conforming to ASTM C36, Type X. Fire-retardant gypsum wallboard shall be listed by the Underwriters Laboratories, Inc. (Guide No. 40 U18.23).

4. Gypsum backing board shall be 48" wide backing board with square edges. Fire retardant gypsum backing board shall conform to ASTM C36, Type X and shall be UL listed.

5. Accessories shall be as follows:

a. Corner Bead - U. S. Gypsum Dur-A-Bead, No. 101 or No. 103.

b. Casing Bead - U. S. Gypsum No. 200-A or 200-B metal trim.

c. Control Joint - U. S. Gypsum No. 093.

6. Screws, nails, clips, ties and other accessories shall be as recommended by the gypsum board manufacturer.

7. Adhesives shall be Durabond of type recommended by the gypsum board manufacturer for application required.

8. Joint treatment system shall be a perforated tape and cement system Durabond or equivalent recommended by the gypsum board manufacturer for the intended use.

PART 3: EXECUTION

3.1 INSPECTION

A. Examine supporting materials and floors to receive work of this section before commencing work. Do not proceed until conditions which would result in a less than first class installation are satisfactorily corrected. Commencing work shall be construed as acceptance of the surface by this Contractor as satisfactory to receive gypsum wallboard system.

3.2 INSTALLATION OF METAL STUDS

A. Install metal studs, runners and accessories strictly according to manufacturer's recommendations. Align partitions accurately. Coordinate with work of other trades.

B. Secure floor runners to concrete floor with concrete nails or powder driven anchors spaced not over 24" on center.

C. Anchor ceiling runners at approximately 24" on center. Where partitions terminate at the finish ceiling, install compressible gaskets between runner and ceiling grillage, and screw ceiling runner to acoustical ceiling main runners or cross runners.

D. Locating Studs: Space studs 16" o.c. unless otherwise indicated. Install additional studs or adjust location of basic studs to accommodate the following:

1. Wall hung casework or cabinet. Locate studs within 4" inside each end of wall hung casework and cabinets. Critical stud locations for casework or cabinets to be located by casework installer.

2. At all intersections of walls and partitions.

3. At all changes in partition and wall types.

4. Where any other equipment or shelf standard is to be mounted on the wall or partition.

E. Studs shall be full height without splices. Securely attach all studs to floor and ceiling runners.

F. Place studs directly against jambs of steel door frames, abutting partitions, internal partition corners, partition terminals and similar locations, and anchor such studs to runner channels with screws or other positive fasteners.

G. Securely anchor studs to jamb and head anchor clips at hollow metal door frames with screws or bolts. Install a runner track with web and flanges bent down at each end across head of steel frames, and screw each flange to vertical studs. Install jack studs above frame.

H. Locate extra studs not more than 2" from jambs of hollow metal door frames, abutting partitions, internal partition corners, partition terminals and similar locations and anchor such studs to runner channels with screws or other positive fasteners.

I. Install sound insulation in partitions where indicated on the drawings.

J. Construct partitions thicker than standard stud width using studs back to back and screwed together not over 24" on center or use double stud walls. Brace double stud walls with 12" high, 1/2" thick gypsum lath gussets spaced not

over 24" on center and screwed to studs with not less than three screws on each side of wall, or brace with 2-1/2" studs spaced not over 48" on center.

K. Reinforce partitions as necessary to receive and support casework and other equipment mounted on the wall.

L. Where ceiling runner abuts non-cellular steel deck, install neoprene or metal profile closures as shown on drawings.

3.3 INSTALLATION OF GYPSUM WALLBOARD

A. Install gypsum board strictly according to ANSI A97.1 and manufacturer's recommendations.

B. Cut gypsum board by scoring and breaking neatly or by sawing, working from face side. Cut or break back paper. Smooth cuts as necessary to form neat joints. Kerf where required for form curved surfaces.

C. Install gypsum board with true, even surfaces and straight, sharp corners. Use full length boards where possible. End joints on the same side of wall shall be staggered, and end joints on opposite sides of wall shall not occur over the same support. Do not locate normal end joints at edge of openings. Form joints neatly. Butt boards together, but do not force into place. Do not place butt ends against tapered edges. No joint shall have a gap greater than 1/4".

D. Use gypsum backing board for first layer of double layer construction. Stagger joints between layers.

E. Fasten gypsum board beginning at the center and work toward the outer edges. Hold the board firmly against the supports while fastening. Locate fasteners opposite each other on adjacent ends and edges. Fasteners at edges of boards shall be located from 3/8" to 1/2" from the edge.

F. Openings for electrical devices, piping and grilles and registers shall be accurately located and neatly made to closely fit the devices and be completely covered by plates and escutcheons.

G. Install corner reinforcing at external corners, and install casing beads at exposed perimeter joints to be sealed and where gypsum board abuts other materials. Install control joints where indicated on the drawings. Where not indicated, locate control joints not over 30' on center.

H. Seal partition perimeter joints where indicated on the drawings, and seal all perimeter joints (top, bottom, and both ends) in partitions indicated to be sound rated. Seal around pipes, ducts, conduit and other items extending through gypsum board partitions. Use acoustical sealant.

I. In sound rated partitions, completely cover the back and sides of electrical boxes and other cutouts with acoustical tape. Extend tape onto back of gypsum board to seal the joint. After box is taped, solidly fill the joint with joint compound.

J. Install gypsum board with long dimension on board parallel to metal studs or furring channels. Center joints over flanges to studs and furring channels, and stagger joints on opposite sides of stud partitions.

K. Screw gypsum board to studs and furring channels with manufacturer's standard screw of type recommended for this installation. For single layer construction, space screws 8" on center along edges and 12" on center in the field. For double layer construction, space screws 16" on center for both layers.

L. Where metal stud partitions have gypsum board one side only, brace the exposed stud side with 12" high, 1/2" thick gypsum board gussets, spaced not over 24" on centers, and screwed to each stud with minimum of two screws.

3.4 JOINT TREATMENT

A. Tape and finish gypsum board surfaces including partitions above suspended ceiling. Apply materials strictly according to manufacturer's recommendations. Fill joints with joint compound, embed perforated tape, and apply a skim coat of joint compound over tape. Apply two additional coats of joint compound allowing at least 24 hours between each coat. Fill dimples and imperfections with three coats. Sand each coat. Finished surfaces shall be uniformly smooth, true and in satisfactory condition to receive paint.

3.5 CAULKING

A. Seal perimeter joints and other joints in gypsum board as indicated on the drawings or specified above.

B. Joints shall be clean and dry. Prime joints as recommended by the sealant manufacturer. Mask face of gypsum board and adjoining materials at exposed joints as necessary to keep exposed faces free of sealant. Apply sealant strictly according to manufacturer's instruction. Completely fill the joint with sealant. Clean sealant from adjacent surfaces, and remove masking.

3.6 GROUTING OF FRAMES

A. Partitions with gypsum board finish: Spot grout steel frames at each anchor and at floor.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post bid evaluation of proposed substitute products, methods, etc. and other conditions.

B. Work under this section includes furnishing and installing the resilient tile and base materials shown on the drawings and specified herein.

C. Related work specified elsewhere.

1. Plastic laminate cabinets: Section 06412.

1.2 SUBMITTALS

A. Samples: Submit samples of materials to the Architect for selection and approval in accordance with Section 01300.

1.3 PRODUCT HANDLING

A. Deliver materials in their original unopened containers with manufacturer's labels intact.

B. Store and handle materials in a manner that will prevent damage and provide protection against moisture and the elements. Store materials at the job site for at least 24 hours prior to installation.

C. Store materials containing solvents in tightly sealed containers. Assume fire and safety protection.

1.4 ENVIRONMENTAL CONDITIONS

A. Maintain 70°F minimum temperature in rooms for 24 hours before, during and for 48 hours after laying flooring.

PART 2: PRODUCTS

2.1 MATERIALS

A. Resilient tile and related materials: Armstrong Cork Co., American Biltrite Rubber Co., Flintkote Co., GAF Corp., Kentile Floors, Inc., Johnson Rubber Co., Vinyl Plastics and Mercer Plastics Co. are approved manufacturers of the following materials.

1. Vinyl Asbestos Tile: 12" x 12" x 1/8" thick of custom color equivalent to Armstrong Imperial Modern Series. Conform to requirements of Federal Specifications SS-T-312, Type IV; color selected by Architect.

2. Tile and Carpet Joiner: Mercer No. 15.

3. Resilinet Base: Vinyl, top set coved type, 4" high, of colors selected by the Architect. Provide pre-formed internal and external corners. Provide straight base without cove at carpet. Federal Specification SS-W-40, Type II.

4. Adhesive: Waterproof type as recommended by above material manufacturers.

5. Surface Finish: Wax of type recommended by tile manufacturer.

6. Match existing adjacent flooring at remodeled existing areas with resilient flooring.

PART 3: EXECUTION

3.1 EXAMINATION OF SURFACES

A. Examine surfaces to receive resilient flooring and base and notify the Contractor in writing if any condition exists that will prevent satisfactory results. Do not proceed with installation until unsatisfactory conditions are corrected. Commencement of work implies acceptance of surfaces and assumption of responsibility for satisfactory results.

3.2 PREPARATION OF SUB FLOORS

A. Thoroughly clean sub-floors and remove grease; dirt and other substances. Fill cracks and holes.

3.3 INSTALLATION

A. Install resilient tile: Apply adhesive and install resilient tile flooring and base in accordance with manufacturer's recommendations.

1. Vinyl Asbestos Tile: Lay and fit tile with joints tight and in true alignment. Layout tile starting at center of floor, as indicated by north-south, east-west lines on drawings. Continuous joints to run east-west. At individual spaces lay tile symmetrical about centerlines of rooms or spaces with no border tile less than one-half size. Lay tile with alternating rows of tile breaking joint at midpoint of previous rows, grain pattern continuous. Cut tile to fit around permanent fixtures and fit accurately at jointing with other materials.

2. Resilient Base: Install base walls in rooms scheduled to have base. Use straight type at carpet and use cove type at all other flooring. Firmly cement base to backing, straight and true with tight butt joints. Apply after floor tile is in place.

3. Install tile prior to floor mounted electrical/telephone devices.

3.4 CLEANING AND FINISHING

A. Just prior to final inspection, thoroughly clean surfaces of above materials in accordance with manufacturer's instructions. After cleaning apply one coat of surface finish and polish with a mechanical buffer. Upon completion, leave floors clean, smooth and free of buckles and projecting edges.

3.5 PROTECTION

A. Protect finished work from damage until final acceptance. Replace any damaged work.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing all carpet and accessories indicated on the drawings or specified herein.

C. Related work specified elsewhere.

1. Resilient base: Section 09650.

1.2 SUBMITTALS

A. Refer to the following articles:

1. Samples: 1.3.H.
2. Order Copy: 1.3.I.
3. Installation Instructions: 1.3.J.
4. Shop Drawings: 1.3.K, also provide seaming diagram.
5. Maintenance Manual: 1.3.N.

1.3 GENERAL INFORMATION AND REQUIREMENTS

A. Type of installation: Continuous wall-to-wall carpet; direct glue without pad.

B. Installation: Complete installation, including all accessories and fastening materials as per job conditions.

C. Clarifications: Request clarifications in writing from Architect.

D. Quotation Requirements: Quotations to General Contractor shall:

1. Include a total lump sum for all materials and installation.
2. Be based on total amount of new carpet, and related accessories required for complete installation, including excess materials and extra carpet as specified. Seconds or imperfections are not acceptable.

3. List any deviation from the quality of materials as specified under Articles 2.1 or 2.2. Submit manufacturer's specifications with deviations indicated.

E. Quantity: Provide all quantities as required for complete installation, plus required extra carpet; no future adjustments will be made.

F. General contractor's Responsibility: Provide smooth, sealed, clean and cleared floors acceptable to applications of carpet. Protect installed carpet and provide final cleaning prior to final inspection and prior to acceptance of the Project.

G. Carpet Subcontractor's responsibility: Examine floors for acceptability to receive carpet. Report any dissatisfaction to General Contractor immediately. Application of carpet shall be considered that floors are acceptable and Carpet Subcontractor will be held responsible for producing a satisfactory and guaranteed result in the finished installation. Provide installed carpet with protective cover of fiberglass reinforced heavy paper.

H. Samples: Label all samples to indicate manufacturer's name, suppliers' name, job location, composition, construction quality, face weight, backing weight, total weight and pile height. Provide carpet samples to Architect in full color range, including custom colors if required to match sample submitted and selected by Architect. Successful subcontractor shall provide:

1. Initial color samples as requested by Architect.

2. Three 18" x 24" samples of carpet to be installed. One of these samples may be used for testing purposes.

I. Order Copies: Provide a copy of order to manufacturer of carpet and a copy of the mill order to the Architect prior to any carpet being fabricated or woven.

J. Installation Instructions: Carpet Subcontractor shall submit to the Architect and Owner printed instruction methods recommended by the carpet manufacturer and any deviations from project specification. Any deviations in installation methods shall be approved in writing by the carpet manufacturer.

K. Shop Drawings: Submit reproducible type drawings indicating: areas to receive carpeting; type of installation (i.e. glue down) direction of laying; location of seams and cross seams.

L. Carpet Identification: Carpet, when delivered to job site, shall have mill registered numbers attached and accessible for identification.

M. Extra Material: Excluding remnants, provide the minimum yardage of extra carpet as specified under carpet, Articles 2.1. Provide remnants specified under Article 3.1.G.

N. Maintenance Manual: Furnish the Architect with three printed copies of the carpet manufacturer's recommendations for care, cleaning, maintenance and repair.

O. Guarantee: Provide the Owner with manufacturer's five-year, full warranty against wear, failure of static protection, delamination of secondary backing, edge ravel; and a minimum average twenty-pound tuft bind. Installation shall be guaranteed for 18 months in accordance with the project's General and Special Conditions of the Contract Documents.

PART 2: PRODUCTS

2.1 CARPET (Minimum Acceptable Requirements)

A. Specified manufacturer and carpet type: Lee's carpet design VI L5099, Bigelow's Regents Row or Mohawk Emissary.

B. Other Manufacturers: Carpet by other manufacturers which conform to this specification will be acceptable.

C. Weave: Velvet-woven through back.

D. Surface Texture: Cut/uncut.

E. Stitches: 8.0 per inch (32/dm).

F. Pile Height: .255.

G. Face Yarn: 4 ply Antron III continuous filament nylon.

H. Dye System: Yarn dyed (prior to construction).

I. Face Yarn Weight: Min. 34.5 oz/yd.²

J. Backing Materials: Polypropylene.

K. Total Weight: Min. 63 oz./yd.²

L. Width: 12' (3.7m)

M. Extra Material: 1%.

N. Static Parameter: 3 KV at 20% RH at 70°F.

2.2 FLAME SPREAD RATING

A. Rating: Carpet, including its backing, shall have a rating not exceeding 75 as tested by ASTM E-84-75 and shall meet flammability requirements of the Department of Commerce Standard DOC FF1-70.

B. Certification: Manufacturer shall provide certification that carpet conforms to specified rating.

2.3 ACCESSORIES

- A. Adhesive: Brand as recommended by the carpet manufacturer; contact adhesive at perimeter of carpet, release type fast setting adhesive at field and sealing cement at length seams.
- B. Primer: As recommended by manufacturer.
- C. Carpet Edge Trim: Robert's Universal Molding, aluminum retainer with vinyl insert, or equal by Mercer, standard color as selected by Architect. Use where edge of carpet would be exposed.
- D. Seaming Tape: As recommended by manufacturer.
- E. Seaming Cement: As recommended by manufacturer.
- F.. Carpet Protection: St. Regis "Seekure". Tape all seams with tape, pressure sensitive adhesive one side.

PART 3: EXECUTION

3.1 INSTALLATION

- A. General: Install only on surfaces free of debris, oil, grease and broom cleaned, with this cleaning by General Contractor. Verify condition of floors before proceeding with work. Correct conditions detrimental to the proper and timely completion of the work. Commence carpet installation after ceiling work and painting at areas to be carpeted is completed. Install by trained experienced mechanics in strict accordance with manufacturer's recommendations. Provide all necessary items to complete carpet installation.
- B. General carpet Installation: Cut and fit evenly. Tightly fit carpet to vertical surfaces. Install using widest practicable widths. Hold cross seams to an absolute minimum. If pattern, match and line up for proper appearance. Neatly and inconspicuously install seams using seam cement and seaming tape. Provide edge trim at exposed edges.
- C. Glue-Down Carpet Installation: Adhere only to cured, sealed, primed, clean, dry, non-porous concrete. Trim and neatly fit seams at the time of installation. Apply not less than 4" wide band of contact adhesive at wall perimeter and not less than 8" contact adhesive band at cross seams. Edge seal both seams. Apply full bed of field adhesive using 1/8" to 3/16" notched trowel. Apply bead of sealing cement at length seams. Roll carpet with 150 lb. roller to insure contact with adhesive.
- D. Workmanship: Unless more stringent methods are specified, install in accordance with manufacturer's instructions to best industry practices. Completed installation shall present smooth, unwrinkled appearance with neat seams and edges and free of wrinkles and puckers.

E. Cleaning: At completion, remove from site all excess material cuttings, threads and leave carpeting clean. Further cleaning thereafter will be the responsibility of General Contractor.

F. Carpet Protection: Cover all installed carpet with protective cover of nylon reinforced Kraft paper using as long lengths and widest widths as possible. Lap seams 4" and continuously tape.

G. Remnants: Package usable scrap and coverage (carpet material over 3 sq.ft.), identify, and turn over to the Owner for his use.

H. Extra Material and Maintenance Manual: Provide as specified under Articles 1.3.M and N.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes providing all labor, materials, services, equipment, transportation and services necessary to complete all epoxy-polyester wall coating work as indicated by "S.G." on the drawings. Refer to drawings for locations.

C. Related work specified elsewhere:

1. Gypsum Wallboard: Section 09250.
2. Painting: Section 09900.

1.2 SUBMITTAL

A. Submit full range of color samples to Architect for selection. After selection, but before commencement of work, prepare two (2) 8" by 16" samples of each color selected on concrete block or other approved surface for Architect's approval.

B. All colors shall be selected by Architect from manufacturer's standard range. Finishes shall be semi-gloss or satin, of solid, plain colors as required.

C. Samples shall be prepared and submitted in accordance with the requirements of Division 1, General Requirements, with all postage and transportation cost paid by this Subcontractor.

1.3 GUARANTEE

A. The Contractor shall obtain from the applicator a written guarantee to the Owner from both the applicator and the manufacturer of the glazed coating system materials covering replacement without charge of defective work caused by defects of materials or workmanship which appear within period of one (1) year from date of final completion of the Project.

1.4 PRODUCT HANDLING

A. Deliver materials to Project in original containers with seals unbroken, labels intact, containing manufacturer's hallmark. Containers without labels will be cause for rejection. Use materials only in accordance with container label directions.

B. Punctured or damaged containers shall be removed from the site before application of materials is begun.

C. All materials shall be properly stored in spaces provided. Such spaces shall be kept under lock and shall be inaccessible to all except those employed under this section.

PART 2: PRODUCTS

2.1 MATERIAL

A. Glazed wall coating shall be a polyester-epoxy or polyester-polyurethane system providing a hard tile-like glazed finish, resistant to moisture, abrasion and staining. Glazed finish shall be one of the following products, or approved equal which conforms to these specifications will be acceptable.

1. "Descoglaze" by McNaughton Books, Buffalo, N.Y.
2. "Sanitile 550" by Master Mechanics Company, Cleveland, Ohio.
3. "Tru-Glaze" by Devoe Paint, Louisville, Kentucky.
4. "Pittglaze" by PPG Industries, Pittsburgh, Pennsylvania.

B. Materials installed under this Section shall have a Class A fire-rating and shall meet or exceed the following requirements when tested under ASTM E-84.

Flame Spread:	0 - 10
Fuel Contributed	0 - 10
Smoke Developed	0 - 15 (Smoke must be non-toxic.)

C. All materials shall be freshly compounded, and supplied by coating manufacturer or his franchised representative. Except as otherwise indicated, coating shall comply with Federal Spec. TT-C-550a or TT-C-545b.

D. In addition to the above listed rating, materials shall meet the following minimum requirements.

1. Chemical Resistance: Unaffected by common industrial cleaning and maintenance compounds.

2. Stain Resistance: Following stains shall be easily removable: lipstick, fountain pen ink, ballpoint pen ink, grease pencil marks, rubber heel marks, petroleum oil, and crayon.

3. Scrubability Test: No harmful effects after 5,000 cycles on a Gardner Straight Line Washability apparatus.

4. Alkali Resistance: Finish coat, not affected by seven day immersion in 5% sodium hydroxide held at 75°F. (+/-) 2°F. - ASTM D-1647.

5. Acid Resistance: Finish coat not affected by seven day immersion in: 50% alcohol, 20% caustic sodium hydroxide, 50% sulphuric acid, 15% hydrochloric acid, 10% lactic acid, 20% calcium chloride, 5% urea and mineral spirits.

6. Fungus Resistance: Conforms to TT-C-550a, paragraph 3.3.7. Material does not contain any mercurial fungicide.

PART 3: EXECUTION

3.1 GENERAL

A. All surfaces to receive glazed coating shall be thoroughly cured, dry and clean. Moisture contents shall not exceed 16%, as measured with a moisture meter, in the presence of the Architect and Owner. Wall temperature shall be maintained at a minimum of 50°F. during the application of glazed coating and for two (2) weeks thereafter.

B. Carefully inspect all surfaces to which glazed coating is to be applied and report to the Architect in writing, surfaces which are not in satisfactory condition to receive work under this Section. Commencement of application of glazed coating to any surface will be construed as acceptance of that surface.

C. Mask all surfaces that are not to be coated.

3.2 COORDINATION OF WORK

A. Areas in which glazed wall coatings are to be applied shall be kept free of traffic and no other trade shall be permitted to work in rooms during the application and curing of the coating.

B. Plumbing fixtures, accessories, grilles, radiation, etc., shall not be installed until after glazed coating work is complete.

C. Hard flooring (ceramic tile, concrete, etc.) shall be installed before glazed coating work is begun. Soft flooring (resilient flooring, composition flooring, etc.) shall not be installed until after glazed coating work is finished.

D. Installation of suspended ceilings, painting of surrounding areas and caulking shall be done after coating work is finished.

3.3 APPLICATION AND WORKMANSHIP

A. Application shall be by an applicator approved by the manufacturer and shall be in strict compliance with the manufacturer's written instructions.

B. Adjacent areas not to receive glazed wall coating shall be effectively masked or protected by drop-cloths.

C. Apply colored finish glaze coat by airless spray to a minimum dry film thickness of 5 mils. Back roll with roller as required to remove pinholes and unevenness.

D. Allow 24 hours for finish coat to cure and protect from damage during curing periods.

E. Each coat applied shall be inspected and approved by the Architect and Owner before succeeding coat is applied. A progress schedule showing date of application of each coat for each room, space or area shall be made by the Contractor for inspection and approval of the Architect and Owner.

F. Glazed wall coating shall cover full height of wall where indicated, from floor to ceiling of each area.

G. Begin application only after the room exhaust system is installed and operating. Seal off each room and thoroughly exhaust noxious fumes after application and during curing. Take all precautions to avoid drifting of noxious fumes into areas occupied by University personnel. Enlist the cooperation of the Mechanical Contractor.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes all patching and repairing of direct-to-steel sprayed fireproofing to match existing where indicated or disturbed by work of this Contract. Clean surfaces to receive fireproofing and protect existing sprayed fireproofing.

C. Related work specified elsewhere:

1. Metal Fabrications: Section 05500.
2. Operable Walls: Section 10630.
3. Integrated Ceilings: Section 13070.

1.2 QUALIFICATION OF MATERIALS

A. Materials, procedures for application, dry densities, and thicknesses required to provide protection shall be qualified in accordance with UBC Standard No. 43-3 or ASTM E119 to match existing.

1.3 DELIVERY AND STORAGE

A. Material shall be kept dry until ready for use. It shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. Materials that have been exposed to water before actual use shall be discarded.

B. All manufactured materials shall be mill-mixed and shall be delivered in original, unopened packages bearing the name of the product, the manufacturer's name and the Underwriter's Laboratories, Inc. label verifying compliance with UL quality control inspection program and the UL classification.

PART 2: PRODUCTS

2.1 MATERIALS

A. Cementitious mixtures shall be listed in Underwriter's Laboratories, Inc. "Building Materials Directory". Products of Construction Products Division of W.R. Grace Co. or approved equal are acceptable.

B. Water shall be clean, fresh, suitable for domestic consumption, and free from such amounts of mineral or organic substance as would affect the set of the fire resistive material.

C. All manufactured materials shall be mill-mixed requiring only the addition of water at the job site.

D. All products shall be asbestos free.

PART 3: EXECUTION

3.1 SURFACE PREPARATION

A. Thoroughly clean all surfaces to receive sprayed fireproofing with hand tools, power tools, and/or solvent cleaning methods so that no mill scale, dirt, grime, oil, grease, dust, loose rust or paint, or other foreign material which would prohibit satisfactory bonding of fireproofing to the steel.

B. Cleaning shall be accomplished just prior to the application of fireproofing.

C. Notify the General Contractor of any condition of surface which cannot be corrected by normal ceaning methods specified above and require correction of condition before applying sprayed fireproofing.

D. Application of fireproofing shall be interpreted as acceptance by the applicator of the suitability of the surface to receive his work and acceptance of responsibility for any failure of bond between fireproofing and steel.

3.2 PROTECTION OF PERSONS AND PROPERTY

A. Provide all necessary measures for protection of workmen and public, as required under the regulations of the U.S. Occupational Safety and Health Act and the Minnesota Department of Labor and Industry and statutory requirements. Provide the protection for workmen applying fireproofing and for other workmen who are in the vicinity of application or mixing operations.

B. Minimize overspray or fall-out as far as practicable through careful spray control. Provide masking, drop cloths or other satisfactory covering as necessary to prevent damage or coating from overspray or fall-out at surfaces and features where such non-intended fireproofing coating will be detrimental to the other work or cause cleaning expense to other Contractors. Clean or replace any material or finish damaged or coated.

3.3 TEMPERATURE AND VENTILATION

A. When the prevailing outdoor temperature at the building is less than 40°F, an interior temperature and temperature of the steel shall be maintained at 40°F or higher for 24 hours before, during and 24 hours after application of sprayed fireproofing.

B. The applicator shall provide natural ventilation to properly dry the sprayed fireproofing during and subsequent to its application.

3.4 APPLICATION

A. Sprayed fireproofing shall be applied to match existing.

1. For thicknesses of approximately 1/2" or less apply in one operation.
2. For thicknesses approximately 5/8" or greater, make second and succeeding applications after previous coat has set.
3. Only experienced mechanics approved by the materials manufacturer shall be allowed to place the materials. A qualified manufacturer's representative shall be present for initial application to guide and assist applicator's personnel.
4. Provide and use workable gauges to insure the required thicknesses are constantly provided.

B. Fireproofing mix containing material that has partially set shall not be used. Materials containing lumps shall not be used. Each batch shall be mixed separately.

3.5 CLEAN-UP

A. After completion of fireproofing in any area, remove equipment and clean the area. Clean surplus materials or deposits from floors. Clean wall and other surfaces which will be exposed. Clean fireproofing, including over-spray, fall-out of other residue from all surfaces.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes field finishing of all materials scheduled and/or specified for paint, enamel, transparent finish and similar field painting not specified under other sections.

C. Related work specified elsewhere:

1. Special formed metal: Section 05750.
2. Carpentry: Section 06100.
3. Custom steel frames: Section 08113.
4. Wood doors: Section 08200.
5. Gypsum wallboard: Section 09250.
6. Gypsum Lath and Plaster: Section 09200.

D. General Outline of Work: Following outline is intended to complement and clarify the drawings. Do not construe as listing all surfaces, materials or finishes.

1. Interior:
 - a. Walls and plaster ceilings.
 - b. Custom steel frames. Paint on all sides including at rooms or spaces not otherwise painted or finished.
 - c. Wood doors.
 - d. Wood hook strip.

E. Work excluded from this section (areas or materials):

1. Interior:

a. The walls and ceilings of shell spaces or of any room or space not scheduled for paint or clear finish in Room Finish Schedules.

b. Concrete floors.

c. All special formed metal specialties with factory finish. See Section 05750.

d. Plastic laminate surfaces.

e. Prefinished surfaces and materials not normally requiring painting.

1.2 INTENT OF DOCUMENTS

A. The Subcontractor providing the work of this Section shall examine the specifications for the various other trades and other contractors and shall familiarize himself with all their provisions regarding their painting and it shall be clearly understood that all surfaces that are left unfinished or have prime coat only by the requirements of other specifications shall be field painted or finished as a part of this Section.

B. Painting under this Section includes and means all specified or required preparatory work and applicatin of paint systems including sealers, stains, fillers, varnishes, paints, clear silicone treatments, and other similar finishes not specified under other Sections.

C. In painting new work of this Project, paint all paintable surfaces except those explicitly omitted herein under Article 1.1.E. Paintable surfaces are: plywood; metal, insulated or bare, (including piping, hangers, supports, ducts, brackets and other miscellaneous metal); ducts, insulated or bare; piping and equipment insulation and insulation covering; other surfaces listed under Painting Outline above.

D. Except for factory finish coats and prime coats on certain mechanical and electrical work, no painting is required of Mechanical and Electrical Contractors; field painting of all surfaces shall be done by Painting Subcontractor under this Section. Refer to Mechanical and Electrical drawings and specifications for extent of piping, conduit, ductwork and equipment.

E. The number of coats specified are field painted coats, in addition to prime or shop coats, after all touch up work has been done to restore shop coats to full coverage. Use only first line products of manufacturers specified, of types of paint specified.

1.3 SUBMITTALS

A. Painting Systems: Submit for Architect's approval descriptive data in duplicate for paint materials and systems to be furnished. In this submittal, indicate each specified system, locations or use and the substitute system proposed.

B. Colors: The Architect will select all colors. If color selections are made which are not in the color line of the paint to be furnished, submit in duplicate for approval, 8" x 10" color cards showing the selected color in the paint to be furnished.

1.4 JOB CONDITIONS

A. Paint under conditions best suited for first quality work, including dry surfaces, dust free spaces, minimum temperature of 40°F or higher as recommended by manufacturer. Test materials to insure the base surface is dry. Paint in spaces not subject to entrance of dust or moisture from adjacent areas. Work with adequate illumination.

B. Walls covered by cabinets shall be painted, except for final coat.

C. Protection:

1. Protect all surfaces subject to damage and misplaced paint by covering with drop cloths, by masking, by other suitable covering or by removing from area.

2. Take particular care in working over and around plastic laminate cabinets as well as other prefinished work. Provide hardboard covering at tops to prevent accidental damage and adequately cover or mask equipment.

3. Make good any damage caused by painting operations.

4. General Contractor shall isolate, cover or protect as necessary to insure no damage, stains, abrasions, other disfigurement of finish painted surfaces immediately upon completion by painter of final application to such surfaces.

5. Maintain 10# CO₂ extinguisher in paint storage, mixing rooms. Remove oily rags and other fire hazards at end of day's work. Keep cans tightly covered. Take every precaution to avoid danger of fire.

D. Cleanup:

1. Remove oily rags, waste, etc., from building every night.

2. Upon completion of work, remove all misplaced paint, stains, etc., and remove all debris, rubbish, materials and equipment, and excess materials from the premises.

1.5 PRODUCT HANDLING

A. Delivery: Deliver all materials in the original containers, with seals unbroken and labels intact.

B. Storage:

1. Store and mix materials in designated places only. Protect walls and floors of storage rooms.

2. Post storage and mixing areas "NO SMOKING" and strictly enforce.

1.6 GUARANTEE

A. Guarantee all work for one year against blistering, peeling, or other loss of adhesion, yellowing, excessive chalking, other defects in material or workmanship. Remove defective work, prepare and repaint surface without cost to Owner. Repaint all of surface (i.e. wall, door, etc.) on which work is defective to exact match of other adjacent similar surface; if exact match cannot be provided, then repaint adjacent surfaces to extent required to insure exact match.

PART 2: PRODUCTS

2.1 MATERIALS

A. Use only materials of brand and quality specified, if brand and quality are not specified, use material approved by Architect and Owner.

B. Provide turpentine, alcohol, mineral spirits, bonding solution, sundries, etc., of highest quality, pure and with identifying label on container and in accordance with paint manufacturer's recommendations.

C. Use no materials over paint product of another manufacturer except as otherwise specified or permitted by Architect, and only if recommended by manufacturers.

D. Before applying paint over any shop coat or other pre-primed surfaces, verify compatibility of coatings.

2.2 COLORS

A. General: Architect will select colors, which may be from University of Minnesota Standard Color Palette. Mix paint to match color chips where necessary. Prepare actual samples, including natural finish as directed.

2.3 PAINTING SYSTEMS

A. Painting systems are specified using the products of Pratt and Lambert Company to establish standards of quality. Comparable systems of Fuller-O'Brien Paint Company, Benjamin Moore & Company, Sherwin Williams, Martin Senour Company, Pittsburgh Plate Glass, The Glidden Company and Devoe & Reynolds, or approved equal, will be acceptable subject to approval by the Architect of the systems and specific products.

B. Use the materials of the same manufacturer for each system insofar as possible.

C. Interior Systems:

1. Plaster and Gypsum Wallboard:

2 - Coats P&L Pro-Hide Latex Satin Enamel.

2. Wood Doors and Other Wood for Painted Finish:

1 - Coat P&L Interior Trim Primer
1 - Coat P&L Vitralite Enamel Undercoating
1 - Coat P&L Vitralite Enamel Eggshell

3. Steel Frames and Ferrous Metal:

1 - Coat P&L Vitralite Enamel Undercoating (in addition to shop prime)
1 - Coat P&L Vitralite Enamel Gloss
1 - Coat P&L Vitralite Enamel Eggshell

4. All Surfaces Inside Ductwork (or ceiling plenums) and equipment visible through grilles and registers:

1 - Coat P&L Effecto Enamel, Flat Black (paint minimum 2 feet back from registers).

5. All Other Metal Work

1 - Coat appropriate Primer (or one coat P&L Vitralite Enamel Undercoating if shop primed).
1 - Coat P&L Vitralite Enamel Eggshell

PART 3: EXECUTION

3.1 EXAMINATION OF SURFCES

A. The Subcontractor shall examine the surfaces to be finished prior to commencing work. If woodwork, metal or any other surfaces to be finished cannot be put in proper condition for finishing by customary cleaning, sanding and puttying operations, notify the Contractor in writing or assume the responsibility for and rectify any unsatisfactory finish resulting. Test surfaces for dry conditions to receive paint.

3.2 WORKMANSHIP

A. Job Site Sample Areas: Make sample application on Project surfaces to extent directed by Architect or Owner. Obtain acceptance of sample field application before making additional applications. Accomplish all work to equal or exceed standards established by approved samples. Protect and maintain approved field samples through completion of Project.

B. The workmanship shall be of the very best, employing only skilled mechanics. Spread the materials on in even, thorough coats without runs, sags or other blemishes. Meet standards and recommendations for "Type 1 - Recommended" type

work of Painting and Decorating Contractors of America, as minimum requirements, in absence of more stringent Project specification requirements.

C. Consult with Architect and/or manufacturer's technical representatives if in doubt as to suitability of material to application. Verify that paint is compatible with shop coat of others.

D. Apply succeeding coats only after prior coat has been approved by Owner otherwise no credit will be given for the coat.

E. Coordinate work with others to insure that work to be painted is given maximum possible protection by applying coatings at times as will best insure such work against deterioration of any kind.

3.3 SURFACE PREPARATION

A. All surfaces to be painted shall be cleaned and free of dirt, grease, rust, and dust before painting is started.

B. All necessary puttying of nail holes, cracks, etc., shall be done after the first coat, with putty of color to match that of the finish. Fill countersunk screw heads metal anchorage (not stop screws) with paste metal "body putty". Sand smooth and flush.

C. Touch up metal where shop coats are abraded. Clean down to bare metal and touch up paint used for shop coat.

D. All metal surfaces shall first be washed with mineral spirits to remove any dirt or grease before applying materials. Where rust or scale is present, it shall be wire brushed or sandpapered clean before painting.

E. Remove and reset hardware as required to completely finish surfaces and prevent misplaced paint. Cooperate with other trades and schedule painting operations prior to final setting and adjustment of hardware.

F. All woodwork to be finished with varnish or enamel shall be sanded smooth and the surfaces cleaned before proceeding with the application of the first coat. Sand between each coat with fine sandpaper to produce an even smooth finish, except do not sand satin.

G. All coats shall be thoroughly dry before applying succeeding coats.

H. Patch small holes, abrasions and similar defects with spackle after prime coat. Patch flush and smooth with adjacent surface. Seal spackle or patch before succeeding coats.

3.4 PREPARATION OF EXISTING SURFACES

A. General: Wash all surfaces to be repainted. Remove all grease, oil, soil or other matter which will interfere with proper bond of new material. Scrape and wire brush all loose or flaking paint to clean down to sound surfaces, and edges to feather out. Remove all rust, scrape and brush to provide bright clean

metal. Surfaces shall be clean, smooth, free of cracks, alligatoring, loose material. Etch surface of paint by using chemical wash. Fill cracks, voids and similar defects. Above work shall be done in addition to any other required preparation. Do all work necessary to place in best possible condition for repainting.

3.5 APPLICATION

- A. Apply all materials without reduction, unless reduction is explicitly required by manufacturer's original container label or unless otherwise directed or approved by Architect. Adulterate no material.
- B. Apply all coatings smoothly, evenly and free of runs, sags, crawlings, impurities and skins.
- C. Apply over only thoroughly dry preceding coat. Follow manufacturer's printed directions for drying time of undercoats. (Generally 24-hour minimum will be required).
- D. Color each paint coat to approximate color, somewhat lighter, of succeeding coat.
- E. Finish tops and bottoms of doors and transoms same as rest of door, with all coats of paint. Should painter fail to paint tops and bottoms of wood doors, with all specified coats, and any door warps, painter shall be held responsible for entire cost of door replacement, including new door, fitting, sanding, and refinishing.
- F. Lightly sand before applying each coat of stain, sealer, varnish, enamel at wood (except do not sand stain), and elsewhere that runs or un-even build-up occurs, to insure smooth coats and adhesion.
- G. Paint primed hardware, including closers, carefully, neatly and so no hardware paint shows on doors or frames. Keep other finished hardware completely free of stain, varnish and paint.
- H. Apply paint adjoining other materials or other color with full, clean cut lines without overlapping and to straight line.
- I. Apply all work free of runs, holidays, dead spots, roller or brush marks, foreign materials and impurities, etc., and uniform in color and sheen.
- J. At completion of work of other trades, touch up and restore all painted work where damaged or defaced, free of blemishes.
- K. Apply coding to piping as directed and specified.
- L. Discard all containers as they are emptied. Reuse will be prohibited.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installing all tackboard (T.B.) and base materials and trim as specified herein. Install Owner's existing chalkboard, base materials and trim.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings and manufacturer's literature on all tackboard, indicating trim.

B. Samples. Furnish samples of tackboard and trim for finish and color approval by Architect.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers as listed under Products as hereinafter specified.

2.2 TACKBOARD (T.B.)

A. Tackboard as manufactured by Claridge Products and Equipment, Inc. (No. 1104, Burnt Umber), Neal Slate Co. (Char brown #13), equivalent brown color by Addendum Ten Company, or approved equal, conforming to these specifications, including color, will be acceptable.

B. Tackboard shall be best quality natural cork wood, fine ground and compressed into 1/4" thick sheets with a burlap back and a fully washable, soil resistant, plastic coated finish face. Colors as indicated above.

C. Tackboard as indicated on drawings laminated to plywood or chipboard.

D. Tackboard shall be size as indicated on drawings. No joints in cork except where both dimensions exceed 72'.

2.3 TACKBOARD TRIM

A. Furnish and install extruded aluminum trim for wall mounted tackboard as shown on drawings and specified herein. Trim as manufactured by Neal Slate Co., Claridge Products and Equipment, Inc., Addendum Ten Company, or approved equal which conform to these specifications will be acceptable.

B. Typical metal mouldings: groundless, extruded aluminum trim, satin finish, single lengths up to maximum trim lengths, straight, undamaged, true, free of defects. No extrusion markings shall be noticeable. Typical trim shall be:

1. Perimeter Trim: Slip-trim, Type #J-5, Neal Slate Co.

C. Finish: All trim shall be color anodized (AA C22-A33). Provide in color to match tackboard color. Touch up all abrasions and field cuts after installation.

D. Moulding location: All tackboard shall be trimmed all four sides. Provide perimeter trim at all edges, except where otherwise indicated.

PART 3: EXECUTION

3.1 TACKBOARD INSTALLATION

A. Installation: Where required, provide approved hardboard backing, firmly anchored to wall. Install cork with adhesive recommended by manufacturer free of bulges, marks, soiled or at otherwise damaged area. Replace soiled, damaged or unsatisfactory cork. Cork installation to be guaranteed against bulging, loosening and to remain a flat, stable surface. No joints in cork except where both dimensions exceed 72'.

B. Moulding and Trim Installation: All joints shall be tight. Install in single lengths, straight, true and free of defects. Moulding shall be securely mounted and anchored to wall and guaranteed rigid and permanent. Set and install to manufacturer's recommendations. Corners shall be neatly mitered.

C. General Installation: All work plumb, square and level, securely fastened.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installation of fire extinguisher cabinets.

1.2 QUALITY ASSURANCE

A. Products specified are those of JL Industries to establish standards of quality. Products manufactured by Larsen's Manufacturing Co., Elkhart Brass Manufacturing Co., or approved equal and meeting the same requirements of performance and design, are acceptable.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings in accord with Section 01300. Submit brochures, schedules, installation details, etc., as required to provide for proper installation.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver cabinets required by Project sequencing, for installation.

PART 2: PRODUCTS

2.1 CABINET

A. Ambassador series, single extinguisher, Model 2018 (semi-recessed). Steel prime painted construction, full DSA door with pull handle. Color of outside of cabinet, Red, baked enamel finish inside. Verify exact color with Architect. No lettering.

PART 3: EXECUTION

3.1 INSTALLATION OF EXTINGUISHER CABINETS

A. Install cabinets as construction progresses.

B. Install level and plumb, anchored securely and in accordance with details.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all operable walls (folding panel type partitions).

C. Related work specified elsewhere:

1. Steel Support Beams: Section 05500.
2. Gypsum Wallboard: Section 09250.
3. Plenum Sound Barrier: Section 13070.

1.2 SUBMITTALS

A. Shop Drawings: Submit fabrication and installation drawing of each partition type and opening schedules for all operable walls in accordance with Section 01300.

B. Samples: Submit samples of panel construction.

C. Test Data: Submit reports by an approved independent testing laboratory certifying the operable wall proposed for use in this Project has been tested in a full size 14' x 19' test opening working assembly in accordance with ASTM E90-75 and the assembly meets or exceeds the specified STC requirements.

1.3 PRODUCT HANDLING

A. Package, handle, transport, store and erect at the jobsite in a manner that will avoid damage. Damaged, dented or torn materials or panels will be cause for rejection.

1.4 QUALIFICATIONS

A. Manufacturer: The product of Modernfold is specified to establish standards of quality of appearance, performance and workmanship. The products of Richards-Wilcox Manufacturing Company, Holcomb & Hoke Manufacturing Co., Inc., or approved equal, are acceptable subject to the approval by the Architect of minor deviations from these specifications and the details of installation.

PART 2: PRODUCTS

2.1 OPERABLE WALL

A. Operable wall shall be manual operated folding panel operable walls complete with tracks and accessories indicated on the drawings, specified herein or required to complete the installation. Operable wall shall be Modernfold Acousti-Seal Model #908, or approved equal meeting the requirements herein.

B. Sound Transmission Class (STC): STC 48-52, NSSEA Class G.

C. Operation: Operable wall shall consist of a series of paired top-supported manually operated panels. Each pair of panels shall be pushed into position, automatically setting the drop seal mechanism. An operable panel with 3" travel shall make the final closure. Final positive compression of the panels for sound seal may be accomplished by a lever-operated operable panel (not operable jamb).

D. Suspension System: The suspension system shall consist of a continuous cold rolled steel track, supported by adjustable steel hanger brackets connected to the structural support by threaded rods. Each panel shall be supported by the trolley assembly consisting of four flangeless steel wheels with steel ball bearings.

E. Panels: Nominal 3" thick in manufacturer's standard widths. Panel construction shall consist of 20 gauge steel panel skins welded to 16 gauge cold rolled steel frame.

F. Sound Seals: Vertical seals between panels shall consist of a tongue and groove metal astragal with built-in vinyl sound seal. Horizontal top seals shall be continuous contact multi-finger vinyl. Operable floor seals shall provide 1" operating clearance and be activated by the final closing action of the partition. Floor seals shall compensate for live load deflection and be self-adjusting.

G. Panel Finish: "Illustra-Cote", or approved equal, meeting the following requirements:

1. Writing surface shall be of composition that readily lends to application of colored felt markers, both water soluble and permanent types. Markings shall adhere with uniformity and clarity, but remove easily and completely with erasure procedures.

2. The surface shall be resistant to staining by even the most tenacious substances like tar, lipstick and grease and withstand the harshest cleaning agents like paint remover, lacquer thinner and MEK.

3. It shall resist corrosive acids, alkalies, caustics - in effect be so inert there is no commercial solvent for it.

4. It shall not crack, check, or chip; shall stand up to prolonged rubbing and cleaning and remain impervious to moisture.

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5. Color retention of white matte surface shall be such as to present excellent projection screening for movies, slides and superimposings.

PART 3: EXECUTION

3.1 INSPECTION OF OPENINGS

A. Inspect openings and other work prepared under other sections which affect the first class installation of operable walls and perform no installation until all deficiencies have been corrected. Commencement of installation of operable walls shall be construed as acceptance of all conditions and responsibility for proper operation and performance of the installed partition.

3.2 INSTALLATION

A. Operable walls shall be installed by the wall manufacturer or his authorized representative. Punching or drilling of holes for hanger rods in supporting steel members is part of the installation of operable walls.

B. Install operable walls strictly in accordance with manufacturer's recommendations and approved erection drawings. Erect hardware and partitions in a substantial manner complete with operators and accessories. Upon completion, lubricate operating parts according to manufacturer's instructions, adjust partitions and controls for ease of operation and leave installation clean, in good operating condition. Guarantee proper, smooth and easy operable installations. Make all adjustments to insure the performance, including prompt follow-up service during the guarantee period.

C. The operable wall subcontractor shall assume full responsibility for the field performance of the "in-place" partition assemblies. The entire assembly includes the entire sealing at perimeters and the tracks. At the discretion of the Owner or Architect, field tests on the completed assemblies may be performed in accordance with ASTM E336-76. The field performance shall not be greater than 4 to 6 STC below the laboratory STC value specified for the partition. Should the assembly fail the tests, corrections shall be made by this subcontractor and the cost of the test paid by the subcontractor. If the assembly passes, the Owner will pay for the tests.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, requirements of pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing the ceiling grid system and the entire integrated ceiling system as specified herein and identified on the drawings and schedules as Acoustic Tile. Match existing systems at interface locations.

C. Related work specified elsewhere:

1. Gypsum Wallboard: Section 09250.
2. Fixed and Flexible Ductwork: Division 15.
3. Lighting Fixtures and Electrical Systems: Division 16.
4. Special Formed Metal: Section 05750.
5. Operable Walls: Section 10630.
6. Plaster Ceiling: Section 09200.

1.2 GENERAL INFORMATION

A. The following information is intended to complement and clarify the intent of the drawings in establishing the scope of the work but do not construe as listing all required work. Provide all materials and labor to complete the work.

B. Furnish and install suspension system to existing lip type hanger tabs provided with metal deck under earlier contract.

C. Furnish and install ceiling grid as detailed on the drawings.

D. Furnish and install ceiling air diffusers, linear air plenums, service panel module, (perforated at fire speakers and paging speaker locations) acoustical board and all other accessories and parts to the ceiling system.

1.3 SUBMITTALS

A. Shop Drawings:

1. Submit and obtain approval of erection layouts, reflected ceiling plans

and installation detail before commencing with installation.

2. All drawing submittals shall be made in accordance with Section 01300.

B. Samples:

1. Texture and Pattern: Submit two sets of a minimum of 3 samples 24" BY 60" representing the full range of texture or pattern characteristic of production of the specified or selected material. The Architect will select and approve the range of texture or pattern acceptable for the Project and will return one set to the Contractor for use in visual quality control at the factory. The other set will be delivered to the job site for comparison with installed material.

2. All samples shall be submitted in accordance with Section 01300 in duplicate; after approval, one set of samples will be retained in the office of the Architect and one set in the Owner's field office as quality comparison samples for all fabricated parts.

1.4 QUALITY ASSURANCE

A. System:

1. It is intended that the ceiling components furnish and installed under this Section be a complete integrated ceiling system, and be structurally, mechanically and electrically adequate to fulfill the requirements of the work and of these specifications, and to interconnect properly with work provided under other Sections.

B. The integrated ceiling system manufacturer shall have established organization and production facilities, specializing in this type equipment, shall be currently engaged in the manufacture of integrated ceiling system, shall have the demonstrated ability to produce the specified integrated ceiling system of the required quality and the proven capacity to complete an installation of this size and type within the required time limits.

C. The integrated ceiling system manufacturer shall have an established resident local representative in the Minneapolis-St. Paul Metropolitan Area who is fully qualified in integrated ceiling system and has the authority to make decisions and act for the subcontractor.

D. The manufacturer shall be responsible for the interface, structural requirements, air distribution characteristics and color match of these components. (All components shall be completely supplied by or through the manufacturer as a single responsibility source.)

E. Acceptance of Bidders: Acceptance of manufacturers to bid the work of this section, as listed herein, or in addenda, indicates that by preliminary samples and other data submitted, the manufacturers appear capable of providing integrated ceiling systems to meet the design intent. The acceptance for bidding does not indicate acceptance of preliminary samples, except for general construction, nor acceptance of deviations proposed by the samples or by other

data. Provide all materials, equipment and other items in strict conformance with, and to meet all performance criteria called for by the Contract Documents. Any additional permissible deviations from the basic Contract Documents will be as listed in addenda.

F. Qualified Bidders: The following firms prequalified for bidding integrated ceiling systems in previous projects, through the procedure outlined under paragraphs of this article, demonstrating a generally satisfactory level of quality of workmanship. Subject to meeting all specified requirements, they are accepted as qualified to bid this project:

1. Lok Products Company
2. Southern Extrusions, Inc.
3. Ceiling Dynamics, Inc.

G. Qualifications of other Bidders: In addition to the requirements of Article 12 of the Instructions to Bidders and Article 7 of the General Conditions, other manufacturers wishing to bid this work shall request pre-bid evaluations of their proposed products by submitting the following information and samples to the Architect not later than 21 days prior to bid date. Samples shall be uncrated and assembled, ready for inspection.

1. Submit a list of representative installations complete during the last 5 years, listing the Owner, the year and approximate dollar value of each installation.

2. Submit certified reports of tests of the performance capabilities of systems. Tests shall have been conducted by a nationally recognized, independent testing laboratory, equipped and qualified to perform the tests, at no cost to the Owner or Architect. Reports shall indicate the testing procedures and certificates provided in accordance with Section 01400. Performance requirements shall be as specified herein.

3. Submit a detailed, written list of proposed deviations to the Architect for acceptance. Deviations shall include any items or products which are specified by named brands or producers. Such list shall specifically identify and describe in detail each proposed deviation. Manufacturer's standard catalogs, drawings and other information may be submitted to supplement the list of proposed deviations but will not in themselves be considered as an adequate list or description.

4. Submit the following samples at no cost or obligation to the Owner or Architect. Deliver, uncrate and set up samples at a location in the Metropolitan Minneapolis-St. Paul Area, designated by the Architect. Remove samples when directed by Architect. Samples shall be of the quality and construction specified and proposed for the work for the Project.

- a. Two samples of each material, size 24" by 60".

b. One piece of each member of the ceiling grid and each joint in such grid, size - 12" long sections.

H. Pre-Bid Evaluation: The University and Architect reserve the right to make such investigation of bidders and their products as specified under "Qualifications of Bidder" in the Instructions to Bidders. The decision of the University and Architect shall be final and binding.

1. Minor variations in construction and fabrication techniques inherent between manufacturers of the integrated ceiling systems will be considered, provided the specified standards of design, function, dimension, appearance, durability, strength, quality and performance are met. The burden of proof rests with the party making the request.

2. The acceptance or rejection of a proposed deviation of sample is vested in the Architect whose decision shall be final and binding. The determination may or may not express the reason for the decision. Bidders shall be notified in addenda which deviations have been accepted by the Architect. If proposed deviations are not submitted as specified, or are not accepted, it will be held there are no deviations and none will be permitted in the work provided.

3. The samples of the successful bidder may be retained by the University for purposes of comparison in the determination of the acceptability of the samples specified under Article 1.3.B above.

I. Acceptable Manufacturers: Additional acceptable manufacturers, as determined through the process described above, will be listed in Addenda.

J. Erector or Installer:

1. Erector of the ceiling system shall have at least three years experience in the installation of integrated ceilings, and be the grid manufacturer's franchised applicator or authorized representative.

2. Erector shall present evidence that he is capable of installing the various components within his own organization, and without resorting to additional subcontractors. In addition, he shall present written evidence that he is experienced in the satisfactory installation of the products specified, including a written approval from the manufacturer of the products he proposes to use, that he is an acceptable and authorized applicator of these products.

1.5 PRODUCT HANDLING

A. Package, handle, transport and store materials at the jobsite in a manner that will avoid damage. Repair or replace all damaged material.

B. Ceiling materials shall be delivered in manufacturer's original labeled unopened cartons, suitably stored within the building and protected from damage until ready for installation.

1.6 JOB CONDITIONS

A. Inspection: Before commencing integrated ceiling work, inspect all surface and structural elements to receive work of this Section to assure that conditions are suitable for installation of the work. Notify Architect in writing of unsatisfactory conditions and do not proceed with the work until Architect's instructions have been received. Commencement of work shall be construed as acceptance of conditions.

B. Environmental Conditions: The building shall have a relative humidity of 50% +/- 15%, before materials are delivered to the site or work is begun. Uniform temperature of at least 60° shall be maintained during and after the installation.

C. Coordination: Coordinate integrated ceiling work with that of related trades. Ceilings shall be suspended from structural elements only, completely independent of all mechanical and electrical systems and their suspension.

D. Supervision: The manufacturer of the ceiling system components shall personally or through an authorized competent representative satisfactory to the Architect, constantly supervise the work and shall whenever possible, keep the same foreman on the work from commencement to completion.

E. Responsibility and Cooperation: Subcontractor shall submit architectural, structural, electrical and mechanical plans and check them with his work, as he will be held responsible for conditions shown on one or called for by one and not indicated or called for on the other that may affect his contract. Subcontractor shall consult with the Superintendent of other trades and General Contractor's Superintendent to insure complete coordination of all the work.

PART 2: PRODUCTS

2.1 SUSPENSION SYSTEM

A. Design: The suspension system shall be designed to accommodate differential deflection of floor to floor in any story of the building with partitions anchored to the floor and ceiling grid system. The design shall provide for differential deflection after installation of all ceiling system elements and with partitions located in any position in either direction. The design shall provide for the positive or negative differential deflection of not less than 1/2" in either direction and will include a spring supported or other approved resilient suspension system to permit the required movement without failure or excessive distortion of any grid member.

1. Provide spring suspension system in areas bounded by grids as follows:

a. By grid S32 to S36 and by E12 to E17..

2.2 GRID SYSTEM

A. Aluminum Grid System shall be compatibly designed to function as a structural supporting system or the related ceiling system components and also

serve as an indirect means of partition connection without pre-determined partition locations. The 6'-2" modular layout shall be rigidly adhered to with the exception of air distribution diffuser locations which shall remain flexible to accommodate room interior air distribution requirements as set forth herein. The minimum section properties of the ceiling grid members shall be:

1. Primary grid members - Moment 0.245 in. to the power of 4 and Section Modules of 0.16 in. cubed.

2. Secondary grid members - Moment 0.127 in. to the power of 4 and Section Modules of 0.11 in. cubed.

B. Partition Connection Slots: The primary ceiling grid members (main runners, cross runners, split runners and edge runners) shall have not less than a 5/8" deep 5/16" - 18 thread extruded linear slot which will form a continuous opening to accept National coarse threaded 5/16" - 18 screws. Where main runner, split runner or edge runner intersect with another slotted runner, the flange or flanges of the continuous runner shall be interrupted and the intersecting runner shall be coped so that the intersecting slot is through to the continuous slot.

C. Service Panel and Light Fixture Connection Slots: Main runners shall have not less than 3/8" deep 7/32" - 24 thread extruded linear slot forming a continuous opening to accept 7/32" - 24 screws.

D. Grid Connections: The main runners shall interlock with the cross runners by means of a horizontal threaded connector or other approved system so that cross runners when installed shall have a torsional resistance of 300 inch pounds. Such connections shall also be designed to resist tension stresses of 300 pounds. All exposed joints of the ceiling grid members shall be drawn tight and not exceed the allowed tolerances as set forth in the American Society for Testing and Materials ASTM designation: C635-69.

E. Material: Suspended ceiling grid shall be extruded of 6063-T5 alloy aluminum with configuration and straightness tolerances not to exceed those established by the Aluminum Extrusion Association and with manufacturing dimensional tolerance maximums as established by the Acoustical Materials Association. All exposed surfaces (including service panels, etc.) shall be chemically treated in accordance with ASTM D-1730 and given two coats of baked enamel. Color shall match existing.

F. Grid Members: All grid members shall be of the general configuration shown on the drawings. Visual and functional shapes and dimensions shall be adhered to strictly. Minor dimensional variations in concealed portions of members which are necessary to satisfy requirements for structural performance or extrusion or fabrication techniques are acceptable. Maximum acceptable height of any grid member shall be 2-1/4".

G. Lens Support: Lens support members shall be of the general configuration shown on the drawings, fabricated from aluminum, finish to match runners.

H. Hold Down Clips: Provide hold down clips at all units over partitions. Furnish 10% additional clips and turn over to Owner for future changes.

I. Provide all miscellaneous angles, runners and other supports for acoustic material where other materials or systems pass through ceilings as at service columns.

2.3 SERVICE PANELS

A. Furnish and install service panel area covers for hardware items such as supplementary lighting, communication terminals, fire sprinkler heads, smoke detectors, fire speakers and paging speakers, and items as indicated in other sections of the specifications. Furnish the service panel air register-boot as herein described, and overhead light mounting panel.

B. Service panel covers shall have compatible mounting hole locations to mate with the extruded top vertical linear thread provided by the main runners of the ceiling grid.

C. Construction of the service panels shall be as shown on the architectural plans and shall be manufactured of 18 gauge steel. All exposed surfaces (including service panels, etc.) shall be chemically treated in accordance with ASTM D-1730 and given two coats of baked enamel. Color to match existing grid system.

D. Acoustical damping: Apply full bedding of acoustic tile adhesive and imbed one layer of specified, or approved, sound attenuation board.

2.4 LINEAR AIR PLENUMS

A. Linear Air Plenum shall be constructed of no less than 26-gauge galvanized metal and the side rails and end pieces shall be of extruded aluminum 6063T5 alloy, .062 minimum wall thickness. The diffuser side rails shall be end coped and factory painted to match the ceiling suspension members. The interior including end and center spacers, wires and plenum shall be factory painted, flat black.

B. Plenum shall be complete with spin-in collar with quick coupler clips attached, locking clips and stabilizing angles.

C. Plenum shall straddle the ceiling cross runner to form one or two one inch slots.

D. The plenum when in position as a supply air diffuser shall have a minimum of two separate pairs of air pattern control wires in each slot. The diffuser shall also use the ceiling suspension member as an air diffusing member. Each unit shall include an internally mounted and adjustable spread control device.

E. Each plenum shall be relocatable in the field to any cross runner and shall be supported at both ends on the ceiling grid. The linear air plenums shall be of two types with performance characteristics as follows:

1. Lok Products Co. Model EGS-1.00-2HS-59-R10-2 slot, Titus, Tuttle and Bailey, or approved equal.

- a. Total pressure at 350 CFM of air shall not exceed .105" H₂O.
- b. Maximum NC of 34 based on 15 db room absorption.
- c. Minimum NC of 30 based on 15 db room absorption.

2. Lock Products Co. Model EGS-1.00-2-HS-59-R7-1 slot, Titus, Tuttle and Bailey, or approved equal.

- a. Total pressure at 185 CFM not to exceed .105" H₂O.
- b. Maximum NC of 34 based on 15 db room absorption.
- c. Minimum NC of 30 based on 15 db room absorption.

3. Maximum entry velocity shall not exceed 900 FPM. All tests and performance data shall be made in accordance with procedures set forth in ADC Equipment Test Code 1062R2.

4. The performance of the air diffuser will be such that the room air motion rate in the occupied space will not exceed 50 FPM terminal velocity.

5. The total system including ceiling grid, lights, ceiling panels, service module and air diffuser member shall be tested as a system and shall fulfill the design criteria as set forth by the plans and specifications.

2.5 ACOUSTICAL MATERIALS

A. General Description: Ceiling lay-in panels shall be 2' x 5' (approx.) size and shall be of thickness required to meet all structural, acoustical and other requirements specified herein or implied. Material shall conform to Federal Specification SS-S-119a (GSA-FSS) and shall be as described in the current edition of the Acoustical and Insulating Materials Association (AIMA) Bulletin "Performance Data."

B. Performance Criteria: Laboratory test data shall be submitted along with samples of the panels to be used for final approval of the Architect in accordance with Article 1.3 above. Test data submitted shall include at least the following:

1. Sound absorption coefficients determined by ASTM test method C423 for individual frequencies at octave intervals from 125 to 4000 hertz with the test sample in a Mounting 7 configuration. The NRC range shall be .65 -.75.

2. Sound attenuation factors determined by "Ceiling Sound Transmission Test by Two-Room Method", tentative Method of Test AMA-1-11-1967 for sixteen third octave intervals from 125 to 4000 hertz (Hz). The test data may be on a smaller size sample of the material to be used in the final installation (for example 12" x 12" or 12" x 24" units). The test sample shall be measured with a "continuous" mounting arrangement at the test room dividing partition designated "C" by AIMA. The test results shall indicate that the material is capable of yielding a ceiling Sound Transmission Class (STC) range of 45-49 as determined by ASTM document E413-70T.

3. Manufacturer's certification that the material will provide a ceiling Sound Transmission Class (STC) range of 40-44 when installed in the suspension system specified herein using 2' x 5' lay-in panels. The submission of laboratory test data giving sound attenuation factors as determined by AIMA test designation AMA-1-111-1967 and Ceiling Sound Transmission Class (STC) values as determined by ASTM document E413-70T for a test installation of the material in a lay-in suspension configuration continuous at the test room dividing partition shall be included with the manufacturer's certification.

4. Light reflectance values determined by ASTM test method C523 indicating that the new material will have a light reflectance of .75 or greater.

5. Flame Spread test data as determined by ASTM E84 indicating that the material falls within Flame Spread Index Range 0-25.

6. Any available test data to indicate to the satisfaction of the Architect that the material will satisfy long term maintainability requirements (washability, scrubability, self-sanitization, etc.).

C. Acceptable Materials: Ceiling lay-in panel materials meeting the above performance requirements include the following, or approved equal.

1. Armstrong, Minaboard with Attenu-Guard Treatment, Classic Design, plastic coated.

2. National Gypsum, Solitude, Needle Perforated, plastic coated.

3. Conwed, Lo-Tone AF, Constellation, plastic coated.

4. Keene Corporation, Hansoboard Hansotar AF, plastic coated.

5. US Gypsum Aurotone, pin-perforated, atten-treated, plastic coated.

2.6 PLENUM SOUND BARRIER

A. Plenum sound barriers shall be Asarco Acoustilead sheet or approval equal, 1/64 inch thick weighing one pound per square foot, conforming to ASTM Specifications B-29-55.

PART 3: EXECUTION

3.1 GENERAL WORKMANSHIP

A. All materials shall be installed in strict accordance with manufacturer's specifications, to details shown on the Drawings under conditions as outlined in the current bulletin of the "Acoustical Materials Association" Section on "job conditions" as may be applicable for portions of work herein.

B. The suspension systems and acoustical tile units specified herein shall be installed by the manufacturer or an approved representative recommended by the manufacturer.

C. Cutting and Repairing: Do all cutting necessary for the proper installation of this work and repair any damage to other materials or systems. Coordinate this work with that of other Subcontractors. Patch and repair all surfaces where other materials are removed. The patch surfaces shall match surrounding surfaces in material and finish, and all repairs shall be done to the satisfaction of the Supervising Engineer.

D. All workmanship shall be first class and the best type in every case. Nothing herein is to be construed as calling for other than first class workmanship and any not so fulfilling this requirement shall be removed and replaced with proper material and workmanship.

3.2 INSTALLING SUSPENSION SYSTEM

A. Hanger Tabs and Fittings: Hanger tabs capable of supporting 100 pounds are provided 1'-0" o.c. on all side joints of existing metal deck.

B. Hanger wires for the suspended ceiling system shall be attached to the hanger tabs or fittings. Suspension system shall not be attached to ductwork, conduit, equipment or other than the building structure. Where ductwork, conduit or equipment arrangement make it impossible to provide direct-to-structure hanging within the maximum allowable spacing, provide approved trapeze suspension from ceiling. Wires shall be threaded thru the ceiling grid members and wrapped a minimum of 4 full turns to insure gaining full strength of the suspension system. Hanger wire spacing shall average no more than 6'-2" maximum along any major load carrying member. The entire ceiling system installation shall be closely coordinated with all other trades.

3.3 INSTALLING CEILING GRID

A. Location of ceiling members shall be as shown on architectural reflected ceiling plans.

B. Install all members according to the approved ceiling grid installation details with the ceiling plan level, all jointery with the specified tolerances and all fastenings drawn up tight.

C. Accurately align all visible grid members.

D. Defective Components: Do not install component parts which are observed to be defective in any way, and remove such parts for replacement. The cost of replacing components damaged during installation shall be a part of the responsibility of this section.

E. The installation of all mechanical components of the integrated ceiling and coordination of the installation of the lighting fixtures (by Electrical Contractor) shall be the responsibility of the Subcontractor for this Section and the various classes of work shall be done by the proper trades. Refer to Article 3.5, below, for installation of mechanical components.

3.4 INSTALLING PLENUM SOUND BARRIER

A. Plenum Barriers: Provide continuous soft lead sheet plenum barriers above partitions where shown on drawing.

B. Provide plenum sound barriers to hang vertically between underside of floor above and top of ceiling partitions where indicated as follows:

1. Fasten continuous blocking to deck or slab, positioned so lead sheet will drape onto ceiling directly over the partition. For fluted decks, install preformed neoprene filler strips to conform to flutes in deck and insure a tight fit between blocking and deck.

2. Cut lead sheets sufficiently long to drape at least 2" onto the ceiling surface. Fold upper edge over batten and attach to continuous blocking. If ceiling is uneven, tape or dress lower edge of ceiling surface. When vertical joints are necessary, join adjacent sheets with folded, lock seams.

3. Make cutouts to accommodate ducts, conduit, pipes or beams passing through the plenum barriers, slit barrier from bottom of sheet to point of penetration and make orange peel slits to accommodate obstruction. Drape lead over obstruction and collar flaps tightly against it. Tape insulation and flaps tight to object passing through.

D. Any penetrations made through the plenum sound barrier after its initial installation shall be repaired to restore the integrity of the original installation at the expense of those making the penetration(s).

3.5 INSTALLING SERVICE PANELS, LINEAR AIR PLENUMS, CEILING AIR DIFFUSERS AND REGISTERS

A. Install service panels, linear air plenums, ceiling air diffusers and registers in the ceiling grid in accordance with the approved design details and ceiling plans.

B. Accurately align all visible items with the ceiling grid.

C. Securely anchor all items to the ceiling grid using 3/8" x 7/32" - #24 thread cadmium plated machine screws. Service panels, shall lay flat and flush with bottom of runners.

D. After installing, move or adjust all moving or adjustable parts through their full range to assure proper and free functioning in the completed installation. Repair or replace any malfunctioning items.

3.6 INSTALLING ACOUSTICAL MATERIAL

A. Ceiling lay-in panels shall be installed in strict accordance with the patterns and arrangements shown in the drawings and in accordance with the recommendations of the manufacturer.

3.7 AIR BALANCE RESPONSIBILITY

A. Subcontractor for this section shall cooperate with the selected test and balancing agency in the following manner.

1. He shall coordinate his schedule with the Air Conditioning Contractor to have his system in operating condition in sufficient time before final completion date so that the testing and balancing can be accomplished.

2. He shall provide the labor and tools to make corrections when required without undue delay at no additional cost to the Owner.

3. He shall advise the Test and Balance Contractor of any major changes made in his system during construction.

4. He shall be responsible for removing and replacing ceiling panels necessary to the testing and balancing of the air distribution system.

3.8 FIELD QUALITY CONTROL

A. Field Tests: Field tests on the final installation may be performed at the discretion of the Owner to insure that the actual materials and methods meet the specified requirements in all respect. Field tests shall include the following:

1. Sound Absorption tests on selected samples of the materials actually being installed by the impedance Tube Methods (ASTM C384-58).

2. Sound Attenuation tests between selected adjacent complete rooms in accordance with ASTM E-336-78T.

3. Light Reflectance tests on selected samples of the materials actually being installed in accordance with ASTM C523-68.

B. Tests shall be performed by an independent testing agency retained and paid by the Owner except that where test results indicate failure of the installation to meet the required performance cost of such tests and any retesting required shall be paid by the Subcontractor for this Section.

3.9 CLEANING AND TOUCHING-UP

A. After installation of entire suspended ceiling system has been completed, clean the entire surfaces thereof, removing any discolorations or foreign matter and touch up all abraded spots and edges (if any) with the same paint as was used in the factory-applied finish of the component, to the acceptance of the University.

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CONDITIONS, SPECIFICATION AND RELATED DOCUMENTS FOR

UNIT B/C - PHASE X SHELL SPACE COMPLETION
RURAL PHYSICIAN ASSOCIATE PROGRAM - FLOOR FIVE
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION

Clinton N. Hewitt
Assistant Vice President for Physical Planning

University of Minnesota

Director of Engineering and Construction

University of Minnesota

Paul J. Maupin
Health Sciences Planning

University of Minnesota

THE ARCHITECTS COLLABORATIVE, INC.

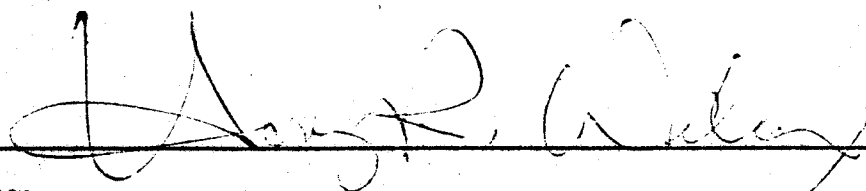
Cambridge, Massachusetts

HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
University Park Plaza - Suite 704
2829 University Avenue Southeast
(612) 378-3833

Minneapolis, Minnesota
55414

As to Engineering:

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



Date:

Reg. No. 9603

neatly folded to approximately 8-1/2" x 11" size and bound in indexed loose-leaf binders of adequate size to contain the material. Each binder shall be properly identified. Upon completion of these portfolios, the Contractor shall turn over to the Architect/Engineer, prior to the Owner taking over the building, for approval and delivery to the Owner.

B. Instructions shall contain the following information and services:

1. Manufacturer's recommended cleaning and maintenance procedures.
2. List of materials recommended for maintenance.
3. Complete operating instructions.
4. Name and address of authorized service organizations and parts depot.
5. Where indicated in the specifications, the Contractor shall provide the services of a factory trained representative to instruct the Owner's authorized personnel in the operation, control and maintenance of equipment.
6. Refer to Sections of specifications for additional information to be furnished by the Contractor.
7. The Mechanical Contractor shall instruct the Owner's representative in the use of all equipment and systems, as specified in Section 01700.

1.7 OTHER WORK

A. Other work will be performed by separate trades. This Contractor shall give careful consideration to work of all of the general, electrical, elevator and other trades, and all subsidiary trades, and shall organize his work so that it will not interfere with the work of other trades. He must consult all the specifications for correlating information and all drawings for details, dimensions, foundations, pits, etc.

1.8 CLEANING

A. Refer to and comply with requirements of General Conditions, Section 01010 and 01070. The Contractor and Subcontractors for the various phases of the work of this Division shall promptly clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished under any or all contracts in a clean first-class condition.

B. Air surfaces of all coils, convectors, fan housings, fan wheels, fan motors, air unit plenums and all air filters shall be wiped or vacuumed clean or washed, if required, leaving the installation in a first-class condition.

C. All plumbing fixtures shall be thoroughly cleaned of all plaster, stickers, rust stains, and other foreign matter or discoloration, leaving every part in an acceptable condition and ready for use. The surface of all floor drains, clean-outs and other equipment shall be cleaned and each item shall be left in a

first-class condition. Thoroughly clean all items of equipment furnished such as traps, strainers, pumps, motors, compressors, condensers, etc., leaving each item in a clean first-class condition.

1.9 PAINTING AND STENCILING

A. Painting of final field coats on materials and equipment furnished under the mechanical portion of the contract will be done under the general construction contract as described in Section 09900. This Contractor shall, however, refinish and restore to the original conditions and appearance all mechanical equipment which has sustained damage to the manufacturer's prime and finish coats of enamel or paint. Materials and workmanship shall be equal to the requirements described in Section 09900. All painting or paint finish referred to in Division 15 is to be provided by this Contractor. This Contractor shall identify piping and indicate direction of flow, by marking the equipment as frequently as necessary for painting and stenciling by General Contractor. Laboratory water piping systems shall be labeled "Water Unsafe for Drinking" in accordance with the Minnesota State Plumbing Code.

1.10 DEMOLITION, REMODELING, CUTTING AND PATCHING

A. Refer to and comply with requirements of Section 01070.

B. The relocation of existing equipment and piping systems shall be accomplished in the least possible time. Work shall be scheduled so as to minimize the down time for the respective systems involved, and the schedule approved by the University in advance. This will be required for existing services being revamped and/or relocated and all interconnecting portions of these systems shall be installed as complete as practicable prior to actual shut-down for final connections.

C. As applicable, work shall be coordinated with the other contractors, other trades and with the University. In areas where work involved may interfere with existing building operations or require temporary or permanent cessation or relocation of building functions, the University must be consulted so that work schedules can be set up acceptable to all concerned.

D. This Contractor shall furnish and install all materials and equipment to complete remodeled areas of the existing buildings as shown on the plans specified herein, or required to complete the work indicated under this Contract, including all minor items necessary for complete and operating installation. This Contractor shall offset existing piping and ductwork as indicated on the drawings or as required to accomplish the remodeling indicated.

E. This Contractor shall be responsible for all necessary cutting and patching required in connection with his work and where necessary because of removal or change of existing work. Cutting of structural members and finished surfaces shall not be allowed without permission from the Architect or Structural Engineer. These cutting and patching requirements will be modified only if general construction specifications and drawings specifically and clearly state that certain or all portions of same required for each of the various trades is to be performed by the General Contractor.

F. This Contractor shall remove existing mechanical work as shown, or is required to accomplish the work as indicated on the drawings. Where required, existing piping, ductwork and other mechanical work and systems shall be relocated or rerouted to accomplish and complete the work.

G. Cutting and patching to expose and remodel existing mechanical systems shall not be construed as the work of another contract unless specifically called for on another contractor's documents. In general, all patching caused by Mechanical Contractor's cutting and demolition work to accomplish the work of the Mechanical Contractor shall be done by the Mechanical Contractor, except as indicated to be done by the General Contractor on the Architectural Drawings.

H. Cutting required for plumbing, heating, ventilating and air conditioning work, etc., shall be done by the Mechanical Contractor to the entire satisfaction of the University and Architect/Engineer. Cutting shall be kept to a minimum which will allow the proper placement of the materials.

I. All unsalvagable materials shall be removed in a manner that will avoid damage to materials or equipment to remain and shall be completely removed and legally disposed away from the site.

J. Salvagable materials designated for re-use or relocation shall be carefully removed and shall be protected from damage until they are incorporated into the new work.

K. Salvagable mechanical equipment not specifically stated or specified to be reused should be reviewed with the University's representative as to disposition. If the University desires to retain, the equipment should be carefully removed, protected from damage and turned over to the University at a location outside the building. If the University does not desire the equipment, it should be completely removed and legally disposed away from the site. Equipment shall include but not be limited air handling units, ductwork, diffusers, control instruments, tubing, piping, valves, plumbing fixtures, trims, drains, cleanouts, and fire protection sprinkler heads.

L. See Sections 01010 and 01500 for special requirements such as the use of construction tools, barricades, and protection of the existing building.

M. The Mechanical Contactor shall repaint all areas where he has performed cutting and patching at rooms, spaces or locations that are not repainted under the General Contract, generally these will be locations where no demolition, cutting and patching is performed by the General Contractor.

N. Refer to Sections 01070, 04200, 09100 and 09900 for execution and requirements for patching and painting and comply with applicable provisions as to materials and workmanship.

1.11 GOVERNING CODES

A. The mechanical installation shall conform to the current provisions of all local and State Codes pertaining to plumbing, heating, ventilation and refrigeration work including, but not necessarily limited to the following:

1. Minnesota Building Code
2. Minnesota State Plumbing Code
3. American Water Works Association
4. National Electric Code
5. Minnesota State Board of Health
6. Minnesota Safety Code and Regulations
7. Sheet Metal and Air Conditioning Contractors National Association
8. Local applicable ordinances.

1.13 STANDARDS

A. All materials supplied under the mechanical contract requirements shall conform to the latest editions of the following standards:

1. All applicable standards as published by the American Society of Testing Materials.
2. All applicable standards as published by the National Fire Protection Association.
3. American Standards Association.
4. American Society of Mechanical Engineers.
5. American Society of Heating, Refrigeration and Air Conditioning Engineers.
6. Air Moving and Condition Association.
7. University of Minnesota Standards.

1.4 TESTS

A. All work shall be inspected, tested and approved as required by the State of Minnesota and local regulations. Tests shall be made in presence of proper inspectors and Architect/Engineer or their duly authorized representatives.

All tests shall be made by the Contractor at his own expense, unless specifically noted otherwise, and he shall furnish three (3) test certificates each to the University and Architect/Engineer.

B. All work shall prove absolutely tight under required tests. All types of piping systems except final tests of completed systems shall be made before pipe is covered or connected to fixtures and equipment. Tests required shall not be less than specified in the following paragraphs.

C. All gauges, tools, pumps, gas, air or other equipment required for testing and initial adjusting of piping systems shall be purchased and provided by this Contractor.

D. Piping Tests

1. Sweat copper joints. Provisions shall be made for removal of one (1) percent of the sweat joints in copper piping for inspection and testing. Additional joints may be required to be removed if failure occurs in original one (1) percent tested.

2. Silver brazed copper joints. Mechanics doing silver brazing are required to pass a certifying test. Test shall simulate job conditions using fittings of size and type specified.

a. Test sample shall be two (2) nipples (12" long) and one (1) coupling of the largest size to be used at the job (2" minimum size). Execute one (1) sample in horizontal position, 6'-0" above floor, and one (1) sample in vertical position 5'-0" above floor with upward flow of brazing.

b. Test samples shall be sent to an independent testing laboratory by the Contractor, and Contractor shall pay all costs of test.

3. Welding

a. Certification shall be for type of work being performed by welder and shall be accomplished in accordance with ASME "Qualification Standard for Welding Procedures, Welders and Welding Operations." No welds shall be made by any welder until copies of his certification have been submitted to Architect/Engineer.

b. Welded joints to be tested shall be selected by the University Construction Superintendent. Number selected shall be 2% of joints made, but not less than two (2).

c. Selected joints shall be radiographed by an independent testing laboratory and evaluated on the basis of appropriate codes and construction standards covering services installed. Use APA 1104 from American Petroleum Institute or ANSI-B31.1 where required.

d. All welds shall be stronger than the parent metal. A minimum of two passes shall be used on all arc welded joints.

e. Contractor and the University shall agree upon the degree of examination and the basis of rejection of welding prior to installation.

E. Systems Tests

1. All soil, waste, storm water and vent conductors, etc., shall be tested with air of 5 psi pressure and shall remain constant for 15 minutes without the addition of air.

2. Cold, hot and recirculating hot water piping shall be tested and proven watertight under a hydrostatic pressure of 125 psi pressure or 1-1/2 times the working pressure, whichever is greater, for a period of two (2) hours prior to application of pipe insulation and final connection to fixtures.

3. The Standpipe and Sprinkler Piping System shall be tested hydrostatically at 300 psi water pressure for a period of two (2) hours.

4. All Hot Water Reheat and Radiation Piping shall be subjected to an air test of not less than 75 psi pressure or 1-1/2 times the working pressure whichever is greater. The pressure shall be maintained for a period of two (2) hours with no drop in pressure. Soap test all joints.

5. Motors: All motors and/or equipment under the mechanical contract shall be listed under load conditions with the RPM and amperage readings taken and listed on the required certificate.

6. Fire Dampers and Smoke Dampers: Each fire damper and smoke damper shall be tested after installation, witnessed by a responsible person to ascertain its proper functioning. Each damper shall be tested and certified. A copy of the certification shall be forwarded to Architect/Engineer, University of Minnesota and RPFEC for record.

7. Heating, Ventilating and Air Conditioning

a. All ventilating and air conditioning systems shall be balanced by an independent test and balance agency retained by the University of Minnesota. The agency will be a fully certified member of the Associated Air Balance Council.

b. The Mechanical Contractor shall have ventilating and air conditioning systems installed, cleaned and operating in all areas delivering air through in accessible ceiling areas so as to remove construction dirt and dust from duct prior to installation of ceilings.

c. All equipment shall be freshly oiled, filters charged with clean media, and installation completely finished prior to acceptance.

8. Hydronic Systems

a. All hydronic systems will be balanced by an independent test and balance agency retained by the University of Minnesota.

9. Fire Safety Precautions

a. See Article 1.33 Section 01010.

10. Automatic Temperature Control

a. The temperature control system is specified under Division 16 and as such is assigned to the electrical portion of the Contract as a responsibility of the Electrical Contractor.

11. Sterilization of Domestic Water Pipes

a. Upon completion of cold, hot water, and circulating hot water piping systems, including water service connection, this Contractor shall sterilize these systems with chlorine before they are placed in operation. Amount of chlorine applied shall be such as to provide a dosage of not less than 50 parts per million. Following a contact period of not less than 6 hours, the heavily chlorinated water shall be flushed from the system with clean water until the residual chlorine content is not greater than 0.2 parts per million. All valves in water lines being sterilized shall be opened and closed several times during the 6 hours period.

b. All sterilization work shall be performed in a manner and with methods such as to meet approval of inspector's office of State Board of Health. Water shall be sampled and tested by the Division of Environmental health, University Health Service before being placed in service.

c. Special care shall be taken in sterilizing, cleaning and flushing piping to eyewashes and emergency showers.

12. Cleaning and Flushing of Piping Systems. The Contractor in the presence of the University shall thoroughly flush the hydronic heating system. Using Wyandott Chemical Corporation's "Conquer" liquid cleaner. The cleaning and flushing procedure shall be in accordance with the following:

a. After the piping systems have been completed and pressure tested, set all hand valves and control valves in an open position.

b. Fill the systems with clean water and start the system pumps.

c. Using the chemical feeders on the hydronic system, add one (1) liquid ounce of "Conquer" liquid cleaner per gallon of water in the systems. The liquid cleaner may be added directly into the cooling tower basin using one (1) liquid ounce of cleaner per gallon of water in the system. Isolate new construction and install temporary pump for circulating the cleanser in new portion of system.

d. After the cleaner has been added to the systems, continue to run the pumps for a period of 4 hours. During this period, the pump strainers shall be inspected and cleaned as required to prevent damage to the pumps, but in no case shall inspection and cleaning be done at greater than one hour intervals.

e. At the end of the 4 hour run, drain all systems completely, then flush with clean water for a 2 hour period discharging dirty water to sewer.

f. Drain systems, disconnect temporary pumps and chemical feeders, remove, clean, and replace all strainer screens and fill systems with clean water.

1.15 IDENTIFICATION

A. All mechanical equipment furnished under these specifications shall be identified with black-white-black laminated 1/8" plastic plates. Plates attached with self-tapping screws.

1.16 CONNECTIONS TO EXISTING BUILDINGS

A. Connections to the existing building shall be made as shown on the plans. Any existing and/or systems affected by these connections shall be replaced into proper operation. Add isolating valves at point of connection to existing services.

1.17 ENTRY OF LARGE EQUIPMENT

A. If any equipment cannot be brought through regular entrances, Contractor shall so notify the University and Contractor for General Construction, and arrange with him to leave suitable openings for accommodation of such large equipment. All such arrangements shall be subject to approval of Architect/Engineer. Without such arrangements, equipment shall be delivered in sections small enough to permit use of regular entrances. This latter practice is not preferred.

1.18 TEST AND BALANCE SERVICE

A. Under a separate contract, the University will retain a qualified independent firm to provide the services of testing and balancing the air, hydronic, chilled water and condenser water systems of this project. The consultant will be responsible to the University and the Architect. It is intended the services will be provided by a firm specializing in testing and balancing air and hydronic systems in building construction and be certified by the Associated Air Balanced Council (AABC).

B. It is intended the separate contract will include all services of testing and balancing in accordance with the published standards of the AABC National Standards for Field Measurement and Instrumentation, Total System Balance. The service will include the Pre-construction Plan Check and Continuous Inspection Plan of the AABC. The consultant shall also act as an inspection agency during construction and shall report to the University any discrepancies or items not installed in accordance with the Contract Documents pertaining to the systems he will be testing and balancing.

C. The consultant will provide the testing and balancing service for air and piped systems, such as:

1. Complete ventilating, air conditioning and exhaust systems, including fume hood tests, balancing the air flow to and from all openings, adjusting dampers, fan speeds and other adjustments necessary to provide fully balanced systems performing as intended by the Contract Documents.

2. Piped/pumped systems of all hydronic, recirculating domestic water, and other systems, balancing the flow to/from each device and making such tests and adjustments necessary to meet the require volume and performance intended by the Contract Documents.

D. Where applicable, the consultant shall test and balance systems in operation at both the normal and emergency mode conditions.

E. The Mechanical Contractor (and his subcontractors and suppliers) shall coordinate his work and cooperate with the test and balance consultant throughout construction as necessary for the consultant to satisfactorily and efficiently perform his services. The Mechanical Contractor shall:

1. Provide the consultant with a schedule of the work, undating the schedule as the work progresses and giving the consultant timely notices to allow examinations and permit test and balance services to be accomplished at appropriate times.

2. Advise the consultant of changes, modifications and rearrangements made during the construction progress.

3. Provide a copy of pertinent shop drawings, pertinent equipment brochures, fan curves, coil data, grille register and diffuser submittals, pump submittals, pump curves, control diagrams, other similar data, and any other necessary information required to perform the balancing and adjusting of the HVAC and piped/pumped systems. All such data shall be the final copies accepted by the University and Architect/Engineer.

4. Leave all air and piping balancing devices in the wide open position, and instruct all workmen and subcontractors for this requirement, and free all operating arms and adjustments so they can be easily operated.

5. Allow access to all areas of the work as necessary to accomplish the test and balance services.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1, General Requirements and Section 15010, General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. These conditions supplement provisions of General Conditions and Division 1.

PART 2: INSTALLATION

2.1 GENERAL

A. All pipes shall be required size, round and straight and shall be cut, reamed, threaded, beveled for welding and/or otherwise prepared for joining with proper tools. All piping shall be properly enclosed, supported, guided, anchored, sway braced, connected, tested, cleaned and flushed out, properly insulated and protected where required, and run in a neat and orderly manner to the satisfaction of the Architect/Engineer. Lines required to be enclosed in ceilings, chaseways or similar spaces shall be installed to permit such enclosure as intended. This Contractor must lay out his work, properly locate the apparatus and add necessary pipe, sleeve, etc., and take his own measurements at building.

B. All pipes shall be run with proper grades to provide for easy draining and in group runs where applicable. Pipe sizes shown on the drawings are nominal pipe sizes and not outside diameters. Pipes shall be run substantially as indicated on the drawings; however, Architect/Engineer reserve the right to require this Contractor to make minor changes in pipe locations where conflicts occur with other trades. Such changes shall be made without extra cost to the Owner.

C. All piping shall be installed with ample provisions for expansion and contraction to prevent damage to same or to building structure. Such provisions shall be made by means of piping offsets, changes in directions, expansion loops and/or suitable expansion joints. Suitable anchors and guides shall be provided to permit proper deflection and compression of offsets, loops and expansion joints. Expansion joints shall not be used in lieu of offsets, changes in direction or loops, except where specified and/or indicated on the drawings or where otherwise obviously necessary.

D. All heating and cooling piping systems shall conform with all applicable requirements of the Code for Pressure Piping, ASA B31.1 and with all applicable state and local codes, except that where type and quality of materials, weights, thickness, design, pressures or fabrication techniques are called for in these

specifications which exceed or upgrade such code requirements, these specifications shall govern.

E. Bolt and gasket sets for all steam piping, except condensate piping, shall be flanged bolts ASTM A193, grade B7 alloy steel with semi-finished hex nut A-194. Gasket shall be flexitallic type C-G, or equal. For condensate piping the bolt material shall be cold rolled steel flanged bolt with hex head and heavy semi-finished hex nut. Gasket shall be 1/16 Grante ring gasket, or equal.

2.2 PLUMBING PIPING SYSTEM

A. The continuous waste and vent piping method shall be followed for entire plumbing system. Provide laboratory and domestic hot, circulating hot and cold water, distilled water, compressed air, natural gas, carbon dioxide and vacuum lines to all outlets, junction boxes, and fixtures as shown on drawings or specified herein.

B. All water piping shall be pitched to drain points, and up from hot water tanks, supply mains or risers 1/8" per 10 feet wherever possible. Provide a 3/4" hose bibb drain at end of ech main and base of each riser and elsewhere as indicated on drawings.

C. All waste and vent piping shall be properly pitched 1/4" to the foot where possible and 1/8" minimum unless indicated otherwise so that all waste piping will drain back to main stacks and vent pipe will drain back to fixture unless loop venting indicates other pitch. Piping shall be properly supported so that it will not sag and form pockets. Joints between cast iron pipe and fittings shall be caulked with pitched oakum, thoroughly forced into joints with caulking tools. The joints shall then be filled with molten lead solidly caulked even with the hub top. Joints for acid resistant waste and vent shall be glass bead with stainless steel or glass reinforced nylon compression type assemblies with teflon liner. Where acid resistant piping connects to cast iron piping, the connecting fitting shall be an acid fitting and the common line shall continue as acid recisting material. Preformed molded rubber rings may be used where specified under Section 15110.

D. Consult manufacturer's data and details of rooms containing plumbing fixtures on architectural drawings before roughing-in piping. Plug or cap piping immediately after installation. Waste stuffed in open ends of piping shall be removed before installation of next length of pipe. Minimum size of all water piping shall be 3/4" except for short stubs immediately at fixtures.

E. All groups of fixtures shall have main valves including drain cocks with valves spotted in accessible, but concealed locations.

F. Circulating hot water piping systems shall be properly balanced so as to provide equal flow in all branches of the system. Provide a thermometer in each circulating branch.

2.3 HEATING PIPING SYSTEM

A. All hot water heating piping shall be installed with a minimum pitch of 1/8"

per 10 feet to free itself of water when drained and/or air when operating. If risers and drops are required in horizontal pipe runs, install a 3/4" IPS by 6" high capped pipe air chamber for hydronic main supply and return risers. See Article 2.5 of Section 15130. Through a reducer, connect a 1/8" copper tube and run the stubs to discharge over a janitor's slop receptor or an equipment room floor drain. On the end of the copper tube near the drain, install a key-operated manual air vent. Provide a gate valve and union on inlet to air vent. Furnish and install on each reheat coil, shutoff valves, unions, control valve and a full supply pipe size air chamber at least 4" long with reducer on top to a Taco, Dole, or standard type key-operated air vent valve. Provide copper tubing on air chamber outlets and run tubing to accessible location before installing air vent when necessary for access and when directed by Architect/Engineer.

B. Under no circumstances shall any pipe connections in the field be made by punching a hole in a pipe and inserting or saddling a branch take-off. Flanged connections required to match field equipment may be made using slip-on flanges.

C. Work done in approved prefabrication shops field located or otherwise may be done as follows: Submit prefab pipe for University of Minnesota inspection before installation.

1. Provide welding tees on all full size branch take-offs from pipe mains.
2. Provide a welding tee and reducer fitting at branch connections that are one size smaller than the main. Reducing tees may be used.
3. When the branch pipe is at least two sizes smaller than the main pipe, the branch may be saddled to the main on 2-1/2" diameter and larger pipes.
4. Slip on flanges or weld neck flanges are permitted.
5. Omit back-up rings specified for each joint in welded pipe sizes 2-1/2" and larger.

2.4 AIR CONDITIONING SYSTEM

A. All chilled water piping and condenser water piping shall be installed with a minimum pitch of 1/8" per 10 lineal feet to free itself of water when drained and of air when operating.

B. Under no circumstances shall any pipe connections in the field be made by punching a hole in a pipe and inserting or saddling a branch take-off. Reduction in line size for all piping shall be with eccentric fittings, butt weld, or screwed according to size and application. Flanged connections required to match field equipment may be made using slip-on flanges.

C. Work done in approved prefabrication shops field located or otherwise may be done as follows. Submit prefab pipe for University of Minnesota inspection before installation.

1. Provide welding tees on all full size branch take-offs from pipe mains.

2. Provide a welding tee and reducer fitting at branch connections that are one size smaller than the main. Reducing tees may be used.

3. When the branch pipe is at least two sizes smaller than the main pipe, the branch may be saddled to the main on 2-1/2" diameter and larger pipes.

4. Slip on flanges or weld neck flanges are permitted.

5. Omit back-up rings specified for each joint in welded pipe sizes 2-1/2" and larger.

2.5 CONNECTIONS TO MISCELLANEOUS EQUIPMENT

A. Due to the fact that the manufacturer of the equipment purchased may vary slightly from that specified and therefore requires some rearranging or equipment different from that indicated on the drawings, the Contractor shall make connections to such re-arranged equipment without additional cost to the Owner. That is for an initial installation arrangement other than that indicated on the drawings.

B. This Contractor shall make all water, waste, vacuum, air, carbon dioxide, vent, gas, steam, condensate return hot water heating and ductwork connections to all equipment that is installed for this project, whether or not such equipment is furnished by this Contractor, other contractors, or by the Owner. This includes furnishing and installing pipe, shutoff valves, unions, fittings, ductwork, air control devices and insulation.

C. The unpacking, assembling and setting of equipment furnished under other than mechanical sections of these specifications, will be performed by than this Contractor. This list includes, but is not necessarily limited to the following which are listed in the General and Electrical sections of the specifications and/or Architectural and Electrical Drawings.

1. Linear diffusers, registers, grilles, integral with ceiling components.

2. Louvers.

3. Owner furnished equipment. Section 01010.

4. Generally, connection types and sizes are described in the above lists and/or shown on the drawings.

D. The Mechanical Contractor shall coordinate work between the various trades to insure proper installation and operation of all systems. The following list is presented to assist the Mechanical Contractor with coordination and shall not be considered as inclusive for all coordination required.

1. Reheat coil connections.

2. Diffusers, Registers and Grilles.

3. Items listed in Paragraph (C).

PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1, General Requirements and Section 15010 General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. These conditions supplement provisions of General Conditions and Division 1.

1.2 SHOP DRAWINGS AND EQUIPMENT BROCHURES

A. Refer to and comply with Section 01300.

1.3 DRAWINGS

A. In general, the drawings of the mechanical systems and equipment are to scale. However, to determine exact locations of walls and partitions, the Contractor should consult the architectural and/or structural drawings. Drawings shall not take precedence over field measurements.

B. Plans of piping and ductwork although shown on scale drawings are diagrammatic only. They are intended to indicate size and/or capacity where stipulated, approximate location and/or direction, and approximate general arrangement of one phase of work to another, but not the exact detail or exact arrangement of construction. If it is found, before installation of any or all construction phases, that a more convenient, suitable or workable arrangement of any or all phases of the project would result by varying or altering the arrangement indicated on the drawings, the Architect/Engineer may require the Contractor to change the location or arrangement of his work without addition cost to the Owner, in accordance with directions from the Architect/Engineer.

C. Where discrepancies are discovered after certain portions or phases of any contract have been installed, the Architect/Engineer reserves the right to require the Contractor to make minor changes in pipe, duct, fixture, or equipment locations or arrangement to avoid conflicts with other work at no additional cost to the Owner.

D. Because the drawings are to a relatively small scale to show as large a portion as is practical, the fact that only certain features of the system are indicated does not mean that other similar or different features or details will not be required. Contractor shall furnish all incidental labor, material or equipment for the systems in their control so that each system is a complete and operating one unless otherwise specifically stipulated in the detailed body of the specifications.

E. In general, pipe lines requiring drainage shall be laid out at the site first, then large pipe mains, then space for air ducts, then electrical conduit. The Mechanical Contractor shall provide extra stub risers, drip-trap-and-rise installations, and drip and trap assemblies at low points in steam systems as may be required; air vents, rises and drops in forced hot water mains as may be required; and extra lengths and fittings in all phases as may be required to install all systems in the space available and as necessary to avoid interferences.

1.4 CONNECTIONS AND LAYOUT

A. It shall be the responsibility of this Contractor to make connections at terminal points of contract. The piping, ducting and equipment, etc., may be shown with excess clearances for clarity. However, the Contractor shall group pipe and arrange all ducts and equipment to present a neat and workmanlike appearance and to avoid blocking of passageways.

B. Contractor shall arrange for and pay for all costs involved in the extending, rerouting and connecting to the existing systems. The Contractor shall apply for and include in his bid all fees, city inspection charges, permit charges, (except permits paid by University - see Section 01010) work charges, etc., when required at time of Owner's signing for same.

1.5 SERVICE INTERRUPTION

A. This Contractor shall schedule his work in such a manner that he does not interrupt any services to any University of Minnesota buildings unless authorized by the University. Refer to and comply with requirements of General Conditions, and Division 1.

B. Any service interruptions to a building, or portion of a building shall be cleared and scheduled with the University prior to the interruption.

C. Mechanical Contractor shall schedule with the University of Minnesota when new branch ducts or piping are to be installed over existing work space ceilings so as not to interfere with users' work schedule.

D. Sprinkler Contractor shall coordinate with Electrical Contractor so as not to shut down the sprinkler system when the electrical fire protection system is shut down temporarily during construction.

E. The fifth floor fire sprinkler system shall be the only floor that should be shut down. If other floors are to be shut down the University of Minnesota Fire Management shall be notified in advance.

1.6 MAINTENANCE AND OPERATING INSTRUCTIONS

A. Refer to and comply with Section 01700 requirements. The Contractor shall prepare a portfolio, as soon as possible after equipment has been ordered, of all mechanical equipment furnished by him on the project. The portfolio shall include manufacturer's shop drawings, parts lists and operating and maintenance instruction of such equipment. Information shall be submitted in triplicate,

E. Also included in this work are connections including shut-off valves, pressure reducing valve, unions, double check valves, open wastes and traps.

1. Make up supply water to:

a. Miscellaneous equipment.

b. Room connections and drains from overflows and units.

2.6 ELECTRIC MOTORS AND WIRING

A. Motors

1. Furnish electric motors as required for each motor driven unit. All motors must conform in every respect to the standard specifications of NEMA and bear nameplate of manufacturer, with current operating characteristics noted thereon.

a. Horsepower ratings: All electric motors shall be sized to meet the horsepower requirements of the driven unit at design characteristics including all V-belt and/or drive and coupling losses which are incurred without loading the motor beyond its nameplate horsepower rating. Where V-belt drives are employed the motor horsepower nameplate ratings shall not be less than 10% of the driven unit brake horsepower requirements.

2. All motors shall be provided with ball or roller bearings complete with grease cups. Motors shall be quiet when operating under full load conditions.

3. Unless otherwise specified, motors shall be of the induction type and shall be of speeds, sizes and for electric current characteristics as given in this specification. Motors shall be mounted on sliding cast iron bases as required. Motors shall be General Electric, Century, Allis-Chalmers, Westinghouse, and Gould or approved equal.

4. Except as noted motors of 1/3 HP and smaller shall be wound to operate on 120 volts, single phase, 60 cycles, A.C. and motors 1/2 HP and larger shall be wound to operate on 480 volts, 3 phase, 60 cycles, A.C. except where otherwise indicated. Except as noted all motors shall operate at 1750 RPM.

5. All motors furnished with the exception of vane axial fan motors and 2-speed fume hood motors shall be high efficiency type. All motors 1 HP and larger shall have at full load a power factor of 85% or greater. The apparent efficiency at fast load (power factor x efficiency) will meet or exceed the values in the following table when motors are tested to IEE test procedure 112A, Method B.

<u>HP</u>	<u>Apparent Efficiency</u>
1	66.9%
1-1/2	69.7
2	70.6
3	71.9
5	73.4
7-1/2	74.4
10	75
15	75.9
20	76.5
25	76.8
30	78.1

6. All Mechanical equipment using motors 1/2 HP and larger shall have listed with shop drawing information:

- a. Motor efficiency at various loads.
- b. Motor power factor at various loadings.
- c. Recommended overload protection.
- d. Recommended power factor correction to a minimum of 90% power factor

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010, General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes performing all labor and furnishing all piping materials, fittings, joining methods, protection and pressure for piping used on this project to connect all fixtures and equipment, pipe and fittings of material and type for various services as listed below:

C. Related work specified elsewhere:

1. Basic Materials and Methods: Section 15100.

PART 2: PRODUCTS

2.1 PLUMBING PIPE AND MATERIALS

A. At all fixture connections where nipples are necessary between copper tubing and fixtures, such nipples shall be standard weight full iron pipe size brass pipe nipples with suitable brass or copper adapters. Steel or iron nipples will not be permitted at any location in copper lines where connections are made to brass fixture valves or trim.

1. Water Piping

- a. Above-ground Piping: All water lines shall be Type "L" hard drawn ASTM B88-58, with soldered joints and fittings. For 2" and larger size pipe on cold, 140 degrees F hot and 140 degrees recirculating hot water and all sizes on 180 degree F hot and recirculating hot water all soldered joints shall be made using silver solder with Sil-fos, Eutectic 1800, or approved equal. For 1-1/2" and smaller size pipe on all cold, 140 degree F hot and 140 degree F recirculating hot water, all soldered joints shall be made using 95/5 solder with No. 50 non-corrosive flux.

2. Waste Piping

- a. Pipe - Service Weight cast iron (above-grade in building). Piping under 2" shall be Schedule 40, galvanized steel with screwed joints.

- b. Fittings - same material as pipe.

- c. Joints caulked.

d. Hubless cast iron soil pipe and fittings are permitted. Mechanical joints for hubless cast iron system shall be made by using neoprene sleeve and stainless steel clamps as specified in CISPI Standard 301.

3. Vent Piping

a. Pipe - Schedule 40 galvanized steel with exception that urinal vents shall be cast iron.

b. Fittings - cast iron.

c. Joints - screwed, caulked.

2.2 HEATING PIPE AND MATERIALS

A. The Contractor shall furnish and install all pipe indicated on drawings and other small pipes to indicated but necessary for proper operation.

1. Hot Water Heating

a. Pipe - Schedule 40 A-53 seamless black steel or A-53 ERW pipe, 2" and larger. Pipe 1-1/2" and less shall be A-53 butt weld.

b. Fittings - up to 2" - "XH" cast iron screwed. 2-1/2" and larger same as for steam piping.

c. Joints - welded or screwed.

d. Welding Neck Flanges - Tube Turn #30, 150# class.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 - General Requirements and Section 15010 General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installing all valves where shown on the drawings and where necessary for proper control of equipment.

C. Related work specified elsewhere:

1. Basic Materials and Methods: Section 15100
2. Piping Specialties: Section 15130
3. Mechanical Support Devices: Section 15140

PART 2: PRODUCTS AND INSTALLATION

2.1 GENERAL

A. All valves shall have name or trademark stamped or cast into body. All valves shall be designed for a minimum of 150 pounds working pressure unless otherwise noted, but figure numbers may indicate greater pressures.

B. Valves of Powell, Stockman, Walworth, Lunkenheimer, Crane, Sarco, Mueller, Ohio, Hoke, Jenkins, Nibco-Scott, Hammond, Rockwell Nordstrom, RP&C, or Hancock manufacture will be accepted.

C. Of the manufacturers listed, the Contractor is requested to standardize on one make as much as practical but not to the extent of sacrificing quality listed.

D. Provide positive dead-end shut-off valves at all pieces of equipment. Valves shall be individually supported so that equipment can be removed and piping system can remain unstressed and in operation.

2.2 VALVE SCHEDULE

A. Domestic Water Valves

1. Valves 2" and smaller size shall be screwed brass body, 150# WSP, rising stem, solid wedge disc gate valve, Crane #431 UB, or Ohio 7150.

2. Valves 1" and smaller may be Apollo series 70-100 or approved equal, bronze ball valve with blow-out proof stem, chrome plated ball with large size port, teflon seats and stuffing box rings. Capacity index for these valves shall be 9.8 for 1/2" size, 18 for 3/4" size and 32 for 1" size. For solder joint valves, use Apollo series 70-200 or approved equal ball valve with externally replaceable stem, chrome plated ball with large size port, teflon seats and stuffing box rings. Capacity as noted above. Valves for insulated piping shall have 1-1/2" stem extension. All valves shall have steel lever handles with vinyl grip.

3. Valves 2" size on copper water piping may be Walworth #11WS.

4. Install a Sarco Company #1BW or Fairbanks #4502 combination balancing valve and shutoff valve on all hot water circulating lines. Valves shall be all brass construction for 200 psi working pressure with screwed connections.

B. Hot Water Heating Piping System

1. Gate valves 2-1/2" and over shall have flanged ends, cast iron 125# WSP body, rising stem, OS&Y renewable seat and solid wedge, Powell Figure No. 1793, Jenkins No. 615-A, or approved equal. All gate valves in condenser water system that are located in basement shall have cast iron 250# flanges.

2. Gate valves 2" and under shall have screwed ends, bronze 150# WSP body, rising stem, solid wedge, Crane No. 431 UB, Stockham No. B120.

3. Valves on branch and mains and shut-offs at reheat coils 1" and smaller may be Apollo Series 70-100 or approved equal, bronze ball valve with blow-out proof stem, chrome plated ball with large size port, teflon seats and stuffing box rings. Capacity index for these valves shall be 9.8 for 1/2" size, 18 for 3/4" size and 32 for 1" size. For solder joint valves, use Apollo series 70-200 or approved equal ball valve with externally replaceable stem, chrome plated ball with large size port, teflon seats and stuffing box rings. Capacity as noted above. Valves for insulated piping shall have 1-1/2" stem extension. All valves shall have steel lever handles with vinyl grip.

4. Balancing valves shall be combination balancing and shut-off type Illinois 4000 or approved equal up to 1-1/4" size and Illinois series 5000 or approved equal from 1-1/2" size up to 4" size. Sarco IBV combination balancing and shut off valves are approved up to 2" size.

5. Check valves 2" and under shall be screwed ends, bronze 125#, WSP body, Jenkins No. 92, or approved equal. Centerline and Metraflex.

6. Check valves 2" and over shall have flanged ends, cast iron 125# WSP body, Crane #373.

7. Check valves on chilled water and hot water heating pumps shall have flanged ends, semi-steel with bronze trim 125# body center guided silnet check valve, renewable seats and discs, Williams-Hager Type 636, or approved equal.

8. Balancing cocks 2" and smaller shall be Crane #250, 125# W.P. Nordstrom #173, Rockford #350, 175# W.P. on all radiation. DeZurik balancing cocks are equal and approved.

9. Balancing cocks 2-1/2" to 4" shall be lubricated plug type, and shall be Walworth No. 1796 1797F, 175# WOG. DeZurik balancing cocks are equal and approved.

10. Balancing cocks over 4" size shall be lubricated plug type Walworth No. 1718F. 200# WOG or DeZurik Fig. 118.

11. Hot water systems drain valves (riser and low points of mains). All 3/4" size shall be Rockford No. 350, or approved equal, 125#, bronze stem cock with hose end adapter.

2.3 VALVE TAGS

A. All valves not in sight to fixtures or equipment isolated by that valve shall be provided with an approved aluminum, brass or plastic tag. Tags shall be 1/16" thick minimum for metal and 1/8" for plastic and 1.5" diameter (or 1" x 1.5" rect.) Plastic tags shall be P.V.C. or nylon material. Fastening hole drilled 1/4" dia. by 3/8" from edge. Tags shall be stamped for metal and engraved or raised for plastic and numerals filled with contrasting color. Numerals shall be 3/8" high. Fasten to hand wheel with "S" hook. The valve list shall contain the following information.

1. Valve numbers in sequence.
2. Service (with pressure and/or temperature). Identified in accordance with Section 09900.
3. Floor where located.
4. Room number.
5. Nearest column grid intersection.
6. Distance and direction from Item 5.
7. Description and room location of equipment isolated by subject valve. (Abbreviated description of equipment served).

B. The Health Sciences Physical Plant Maintenance and Operations Group will furnish the Contractor with blank forms to be used as a guide for the above requirement.

C. The gate valves on the emergency showers shall be wired open and tagged "DO NOT CLOSE".

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 - General Requirements and Section 15010 General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and section 01010 Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes all piping system specialties required to place the mechanical system in complete working order.

C. Related work specified elsewhere.

1. Basic Materials and Methods: Section 15100.

PART 2: PRODUCTS AND INSTALLATION

2.1 UNIONS AND FLANGES

A. Unions or flanged connections shall be used in piping adjacent to all equipment, valves, etc., as applicable for removal of equipment or to facilitate repairs.

B. On hydronic water piping 2" and smaller furnish and install malleable iron unions, 250# WSP with bronze to iron ground joint.

C. Unions for copper water piping shall be Streamline, or approved equal, ground joint type.

D. All hydronic water piping 2-1/2" and over use 150# forged steel gasket type welding neck flanges, Tubeturn Series 15.

2.2 DIELECTRIC UNIONS AND FITTINGS

A. All copper water piping, copper drainage piping compressed air piping and vacuum piping shall have insulated type unions wherever it contacts iron or steel. This includes copper piping connections to iron or steel valves, tanks, water heaters, and piping. These connections to and including 1-1/2" size shall be Universal insulating union, Series 2000, Styles 3 and 4.

B. The above piping connections 2" and over shall be "Insulket" insulated flange joint as manufactured by Service Engineers, Inc. Gasket shall be sandwich type consisting of a 1/16" layer of Grade XX Industrial Formica bonded between two 1/32" layers of non-graphitized asbestos gasket material. Provide one phenolic sleeve and two phenolic washers and two steel washers for each bolt. Washer shall be provided on each flange. Flange on copper side shall be brass or bronze.

2.3 AIR VENTS

A. Provide and install Sarco 13W or approved equal automatic air vent at top of all hydronic supply and return risers. Air vents shall be installed in accessible locations with a 3/8" discharge pipe run to nearest F.D. or janitor sink. Provide a gate valve and union on inlet to air vent.

2.4 EXPANSION JOINTS, GUIDES, LOOPS AND ANCHORS

A. Provide and install expansion compensators, expansion joints, guides and anchors as required, shown or specified to handle all thermal expansion and contraction in piping systems.

B. Wherever practical, properly installed expansion loops shall be used to compensate for thermal expansion in piping systems. The loops shall be made of dimensions shown, fabricated with long radius elbows and piping of maximum lengths that space permits where dimensions are not given. Loops shall be installed with "cold spring" so that loop in operation will have approximately equal contraction and expansion from fabricated position. Provide guides for loop as detailed on the drawings. Provide lead sheet wrap where copper pipe would otherwise come in contact with steel guide.

C. Wherever loops cannot be employed, the following expansion joints shall be used: Exception: loops may not be used in the high pressure and medium pressure steam lines in vertical risers.

1. Hot Water Plumbing Lines

a. Expansion compensators 1-1/4" and smaller shall be two-ply bronze, externally pressurized with internal duies and internal positive anti-torque devices. Units shall accommodate 1-3/4" pipe line expansion and 1/4" pipe contraction under a working pressure of 150 psi and 250 degrees F temperature. Unit shall have properly located positioning clips to insure installation at correct end-to-end dimensions for full rated traverse. Units larger shall have sweat ends. Compensators shall be rated for a minimum of 12,000 cycle life as manufactured by Flexonics; Model HB, Zallea, Robert Shaw-Fulton or Tube Turn.

D. Anchors and Guides:

1. Anchors and guides shall be provided as necessary as detailed on the drawings. Pipe guides are required on each side of an expansion joint in quantity required by manufacturer. This Contractor shall submit detailed drawings showing stops and guides for all expansion joints and loops. Guides for copper piping shall have lead sleeve for electrolytic isolation.

2.5 FLOOR, WALL AND CEILING PLATES

A. Where uncovered, exposed pipes pass through wall or floors, they shall be fitted with wall or floor plates. Plates shall be at least 1/32" thick, and shall be equipped with set screws for locking around pipe. Plates shall be

finished cast brass chromium plated. Plates shall be set tight against wall or floor.

2.6 PIPE SLEEVES

A. Provide sleeves for all pipes that pass through walls, slabs or partitions. Sleeves shall be set and maintained in place by this Contractor during the progress of the work. All sleeves shall be cut from new material, cut square and reamed.

B. All pipe sleeves through walls, slabs or partitions shall be 1/2" greater in inside diameter than the external diameter of pipe passing through sleeve except for insulated piping where sleeve shall be large enough to allow for insulation on the piping.

C. All sleeves through partition walls shall be Schedule 40 steel pipe extending full thickness of partition and shall be flush with the finished surface.

D. Sleeves through floor slabs for piping where piping or conduit will be exposed shall extend 1-1/2" above finished floor including potentially "wet areas". (Toilets, Laboratory, Showers, Janitor Closets and similar spaces, animal spaces, all equipment rooms, and similar spaces); where concealed, sleeves through the floor shall extend 1-1/2" above finished floor.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1, General Requirements and Section 15010 General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing and installing of hangers and supports as required to install all lines under contract.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Valves: Section 15120.
4. Piping Specialties: Section 15130
5. Mechanical Systems Insulation: Section 15160
6. Vibration Isolation: Section 15150

D. Hangers shall be of proper strength and placed on correct centers to support the lines with no sagging. (See Schedule below). Any additional steel members required to run the pipes or where indicated on drawings shall be furnished and installed by this Contractor.

E. Groups of three or four lines may be supported on trapeze type hangers in a neat evenly spaced manner. Where any piping, over groups of three, are run along walls or tunnels, they shall be racked vertically on side walls to allow maximum clearance space.

F. Pipe hangers and supports may be secured to steel trusses or beams by welding or using toggle expansion bolts, impact type fasteners or through bolts, as conditions require. Grinnel Fig. 66 welded beam attachment shall be used for large diameter pipes.

G. Where hanger attachments are welded to beams or trusses the attachment shall be fireproofed equal to supporting members.

H. Provide and install protective rubber or armaflex type bumper on all hangers that could be dangerous to maintenance personnel.

PART 2: PRODUCTS AND INSTALLATION

2.1 PIPE HANGERS AND SUPPORTS

A. All individual pipes 3" and smaller shall be supported with Grinnel ring type No. 107-R or approved equal; larger pipe shall be supported with Grinnel Co. #260 or approved equal. Clevis hangers as required of sizes to span the insulated pipe. Elcen, Carpenter and Patterson or Fee and Mason of identical type are approved equal. Hangers that support copper pipe shall be copper-plated.

B. Unistrut, Powerstrut or Grinnel vertical and horizontal structural supports shall be used with sufficient anchorage to side walls using inserts and anchor bolts. Any inserts or cinch anchors for pipe hangers shall be furnished and set in place by this Contractor unless otherwise noted.

C. Trapeze hangers and tunnel support systems shall be Unistrut channels at top and wall 8'-0" o.c. Pipe straps shall be Unistrut P2558. Provide for pitch as required. Support members in trapeze hangers shall not be a torch cut. On trapeze hangers provide full circle shield and U-clamp pipes to trapeze. U-clamps shall be Unistrut P-1109 through P-1126.

D. Hangers for insulated piping shall be large enough to encompass insulation and metal shield for same. Provide at hanger points hydrous-calcium silicate insulation in sections 2" longer than hanger shield. Insulation shall have same finish as adjacent covering.

E. Shields shall be provided for all insulated piping at hangers or trapeze bars. Shields for 6" and smaller shall be constructed of 16 gauge galvanized iron. Shields shall be 6" longer than pipe diameter; however, the shielding shall be a minimum of 6" long and a maximum of 18" long. Shields shall completely encompass the covering where pipes are "U"-clamped to trapeze hangers. All other shields shall cover only bottom half of pipe covering.

1. Shields for 8" through 14" pipe size shall be constructed of 14 gauge galvanized steel and shall be 24" long.

2. Shields for 16" and larger pipe shall be constructed of 12 gauge galvanized steel and shall be 24" long.

F. Vertical pipes shall be supported at each floor by riser clamps.

G. Piping subjected to thermal expansion shall be guided at each floor in lieu of riser clamps. An anchor and base support will then be required.

H. Whenever copper piping comes directly in contact with steel support system, and copper plated hangers are not available for use, it shall be this Contractor's responsibility to wrap the pipe with two layers of Minnesota Mining and Manufacturing Company's #33 Electrolytic Tape. The length of tape shall be such to provide 2" overlap on each side of support.

I. Contractor shall consult and cooperate with all other contractors in arrangements of and routing of all supported lines so as to provide maximum clearances, minimum interference and a neat, first-class appearance and accessibility.

J. The following schedule shall be used in establishing distances between supports for steel pipe. When different sizes of pipes are supported on a common hanger, smallest size line shall govern unless an intermediate support is used.

<u>Pipe or Tube Size</u>	<u>Hanger Spacing</u>	<u>Minimum Rod Diameter</u>
1/2" tube only	5'	1/4"
1/2" - 1"	7'	3/8"
1-1/4" - 1-1/2"	9'	3/8"
2"	10'	1/2"
2-1/2"	11'	1/2"
3"	12'	1/2"
4"	14'	5/8"
5"	16'	5/8"
6"	17'	3/4"
8"	19'	7/8"
10"	22'	7/8"
12"	23'	7/8"
14"	25'	1"
16"	27'	1"
18"	28'	1-1/8"
20"	30'	1-1/4"
24"	32'	1-1/2"
30"	34'	1-3/4"
32"	36'	2"
34"	38'	2"

K. The following schedule shall be used in establishing distances between supports for copper pipe. The smallest pipe hung shall determine the distance between hangers where pipes are supported on trapeze hangers.

<u>Pipe or Tube Size</u>	<u>Hanger Spacing</u>	<u>Minimum Rod Diameter</u>
1/2"	6'	3/8"
3/4"	6'	3/8"
1"	8'	3/8"
1-1/4"	8'	3/8"
1-1/2"	9'	3/8"
2"	9'	3/8"
2-1/2"	10'	1/2"
3"	10'	1/2"
3-1/2"	10'	1/2"
4"	10'	1/2"
5"	12'	5/8"
6"	14'	3/4"

L. Pipe hangers and spacing for sewer and waste lines shall be as listed above except that horizontal runs of cast iron and acid resistant piping shall be supported at least once for each pipe section. If glass is used for acid waste piping, the pipe hanger spacing shall be in accordance with the pipe manufacturer's recommendations.

M. Horizontal piping behind laboratory casework shall be supported individually every 6'-0" on Unistrut 13/16" channels with Unistrut standard pipe strap. One hole clamp for piping under 1" o.d. may be used. Contractor shall also provide all channels, framing, fittings, braces, pipe clamps, bolts, nuts, etc. required to install mechanical work that is to be installed.

2.2 UTILITY CORE PIPE AND DUCT SUPPORTS

A. This Contractor may use Unistrut No. U-318 beam clamps with angle and flat clamps for attaching Unistrut channels to provide support for groups of vertical piping in the mechanical utility cores. Z-straps and channels may be used for support between catwalks and floor slabs. Provide shop drawings indicating style, arrangement and usage of this type of support for ones listed.

B. Where known future ductwork and piping is shown in utility cores, care shall be taken to ensure that these spaces are left open in the cores and not eliminated by support systems for present piping and ductwork.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of contract, Division 1 - General Requirements and Section 15010 General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the thermal insulation of all hot and cold piping, ductwork, vessels, equipment and other components of the mechanical systems.

C. Related work specified elsewhere:

1. Basic Materials and Methods: Section 15100.

2. Painting: Section 09900

1.2 DEFINITIONS

A. Concealed insulated surfaces shall mean piping, ductwork and equipment located above suspended ceilings, and in chases.

B. Exposed insulated surfaces shall mean piping, ductwork and equipment located in core shafts, mechanical rooms, tunnels and rooms without suspended ceilings, etc.

C. Mechanical equipment rooms shall be considered as un-airconditioned space for figuring the insulation of return air ductwork.

D. Area above suspended ceilings shall be considered as air conditioned.

PART 2: PRODUCTS AND INSTALLATION

2.1 APPLICATION

A. Insulation shall be applied to clean, dry surfaces with pipe surfaces at room temperature. Insulation shall be butted firmly together. Longitudinal and end joints shall be sealed with compatible jackets, facings and adhesives.

B. Insulation shall be continuous through sleeves and wall and ceiling openings.

C. Metal shields shall be provided under section 15140 for installation at insulated piping hangers.

2.2 INSULATION MATERIALS

A. Insulation materials shall be furnished by Johns-Manville, Owens-Corning Fiberglas, Baldwin-Ehert-Hill, Certainteed Saint Gobain, Gustin Bacon, or approved equal.

B. Adhesives, mastics and coatings shall be furnished by Benjamin Foster (B.F.) Insul-Coustic (I.D.), Chicago Miastic (CMC) or approved equal.

C. All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E-84, NFPA 255 and UL 723. Flame spread rating shall not exceed 25 and smoke developed rating shall not exceed 150. Accessories such as adhesives, mastics, cements, tapes, glass fabric and asbestos cloth for fittings shall have the same component ratings. At cold piping as stated in Article 2.4 a 1/2" thick FR Armaflex with a flame spread of 25 and a smoke developed rating of 150 will be acceptable.

D. Calcium silicate rigid inserts shall be installed at all outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of equal thickness to the adjoining insulation and shall be provided with vapor barrier where required. Insulation inserts shall not be less than the following lengths:

1/2" to 2-1/2" pipe size	12" long
3" to 6" pipe size	15" long
8" to 10" pipe size	18" long
12" and over pipe size	24" long

E. P.V.C. Insulated Fitting Covers: Fittings where indicated herein shall be finished with preformed fitting covers equal to J.M. Unifit, Zeston or Speed Line.

2.3 JACKETS AND FACINGS

A. Where a jacket is specified, the insulation jacket for fiberglass insulation shall be an all service jacket. Jackets and end laps shall be sealed with Insul-Coustic 215 adhesive or Chicago Mastic 17-465 adhesive applied to two surfaces or with self-sealing type lap system.

B. Insulation on all cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal.

C. All exposed hot piping such as steam vents and reliefs and emergency generator and diesel fire pump exhaust shall be metal jacketed equal to Johns-Manville Metal-Loc, of insulation thickness as hereinafter specified.

2.4 COLD PIPING (and Domestic Hot Piping, etc.)

A. Domestic cold water and water service inside building, soil and waste piping located in soffits to a point 3 feet inside building, waste piping from drinking fountain and flushing rim floor drains to vertical stack, horizontal downspout

offset including 1' above and 1' below horizontal, horizontal pipe from drains receiving condensate from cooling coils and horizontal pipe (and vertical piping where shown) from drains serving outdoor air intake, area drains and exhaust plenums.

B. Domestic cold water and hot water, and recirculating hot water less than 1" pipe size, waste piping from drinking fountains to horizontal main. Insulation shall be flexible foamed plastic tubular pipe insulation. Minimum density 6 pounds per cubic foot.

<u>Insulation Material</u>	<u>Insulation Thickness</u>
FR Armstrong Armaflex (or approved equal)	1/2"

The pipe or tubing may be insulated wherever possible by slipping the molded insulation over the lines. Lines already connected shall be insulated by slitting the tubular insulation section and applying them around piping or tubing. All butt ends and longitudinal joints shall be sealed with O.C. 500, JM 57, Armstrong 520, C.M.C. 17-462. All fittings shall be insulated with fabricated sections of tubing insulation nesting sizes mitering joints and sealing with adhesive. Vapor barrier adhesive shall be applied to all seams and joints sealed in accordance with the manufacturer's recommendations to obtain proper adhesion. Where flexible foamed plastic tubular insulation is used, the section at each pipe hanger shall be rigid foam plastic of the same thickness and manufacturer as the adjacent insulation. Inserts shall be installed in such a manner to completely support the pipe and not crush the insulation or damage the vapor barrier. Underground nitrogen pipe insulation shall be covered with a weathertight sealed jacket per manufacturer's recommendations.

C. Domestic hot and cold water and recirculating hot water greater than 1" pipe size.

<u>Insulation Thickness in Inches for Pipe sizes</u>	
1-1/4" - 3"	4" and over
1"	1-1/2"

The insulation shall be sectional type fiberglass pipe insulation and shall have an average thermal conductivity not to exceed .23 BTU inch per square foot per square foot per degree F. per hour at 75 degrees temperature. Insulation shall be 3#/cu.ft. Exposed and concealed piping shall have all service jacket. Fittings, valve bodies, flanges, etc. shall be insulated with fabricated insulation of the same material and thickness equal to adjoining pipe insulation (mitered pipe insulation segments) secured with 3 ply jute twine and finished with one coat of mineral fiber cement). Apply P.V.C. cover over fittings with C.M.C. adhesive 17-465 on the throat and secure it with adjacent pipe covering. Further secure with two wraps of 1-1/2" wide Unifit tape. Stapling of vapor barrier jacket will not be allowed. Exception to above is that all insulated water and waste piping in chases behind casework may be the contractor's option

be insulated with 1/2" flexible foamed plastic insulation similar to Armstrong FR "Armaflex".

2.5 HOT PIPING

A. Hot water reheat supply and return in exposed and concealed areas, hot water radiation supply and returns in exposed and concealed areas, safety relief valve vents and vapor vents.

B. All reheat coils piping, domestic hot and recirculating hot water piping, and relief valve vent piping shall be insulated.

C. The insulation shall be a sectional type fiberglass pipe insulation of 3 lb. per cubic foot density suitable for temperatures of -60°F. to +450°F. and having an all-service jacket cemented on. Fittings, valve bodies and flanges on piping 3" and smaller shall be insulated with JM-301 or equivalent cement equal to thickness of adjacent pipe insulation. Over 3", fittings shall be insulated with mitered segments of pipe insulation secured with #16 gauge copper wire. A finish coat of #301 cement shall be applied over segments. Apply Unifit or Zeston cover with CMC adhesive 17-465 on the throat and secure it to adjacent pipe covering. Further secure with two wraps of 1-1/2" Unifit tape.

D. Insulation shall be of the following thickness:

1. Hot Water

- a. Temperature of 100° to 140°F.
3" and smaller - 1" thick
3-1/2" and larger - 1-1/2" thick.
- b. Temperature of 150° to 212°F. (includes condensate returns)
3" and smaller - 1-1/2" thick
3-1/2" through 6" - 2" thick
8" and larger - 2-1/2" thick

2.6 DUCTWORK THERMAL INSULATION (EXTERNAL)

A. Thermal insulation shall be applied to supply air, exhaust air, return ducts as specified herein. Insulation shall be fiberglass board insulation, unless otherwise noted.

B. Supply and Return Air Duct Insulation. Apply to all supply ducts to the ends of the duct runs, including diffuser necks, register ducts and diffuser plenums. Do not apply insulation over coil access panels and sound attenuators or on sound insulated ductwork. Refer to Sheet A-4 supply diffuser plenum details.

1. Duct Type, Location and Material

a. Insulation on all supply and return air ductwork exposed and concealed in un-airconditioned spaces shall be 1" internal as specified for sound insulation in Article 2.7 this section.

b. Supply air ducts concealed in air conditioned spaces shall be externally insulated with 1-1/2" blanket duct wrap of 1 lb. density with foil face vapor barrier up to reheat coil.

C. Application of rigid duct insulation. Cut top and bottom pieces to lap side pieces on horizontal runs. Attach the bottom pieces with welded pins and caps on 15" center. Attach the side pieces with welded pins and caps, using two (2) pins not over 18" o.c. per piece insulation. Trowel adhesives on bottom, top, sides of duct in 4" wide strips on 1 foot centers and press insulation firmly in place. Caps shall be fiber washers or sheet metal discs of 1-1/2" diameter. Metal fasteners shall be Omark, Duradyne, or KSM capacitor discharge studs. Insulation adhesive shall be B.F. 85-20, C.M.C. 17-460 or 17-461 or I-C225. On foil faced duct insulation, all joints, pins and caps shall be sealed with B.F. 82-07, C.M.C. 17-465 or I-C225 adhesive over which shall be applied embossed aluminum foil tape in 4" widths so as to result in an unbroken vapor barrier surface and a neat exterior appearance. On vertical ducts, adhesives, pins and caps shall be used on all insulation. All ductwork in exposed areas shall be reinforced with corner bead. Apply tack coat of Benjamin Foster's 30-36 Sealfast.

D. Application of blanket insulation. Insulation shall be adhered to the sheet metal ductwork with B.F. 85-20, C.M.C. 17-460 or 17-461, or I-C225 adhesive applied in strips 4" wide around the duct, pressed firmly into the wet adhesive and shall lap at least 3". The insulation shall be further secured with soft copper wire half-hitched into loops on 8" centers, or at the contractor's option, provide welded pins and caps on 18" centers on bottom and sides of the ducts as specified above for rigid insulation. On foil faced duct insulation, all joints, pins, caps, breaks, edges and cracks shall be sealed with B.F. 82-07, C.M.C. 17-465 or I-C225 adhesive over which shall be applied an embossed aluminum foil tape in 4" widths so as to result in an unbroken vapor barrier surface and a neat exterior appearance. Staples in vapor barrier will not be permitted.

2.7 SOUND INSULATION (INTERNAL)

A. Sound insulation shall be applied to the interior of all supply and return ducts as described in Article 2.6 and all transfer ducts, (1) all supply ducts downstream of reheat coil, (2) in return and exhaust ducts (except fume hood exhaust) for a distance equal to 10 duct diameter equivalents measured from fan inlets back through the duct system. All sound insulation shall be Johns-Manville Lina Coustic, Gustin Bacon UltraLiner, Baldwin-Ehert-Hill FFF90-A, Owens Corning Fiberglas Matface or approved equal, duct liner with a black fire resistant skin surface. Overall density shall be of 1-1/2 to 1-3/4 pounds per cubic foot. Liner shall be 1" thick and rated for velocities of 4000 FPM. Insulation shall meet NFPA Pamphlets 90A and 90B fire-resistant requirements and shall conform to the requirements of UL Pub. No. 181. The sound absorption coefficients shall not be less than the following:

Frequency (CPS)	125	250	500	1000	2000	4000
Absorption Coefficient	.10	.40	.60	.90	.90	.90

B. The insulation shall be applied in fabricated pieces sized to the interior duct surfaces with the black coated surface exposed to the air stream. It shall be firmly held in place with a fire resistant adhesive such as Benjamin Foster 85-10 or 85-20, or approved equal covering a minimum of 100% of the duct surface. In addition, insulation on the top and sides of horizontal ducts and all sides of vertical ducts shall be further secured with Omark, Duradyne KSM capacitor discharge studs and caps, or approved equal, on 15" centers. Dishcharge stud and cap shall be an integral unit so that the stud does not penetrate the cap. Exposed longitudinal edges of insulation shall be coated with a heavy layer of Benjamin-Foster's 60-30 fire resistive mastic, or approved equal, prior to installation in the duct system. Transverse edges shall be covered with a "U" shaped sheet metal protector secured to the duct.

1. Duct sizes listed on the drawings are internal sizes. Where insulation is applied to the inside of the duct, the metal size of the duct shall be increased in amount to result in internal dimensions equal to that shown on the drawings.

2. Where sound insulation is specified and/or shown for ducts which require thermal insulation as specified, the thermal insulation may be omitted on the outside of the sound insulated duct.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnish equipment, materials and performing all labor necessary to connect the domestic water service to the existing systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100
2. Pipe and Pipe Fittings: Section 15110
3. Valves: Section 15120
4. Piping Specialties: Section 15130
5. Mechanical Supporting Devices: Section 15140.
6. Vibration Isolation: Section 15150.
7. Mechanical Systems Insulation: Section 15160.
8. Fire Protection System: Section 15500.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing of all equipment, materials and performing all labor necessary to connect the domestic hot water system to the existing system.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110
3. Valves: Section 15120
4. Piping Specialties: Section 15130
5. Mechanical Supporting Devices: Section 15140
6. Mechanical Systems Insulation: Section 15160.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1, General Requirements, and Section 15010, General Provisions - Mechanical, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements, for requirements and pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing all equipment, materials and performing all labor necessary to connect the soil and waste piping systems and other related systems.

C. Related Work Specified Elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Piping Specialties: Section 15130.

PART 2: PRODUCTS AND INSTALLATION

2.1 GENERAL

A. Floor drain provided under this contract shall be of Josam Manufacturing Company, Jay R. Smith, Wade Manufacturing Company, Zurn Industries, or approved equal, of type and size specified or indicated on the drawings. Except where otherwise specified or indicated, strainer for 2" floor drain shall be at least 5" in diameter. Drain shall have nickel bronze strainer unless otherwise specified. The following numbers are taken from the Josam catalog.

B. Floor drain shall have threaded, spigot or hub outlet as required for proper connection to piping and shall be provided with a trap. Drain installed in connection with waterproofing membrane, copper or lead flashing shall be provided with drainage flange, weepholes and flashing clamp.

C. This Contractor shall provide 16 oz. copper flashing or 8 lb. lead flashing to extend 12" from clamping ring on new floor drain. Existing concrete floor shall be core drilled with opening enlarged as necessary to receive this flashing pan. Floor patching shall be latex patching concrete. Cutting and patching by Mechanical Contractor.

2.2 FLOOR DRAIN IN FLOOR ABOVE GRADE

A. New Service Sink and Janitor Closet - Room No. 105: Josam No. 30000-A cast iron floor drain, two-piece body with double drainage flange; wejloc invertible non-puncturing flashing collar, weepholes, bottom outlet inside caulk

connection; adjustable satin nikaloy round super-flo strainer. Provide Josam 88150-Z-60 series coated cast iron deep seal "P" trap for no-hub connection. Use shallow trap where necessary.

2.3 CLEANOUTS

A. Cleanouts, placed in accessible locations, shall be provided in all drainage lines where indicated on the drawings and where necessary to permit rodding out of the entire drainage system.

B. Cleanout plugs and tees for bell and spigot piping shall have a cast iron body and a Minneapolis pattern cast brass plug. On threaded piping, cleanouts shall consist of a Minneapolis pattern cast brass plug screwed into a suitable fitting. Cleanouts on piping installed in inaccessible furred spaces above inaccessible ceiling shall be provided with extensions to bring cover flush with finished floor.

C. See list below for type of frame and cover to be provided in the floor.

D. All cleanouts shall be Zurn Manufacturing Company of the following figure numbers. Products as manufactured by Josam, Jay R. Smith, or Wade are acceptable.

1. Finished floors of asphalt, vinyl, rubber or other composition: ZN-1400-6, bronze plug cleanout with nickel bronze round frame and round recessed cover.

2. Finished floors of terrazzo or cement: ZN-1400-10 bronze plug cleanout with nickel bronze round frame.

3. Finished floors with ceramic or quarry tile finishes: ZN-1400-3 bronze plug cleanout with nickel bronze square frame and round cover.

4. Unfinished floors and traffic areas: Z-1420-25 bronze plug cleanout with cast iron frame, heavy duty cover and anchorage lugs.

5. Walls: Wall cleanout plugs in finished walls shall be Fig. ZN-1440-3 with square access covers. Wall cleanouts in unfinished walls shall be Fig. ZNANB-1460-8 cleanout plug and housing with secured round access cover.

6. Carpeted rooms: ZB-1400-14 bronze brass countersunk plug, round brass scoriated cover flush with concrete floor. Carpeting shall be continuous over cleanout and shall be marked by a single chrome-plated round head screw protruding through the carpet and screwed through the center of the brass cover.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing of all equipment, materials and performing all labor necessary to connect the plumbing fixtures, trim and other related systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Valves: Section 15120.
4. Piping Specialties: Section 15130.
5. Mechanical Supporting Devices: Section 15140.
6. Mechanical Systems Insulation: Section 15160.

PART 2: PRODUCTS AND INSTALLATION

2.1 GENERAL

A. Furnish and install fixtures and trim of first grade quality and finish, free from flaws and scratches. All fixtures shall have ground backs. Groups of fixtures shall be matched. Fixtures and trim are to be furnished as listed and shown under catalog numbers, unless otherwise noted and described.

B. The following fixtures are taken mainly from the Elkay and Halsey Taylor catalogs to designate type of fixtures desired. Fixtures of similar type and grade may be used in place of those specified, all subject to Engineer's approval. Just, Haws, and Carlton are approved.

C. All faucet, loose key stops, and flexible tube risers listed shall be Chicago Faucet Company. All fixture supplies shall be supplied with loose key stops.

D. Trim of similar type and grade may be used in place of those specified, all subject to Engineer's approval.

2.2 FINISH OF TRIMMINGS

A. All exposed waste and supply pipes at the fixtures shall be chromium plated brass pipe, iron pipe size. The faucets, stops, valves, traps, etc., shall be heavy cast brass, chromium plated. All chromium plate shall be applied over a nickel plated base.

B. Provide a bead of caulking around each wall hung plumbing fixture.

2.3 FIXTURES SUPPORTS

A. Fixtures hung from partitions, finished one side only, are to be supported as the type of fixture may demand, either with bolts extending directly from the fixture or from bolts extending from the fixture hanger, entirely through the partition. Bolts shall be welded to a steel plate, set plumb, on the opposite side of the partition and securely anchored. End of bolts or rods shall have C.P. cap nuts.

B. Fixtures hung from partitions finished both sides, the fixture shall be hung in a like manner mentioned above, except that anchor plates shall be placed within the partition and securely anchored. End of bolts or rods shall have C.P. cap nuts.

C. Anchor bolts for supporting plumbing fixtures shall be the sole responsibility of the Mechanical Contractor. He shall furnish the bolts and/or anchorage and shall be solely responsible for the correct location of the bolts. All anchors are to be placed as the walls are being laid up to avoid drillings.

D. All anchor holes in the fixtures are to be utilized.

2.4 CLEANING

A. After fixtures and trim are installed, place suitable guards on fixtures and trim to prevent use and protect from paint and plaster during construction. Prior to final inspection, clean off all labels and remove any construction dirt, rust, paint and plaster.

2.5 FIXTURE ROUGH-IN

A. Roughing-in for waste, vent and supply connections at the various fixtures shall be as follows:

<u>Fixture</u>	<u>Waste</u>	<u>Vent</u>	<u>Hot Water</u>	<u>Cold Water</u>
Service Sink	3"	1-1/2"	3/4"	3/4"
Sink	1-1/2"	1-1/2"	1/2"	1/2"
Electric Water Cooler	1-1/4"	1-1/4"	---	1/2"

2.6 FIXTURE MOUNTING HEIGHTS

- A. Fixture mounting heights shall be as shown on the architectural drawings.
- B. Note special rough-in heights for handicapped.

2.7 PLUMBING FIXTURE SCHEDULE

A. The fixtures listed herein refer to fixture numbers noted on the drawings. A continuity is established between the fixture number used on this project and those used on the existing Unit B/C, previous Unit B/C Phase II, Phase III, Phase IV, Phase VI, Phase V Stage 1, Stage 2, Stage 3, Phase XI, and Phase XIII Projects. Where fixture and trim are identical, the fixture number from the original project shall be used. A new number is assigned to all new combinations of fixture and trim.

Item F-4B Electrical Water Cooler - (Wall Hung)

Electric Water Cooler: Halsey Taylor WC7A-1 Unit shall deliver 7 G.P.H. of 50° water at 90° ambient and 80° inlet water; all stainless top and cabinet; two stream mound building projector; right and left hand operation; separate valve and diaphragm automatic stream regulator shall be mounted within cabinet. Compressor shall be hermetically sealed with start capacitor; system controlled by primary and secondary protection thermostats. Concealed hanger.

Supply: 3/8" I.P.S. connection with 3/8" I.P.S. flexible tube riser with loose key stop.

Waste: Removable grid strainer plate; 1-1/4" O. D. slip connection with 1-1/4" tailpiece.

Trap: 1-1/4" I.P.S. slip connection trap is furnished with unit. All drain piping to be concealed.

Item F-5 Janitor Receptor

Receptor: Concrete receptor to be furnished by General Contractor. Floor drain shall be furnished by Mechanical Contractor as specified in Section 15260 for above grade installations.

Trim: Chicago Faucet Co. 897 Quatern combination sink fitting with vacuum breaker, 3/4" hose thread on spout, No. 369 handles with adjustable wall brace, pail hook and No. R 1/2" flanged female adjustable arms with integral stops. Polished chromium plated. Center line of faucet to be mounted 48" above floor.

Item F-6J Sink

<u>Sink:</u>	Elkay LR-1922	19" x 22" (16" x 16" x 7-1/2") single compartment, 18 gauge, type 302, self rim, stainless steel sink, 3 faucet holes, undercoating.
<u>Trim:</u>	Chicago Faucet Co. 785-E3-633	Hi-Lite Quatern fitting with No. 633 cross handles and No. GN-1A-E3 Rigid/Swing gooseneck spout and E3 Softflo outlet.
<u>Supplies:</u>	Chicago Faucet Co. No. 442-LK	Slow compression angle stop with lock shield cap and No. 293-6 loose key handle; 1/2" I.P.S. female inlet and outlet; polished chromium plated.
<u>Waste:</u>	Elkay No. LK-35	Standard duo strainer; fits 3-1/2" opening; 4-1/2" top diameter; stainless conical basket with neoprene stopper; C.P. brass, 1-1/2" O.D. tailpiece.
<u>Trap:</u>	American- Standard No. 4403.010	Adjustable cast brass P-trap with tubing drain to wall: 1-1/2" inlet; 1-1/2" outlet; swivel joint; cleanout plug; slip inlet; escutcheon; chrome finish.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. In general, the system is rated as light hazard and coverage is limited to 225 square foot per head. Work under this section includes removal of upright sprinkler heads in existing unfinished shell spaces and installation of new recessed heads in the finished spaces covered by this Project. This includes the necessary sprinkler piping as shown on the the drawings and as specified below. New piping shall be extended from existing branch line after removing existing heads. Where necessary, extend piping from existing plugged cross. The entire sprinkler layout shall conform to the reflected ceiling plan as shown. If additional heads are required to meet NFPA 13 they shall be included as a part of this contract at no additional cost and following the pattern shown. Ceiling contractor, architectural representatives and sprinkler contractor shall coordinate all ceiling sprinkler layouts before installing any piping. Submit ceiling plan marked as shop drawing plan for approval. The sprinkler heads as laid out and installed must meet or exceed NFPA requirements.

1. Existing sprinkler heads being removed shall be turned over to Owner in good condition.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Piping Specialties: Section 15130
3. Mechanical Supporting Devices: Section 15140

PART 2: PRODUCTS AND INSTALLATION

2.2 PIPE AND PIPE FITTINGS

A. Fire Sprinkler System - within building:

1. Pipe:

a. Steel Pipe: Electric resistance welded and seamless - black or hot dipped (galvanized) ASTM-210, Schedule 40, ASTM A-135, Schedule 10; and ASTM A53.

2. Fittings: 125 lb. standard weight cast iron screwed for pipe 2" and smaller, or standard weight steel welding fittings, ASTM Specification A-234.

3. Joints: Screwed, welded or cut groove methods are approved for Schedule 40. Welded or roll groove method approved for Schedule 10. Victaulic, Groovagrip and Rollagrip are approved couplings. "Strap" type of mechanical tee for branch connection is not approved.

2.2 SPRINKLERS

A. Sprinkler heads to be of the automatic type with fusible link, deflection and frame, of the pendant type as noted on plan, equal to Star Model "E" flush pendent.

B. Sprinkler shall be spray type 165°F. temperature rating.

C. Sprinkler mounted in ceilings in finished spaces shall be chrome plated except as noted otherwise.

2.3 INSTALLATION

A. The sprinkler work shall conform to NFPA standards, the City of Minneapolis and the insurance company have jurisdiction. All work required for respective systems shall be performed by workman skilled this trade. All work shall be neat and piped in a workmanlike manner. Piping shall be run in strata provided with no interference with other trades.

B. University of Minnesota Fire Management Personnel shall be notified well in advance of shutting down system during work in space covered by this Project.

C. All required permits for sprinkler system, and related work shall be obtained and paid for by this Contractor.

D. Sprinkler Contractor shall coordinate with Electrical Contractor so as not to shut down the sprinkler system when the electrical fire protection system is shut down temporarily during construction.

E. The fifth floor fire sprinkler system shall be the only floor that should be shut down. If other floors are to be shut down, the University of Minnesota Fire Management shall be notified in advance.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing of all equipment, materials and performing all labor necessary to connect the hot water heating systems and other related systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110
3. Valves: Section 15120
4. Piping Specialties: Section 15130
5. Mechanical Supporting Devices: Section 15140
6. Mechanical Systems Insulation: Section 15160.
7. Mechanical Work for Fire Management and Environment Control Systems: Section 15950.

D. Furnished but not installed under this section:

1. Hot water reheat coils.

E. Installed but not furnished under this section:

1. Control valves for reheat coils.

PART 2: PRODUCTS AND INSTALLATION

2.1 REHEAT COILS - HOT WATER

A. Furnish all non-ferrous tube and fin extended surface hot water reheat coils. Coils shall be McQuay, Dunham-Bush, Trane or Bohn, with flanges for mounting in ductwork.

B. Coils shall be one or two rows deep, with 5/8" O.D. tubes ARI rated 9 fins per inch maximum, with at least 17 square feet of external fin surface per

surface foot of face area per row. The majority of the coils shall be single tube serpentine or header type and shall be used as required to meet capacity and pressure drop requirements based on 55°F entering air. Coils shall be of nominal face dimensions and of minimum face area as indicated in the schedules and they shall have capacities as indicated when using water from 195° to 165°F.

C. Coils shall be tested for 150 psig working pressure with copper return bends brazed into tubes on both ends with copper to IPS adapters brazed to the length and not higher than 13" may be built of 20 gauge galvanized iron with 1" length wide flanges.

D. Water friction shall not exceed 8.0 feet of head in each coil. Air pressure drop shall not exceed .25 inches W.G. This Contractor shall tag all reheat coils and distribute them near the correct location for installation in the duct system as covered under Section 15800. This Contractor shall furnish complete information to the Ventilation Contractor regarding proper setting of the coils in the duct system.

E. See Ventilation Schedules on drawings for reheat coil data.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing of all equipment, materials and performing all labor necessary to connect the ventilation and air conditioning systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Mechanical Supporting Devices: Section 15140
3. Vibration Isolation: Section 15150.
4. Mechanical Systems Insulation: Section 15160.

5. Mechanical Work for Fire Management and Environment Control Systems: Section 15950.

D. Installed but not furnished under this section:

1. Water reheat coils.
2. Smoke control dampers.

PART 2: PRODUCTS AND INSTALLATION

2.1 SHEET METAL WORK

A. All ducts shall be constructed from zinc-coated iron or steel sheets unless listed otherwise, and they shall conform accurately to the dimensions indicated on the drawings. All ducts shall be installed in accordance with the recommendations of the latest edition of the ASHRAE Handbook (1975 Equipment Volume) Chapter on Air Duct Design. Gauges of metal and reinforcing shall be in accordance with the tables as follows:

- Table #4 Low Pressure Ducts - Supply Ducts
Table #4 Low Pressure Ducts - Return and Exhaust Ducts

Relief and exhaust air ducts at the point of entering or leaving the building, ductwork containing duct humidifiers, and any point where moisture can collect, shall be soldered absolutely water tight.

B. All joints on supply air duct work shall be sealed with 3M Brand Sealer EC-900, or approved equal, with application, according to manufacturer's recommended procedure.

C. Flat areas of duct over 18" in either dimension shall be cross broken. Cross breaking is not required if the ducts are insulated.

D. All ductwork shall be run substantially as shown on the drawings. However, where conflicts occur with other trades, the Architect/Engineer reserves the right to require the Contractor to make minor changes in duct locations. Whenever possible, ducts shall be run close to beams or floor slabs above, and where two or more ducts cross each other they must be arranged in such a manner as to get the greatest possible clearances underneath. This Contractor shall avoid running ductwork in the plumbing or electrical strata. This Contractor shall not cover service panels or electrical outlets.

E. Where sound insulation is specified and/or shown for ducts, they shall be constructed so the sizes shown on the drawings are the dimensions inside the insulation. A reduction in duct area because of the installation of sound insulation will not be permitted.

F. All horizontal ductwork shall be securely anchored to the building construction in a manner to be free from vibration and swaying under all conditions of operation. Hangers for ducts smaller than 30" x 15" shall be supported with trapeze hangers, consisting of galvanized steel straps metal screwed to the duct in accordance with the following schedule.

<u>Strap Size</u>	<u>Duct Size</u>	<u>Hanger Spacing</u>
18 ga. x 1" W	Up to 17" x 11"	8'-0" o.c.
18 ga. x 1" W	18" x 12" to 30" x 15"	6'-0" o.c.

Ductwork larger than 30" x 15" shall be supported with trapeze hangers consisting of rods and angles. Rivets or bolts shall be used for attaching hangers to ductwork.

G. All vertical duct risers that pass through floors shall have supporting angles that shall be securely fastened to ducts with rivets (no screws) attached to the ducts with the angles supported on adjoining floor or beam construction in an approved manner. Angles shall be galvanized and shall be placed on at least two sides of the duct.

<u>Angle Size</u>	<u>Duct Size</u>
1-1/2" x 1-1/2" x 18"	36" x 18"
2" x 2" x 1/8"	48" x 24"
2" x 2" x 3/16"	Larger than 48" x 24"

H. The minimum duct size shall be 6" x 6". Curved elbows shall have a centerline radius equal to 1-1/2 times the width of the duct. Where space conditions prevent the curved elbows specified above and/or where square turns are indicated on the drawings, the Contractor shall use multi-type turning vanes, such as "Ducturns" or he may construct the vanes to conform with the following requirements. Changes in size throughout shall be of perfect rectangular cross section. Vanes shall be well-braced and rough or raw edges shall be avoided to the same gauge as the duct in which they are installed. Vanes shall be pre-assembled on runners before being installed in the elbow. Vanes shall conform to the following table:

<u>Duct Width Inches</u>	<u>Vane Spacing Inches</u>	<u>Inside Blade Radius Inches</u>	<u>Outside Blade Radius Inches</u>	<u>Runner Width Inches</u>
Up to 25"	1-1/2 centers	2	1	5
Above 25"	3-1/4 centers	4-1/2	2-1/4	9

I. All branch take-offs, from the main shall be of the "divertor" type.

J. Backdraft dampers shall be constructed of rolled aluminum leaves, 16 gauge, attached to steel rods supported in a steel frame. Dampers shall be provided with position indicators. Each leaf of the shutter shall be edged with a neoprene strip tightly folded into the metal to prevent "rattling". All leaves shall be linked together to operate as a unit.

K. Provide protective rubber or armafex type bumpers on all hangers and corners of ducts that could be dangerous to maintenance personnel.

2.2 VOLUME, AIR FLOW DEVICES AND BALANCING DAMPERS

A. This Contractor shall furnish and install the required air devices necessary to produce the specified air volumes without excess air resistance or noise. Volume dampers shall be installed at all diffuser and register take-offs, (exhaust, supply and return).

B. Butterfly dampers shall be installed at all branch take-offs or in trunk ducts at branch take-off locations. Dampers shall be reinforced to prevent vibration, and shall be equipped with approved damper rods, quadrants and locking devices. Quadrants shall be marked to indicate damper position. Where ducts are insulated, quadrants shall be set to finish flush with insulation. Up to and including 3 square feet duct area, use one butterfly damper, from 3 square feet duct area up to and including 6 square feet duct area, use two butterfly dampers each with locking quadrants. Over 6 square feet duct area use opposed blade dampers with standard channel welded frame and oilite brass bearings. Maximum blade width shall be 6". Splitter dampers shall be used only for conditions described on symbol sheet and where specifically shown on drawings.

2.3 ACCESS DOORS, PANELS AND CLEANOUTS

A. Where reheat coils, motorized dampers, fire dampers (new and existing), control equipment, etc., are installed in ducts, provide access panels made air tight with gasketed edges. Access panels shall be detailed on the drawings. Provide access doors between obstructions at each change of direction and/or not more than 20'-0" o.c. on horizontal ducts and at the bottom of each duct riser. Access doors shall be sized in accordance with equipment maintenance and duct cleaning requirements of the system. Additional access panels beyond those on the drawings shall be installed to fulfill this spacing requirement. Use Ventlock sponge rubber gasketing material. The panels shall be double wall construction with 1" of rigid insulation fill and shall be attached to the duct with cam latches. Omit access panel insulation and double wall construction if ducts are not specified to be insulated. For other than reheat coils the access panels shall be of adequate size to permit maintenance of the equipment. For reheat coils the access panels shall be installed on the side of the duct so that the coil and valves can be serviced through one ceiling access panel. The duct panel shall be at the air inlet side for coil cleaning and shall be sized as follows:

<u>Reheat Coil Depth</u>	<u>Access Panel Size</u>
6" to 15"	10" W. x (coil depth - 2") D.
15" to 21"	12" W. x (coil depth - 2") D.
21" and above	18" W. x (coil depth - 2") D.

B. Normally coil access panels shall be installed on the sides of ducts. However, where pipes, conduit, etc. interfere with easy access, panels may be installed on the bottom of the duct. The Contractor shall secure the Architect's permission before using bottom mounted panels.

C. See paragraph 2.11 for access panels at fire and motorized smoke dampers.

2.4 FLEXIBLE DUCT

A. Flexible insulated ducts shall be a factory assembled unit, with spin-on fitting with integral volume damper with locking quadrant device for connection to the branch duct and a downstream coupler specifically designed to lock in to the coupler collar furnished on the air diffusers or registers. This collar must be verified with units furnished with the ceiling system.

B. Flexible duct connections shall be made with factory pre-insulated duct. Outer jacket shall be fiberglass reinforced aluminum copolymer vapor barrier, then covered with 1" fiberglass insulation blanket. Inner core shall be a continuous steel helix encapsulated between layers of aluminum copolymer laminate. The duct must comply with the latest NFPA Bulletin 90A and be listed as Class I Air Duct Material, UL Standard 181. It shall be Type 30A Norflex as manufactured by General Environment Corporation, or approved equal.

1. Flame Spread - Not over 25
2. Smoke Developed - Not over 50

C. Flexible duct assembly shall have a thermal conductivity "K" factor of 0.25 at 75 degrees F mean. Assemblies shall be constructed for conveying air at 250 degrees F at a maximum velocity of 2400 F.P.M. and 1-1/2 inches of maximum internal positive static pressure and 1/2" maximum negative pressure.

D. Assemblies shall consist of insulated duct lengths of 5'-0" with no splices in a run of duct with 45 degrees total bends the maximum that are allowed in the 5'-0" run. The assembly shall have a minimum straight run acoustical attenuation of the following:

Frequency (CPS)	125	150	500	1000	2000	4000
Attenuation (DB)	15	18	17	18	14	9

2.3 REGISTERS, GRILLES, DIFFUSERS AND CONTROL DEVICES

A. This Contractor shall furnish and install all registers, grilles, diffusers and such air distribution accessories indicated, shown and/or tabulated on the drawings, that are necessary to affect uniform distribution of air. All registers, grilles and diffusers furnished by the Mechanical Contractor shall have prime and finish coat as selected by Architect. Draw all air outlet and return devices tight to ceilings and/or walls to eliminate dirt streaking using extra screws if necessary to secure a tight fit. This Contractor shall refer to architectural drawings for type of ceilings and be responsible for proper type of frame for type of ceiling or wall. The various grilles, registers and diffusers are indicated on the plans by alphabetical letters, according to the following schedule. Registers, grilles, diffusers and control devices by Waterloo-Anemostat, Carnes & Krueger and Titus are approved as equal to Tuttle & Bailey as specified.

B. A continuity is established between the identification of the grilles and registers used on this project and those on the original project. Where the item is identical, the identification and description from the original project shall be used. A new identification is assigned to all registers and grilles not used initially on this project. The list of register and grille types follows:

1. Linear supply diffusers, with no alphabetical notation, but noted on plans as 1-way, 2-way, etc. are furnished and installed with the ceiling suspension system. This Contractor shall make air flow adjustment and connections to supply air distribution system with flexible duct.

2. Type 'B' ceiling panels used as 10" x 9" supply, relief, return and exhaust. These units are furnished and installed with the ceiling suspension system. This Contractor shall make air flow adjustment and connection to return and/or exhaust air distribution system. When a panel is used for supply air the General Contractor shall insert a pattern controller into the panel, see Architectural Detail on Sheet A-4. This Contractor shall make connection to supply air distribution system with flexible round duct. See Architectural Drawing A-5. See reflected ceiling plans for exact location of grilles in panel.

3. Type 'C'. Same as Type 'B' except 10" x 16" size. See Architectural Drawing A-4.

4. Type 'D'. Same as Type 'B' except 10" x 23" size. See Architectural Drawing A-4.

5. Type 'E'. Same as Type 'B' except for grille location in panel. See Architectural Drawing A-4.

6. Type 'F'. Same as Type 'B' except for grille location in panel. See Architectural Drawing A-4.

7. Type 'G'. Linear return and/or exhaust register, 1-slot. These units are furnished and installed with the ceiling suspension system. This Contractor shall make air flow adjustment and connections to exhaust or return air system with flexible duct.

8. Type 'H'. Same as Type 'G', except 2-slot.

9. Branch take-off device for butted duct connection, butted registers, etc. shall be Tuttle and Bailey "Vectrols".

2.8 DUCT SLEEVES

A. Furnish and install sleeves at all locations where ducts pass through walls, floors or partitions not fire rated. Sleeves shall be fabricated of 16 gauge galvanized iron with angle iron stiffeners as required to prevent bending.

B. Sleeves shall be 1/2" larger in dimension than the duct passing through and shall be 1/2" larger than through-going insulated duct.

C. Sleeves passing through finished walls, ceilings and partitions shall be set flush with finished surface. Sleeves through floors in exposed and concealed areas shall be extended 1/2" above finished floors.

D. Seal the space between the duct and sleeves with plastic caulking such as Presstite or Dura-Gum. Sleeves shall be set and maintained in place by this Contractor during the progress of the work.

E. Where ducts pass through fire partitions the ducts and sleeves shall be constructed per Paragraph 2.9.

2.9 AUTOMATIC FIRE DAMPERS

A. Furnish and install fire dampers in all ducts where shown on the drawings, where required by the City of Minneapolis, where required by NFPA Pamphlet 90-A, and Minnesota Building Code as indicated on drawings.

B. All fire dampers shall bear UL label and shall be constructed and installed in accordance with NFPA Pamphlet 90-A and as detailed on the drawings. Steel sleeves as shown shall be attached to walls and floors and to the fire damper. Fire dampers in low velocity ductwork under 1-1/2 square feet in area shall have blades out of the air system.

C. All dampers shall have approved damper position indicators so that damper position can be determined without removing the access panel. Access panels with glass insert will be acceptable in lieu of damper position indicator. Glass used shall have essentially the same fire rating as a metal panel. All dampers in return or exhaust systems shall be 286°F links.

D. Fire dampers shall be Air Balance, Advanced Air, Ruskin and Air Stream, United Sheet Metal Co., Tuttle & Bailey, Phillips or approved equal.

2.10 EXISTING FAN ADJUSTMENT

A. This Contractor shall be responsible for adjusting airflows on all existing fans affected by this project. All existing units have fan and motor capacities capable of handling the addition air required by this project. This Contractor shall adjust blades on vane-axial fans and provide belts and pulleys, etc., for centrifugal fans as required by the Balancing Contractor.

B. The following table represents the addition air flow required at each of the existing duct risers:

<u>Floor</u>		<u>Riser Number</u>	<u>CFM</u>	<u>Fan Type And Location</u>
5	Supply	S7C/31	4430	Vane-axial - bsmt.
5	Return	RE-6C/30	965	Vane-axial - bsmt.
		RE-3C/27	3350	Vane-axial - bsmt.
5	Exhaust	E1C/27 (Toilet)	60	Centrifugal - 15th floor

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SECTION 15950 MECHANICAL WORK FOR FIRE MANAGEMENT AND ENVIRONMENTAL CONTROL SYSTEMS

PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 15010 General Provisions - Mechanical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing of all equipment, materials and performing all labor to accomplish all required mechanical work for fire management and environmental control systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Piping Specialties: Section 15130.
4. Hot Water Heating System: Section 15650.
5. Ventilation and Air Conditioning: Section 15800.
6. Fire Management and Environment Control Systems: Section 16900.

PART 2: PRODUCTS AND INSTALLATION

A. The following work is part of this section of the specification and will be performed by the Mechanical Contractor with supervision by the FM and ECS Subcontractors under Division 16.

1. Confirm control damper sizes to FM and ECS Subcontractor before fabrication by FM and ECS Subcontract.
2. Installation of automatic control dampers.
3. Furnishing and mounting of damper blank-off plates.
4. Installation of immersion wells and pressure tapping.
5. Installation of automatic control valves.
6. Installation of pressure tapping and associated shut-off cocks.
7. Mechanical Contractor should check with temperature control contractor for location and number of above items required.

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CONDITIONS, SPECIFICATION AND RELATED DOCUMENTS FOR

UNIT B/C - PHASE X SHELL SPACE COMPLETION
RURAL PHYSICIAN ASSOCIATE PROGRAM - FLOOR FIVE
UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION

Clinton N. Hewitt
Assistant Vice President for Physical Planning

University of Minnesota

Director of Engineering and Construction

University of Minnesota

Paul J. Maupin
Health Sciences Planning

University of Minnesota

THE ARCHITECTS COLLABORATIVE, INC.

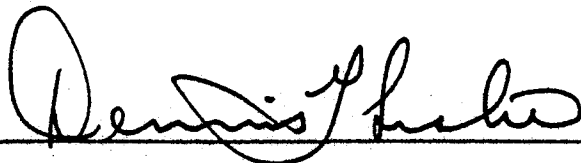
Cambridge, Massachusetts

HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.
University Park Plaza - Suite 704
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(612) 378-3833

Minneapolis, Minnesota
55414

As to Engineering:

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



Date:

Reg. No. 9112

PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Provisions of this section apply to all work of the Electrical Contractor.

1.2 CODES AND STANDARDS

A. The entire installation shall meet all requirements of the 1981 National Electrical Code (NFPA 70) and all State and local regulations as they may apply. Standards of the following associations or organizations shall be followed and applied where applicable as minimum requirements.

- (UL) Underwriters Laboratories
- (IEEE) Institute of Electrical and Electronic Engineers
- (NEMA) National Electrical Manufacturers Association
- (NFPA) National Fire Protection Association
- (NBFU) National Board of Fire Underwriters
- (EEI) Edison Electric Institute
- (IPCEA) Insulated Power Cable Engineers Association
- (ASTM) American Society for Testing and Materials
- (OSHA) Occupational Safety and Health Act of 1970
National Electric Safety Code (Handbook H30)
of the National Bureau of Standards
- (ANSI) American National Standards Institute

B. The rules and regulations of the University of Minnesota Physical Planning and Development Department shall be checked and complied with where applicable.

1.3 PERMITS AND LICENSES

A. All licenses shall be secured and paid for by this Contractor before actual work is started and he shall observe all requirements stipulated thereon. The University will obtain required permits from the State and Municipality.

1.4 INSPECTION

A. The installation shall be made in a neat and workmanlike manner by persons licensed and skilled in the trade and shall be done under the supervision of a master electrician licensed to do work in the State of Minnesota.

B. All electrical work or wiring accomplished on University of Minnesota property shall be inspected by a University Electrical Inspector. The electrical contractor shall file a University of Minnesota Request for

Electrical Inspection. The request forms are available from the Engineering and Construction Division of the Physical Planning Department and will normally be given to the Electrical Contractor at a pre-construction meeting.

C. No project consisting of electrical work or wiring shall be installed until a request is on file with the Engineering and Construction Division, Electrical Inspection Office.

D. Requests for electrical inspection will give the phone number to call for all inspections required by the Office of Electrical Inspection. A request for final inspection shall be made within 48 hours of project completion.

E. A permit number for the project will be assigned to the Request for Inspection by the University. A permit application will be made and fee paid to the University Building Official by the appropriate University departments and will not be the contractor's responsibility. University shall return a signed copy of request upon completion of Project.

F. All requirements of the latest Minnesota State Building Code applicable to electrical installations will be enforced.

1.5 GUARANTEES AND TESTS

A. All wiring shall be tested for opens, shorts and grounds with megger equipment prior to acceptance. Contractor shall be responsible for proper installation of all items in this Contract and shall remedy, free of charge, any defects in materials and workmanship and repair all damage resulting therefrom in accordance with provisions of the General Conditions. Provide testing of materials, equipment and installations as specified below.

1. In addition to the tests required under industry standards, the Contractor shall inspect and test all materials and equipment as specified herein. Acceptance of the work by the University shall be contingent upon satisfactory completion of these tests.

2. All portions of the work shall be subjected to a careful and thorough visual inspection to detect, insofar as possible, any erroneous or loose connections, damaged components, presence of foreign objects or materials, poor workmanship, incorrect ratings of overcurrent protective devices, or other abnormal conditions. Instrument and operational tests set forth herein shall be made after such visual inspection. All instruments, safety equipment and other devices, as well as competent personnel required for making the tests, shall be furnished by the Contractor. Instruments shall be of types specifically designed for the tests and methods prescribed, and shall be certified or demonstrated to be accurate within reasonable limits. Persons assigned to such testing shall be familiar with the procedures, equipment, and precautions required. In the event that the Contractor fails to demonstrate reasonable compliance with these provisions, the Engineer may require that any or all of the tests be performed and certified by a recognized testing laboratory, the cost thereof being borne by the Contractor.

3. All tests shall be scheduled at least 48 hours in advance with the University Electrical Construction Superintendent and Engineer and shall be conducted in his presence. All results shall be tabulated neatly and legibly on standard test forms by the Contractor. The test reports shall include the pertinent readings or observations, a description of the method used and list of the equipment employed. Test reports shall include all pertinent data as to failures or abnormal readings, the cause if determined, and corrective measures taken. In all cases of test failure, the Contractor shall demonstrate the corrective measures proposed are adequate before making repairs, adjustments, or replacement. Test reports shall be submitted to the University (two copies); and Engineer (one copy) within 24 hours after completion of the test. One additional copy of each test report shall be submitted to each "Maintenance and Operating Instructional Manual".

4. All instrument and operational tests set forth herein shall be made after equipment and cable installation but prior to the energizing of the primary distribution system (except otherwise where noted). The following tests shall be conducted:

a. Ducter Test (Low Resistance Ohmmeter):

1) A ducter test shall be conducted on all secondary switches and breakers rated 200 amp. or larger.

b. Feeder and busway (600 volts or less) shall have the following tests:

1) Insulation test, phase to phase and phase to ground with a 500 volt D.C. megger.

2) Continuity check.

5. The following tests and adjustments shall be made after energizing:

a. Demonstrate proper functioning of lighting equipment, controls, and the existence of correct rotation.

b. Determine the load balance and total load on each secondary feeder. (Tabulate and submit three copies to Engineer).

c. Properly coordinate and set overcurrent devices. Should any operating condition be encountered which would require abnormal or unsafe settings of protective devices of any sort, this fact shall be immediately brought to the attention of the Engineer.

6. In all cases where tests indicate failure or abnormal results, the final corrective measure shall be as directed by the Engineer. All corrective measures required and any replacement of damaged equipment and/or cable shall be by the Contractor at no additional expense to the University.

a. Any undue heating or other departure from normal operation shall be reported to the Engineer.

b. Any equipment involved in fault conditions during initial energization shall be repaired or replaced.

c. In any case where the installed equipment cannot be repaired and/or corrected to obtain correct test results, the Contractor shall replace and retest the equipment and/or cable as directed by the Engineer.

B. In addition to the requirements of the General Conditions covering guarantees, this Contractor shall reimburse the University for switching costs in connection with repair of the faulty part or parts, the cost of temporary services associated therewith and for the costs which the University may incur in the location of such faulty part or parts.

C. Specific equipment warranties different than one year shall take precedence. Specific tests besides those mentioned above shall be performed as required in other sections of these specifications.

D. Incandescent lamps are excluded from the provisions of guarantees, but they shall not be installed until final completion of the project to replace the temporary incandescent lamp used for construction lighting.

1.6 DIMENSIONS AND CORRELATION

A. For the purpose of clearness and legibility the drawings are essentially diagrammatic and are intended to indicate size, capacity and location but not exact details or arrangements of constructions. It is the intent of the electrical construction drawings to indicate branch circuit conduit layouts. These conduit layouts shall not be combined by the Contractor to reduce branch circuit conduit home runs to panelboards or other distribution equipment. These conduit layouts shall be utilized by the Contractor for only the wiring indicated on the drawing. Other wiring shall be provided with separate conduit except that motor power and control wiring may be combined within the same conduit system where acceptable by the NEC. Architectural, mechanical and structural drawings shall be examined so that all details of the project are understood and work procedures known before bid and installation. Exact locations and details shall be obtained from dimensioned drawings but shall not take precedence over field dimensions.

B. Miscellaneous equipment (pull boxes, junction boxes, fittings and expansion joints) necessary to complete the work satisfactorily shall be furnished and installed even though not specifically shown on plans.

C. This contractor shall cooperate with other contractors for proper anchorage, placement and accomplishing of all work. In general, plumbing and ventilating lines are laid out first. Interference between the work of the various contractors shall be resolved before installation. In the event of conflict of space requirements or locations with other trades, he shall refer the matter to the University for decision.

1.7 CUTTING, PATCHING AND DEMOLITION

A. This contractor shall be responsible for all necessary cutting and patching required in connection with his work and where necessary because of removal or change of existing work. Cutting of structural members and finished surfaces shall not be allowed without permission from the Architect or Structural Engineer. These cutting and patching requirements will be modified only if general construction specifications and drawings specifically and clearly state that certain or all portions of same required for each of the various trades is to be performed by the General Contractor. Refer to Section 01045.

B. This Contractor shall remove existing electrical conduits, wires, fixtures, boxes, and wiring devices from the existing construction to accomplish the work as shown on the plans. Light fixtures and electrical equipment not shown to be reused shall be turned over to the University and all other conduit, wire boxes, etc. shall be removed from the site by the Contractor, abandoned conduit in ceilings, walls and floor slab shall be cut off below new finish line to allow new finish surface to be applied. Contractor shall verify that circuits or wiring removed do not interrupt service of any kind beyond remodeled area. If necessary, Contractor shall re-route conduit and wire to maintain services to areas beyond the remodeled spaces.

C. The Electrical Contractor shall repaint all areas where he has performed cutting and patching at rooms, spaces or locations that are not repainted under the General Contract. Generally, these will be locations where no demolition, cutting and patching is performed by the General Contractor.

D. Contractor shall carefully review the Contract Documents for all other contractors with respect to coordination of the demolition, removal and remodeling work. Cutting and patching to expose and remodel existing mechanical or electrical systems shall not be construed as the work of another unless specifically called for on another Contractor's documents.

E. Refer to General Construction Specifications for execution and requirements for patching and painting and comply with applicable provisions as to materials and workmanship.

1.8 SALVAGEABLE MATERIAL AND EQUIPMENT

A. All existing electrical materials and equipment are to be removed by this Contractor and shall remain the property of the University unless indicated otherwise by the University.

B. Removed materials and equipment that the University no longer wishes to retain shall become the property of the Contractor, and he shall dispose of it off the University of Minnesota's property at no additional cost to the University.

C. Any removed materials and equipment to be delivered to the University shall be delivered to a given site as directed by the University of Minnesota Electrical Superintendent.

1. All materials and equipment delivered or returned to site indicated by University of Minnesota Superintendent shall be in the same condition it was prior to being removed from project site or site indicated by University of Minnesota Superintendent.

2. Delivery shall be made during regular working hours or as the University may direct.

D. All removed materials and equipment shall be tagged with the following information:

1. General description, if cable, description to include size, type, and length of cable(s).
2. Location removed from.
3. Date removed.
4. Contractor's name.

1.9 CLEANING

A. The Contractor shall periodically remove waste and rubbish and maintain order. Premises shall be left clean and free of debris and unused construction materials before acceptance. Refer to Sections 01010 and 01700 and comply with applicable provisions.

B. All electrical materials, equipment and apparatus including light fixtures and lamps shall be thoroughly cleaned, to be free of dust, dirt, rust and foreign materials before acceptance.

1.10 PAINTING AND LABELING

A. All equipment furnished under this Contract shall be factory finished and painted or galvanized. Any marred finishes on this equipment shall be painted to match as a responsibility of this Contract.

B. Provide typewritten card index with plastic cover describing circuits in each panelboard.

C. Provide engraved 1/8" black-white-black laminated bakelite or plastic labels securely fastened with screws or escutcheon pins to identify electrical equipment as follows:

1. Panelboard name, and voltage fastened on inside of hinged door.
2. All main power and special system junction boxes. Locate these on the inside of flush boxes in finished areas and outside of the box where they are surface mounted in equipment spaces.
3. All motor control stations, combination starters in motor control centers, starters and disconnects, except when these items are adjacent to each other, only one label is necessary.

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UNIT B/C X

4. Plastic imprinted adhesive labels (Dymo Tape) will not be acceptable except for item (2).

D. Provide engraved identification for switch and wiring device plates (Section 16100) and flush mounted motor controls where shown on plans. All engraving shall be sized as large as possible and shall be paint filled, black is standard; use red for emergency. For motor controls engrave 3/8" black-white-black plastic laminate.

E. Refer to other sections of these specifications for labeling, graphic diagrams and high voltage signs that must be provided with individual equipment.

1.11 QUALITY AND WORKMANSHIP

A. All materials shall be new, free from defects and shall be listed by, or bear the label of a qualified testing laboratory where subject to such approval. Materials shall be of the same manufacture or brand for each type of material unless designated otherwise.

B. All materials and finishes shall be adequately protected during construction, from moisture, temperature extremes and physical abuse. All materials shall be assembled in a workmanlike manner in accordance with current recommended standard practice. Certain work such as painting, patching, core drilling and welding shall be done at the Electrical Contractor's direction, responsibility and expense but accomplished by workmen skilled in the particular trades.

1.12 SHOP DRAWINGS

A. Refer to Section 01300.

1.13 LIST OF MATERIALS, LIST OF SUBCONTRACTORS AND OTHER SUBMITTALS

A. Refer to Section 01300.

1.14 SAMPLES

A. Not used.

1.15 OPERATION AND MAINTENANCE INSTRUCTIONS AND AS-BUILT DRAWINGS

A. Refer to Section 01700.

1.16 TEMPORARY ELECTRIC SERVICE AND LIGHTING

A. This Contractor shall install temporary secondary electric services and lighting for new building construction as outlined in Temporary Facilities, Section 01500 and herein.

B. Temporary electric service shall be provided. The Electrical Contractor shall arrange for the electric service with the University of Minnesota Electrical Construction Superintendent. The electrical energy costs will be

paid by the University directly to the power company. The Electrical Contractor shall furnish all materials and labor to extend temporary service.

1. The temporary service connection point shall be the Unit B/C permanent building electrical distribution system. Typically, this shall be an existing 120/208 volt, 3 phase, 4 wire distribution panelboard installed under B/C Phase I Contract.

2. Upon start of construction, Contractor shall install new 2" 4 # 3/0 and 1 #6 ground feeder from existing distribution panel #LDC5-2 located in core #32 on fourth floor to panel #LC5-4 located near grids S36/E17. This panel location shall be utilized for installation of temporary electric service to a temporary panelboard as indicated below.

3. Provide a 1-1/2" - 4#3 and 1#8 ground THW feeder tap from panel #LC5-4 new feeder to temporary panelboard.

4. The temporary panel shall be 100A-3 phase-4 wire, 24 circuit with 20-20 amp, 1 pole circuit breakers and 2-20 amp, 2 pole circuit breakers. Provide GFI circuit breakers as required by code.

5. At the temporary panel location provide a receptacle panel with 12-20 amp., 120 volt, 3 wire grounded type single receptacles and 1-20 amp., 240 volt, 3 wire grounded type single receptacles. Each receptacle shall be connected to a separate circuit.

6. From the temporary service location each individual contractor will provide his own portable cords and outlets for hand tools.

7. Within the building provide a sufficient number (minimum 50) rubber covered lamp sockets uniformly spaced so that in general 200 watt lamps (maximum) will provide satisfactory lighting on temporary cable connected to disconnects and located for all trades. Lighting shall be adequate to provide suitable working conditions for high quality workmanship, as approved by the University, and safe lighting conditions. As work progresses, these sockets shall be relocated by the Electrical Contractor as required. All trades will provide their own portable cords and outlets in the building for portable tools. All light bulbs will be furnished by General Contractor, but shall be installed removed and reinstalled as burn outs occur by the Electrical Contractor.

8. Within the capacity of the temporary service, electrical service for other equipment shall be provided by each Contractor and may be taken from the Temporary Service. Electrical energy costs will be paid by the University. The energy demand shall not exceed the service and any damage resulting from misuse overloading or faulty equipment shall be paid for by the responsible persons. All equipment to be served from the temporary electric service shall be reviewed with the University Electrical Construction Superintendent to assure that the electrical characteristics or equipment will not adversely affect the University's electrical system.

9. The entire installation of construction light and power, shall meet code requirements and shall be safe, substantially supported and adequately

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connected. All temporary service feeders shall be installed in conduit or provided with suitable mechanical protection.

10. The Electrical Contractor shall submit a one line diagram type sketch (3 copies) of the proposed temporary service to the University of Minnesota Electrical Construction Superintendent for approval at least one week in advance of the desired start of the installation of the same. The sketch shall show and describe all cables, raceways, switches, and overcurrent protection and any additional information as may be required.

11. After approval by the University Electrical Construction Superintendent, the Contractor may then proceed with installation of the temporary service.

12. Before energizing the temporary service connected to the University of Minnesota electrical system, the Contractor shall submit the University Electrical Construction Superintendent (3 copies) of "REQUEST FOR TEMPORARY CONSTRUCTION ELECTRIC SERVICE CONNECTION TO UNIVERSITY OF MINNESOTA ELECTRICAL SYSTEM" form. Copies of this form are available from the University Electrical Construction Superintendent.

13. The Electrical Contractor shall meet University requirements for switching and overcurrent protection of the temporary electric service served from the University's distribution system.

14. After the electrical installations are complete, prior to occupancy and when approved by the University, all temporary electrical services, wire, conduits, devices and equipment shall be removed by the Electrical Contractor, except as noted in Paragraph 2 of this section.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes the basic construction materials for erection and installation of the building electrical system.

PART 2: PRODUCTS AND INSTALLATIONS

2.1 RACEWAYS AND FITTINGS

A. Conduit crossing building expansion joints shall be provided with O.Z. grounding type expansion fittings, Type EX or AX. Provide cable support in all vertical conduit runs at intervals required by the NEC or as recommended by the cable manufacturer, whichever is the shortest interval. Cable supports shall be segmented canvas bakelite type, non-ventilated, for 600 volt insulated cables. Supports shall be O.Z. types S, M or equal. Standard locknuts and fittings shall be used with rigid conduits. Insulated steel bushings shall be used on all 1-1/4" or larger conduits; O.Z. type A or B. Terminations at cabinets and junction boxes shall be with double locknuts and phenolic bushings. Grounding bushings shall be O.Z. Type BLG. EMT conduit fittings shall be raintight gland compression type or equivalent, approved by the Engineer. Indenter, set screw, or slip-on types are not acceptable. Flexible metal conduit fittings at outlet boxes shall be an approved grounding type T & B #300 Series or equal. All couplings, connectors, bushing shall be malleable iron or steel and shall be O.Z., Thomas & Betts, Raco or Appleton.

B. All exposed conduit shall be run parallel to wall and floors and shall be supported in a substantial manner with pipe straps, expansion bolts, screws, lag screws, clamps, minerallac clamps or Kindorf or Unistrut trapeze hangers as required.

Conduit SizesMaximum Spacing of Supports

3/4" and under
1" and over

7 feet
10 feet

C. All conduit where possible shall be concealed in the ceiling, floor or wall construction unless indicated as exposed on the plans. Conduit shall be dried, cleaned and deburred before wire is pulled. Conduit outlet bodies may be used for 1-1/4" conduit and smaller for use as a pulling outlet or 90° bend only.

D. Outdoor conduit shall be graded a minimum of 6 inches per 100 feet with no traps. Pitch to drain into manholes, pull boxes or suitably located drain tees.

Provide expansion fittings and seal off conduit systems exposed to wide variations in temperatures or where indicated on the drawings with conduit sealing bushing or other approved methods.

E. Electrical conduit shall be provided as specified and required by code. Conduit shall be Youngstown, Republic, Allied or equal.

1. Conduit size shall be a minimum of 3/4" for all power and branch circuit wiring except as noted below.

a. Conduit shall be a minimum of 1/2" for flexible conduit connectors to individual recessed lighting fixtures.

b. Conduit shall be a minimum of 1/2" for motor interlock and control wiring.

c. Conduit shall be a minimum of 1/2" for communication systems where specifically indicated in the communication specification articles.

2. EMT 1-1/4" or smaller shall be used in furred ceilings, interior partitions, walls or where exposed and not subject to mechanical injury. EMT shall not be used in poured concrete construction on or above grade.

3. Rigid steel conduit shall be used for all other wiring installations except as otherwise specified. Intermediate metal conduit (IMC) may be used in lieu of rigid steel conduit where approved by code for the purpose.

4. Flexible metal conduit shall be used for motor connections and between recessed fixtures, and their junction boxes. Provide liquid tight flexible metal conduit for connections to exterior or wet location equipment. Flexible metal conduit shall not exceed 18" in length for motors and 72" in length for recessed light fixtures. Equipment grounding conductor shall be provided within the raceway run with the circuit conductors for all flexible conduit. Flexible metal conduit shall be cut of the dimension as required for use. General pre-cut lengths will not be accepted.

F. All steel conduit and all locknuts, fittings, couplings, nipples and connectors shall be protected from corrosion by hot dip galvanizing or cadmium coating both inside and out, except electrical metallic tubing shall be enamel or epoxy coating on the interior. All rigid conduit and intermediate metal conduit shall have standard pipe threads.

G. The Electrical Contractor shall install 3 hour fire rated fitting, O-Z/Gedney CFS Series "Fire Seal" when penetrating fire rated partitions and floor slab.

2.2 WIREWAYS

A. Gutters and wireways shall be constructed of galvanized sheet metal conforming to Code requirements. Cover shall be screw cover type and all elbows and fittings shall be made without sharp edges or projections.

B. Gutters and wireways shall be of sufficient cross section to contain conductors, including all splices.

C. Provide permanent welded ground lug in all gutters or wireways. Cover screw connections or sheet metal screws will not be acceptable.

D. Wireways shall be Square D or equal.

2.3 OUTLET, JUNCTION AND PULL BOXES

A. All outlet boxes shall be galvanized. Standard 4" octagonal boxes shall be used for ceiling outlets except as otherwise specified or required. Ceiling outlet boxes shall be equipped with 3/8" fixture studs where required. Outlet boxes in furred construction shall be supported by bar hangers or lightweight channel iron; exposed ceiling outlet boxes shall be secured by wood screws, machine screws, toggle bolts or lead anchors as applicable. All boxes shall be supported independently of support from connecting conduit.

B. Standard 4" square boxes with proper device rings shall be used for device outlets in sheet rock or plastered walls. Ganged boxes with device rings shall be used where more than two devices occur at one location. Rings shall be square-cut type in sheet rock and plastered walls.

C. Use properly sized masonry boxes with square-cut (tile) covers for device outlets in glazed tile, brick and unfinished concrete block walls. These boxes shall be ganged where two or more devices occur at one location.

D. Standard 4-11/16" square boxes shall be used for ceiling and other outlets as required for additional wire space.

E. Square boxes with industrial covers shall be used for exposed wall outlets.

F. Provide FS and FD condulets for outdoor outlets and ceiling outlets wherever required for vaportight fixtures and wet locations.

G. In light switch boxes provide code gauge steel partitions where voltage between adjacent terminals exceeds 300 volts.

H. Covers shall be provided for all outlet boxes and shall be of a design to fit the particular box and location, and shall be readily adjustable for alignment with the walls and finishes. Where these covers are to receive a finish coat of paint, Electrical shall furnish same with one coat of primer. In finished spaces, covers shall be identical to those specified under wiring devices and plates.

I. Light fixtures without integral J-boxes suitable for wiring temperature rating shall have J-boxes installed in an accessible location adjacent to fixture.

J. All pull boxes are not shown on the plans but they shall be provided as required for easy wire pulling and in long runs (90 feet or more), or when more than four quarter bends shall occur in any conduit run. All pull boxes shall be

sized to conform to requirements of the NEC. Pull boxes shall be recessed in all finished portions of building.

K. All junction and pull boxes shall be accessible and permanently labeled to identify the system and wiring within. Refer to Section 16010.

L. Outlet boxes shall be Appleton, Steel City, Raco, or equal.

2.4 WIRE AND CABLE

A. All wire and cable furnished and installed under this contract shall be copper. Wire and cable shall be of size, type and number shown on plans. All conductors shall be of soft annealed copper of not less than 98% conductivity and in all other respects to the requirements of the ASTM specifications, latest edition. Unless otherwise noted, insulation shall be rated at 600 volts.

B. All branch circuit wiring shall be color coded according to the NEC and as follows:

1. 120/208 volt: A - black; B - red; C - blue; Neutral - white; Ground - green; Travellers - yellow;
2. 277/480 volt: A - black; B - red; C - blue; Neutral - white/yellow; tracer or gray; Ground - green; Travellers - yellow.
3. When 120/208 volt and 277/480 volt wiring is installed within the same conduit or raceway, the 277/480 volt conductors shall be tagged at each outlet box or termination.
4. All feeders, if not color coded, shall be permanently marked with paint or tape at their terminations for phase identification.

C. Feeder wire shall be type THW. Branch circuit wire shall be type THW or THWN-THHN. Wire sized No. 8 and larger shall be stranded. Wire sized smaller than Number 12 shall not be used for branch circuits. Number 14 wire may be used for relay and control systems only.

D. All wire pulled through the wiring channels of continuously mounted fluorescent fixtures shall be type RHH and THHN. Wire connected to recessed type and vaportight fixtures shall be type AF. All underground wires exterior to the building shall be in conduit and shall be type THW or THWN. Wire in high ambient areas shall be rated at 90°F.

E. Interior helical spring twist type connectors shall be used on Number 8 and smaller wire sizes. These shall be Scotchlocks or approved equal. Number 6 and larger wires shall terminate in solderless lugs. All terminations, taps and splices shall be compression type Burndy-Hydent or approved equal. Tap and splice devices shall be covered with approved electrical tape.

F. Splices shall not be made in any conductor except where absolutely necessary and then in approved junction or pull boxes. Secondary service wires and

feeders shall be of one continuous run without splice. Provide cable supports and junction boxes as required by Code in all vertical runs of conduit. To relieve strain on the insulation and the conductors when pulling wire, a wire pulling lubricant shall be used.

G. Portable cords for receptacles, equipment and ceiling attachments shall be Type SJO. All cords shall have a grounding conductor and cords shall be properly installed with cord grip devices at each end. Conductor size shall be #12 stranded minimum.

H. Refer to Section 16500 and 16900 for wiring and conductor requirements for specific systems.

I. Wire and cable shall be Continental Cable, General Electric, Cyprus/Rome, Cerro, Crescent, Coleman or equal.

2.5 WIRING DEVICES AND PLATES

A. Provide wiring devices as shown on the plans and identified by the appropriate symbols. Hubbell numbers are used to identify the particular type of devices required except where otherwise noted. Pass & Seymour, Leviton, Sierra, Circle-F or approved equal switches and receptacles shall be provided. All switches and receptacles shall be U.L. listed and meet NEMA WD-1-1971 performance tests for specifications grade devices. All receptacles shall be grounding type.

B. Switch, receptacle and all other plates (including telephone, television, etc. and for all empty outlet boxes) shall be satin stainless steel, Sierra 302 or approved equal with Type 302, stainless steel screws. Weatherproof plates for outdoor and wet location shall be duplex Sierra #WPD-8.

C. All receptacle bodies and switch toggles shall be brown. Certain equipment receptacles available in black phenolic only may be black.

D. All receptacle plates other than the standard duplex 125 volt 20 ampere type shall be engraved with black filled letters indicating volts, amperes and phase; for example, "208V-20A-1PH".

E. All receptacle and switch plates for the emergency electrical system shall be engraved "EMERGENCY" with red filled letters.

F. Receptacles:

<u>Poles/Wires</u>	<u>Volts</u>	<u>Amps</u>	<u>Configuration</u>	<u>Cat. No.</u>	<u>Use</u>	<u>Remarks</u>
2P-3W	125	20A	5-20R	5362	General & Equipment	Duplex
3P-4W	125/ 250	20A	14-20R	8410	Equipment	Single

H. Switches:

<u>Poles</u>	<u>Amps</u>	<u>Volts</u>	<u>Cat. No.</u>	<u>Remarks</u>
Single	20 amp.	277 - A.C.	1221	Toggle-Quiet
Three Way	20 amp.	277 - A.C.	1223	Toggle-Quiet
Four Way	20 amp.	277 - A.C.	1224	Toggle-Quiet
SPDT	20 amp.	277 - A.C.	1557	Momentary Contact

I. Pilot Lights:

1. Pilot lights for single pole switches shall be lighted switch handle type, 125 volt, 20 ampere with red light Sierra #5027R. Pilot lights for 277 volts shall be the same lighted switch handle type, except with #601 adapter.

2. Pilot lights for 3-way switches shall be combination toggle switch and long life neon lamp, Sierra #2151R, for 120 volt or 277 volt operation.

3. Individual remote or signal pilots shall be Sierra #2151R, for 120 volt or 277 volt operation.

2.6 FLOOR OUTLETS

A. Provide fire rated poke through assembly floor outlets where shown on the plans, completely wired and equipped with receptacle or wiring device.

B. Fire rated poke through assemblies shall consist of junction box, conduit nipple and pedestal for systems.

C. Fire rated poke through assemblies shall be Raceway Components Inc. F1-300-21-6.

2.7 CABLE TRAYS

A. Provide a complete cable tray system including all necessary hardware, horizontal bend fittings, vertical inside and outside bend fittings, tees, crosses, offsets, splice plates, blind end plates, hanger rods and clamps and support hanger brackets as required, and as shown on plans. Vertical and horizontal offsets shall be provided as necessary to coordinate with the Mechanical and Structural installation.

B. System shall be Binkley-B-Line Nema Class II trough type, continuous ventilated bottom, galvanized steel, in standard 10' lengths. Trays shall be 3" deep, 9" or 12" wide as indicated on plans.

C. Provide two support rods every 8' or wall bracket support where applicable. At feed points provide conduit to tray adapter fitting. For vertical runs provide nylon cord lacing every 3' for substantial bracing.

D. Manufacturer of cable tray shall provide shop drawings complete with plan layout indicating all sizes and components of the system.

PART 3: INSTALLATIONS

3.1 EQUIPMENT CONNECTIONS

A. Completely wired outlets and disconnects shall be installed as required for equipment furnished by others. Verify connection requirements for all equipment, installed or furnished by others, before installation.

B. In general, the service to equipment is laid out for anticipated electrical requirements as listed on Architectural Equipment Schedule. Actual equipment furnished may differ and shall be checked from the shop drawings to assure proper power supply. Report any differences to the University for procedure or adjustment. Equipment will be furnished by General, Mechanical or Electrical (Group 1) and the University (Group 11).

3.2 INSTALLATION IN STEEL STUD PARTITION WALLS

A. As shown on architectural plans, most interior walls are steel stud, drywall type. These walls fit to horizontal members at the ceiling and floor consisting of 18 gauge sheet steel or 1/8" aluminum channels. Refer to Architectural Details for method of electrical installations. Refer to Electrical Details for wall access limitations.

B. All wiring, including telephone cable and all communications circuits shall be installed in conduit. All steel stud openings to permit horizontal conduit runs shall be cut by this Contractor if not furnished as standard by the stud subcontractor.

C. All openings in these walls for all electrical devices will be provided by the wall subcontractor as directed by the Electrical Contractor.

D. All openings in the horizontal and vertical wall support members for conduit shall be provided by the Electrical Contractor if not furnished as standard by the stud subcontractor. These openings shall be neatly drilled to the approximate size of the service entering.

E. The Electrical Contractor at his option may wire duplex receptacles shown in partitions by providing a junction box above the ceiling and dropping a single conduit run to each receptacle in lieu of running continuous conduit from receptacle to receptacle.

3.3 INSTALLATION AT PLENUM SOUND BARRIERS

A. Where indicated on the architectural floor plans certain rooms will be shrouded with lead above the ceiling from the top of the partition to the structure and around the perimeter walls to adjacent rooms. This installation will be provided by the General Contractor for sound barriers.

B. All electrical conduit penetrations through the lead shielding shall be minimized and the required seal about the conduit or raceway shall be provided by the General Contractor. Electrical installations made after the lead

shielding is installed causing penetrations of the acoustical seal shall be sealed by the Electrical Contractor.

C. The Electrical Contractor shall coordinate and cooperate with the General Contractor to accomplish the installations of electrical systems with the installation of the lead shielding.

3.4 FASTENERS AND SUPPORTS

A. All fastening and supports shall be of an approved type. The use of wire, nails, etc., for fastening exposed conduits is prohibited. Threaded inserts, expansion or toggle bolts shall be used for fastening to masonry walls.

B. Where possible conduits shall be grouped together and rigid racks of angle iron or structural channels shall be provided. Individual conduits shall be clipped to the ceiling or wall with malleable iron pipe straps wherever possible. Where individual conduits must be hung from the ceiling approved conduit supports and rod hangers must be used.

C. Provide rigid rods or bars for the support of lighting outlet boxes and grid boxes. No perforated metal straps may be used.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes the basic installations, assemblies, methods of fabrication and supporting devices for the electrical system.

PART 2: PRODUCTS AND INSTALLATION

2.1 GROUNDING CONTINUITY

A. All conduit systems, equipment housings, material housings, junction boxes, cabinets, motors, ducts, wireways, light fixtures, portable equipment and all other conductive surfaces shall be solidly grounded in accordance with the National Electrical Code to form a continuous, permanent and effective grounding system.

B. Grounding continuity shall conform with N.E.C., Articles #250 and #517 as specified herein and as indicated on plans.

1. Grounding of all branch circuits shall be established by an insulated green jacketed copper conductor sized in accordance with N.E.C. table 250-95 and installed in the conduit system with circuit conductors. This ground conductor shall be connected to the panelboard ground bus from the wiring device, equipment or outlet as required.

2. Grounding continuity shall be established by using standard couplings, connectors, fittings and green jacketed copper conductor jumper in conduit with circuit conductors for motors feeding from motor control centers.

3. All panelboard boxes, transformer housing, conduit nipple and junction boxes shall be bonded together with proper grounding lugs.

4. All connections shall be made with O.Z. or Burndy copper fittings and non-ferrous hardware designed specifically for the cable size and type of attachment required. All fittings, clamp devices, etc., shall be copper or copper alloys to be compatible with the basic copper lugs and cable. Compression type connectors shall be used wherever possible.

2.2 SERVICE GROUND TESTS

A. Ground resistance tests shall be made in accordance with Section 16010.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all secondary electrical distribution equipment and accessories herein specified and shown on plans to provide a complete connected and fully operating system and sub-systems.

C. All equipment and wiring shall be designed and connected for operating on the 277/480 volt, 3 phase, 4 wire secondary system and the 120/208 volt, 3 phase 4 wire, secondary sub-systems.

PART 2: PRODUCTS AND INSTALLATION

2.1 PANELBOARDS

A. Panelboards shall be the dead front type with mains arranged as shown on the panelboard schedule for 120/208 volt or 277/480 volt, 3 phase, 4 wire, wye connection. Enclosures shall be code grade steel complete with door-in-door type trim. The inner door shall be the locking type and the outer door shall be secured by trim type screws on the side opposite the hinge. Trim type screws shall be wide pan head installation in drilled and tapped holes. The outer door for flush cabinets shall be completely framed. The outer door for surface cabinet may be a continuously hinged side door. Shop drawings shall detail these items. Circuits shall be listed on clear plastic covered, typewritten card indexes attached to the inner side of the doors. Each protective device shall be designated by a number at the device. Final room numbers as provided by the University shall be used for all circuit indexes.

B. Panel bus bars shall be solid copper and shall be aligned and rigidly supported on back pan by insulators connected to a removable mounting panel. All lugs shall be copper-bronze for bolted lug connection. Each panelboard shall contain individual insulated neutral bus of same ampacity as the main bus. Where sheduled, panelboards shall contain a separate single ground bus which shall consist of a minimum of 16 solderless connector lugs for 30 circuit panelboards and 24 solderless connector lugs for 42 circuit panelboards. Solderless connector lugs shall be sized for #14 through #4 conductors and a single lug for up to #1/0 with each ground bus. All circuit breakers shall be attached to bus by means of machine screw connections, and shall be removable from the front without de-energizing the panel. Rough-in boxes shall have a minimum width of 20 inches and minimum depth of 4-1/2 inches. Full length vertical buses and cross breaker connections including all hardware shall be provided and installed in all future circuit breaker spares and spaces. All panelboards shall be keyed with identical Corbin Lock #157-67, using WEM-1 key.

C. Where feeders pass through panelboards or sub-feed circuit breakers are incorporated with the panelboard, increase panelboard gutter widths on appropriate side as follows:

1. 4" added gutter width for conductors sized #1 to 4/0.
2. 6" added gutter width for conductors sized 250 MCM to 500 MCM.
3. 8" added gutter width for conductors sized 600 MCM to 750 MCM.

D. Each panelboard shall be identified with a black-white-black laminated plastic plate attached to the inner trim. Letters and numbers shall be cut through the black and into the white of the plastic. Inscription shall be symmetrical about the center line of the plates, and plates shall be attached with self-tapping screws. Identification shall correspond to designations used in the specifications and on plans.

E. The lighting and three-phase motor panelboards shall be dead front type with front removable bolt-in circuit breakers with thermal magnetic trips of sizes shown on schedule on plans. Panelboards shall be designed for 277/480 volt, 3 phase, 4 wire, wye connected, solid neutral. Panelboards shall be General Electric NHB or equivalent. The receptacle and small appliance panelboards shall be dead front type with front removable bolt-in circuit breakers with thermal magnetic trips of sizes shown on schedule on plans. Contractor shall provide a suitable circuit breaker sized for the load for each branch circuit shown on the plans if inadvertently not identified or noted in the panelboard schedule. Panelboards shall be designed for 120/208 volt, 3 phase, 4 wire, wye connected, solid neutral. Panelboards shall be General Electric Type NLAB or equivalent.

F. Circuits shall be connected as shown on the plans for a balanced three phase load. Circuit breaker number for all 3 pole and 2 pole breakers shall have numbers in sequence as follows: 3 pole breaker shall be labeled 1, 2, 3. Typewritten index shall have corresponding numbers in sequence to allow index labeling of a 3 pole circuit without spaces between these numbers. Final room numbers as identified by the Owner shall be used on the index.

G. Distribution type panelboards in shaft spaces shall be similar to panelboards except larger size, wall or floor mounted. Distribution panelboards shall be General Electric Type CCB or NAB or equivalent. Provide hinged wireway cover for each section. Provide ground bus where scheduled and as specified in above.

H. All circuit protective devices shall be molded case circuit breakers with thermal magnetic trips for 120/208 volt 277/480 volt as indicated. All two and three pole circuit breakers shall have common trips.

1. Circuit breakers shall conform to the following minimum characteristics based upon General Electrical nomenclatures:

- a. Branch Circuit Panelboards, 120/208 volt.

<u>Amps</u>	<u>Volts</u>	<u>Frame</u>	<u>Sym. I.C. - RMS - 240V</u>
15-100	240	THQB	10,000

b. Panelboards, 277/480 volt.

<u>Amps</u>	<u>Volts</u>	<u>Frame</u>	<u>Sym. I.C. - RMS - 277V or 480V</u>
20	277	TEF	14,000 (277V)
15-100	480	TEF/TED	14,000 (480v)

I. Panelboards shall be Square D, Westinghouse, General Electric, I.T.E., Federal Pacific or approved Equal. Manufacturer's shop drawings shall include busing details, mounting methods and lug arrangements.

2.2 SECONDARY VOLTAGE INTERRUPTIONS

A. Electric service interruptions involving University property or required by the contractor to perform his work shall be arranged for and approved by the University before interruption.

B. Requests for outages shall be submitted in writing to the University's Electrical Construction Superintendent for approval at the earliest possible date, and in no case later than two weeks prior to the outage. Proposed outage information shall be submitted on a University of Minnesota "Request for Electrical Outage" form (3 copies) available from the University's Electrical Construction Superintendent.

C. The Electrical Contractor shall verify with the University's Electrical Superintendent that all equipment and installation involved is completed, tested, and ready for service and that all related shop drawings and operational data have been submitted before submitting the outage.

D. Scheduled outages will be scheduled at the convenience of the University. The University reserves the right to cancel or change the scheduling of any such outage up to 24 hours before its previously approved starting time. There shall be no additional cost to the University for scheduled outages, or outages rescheduled at the University's request where at least 24 hours notice has been given by the University to the Contractor.

E. All outages shall be held during evenings or on weekends and/or holidays. The Contractor shall figure these costs at premium pay rates. No cost extra will be allowed because the outages or the work during the outages is on an overtime basis.

2.3 FUSES

A. Provide and install secondary fuses in all fusible switches, motor control centers, switchboards sized as shown on the plans. Provide spare fuses as specified in other sections for the specific equipment.

B. Fuses shall be of proper voltage rating either 250 volt or 600 volt class as

required for the particular equipment. Fuses shall be Bussmann or approved equal. All current limiting fuses shall be Class R rejection type.

1. Fuses protecting feeders to 277/480 volt panelboards shall be dual element silver sand type, Buss Fusetron FRS (600V), below 150 amperes and Buss Low Peak LPS (600V) from 150 amperes and above.

2. Fuses protecting feeders to power panels, motor control centers, dry type transformers, bus duct risers and transfer switches shall be of the current limiting, dual-element type, Buss Low-Peak Fuses - LPN (250V); LPS (600v), 600 amperes and below and Buss Hi-Cap KRP-C above 600 amperes.

3. All motors, whether served from individual disconnects or from a motor control center, shall be protected by Buss Dual Element Fusetron Fuses FRN (250V); FRS (600V) to 150 amperes and Buss Low Peak LPS (600V) from 150 amperes and above based on nameplates amperes and service factor. Rejection type fuses shall not be required for FRN and FRS Dual Element Fuses.

4. All requests for substitutions shall be submitted in advance of bid to the Engineer in writing and shall include a coordination table showing that the substitution will provide a coordinated system of overcurrent protection and that the short circuit current let-through shall not exceed the interrupting capability of the equipment or devices being protected.

5. Contractor shall furnish to the University one set of three of each size and type of all fuses installed in fused bus plugs and motor control center combination starter units. The Contractor shall indicate by letter to the University with copy to Engineer the list and location of all spare fuses.

2.4 SAFETY SWITCHES

A. Provide safety switches where required and as shown, sized according to the load served or the feeder or branch wire capacity, for motors and equipment. Switches shall be fused or unfused as indicated and as required.

B. Safety switches shall be heavy duty type, 250 volt or 600 volt and 2 pole or 3 pole as required. Switches shall be visible blade type with quick-make, quick-break operating mechanism, full cover interlock and means for padlocking.

C. Safety switches shall be NEMA 1 or NEMA 3R raintight for wet or outdoor locations.

D. Safety switches shall be Westinghouse, General Electric, Allen Bradley, Square D, Federal Pacific or I.T.E.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installation of all fixtures complete with lamps and ballasts where required as shown on the plans and on the fixture schedule. Capital letters adjacent to outlets indicate the fixture type and small letters indicate the manner of switching. Where continuous row fixtures are specified, it shall be understood that the capital letter next to the outlet identifies all fixtures in the row and all rows are made up of either four or eight foot long fixtures in combination to complete the row. Catalog numbers listed below are for basic four foot long fixtures. Contractor shall be responsible for exact quantities of fixtures required in any row. The channels may be eight feet long, but all plastics, hinged doors and louver sections shall not exceed four feet long. Unless otherwise noted, a suitable and typical fixture shall be furnished and installed at each fixture outlet (or as otherwise indicated on the drawings) though inadvertently not identified on the plans or not listed on the fixture schedule.

PART 2: PRODUCTS AND INSTALLATION

2.1 INSTALLATION

A. Fixtures shall be securely fastened to the suspended ceiling grid, tees, etc., except industrial and strip fluorescent fixtures shall be mounted from structure. Provide all clips, sheetmetal screws, anchors, etc., for a secure installation.

B. Electrical Contractor shall coordinate the fixture installation for all ceiling types and shall check ceiling finishes, clearances, structure suspension system etc., before placing fixture orders to insure correct application. Refer to architectural reflected ceiling plans and details for details of ceiling systems and exact locations of fixtures.

1. Coordinate the installation, placement and cutting of suspended ceiling components with the ceiling system manufacturer and/or installer.

2. Provide plaster frames for recessed fixtures where applicable.

3. Provide all additional structural members where required for fixture support when not furnished with the ceiling system or by the ceiling installer.

4. Surface mounted fluorescent fixtures shall be mounted from Steel City #6029 or edgewise 1-1/2" Lather's channels provided by the Electrical Contractor. Provide 3/16" studs and locknuts for every four feet and at the ends of all fixture rows. Channels shall rest on the ceiling support system and shall be securely fastened into place.

C. All fixtures shall be hung straight and true and as design of fixture and accepted practice dictate. All fixtures shall be cleaned immediately before the final inspection. All fixtures shall be newly lamped and in perfect operating condition at the completion of the job. All necessary devices and auxiliary fitting required for a complete and workmanlike installation shall be furnished and installed by this Contractor.

2.2 LAMPS

A. All incandescent lamps shall be inside frosted, rated at 125 volts unless otherwise noted in the fixture listing. Lamps shall be standard 1000 hour life type except R and PAR Type 2000 hours.

B. Mercury vapor lamps shall be deluxe white or beauty lite inside frosted rated for 24,000 hours life except 100 watt lamps shall be 16,000 hours rated.

C. Rapid start fluorescent lamps shall be T-12 white, 3200 (min.) initial lumens and 20,000+ hours lamp life.

D. Lamps shall be Sylvania, Westinghouse, General Electric or approved equal.

2.3 BALLASTS

A. Fluorescent ballasts shall be for 277 volts (except where noted otherwise), premium high power factor and CBM-ETL approved. Provide multiple lamp ballasts wherever possible. Ballasts shall have internal thermal automatic resetting protection and inert solid fill and capacitor protection to meet Class "P" U.L. rating. Sound ratings shall be "A" for rapid start. Fluorescent ballasts shall be "Premium" Jefferson, General Electric, Westinghouse, or Universal, equivalent to Advance Mark II Kool Koil.

B. Mercury vapor ballasts shall be 277 volts (except where noted otherwise) constant wattage high power factor type Jefferson, Sola, General Electric or approved equal. Mercury vapor ballasts and light fixtures for interior use shall be designed suitable for application with room ambient noise level of 30NC without additive noise contribution to exceed the noise curve criteria. Fixture manufacturer shall be responsible for the proper ballast application and mounting to insure acceptable operation for the application defined.

C. The fluorescent ballast manufacturer shall provide a two-year guarantee against defects in workmanship or material which includes a in-warranty service program providing for the payment of authorized labor charges incurred in the replacement of defective in-warranty ballasts.

2.4 LIGHT FIXTURES

A. All fixtures shall be U.L. approved and manufactured, installed and wired in accordance with the latest rulings of the National Board of Fire Underwriters and national, State and local codes and ordinances.

B. Incandescent fixtures shall be wired with asbestos-covered, heat resisting wire where necessary. Fluorescent fixtures shall be internally wired and with not less than No. 16 standard wire with thermoplastic, asbestos or silicone insulation as listed in Table 402-3 of the National Electrical Code.

C. All fluorescent fixtures shall be designed, tested and guaranteed by the manufacturer for ballast coil temperature not to exceed the U.L. limit of 105 degrees C. and ballast case temperature not to exceed 90 degrees C. for the particular application.

D. The major suspended ceiling is a custom lay-in modular system. All light fixture details and mounting methods shall be designed to accommodate the ceiling system where fixtures are installed within the ceiling system.

E. Submittal of fixture samples to the Engineer for evaluation shall be required 14 days prior to bid date for approval where indicates in the fixture schedule.

2.5 FIXTURE SCHEDULE

<u>Type</u>	<u>Description</u>	<u>Lamps</u>
A	A two lamp lay-in recessed 1' x 4' fluorescent fixture with frameless lens construction. Chassis, wiring channel, reflectors, cover and end plates shall be constructed of not less than 20 gauge steel, chemically treated, then finished in high temperature white baked enamel to obtain at least an 85% reflectance factor. Lamp socket supports shall be 18 gauge minimum. Lens shall be Holophane No. 7160 or approved equal, injection molded of clear virgin acrylic plastic to ASTM standard #D-788-69. Fixture shall be designed specifically for this lens with hinged end frames to preclude light leaks and with inside and aligners to prevent drop out. Fixture shall be 5-1/4" deep maximum and shall be designed to accommodate a 47" x 11" finished opening. Fixture shall be L.P.I. #649001, Columbia #240A-5119G-SP-7160-277, Williams #4522-7160-AP-277, or approved equal. Submit fixture sample for approval. Refer to details, drawing #E-4 for light fixture requirements.	2-F40W
A-1	Same as "A" except 3 lamp with two ballasts. L.P.I. 649009, Columbia 340A-5119G-SP-7160-143-277, Williams #4523-7160-AP277V, or approved equal.	3-F40W

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|-----|---|-------------------------|
| B | Revised existing type "A-3" light fixture removed from shell spaces. Fixtures are L.P.I., 2 lamp, chain hung and without lens. Provide Holophane #7160 lens, clean, relamp and install in modular ceiling where shown. | 2-F40W |
| C | A 2 lamp wall mount fluorescent fixture with straight aluminum baffle finished with eggshell white enamel. Provide channel lengths in single or multiple lamps as shown on plans made up of 4' or 3' rapid start lamps with fascia 2" longer than the lamp channel assembly. Continuous row fixtures shall be provided with seamless fascia. Provide end caps for fixtures where fixtures do not butt to wall. Trim fascia in field as required. Provide shop drawing layout of all continuous row fixtures for approval. Forum #LAE-2020WH-277
volt with lengths as shown on plans or approved equal. | 2-F40W |
| D | Not used. | |
| E | A ceiling mount exit light with single metal stencil face, matte white finish, 6" red letters and downlight. Moldcast #421-MW-R-277V or approved equal. | 2-T6-1/2
I.F.
20W |
| E-1 | Same as Type "E" except with arrow left. Moldcast #421-MW-R-AL-277V or approved equal. | 2-T6-1/2
I.F. 20W |
| E-2 | Same as Type "E" except with arrow right. Moldcast #421-MW-R-AR-277V or approved equal. | 2-T6-1/2
I.F. 20W |
| E-3 | Same as Type "E" except with double arrow. Moldcast #421-MW-R-DA-277V or approved equal. | 2-T6-1/2
I.F. 20W |
| F | A 1' x 4' recessed 2 lamp fluorescent fixture with positive latch, translucent acrylic lens and extruded aluminum door frame and trim. Fixture shall be suitable for mounting in plaster ceiling. Lens shall be KSH-19A-277V. Columbia 5114-FK19A-142-277V or approved equal. | 2-F40W |

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes completely installed, connected, operating and tested systems as herein specified and as shown on the plans and riser diagram details. Equipment shall consist of factory assembled components with warranties and guarantees as herein specified.

PART 2: PRODUCTS AND INSTALLATION

2.1 PUBLIC TELEPHONE CONDUIT SYSTEM

A. Telephone outlets shall be installed as indicated on plans and in accordance with the following:

1. Telephone outlets are indicated on the plans but shall not be installed until final locations are designated by the University Telephone Services.

2. The Electrical Contractor shall install all conduit and outlet boxes for telephone outlets indicated on the plans. Installation shall consist of a double gang box with a single gang device ring and plate as specified in Section 16100, conduit from the outlet box to the corridor cable tray and all necessary brackets and supports. Provide a heavy gauge stranded nylon pull cord in all empty conduits. Provide bushings on all conduit stubs terminated above accessible ceiling space.

B. All telephone conduit shall be 3/4 inch, unless otherwise shown. Pullboxes are not shown on the plans, but shall be provided, as required for ease of wire and cable pulling, and in conduit runs that would otherwise be more than 90 feet in length; and in runs that would otherwise contain more than two 90-degree bends. Double offsets and kicks will not be allowed in any telephone conduit run. Radius of all conduit bends shall conform to the following schedule.

<u>Size of Conduit in Inches</u>	<u>Inside Diameter of Conduit in Inches</u>	<u>Minimum Radius of Bends in Inches</u>
3/4	0.82	8.2
1	1.05	10.5
1-1/4	1.38	13.8
1-1/2	1.61	16.1
2	2.07	20.7
2-1/2	2.47	24.7
3	3.07	30.7

C. All telephone equipment, services and cables will be installed by Northwestern Bell Telephone Company. This contractor shall cooperate as necessary to aid in location, provide prints and/or identify conduit and cable tray locations.

2.2 CLOCKS

A. Provide a wired electric clock or clock outlet as indicated on the plans. All clocks shall operate from 120 volt A.C. with the power source connected to the building wire system as shown.

B. Clock outlets shall be a clock hanger outlet Sierra #2123 with NEMA #5-15R receptacle and stainless steel plate.

2.3 COMMUNICATIONS CONDUIT SYSTEM

A. General

1. Furnish and install empty conduit and boxes as shown on plans and specified hereinafter for projector, sound systems, etc. Wiring and equipment will be provided by the University unless otherwise indicated.

2. All conduit shall be 3/4" or larger where indicated. All boxes shall be double gang or larger where indicated. All conduit stubs shall have bushed ends.

3. All outlet boxes shall be provided with plates or covers unless otherwise noted. Plates for standard size wiring boxes shall be blank stainless steel to match device plates specified in Section 16100. Provide engraving where indicated for device plates. Plates for larger boxes shall be flat 14 gauge galvanized steel. These plates shall be provided with properly applied zinc chromate flat prime coat. Final paint coats will be by the General Contractor.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Contractor shall provide all equipment, materials and wiring necessary for complete installations of the systems herein specified and as shown on the plans, and in the motor schedules.

PART 2: PRODUCTS AND INSTALLATION

2.1 MOTOR WIRING

A. Provide and install all disconnect switches, motor starters, pushbuttons or special starting controls unless indicated by others on the motor schedule. Provide and install all conduit boxes, fittings and wiring for all motors and controls (except as noted below) as shown on the plans or as required. Check all overloads and fuses under operating conditions to assure that they are sized for proper motor protection without nuisance tripping and replace those found inadequate or improper. All overloads shall be sized for maximum rating allowed by Code. Overloads are not required on single phase motors equipped with internal thermal protectors. The motor schedule on the plans is included for the Contractor's convenience; any motor inadvertently omitted from this list but shown on the plans shall be connected.

B. In general, equipment and control wiring shall be provided as follows:

1. PE and EP switches, control solenoids, relays, motorized dampers, low voltage transformers for air handling equipment shall be provided and wired by the Mechanical Contractor except as noted in B.2 below.

2. PE and EP switches shown on the electrical plans for fire management control system interconnect to ventilation systems will be installed by the Mechanical Contractor and shall be wired by the Electrical Contractor.

3. All other wiring, unless otherwise indicated, shall be provided by the Electrical Contractor. Provide wiring and connections as noted in the Motor Schedule and required, unless otherwise indicated.

4. Electrical Contractor shall provide all power interlock wiring of controllers for Mechanical and Equipment Contractors as scheduled or required unless otherwise indicated.

C. The Mechanical and Equipment Contractors will furnish schematic wiring diagrams to the Electrical Contractor for all of their equipment that must be

wired by the Electrical Contractor. Where manual-off-automatic switches are specified, make connections so pneumatic switch or automatic controlling device is in the automatic circuit. All safety interlocking devices shall be wired into the automatic and manual positions of the starter.

D. Electrical Contractor shall furnish and install fused disconnect switch sized and fused if necessary, where required by Code for each motor.

E. Fractional HP manual starters, pushbuttons, controllers, disconnects, and selector switches shall be labeled by Electrical Contractor with "Equipment" as shown on motor schedule with an engraved black bakelite plate fastened with 3M permanent adhesive. Where no pushbutton is required, furnish and install same type of label on disconnect switch or starter. All flush switches which are in public access areas (not closets or equipment rooms), shall have labels engraved directly onto the plate. Wherever the controller and disconnect are together, only one label is required.

F. Provide fuses for all disconnect switches and combination starters as specified in Section 16300. Provide electrical control interlock disconnect devices for all switches with interlock or control circuits.

2.2 MOTOR CONTROLS

A. Provide magnetic starters with three overload elements, selector pushbutton or switch and reset button as required on housing, or remote pushbutton or selector switch and pilot light if shown for all motor controllers shown on plans and designated in the motor schedule.

1. Coil voltages shall be 120 volts as required. For 480 volt motor starters provide transformers sized for required pilot and control load. Transformer shall be sized with sufficient capacity of 5 EP switches minimum.

2. Starters for outdoor and wet locations shall be NEMA 3, raintight.

3. Provide auxiliary contacts for each starter as indicated in the motor schedule in addition to the holding contact where required. In cases where more than 4 contacts are required, provide separate multi-pole relay in the starter or adjacent to it in a separate NEMA 1 box.

B. Provide where shown on plans fractional HP manual starting switch units complete with overload element, neon type pilot light and number of poles as required. Equip these starters with Satin Stainless Steel plates in finished areas to match wiring device plates specified under "Wiring Devices" with engraved designations.

C. Provide all miscellaneous relays and contactors required for interlocking single phase motors. Contactors shall be two to three pole as indicated on plans, rated (20 amp) 60 Hz and in NEMA 1 enclosures.

D. All relays and pilot or control transformers shall be separately fuse protected. Control transformers shall have fuse protection on the primary and secondary sides of the transformer.

E. All motor controls shall be Square D, General Electric, Westinghouse, Allen Bradley, Federal Pacific, or approved equal. Controls shall be of the same manufacturer.

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PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. The Fire Management (FM) and Environmental Control System (ECS) for Unit B/C Phase XIII Contract shall include the extension of the following:

1. Fire Alarm and Smoke Detection System.
2. Voice Alarm and Voice Communication System.
3. Automatic Smoke Control System.
4. Automatic Temperature Control System.

C. The Fire Management and Environmental Control System specified herein and shown on the drawings is Honeywell, Inc., equipment and is an extension of an existing Honeywell system. It is the intent of these specifications to describe the FM performance criteria and a level of equipment quality and function.

D. Coordinate all new work with existing Unit B/C installation and provide additional programming and graphic display revision necessary to integrate the Unit B/C Phase XIII FM and ECS Systems.

E. In general, conduit and wiring layouts associated with the FM System are shown on the electrical drawings as required for the system. All electrical installation work and wiring associated with the FM and ECS System shall be performed by the Electrical Contractor under the supervision of the FM and ECS System supplier. Installation shall be in accordance with the plans and specifications and the FM and ECS System installation drawings. All wiring shall be in conduit and in accordance with the appropriate sections of the National Electrical Code and applicable state and local codes.

F. All pneumatic control installation work associated with the FM and ECS System to activate certain automatic smoke control and automatic temperature control sequences of the HVAC systems will be provided by the FM and ESC supplier.

G. It is the intent of this specifications to define a Fire Protective Signaling System in accordance with the standards established by the National Fire Protective Association (NFPA). Underwriter's Laboratories (UL) standards for equipment testing will be used to established conformance to NFPA requirements.

1. The UL listing shall be for the following types of service:

- a. Automatic Fire Alarm.
- b. Manual Fire Alarm.

2. The UL listing shall be for the following system types: Local: intended to be installed per NFPA 72A.

3. The system shall be supplied with all hardware and installed to comply with all requirements of NFPA 72A Standards for Local Protective Signaling Systems. The system shall meet NFPA 72A signaling systems requirements.

1.2 SHOP DRAWINGS AND INSTRUCTION MANUALS

A. The FM and ECS supplier shall submit reproducible engineering and installation shop drawings of the complete integrated Fire Management and Environmental Control System prior to installation of any equipment. These drawings shall include catalog equipment data and complete wiring schematics and diagrams of all components of the system. All drawings shall be cross referenced to the temperature control drawings where these systems are interconnected for smoke control sequences.

B. All FM and ECS System shop drawings required under paragraph A above shall be submitted to the Engineer and University within 60 days of award of the electrical contract.

C. Provide complete instruction and maintenance manuals of the FM and ECS System. Manuals shall be included but not be limited to the following data:

- 1. Final "as-built" shop drawing wiring diagrams and schematics.
- 2. Floor plans locating all devices to the FM and ECS system and indicating the point number assignment of each device. Floor plan shall also indicate all conduit and wiring interconnecting the components of the system.
- 3. Hard copy drawings of the FM and ECS System graphics.
- 4. Complete operator's instructions for all specific components of the FM and ECS System. Instructions shall include general information, basic operating and emergency procedures of fire alarm system; operator's terminal, printer module, voice alarm and communication system, control of ventilation systems for smoke control.
- 5. Input/output summaries and references including event program summary and directory of graphic displays.
- 6. Programming and point entry and assignment instructions.
- 7. Maintenance instructions of all periodic maintenance required for components of system.

8. Testing procedures for all components of system.

9. Temperature control drawings cross referenced to the FM System drawings.

D. These manuals shall be submitted to the Engineer and University for review prior to acceptance.

1.3 GUARANTEE, TESTING AND INSTRUCTIONS

A. The entire fire management system installation shall carry a one-year guarantee after acceptance of the complete system by the University. Acceptance is defined as the date upon which the University and Engineer have granted approval of complete system installation.

1. FM supplier shall guarantee all devices against defects in material or workmanship and shall guarantee all installation, material and labor provided under this section of work by the allied trades.

2. Electrical Contractor shall guarantee all conduit, wire and electrical installation labor.

B. The complete system shall be totally tested and include a check-out of all manual and automatic system functions to insure proper system operation. Each smoke detector shall be tested to insure proper sensitivity. Testing shall be provided as recommended by the manufacturer for all system components.

C. Provide a complete and thorough training and instruction period to the Owner's designated representatives in the operation of the FM System. Instructions shall explain in detail all system functions as they relate to the operation of this installation. Instructions shall cover periodic testing and check out requirements of the system and components. A minimum of 8 hours of instruction to the University shall be provided under this contract and shall be scheduled at a time approved by the University.

D. Provide comprehensive instruction manuals for the operation, testing and maintenance of the system and its components as specified in Article 1.2 above. These manuals shall be provided at the training and instruction period specified and shall be used as a training guide.

PART 2: PRODUCTS AND INSTALLATION

2.1 FIRE ALARM AND SMOKE DETECTION SYSTEM

A. General

1. Provide and install a complete, electrically supervised, low voltage, 4-wire Class A, closed circuit, zoned, non-coded, fire alarm system. Extend from the existing system as described herein and as shown on the plans.

2. The fire alarm system equipment specified under this section shall be totally solid-state to be compatible with computer oriented digital technology of the existing system. The system shall be a standard with the manufacturer to

insure on-going parts availability and trained technical support. The installation shall include all conduit, wiring, and equipment to make it a completely operable system. All programming and interface equipment necessary to be included in this contract.

B. The existing Central Control Station (CCS) is located at the third floor in Room 75. Certain system equipment shall be remote from Room 75 but shall be considered part of the CCS.

C. Central Processing Unit is an existing Honeywell Delta 1000 located in Room 75 on the third floor of Unit B/C and provided under Unit B/C Phase I Contract. The CPU has the capability of automatically initiating commands upon an alarm occurrence. Any input point may be assigned as an event initiator. A change of status at the alarm initiator will cause a pre-defined series of commands, called an event program, to occur. Programming circuits necessary to cause the existing central processor to function as described have been included in the Unit B/C Phase I Contract.

D. Remote Data Panels

1. Remote Data Panels (RDP's) for collection of input data shall be furnished to meet the specified (FM) system requirements and as shown on the drawings to minimize the length of wiring runs from sensors and actuators. RDP's must be able to handle start/stop commands, control point adjustments, damper positioning, digital alarm and status inputs and any intermix of analog inputs such as temperature, humidity, pressure and other industrial type millivolt inputs.

2. All analog signals entering the RDP shall be converted to error free digital signals for transmission to the central processor unit (CPU). Transmission from RDP to the CPU shall not be limited to hardware only, but shall be capable of transmission via commercially available voice grade telephone circuits. All analog value signals from the analog sensor to the RDP's shall not be transmitted in analog form for more than 100 feet before being converted to digital form. All digital signals entering the RDP's for fire and security shall have line monitoring for current deviation provided by end of line resistors.

3. The Appendix A input/output (I/O) summary specify the data inputs and central functions for the CCS.

4. The RDP's shall have a minimum 4-hour stand-by power supply and shall be located where shown on the plans to minimize present and future wiring requirements. All remotely located RDP's shall be supplied factory pre-wired and shall be of solid state, plug-in circuit board construction. Each command function shall be operable both manually from the Operator's Terminal and automatically from a central processor generated time or event program. the remote data panels shall have circuitry to alarm the central processor upon AC power loss, indicating the individual data panel affected. RDP's shall be Honeywell FS20A and Series 1000 required for specified (FM) system functions.

E. Digital Sensors

1. The RDP's shall be designated to accept digital inputs from devices with isolated dry type contacts (no grounds or no voltage) of either the normally open (N.O.) or normally closed (N.C.) configuration.

F. Fire Alarm Control Units

1. The Fire Alarm Control Units are existing Honeywell W938 Series provided under the Unit B/C Phase I Contract. The control units provide 24V DC power for ionization smoke detectors, and fire alarm signaling circuits.

G. Proof of Equipment Operation

1. Differential pressure or air flow switches shall be provided to prove fan operation. Positive operating status and alarm condition shall be proven for all fans.

2. The system shall have the capability of not only alarming abnormal OFF conditions of fans, but shall also indicate abnormal ON conditions of the same equipment. If a start command has not been issued from the central console and a piece of equipment is turned on, the central processor shall alarm an abnormal ON. This abnormal ON shall also sound the audible alarm and display the alarm ON condition.

H. Manual Stations

1. The manual fire alarm stations shall be Honeywell S464 break glass type. Manual stations shall be operated by pulling down on the lever. The lever shall remain down with the alarm contacts closed until the station is reset.

2. The manual station shall be reset by opening the front, resetting the switch and replacing the glass rod. A spare glass rod shall be furnished for each station.

3. Stations shall be semi-flush mounted in finished areas and surface mounted in unfinished areas as shown on drawings. Provide surface mounted back box painted red for each surface mounted station.

I. Smoke Detectors

1. Ceiling mounted detectors shall be of the dual chamber low voltage ionization type. Each detector shall contain an integral visual alarm indicator with provision for connecting a remote alarm lamp if required in the installation. Both surface and recessed mounting models shall be provided and the proper quantity of each type shall be furnished as required or designated on the plans. The detectors shall mount in a plug-in base containing all terminals for field wiring connections, to allow all wiring to be completed, checked out, and tested, prior to installation of the detectors. Detector shall be Honeywell TC100A.

2. Duct mounted detectors shall be of the dual chamber ionization type. They shall be designed for use in air streams with an appropriate enclosure, and sampling tubes to assure cross-sectional sampling of the air stream within the duct. The duct detectors shall be completely self-contained, including power supply, isolated alarm and trouble contact outputs, power and alarm indicating lamps, key-operated reset switch, and test connection for portable test equipment. Detector shall be Honeywell TC100B (duct mounted).

3. Detectors shall have been tested for performance and stability in accordance with Underwriter's Laboratories Standard 167 and both ceiling and duct mounted detectors shall be U.L. listed.

4. Both ceiling and duct mounted detectors shall be of the type that portable test equipment designed for the purpose can be used to perform complete electrical measurements of the circuit voltage, sensitivity, etc., with the detectors installed in the system at the location of each detector.

5. The ceiling and duct mounted detectors and control units for the fire detection and alarm system shall be of the same manufacture.

6. The detector supplier shall have a local service organization capable of providing service by trained engineers or technicians. The system installation shall be installed by, or under, the direct supervision of the manufacturers' authorized supplier who shall perform the system check-out and testing and certify the installation. Each detector shall be field tested after installation is complete.

2.2 VOICE ALARM AND VOICE COMMUNICATION SYSTEM

A. General

1. It is the intent of this specification to provide an extension of a supervised emergency evacuation system as specified herein and shown on the drawings. The work includes furnishing equipment and installation to meet the requirements for a complete and operational system in conjunction with the Fire Alarm and Smoke Detection System. The sound equipment racks are located at Unit B/C Third Floor, Room 75 which contains all central sound equipment for the system.

B. Function

1. The system provides for speaker coverage of the zones shown on the plans and interfaces with the fire alarm system to provide pre-alert signals and pre-recorded messages for automatic transmission of evacuation instructions over the speakers to be provided under this contract. The system is activated by initiation of an alarm by any of the fire alarm system devices or sprinkler system devices. The pre-alert signal silences automatically and the zones automatically receive programmed pre-recorded messages.

2. Provide for electrical supervision of the speakers in addition to the wiring in the zones. Removal of a speaker, damage to a speaker or non-operation of a speaker shall cause an audible and visual annunciator to activate at the

control console location. Speakers provided under this contract shall be connected to existing speaker zones provided under Unit B/C Phase I Contract as shown on the plans.

C. Speakers

1. Speaker types shall be as follows and as shown on the plans. Provide backbox and baffle for each speaker.

a. Type A - Model 5A451 speaker, Lowel #DP68X backbox with speaker support cover (black finish) to fit box with 7" diameter hole for speaker and mounting holes for speaker and backbox. In general the Type A speaker system shall be used above accessible ceilings where the perforated ceiling metal pan or panel provides the speaker baffle.

2.3 AUTOMATIC SMOKE CONTROL SYSTEM

A. General

1. Automatic smoke control system is designed to control the movement of smoke within an area where a fire has been detected. On fire alarm, the Event Initiated Program (EIP) will close the smoke doors on the fire floor, close the motorized damper supplying ventilation air to the fire zone and modify the control sequence of the supply and return air fans serving the fire zone as shown in the input-output schedule, and as specified by the sequence of control for each air handling system under "Smoke Control Mode" of the Automatic Temperature Control System.

B. Equipment

1. Motorized Dampers

a. Dampers shall be Honeywell D640 parallel blade type. Operators shall be Honeywell pneumatic type, two position spring return damper operator sized to assure adequate torque to positively close damper when power is supplied. Damper shall be activated by an E.P. switch.

b. Certain existing motorized dampers shall be utilized to accomplish the smoke control initiated by the smoke detectors added under this contract.

2.4 FIRE MANAGEMENT SEQUENCE OF OPERATION

A. On fire alarm the existing Event Initiated Program (EIP) provided under Unit B/C Phase I Contract will initiate the following fire management sequence of operation.

1. Alarm is transmitted to Mayo Information Desk and to the central control station.

2. Heating, ventilating and air conditioning equipment servicing fire area and fire floor automatically goes to smoke removal sequence of operation.

- a. Motorized damper in supply air in fire areas closes.
- b. Supply air systems serving adjacent areas on fire floor and floor above and floor below go to 100 percent outdoor air.
- c. Automatic temperature controls maintain proper supply fan discharge temperature.
- d. Supply fan variable inlet vanes are placed under static pressure control to maintain desired static pressure in air supply duct.
- e. Return exhaust system serving fire area goes to 100 percent exhaust air.
- f. Motorized relief air dampers associated with Unit A building systems relieving air in a common air shaft serving both Unit A and B/C shall close for all air handling units located at the basement equipment room only.
- g. Air supply unit for stair tower pressurization is started.
- h. Elevator shafts and equipment room are pressurized by closing return relief damper or exhaust fan shutdown.

3. Doors into stair towers are unlocked to allow access from stair towers to building.

4. Alert tone followed by pre-taped emergency message and instructions is announced over voice alarm system. Different messages are transmitted to:

- a. Fire Floor
- b. Floor above fire floor
- c. Fire below fire floor
- d. All other floors
- c. Elevators

Override from CCS and direct microphone audio announcements to any or all audio zones may be performed at any time.

5. All elevators are captured and brought to ground floor and placed in "key operate" mode for use by fire department personnel.

6. Smoke doors are closed isolating elevator lobby areas from general floor areas and Unit B/C from Mayo and Unit A.

7. CCS printer provides printed record of the specific alarm initiating device and verification of occurrence of individual sequence items.

8. CCS operator arrives in control room and graphics are activated and displayed as follows:

a. Graphic Display 1

1) Floor plan of specific fire floor area identifying all alarm initiating devices and indicating ventilating units supplying the area as a part of the smoke control system.

b. Graphic Display 2

1) CCS operator instructions which are coordinated with information displayed on Graphic Display No. 1.

c. Graphic display shall hold-in on the floor of the initial fire alarm signal.

2.5 AUTOMATIC TEMPERATURE CONTROL SYSTEM

A. General

1. The work under this subsection consists of furnishing and installing a complete system of pneumatic automatic temperature control as shown on the drawings and described herein.

2. Related work specified elsewhere:

a. Basic methods and materials: Section 15100.

b. Pipe and pipe fittings: Section 15110.

c. Domestic and laboratory hot water systems: Section 15220.

d. Hot water heating system: Section 15650.

e. Ventilation and air conditioning: Section 15800.

f. Mechanical work for fire management and environmental control systems: Section 15950.

3. The following work is not part of this section of the specification and will be performed by the mechanical contractor under Section 15950 with supervision by the Fire Management and Temperature Control Subcontractor.

a. Confirm control dampers sizes to FM and ECS supplier before fabrication.

b. Installation of automatic control dampers.

c. Furnishing and mounting of damper blank-off plates.

d. Installation of immersion wells and pressure tapping.

- e. Installation of water flow switches.
- f. Installation of automatic control valves.
- g. Installation of liquid level switches.
- h. Installation of pressure tapping and associated shut-off cocks.
- i. Installation of orifice plates and companion flanges.

B. Automatic Temperature Control Systems

1. The automatic temperature control system shall be as manufactured and installed by Honeywell Inc. The system shall be of the pneumatic type except that electronic equipment components shall be used where specified. The systems shall be installed under the full time supervision of an authorized installation engineer.

2. All pneumatic electric switches, electric pneumatic switches, control relays and interlocking relays shall be contained in the motor control center and enclosure as specified under Article 2.8 Motor Control Centers. Low temperature protection thermostats will be wired to the MCC.

3. See Mechanical Drawing Sheets for locations of mechanical equipment controlled, control valve and damper, thermostat and humidstat locations.

C. Temperature Control Piping

1. Piping

a. Pipe - Type "L" hard drawn copper or virgin polyethylene. Polyethylene tubing shall meet the stress and crack test performed per ASTM D 1693, and shall be classified as flame retardant and must be rated as self-extinguishing capable of passing ASTM-635 flammability test.

b. Fittings - extruded of wrought copper or sharp barb type that does not require spring clips.

c. Joints - soldered, except compression fittings shall be used at instruments or compatible with polyethylene fittings as specified above.

2. All lines in the equipment rooms and in other unfinished spaces shall be run exposed in a neat and orderly manner with pipe runs grouped as much as possible. All tubing and conduit which must run exposed shall follow vertical and horizontal contours to the satisfaction of the Architect/Engineer and be rigidly secured to the building construction at 4'-0" o.c. Tubing shall not be allowed to be fastened to ductwork or electric conduit. All lines in finished spaces shall be run concealed with the majority of each piping installed above the suspended ceilings and in furred walls. Tubing shall be supported from copper clad clevis hangers.

3. Suitable drip legs and drain valves shall be installed at all low points in the piping system to eliminate accumulated condensate.

4. Air piping to controllers shall not be installed in outdoor air intakes where freezing conditions may occur.

5. All tubing or piping, except local individual room control, shall be number coded or color coded for future identification and servicing of the control system.

6. Non-metallic polyethylene tubing used for thermostat fittings shall be 5/32" diameter clearly marked "branch" and "main". These two lines shall be wrapped with a polyethylene cover. A complete line of fittings shall be available for "dry wall" construction, plaster, brick, precast or tile walls. Where tubing exits the wall into the suspended ceiling area, the tubing shall be run in conduit, or protected with "spring" covering to the valve. Tubing run in flexible spring covering shall not exceed 12". Suitable plastic grommets shall be used where polyethylene tubing enters or leaves the conduit or junction boxes for the final connections.

7. All non-metallic polyethylene tubing run in mechanical equipment rooms, utility areas, or finished spaces where other tubing is exposed shall be run within adequately supported rigid metallic raceway, EMT pipe or duct. Terminal single lines shall be hard drawn copper except if the run is less than 12", in which case flexible polyethylene tubing enclosed with flexible spring may be used. Polyethylene tubing shall be supported as in 2 above.

8. Non-metallic polyethylene tubing installed in concealed locations such as pipe chases shall be run parallel to the lines of the building, be adequately supported, and protected as in subparagraph 7 above.

9. Non-metallic polyethylene tubing installed within walls and not adjacent to other service shall be installed in a neat and workmanlike manner, adequately supported and run parallel to the building lines.

10. Polyethylene tubing in 4, 7 or 12 1/4" black tubes individually numbered shall be wrapped with a Mylar tape all enclosed in a .062 jacket of polyvinyl. Bundled tubing of this type may be used for switching lines and shall be self-supporting tied firmly to the structural members. Refer to paragraph 6 for support of tubing.

11. Tubing installed inside or behind control panels shall be neatly tied and supported.

12. System Testing

a. The entire pneumatic piping system shall be tested by placing it under 30 psi pressure for 24 hours with a drop not exceeding 1 psi during that time.

b. All temperature control systems shall be checked out under operating conditions with the actual operations verified and temperature readings taken around each control point to provide the correct control function or operation. All damper function shall be similarly verified. These facts shall also be included with the required certificates.

D. Electrical Work

1. All wiring of PE and EP switches and electrical control devices shall be by the Electrical Contractor under the supervision of the ECS supplier, except as noted otherwise.

E. Control Instruments and Equipment

1. In general, the control instruments and equipment furnished for this installation shall be the best product of its type produced by the manufacturer. The following specifications are intended to set a minimum standard for the particular device described.

2. Dampers: Frames shall be constructed of two hot dipped sheets welded together to form a corrugated blade. Frames shall be hot dipped galvanized steel. Blade width shall be a maximum of 6". All blades shall have replaceable rubber seals along the blade edge. Frames shall have metal stops with rubber seals to seat against ends of each blade. Dampers shall have nylon bearings and oil impregnated shafts. All linkages shall have oil impregnated bearings and shall be enclosed in the dampers frame. No linkage shall be allowed in the airstream. Modulating dampers shall be opposed blade; two position dampers shall be parallel blade.

3. Space Thermostats: They shall be of the proportional-positioning type with adjustable throttling range. Pneumatic non-bleed thermostats shall be of the key operated type, internal stops and be capable of operating on a change in temperature of plus or minus 10F at the thermostat location. Furnish two dozen keys with the installation. Thermostat finish shall be as selected by Architect. Stat located on outside wall shall be insulated to prevent cold way influence. Covers shall expose the set point but conceal the thermometer. Fully recessed aspirating type pneumatic thermostats shall be installed in toilet rooms, vestibules, corridors and traffic areas. Provide electric line voltage thermostats where called for on the drawings. Guards shall be provided on thermostats in equipment rooms. Submit guard for approval.

4. Pneumatic Insertion Sensors

a. Sensors shall be proportioning in action, of corrosion resistant construction, with appropriate range of Degrees Fahrenheit on a calibrated gauge located as indicated on plan. Sensors shall be factory calibrated with all adjustments at the centrally located controller. Provide a red reading angle duct, industrial type thermometer beside each insertion sensor.

b. Averaging element temperature sensors shall be supplied for mixed air, and all other sensing locations when stratification of temperature is likely. To provide adequate coverage average element shall not be less than 20 feet and be serpentine over the sensing area. If a sensor has less than a 20 foot element, two or more sensors shall be supplied.

c. Immersion sensors shall be installed in stainless steel or copper well packed with a heat transfer compound. Honeywell No. 14500430.

d. Space and duct humidity sensors shall have a sensing span of 30 to 80 percent relative humidity for a 3 to 15 psig pressure change. All humidity sensors shall be temperature-compensated and provide pneumatic feedback. Adjustments shall be factory calibrated and sealed.

5. Pneumatic Sensor Controllers: These shall be force-balance, non-bleed pneumatic amplifiers designed for corrosion resistance to high humidity and with integral gauge ports. Controllers shall be field adjustable to either direct or reverse action and for width of proportional band. Set point shall be at the controllers.

a. Authority of compensating sensors shall also be adjustable at the controller.

b. Controllers shall have capability of remote control point adjustment from a proportional manual switch located as directed.

c. Pneumatic receiver controllers shall be supplied with control point adjustment input ports.

6. Pneumatic Actuators: All shall be sized to operate their appropriate dampers or valves with sufficient reserve power to provide smooth modulating action or two-position action as specified. When so specified in the sequence of operation or where more than two actuators are to be operated in sequence to each other, provide position feedback positive positioners with adjustable start point and operating range. Construction shall be piston-type operator, rolling neoprene diaphragm and aluminum body. Operators of plastic type construction are not acceptable.

7. Electronic Pneumatic Relays: Electronic - pneumatic relays shall be completely transistorized and controlled in unitized completely enclosed cabinets. Cabinet shall contain terminal strip and all pneumatic and electronic modulating pneumatic signal to operators.

8. Relays and Switches: Relays of the positive and gradual-acting type and switches shall be furnished and installed as required for the successful operation of the system. All switches shall include suitable indicating plates. Positive positioning devices shall be utilized on all operators where sequencing is specified.

9. Control Valves

a. Valves for reheat hot water service shall be 2-way gradual acting types. Valves shall be suitable for use with 210°F hot water and shall be leakproof under a static head of 100 psi. Valves shall have renewable composition discs and parabolic throttling guides. Valves shall have a shut-off rating of not less than 50 psi. Valves shall be Honeywell VP 514C normally closed.

b. Three-way control valves and diverting valves shall be Honeywell VP 516 mixing valve, or approved equal. Where this valve does not meet flow requirements, Honeywell Series 1600, or equal shall be used.

c. All valves located where it is not obvious what equipment the valve serves shall be tagged as described in Section 15120.

d. All control valves described under this section shall have stainless steel stems and spring loaded self adjusting teflon packing.

e. Valves seats for all valves shall be screwed into body and be replaceable. Seat material shall be brass for screwed bodies and bronze for flanged bodies.

F. Gauges

1. There shall be a minimum of one gauge on all branch lines from all controls. There shall also be sufficient gauges on main lines to indicate pressure in location of groups of controls. There will not have to be a gauge on main line to thermostats in finished rooms, but there shall be a gauge installed in the branch lines to the room unit valves. The gauges shall be a standard product of the control manufacturer for measuring air line pressure.

G. Operating Instructions

1. Upon completion of the work, the manufacturer shall have a qualified representative fully acquainted with the installation to instruct the Owner's Operator in the fundamentals and operation of the system. This instruction period shall not be less than one (1) full working day. the manufacturer shall also, upon completion and acceptance of the work, provide the Owner with three (3) typewritten and/or printed sets of operating and maintenance instructions including sheets describing fundamentals of each system in the installation. One (1) similar set shall be provided for the Architect/Engineer, all sets being neatly clipped in heavy manila folders.

2. The manufacturer shall also mount one (1) set of charts consisting of complete control diagrams, wiring diagrams, etc., adjacent to the equipment in a conspicuous location. Charts shall be mounted in a glass enclosed case.

3. When the system is completely installed and proven to be in operating condition by the control manufacturer and ready for acceptance, the manufacturer shall furnish to the Owner twelve (12) complete sets of instrument adjusting keys and any special wrenches, screw-drivers, or tools necessary for normal service of the same.

H. Sequences of Control

1. Reheat Coil Control

a. Individual room thermostats shall control each reheat coil as shown on the drawings. Certain key room thermostats in addition to controlling their associated reheat coil, shall through a high pressure cumulator control the supply air discharge air temperature of the associated supplied air system. Note: Existing key thermostats in the building also affect their associated supply air temperature, through existing high pressure cumulators.

Key Thermostat Schedule

<u>Unit #</u>	<u>Unit Location</u>	<u>Floor Serves</u>	<u>Room Numbers for Key Thermostats</u>
S-7C	Basement	5th Floor	109, 107

FIRE MANAGEMENT NOTES

1. Provide programming as required to add this device to existing smoke control sequence 5F. Revise graphics as required.
2. Input/output point identification for smoke control sequences was identified and assigned for future use under Unit B/C, Phase I Contract. Provide additional programming and equipment as specified to complete the functions identified in the I/O schedule.

GENERAL FIRE MANAGEMENT NOTE

Electrical Contractor shall make all necessary fire management connections in existing data gathering panels (DGP) located in core #32 for new fire management devices provided under this contract.

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	INDICATION					AUTO. SEQUENCE UPON ALARM								COM. AND STATUS				
	GRAPHICS	ZONE ALARM	ZONE TROUBLE	ZONE SUPERVISORY		NOTIFY FIRE DEPT.	NOTIFY BLDG. ENG.	SMOKE CONTROL SEQ.	PRESS. STAIRS	UNLOCK STAIRS	EMERG. MESS. SEQ.	RELEASE SMOKE DOORS	ELEV. TO GROUND FL.		ON/OFF CONTROL	ON/OFF STATUS		
5th Floor																		
FSZ-5-4			X	X			X											
DGP Power Off			X	X			X											
Smoke Control Seq. 5F	X														X	X		
RE3C-5-4	X	X	X			X	X	F	X	X	A	X	X					See Note #1
RE6C-5-4	X	X	X			X	X	F	X	X	A	X	X					See Note #1
E1C-5-22	X	X	X			X	X	F	X	X	A	X	X					See Note #1
MSZ-5-12	X	X	X			X	X	F	X	X	A	X	X					See Note #1

DUTY CYCLE AND SMOKE CONTROL SEQUENCE SCHEDULE

SMOKE CONTROL SEQUENCE	FIRE AREA	SUPPLY FAN MOTORIZED DAMPERS CLOSE AT FLOOR LEVEL	RETURN FAN TO 100% EXHAUST	SUPPLY FAN TO 100% OUTSIDE AIR	REMARKS
5F	RE3C-5-4 RE6C-5-4	S7C-5-4	RE6C RE3C	S7C S4C	See Note #2

INPUT/OUTPUT SCHEDULE LEGEND

(APPENDIX "A")

INDICATION

- GRAPHICS - Alarm identification and location is shown on existing display No. 1 and operator instructions are shown on existing display No. 2.
- ZONE ALARM - Specific initiating device is identifiable from existing CCS.
- ZONE TROUBLE - Trouble alarm at existing CCS for each item listed.
- ZONE SUPERVISORY - Supervisory alarm at existing CCS for each item listed.
- NOTIFY FIRE DEPT.- Fire Alarm signals transmitted to municipal connection.
- NOTIFY BLDG. ENG.- Signals to be transmitted to Data Center in Room 113 of Unit "A" are listed below:
- Zone alarm
 - Zone trouble
- SMOKE CONT. SEQ. - Sequence defined in Smoke Control Sequence Schedule.
- PRESS STAIRS - Stair pressurization unit is started upon any alarm signal received except zone trouble and zone supervisory.
- EMERG. MES. SEQ. - Emergency Message and Instructions to broadcast.
- SEQUENCE A - Fire Floor, Floor Above, Floor Below, Elevators, and all other floors.
 - SEQUENCE B - Fire Floor, Floor Below, Elevators and all other floors.
- RELEASE SMK. DRS.- All smoke doors are released.
- ELEV. TO GRD. FL.- All elevators are returned to ground floor. Third Floor is ground floor. If alarm originates from Third Floor elevator lobby detector, elevator shall return to second floor.
- ON/OFF CONTROL - Control of On/Off Condition from CCS for items listed.
- ON/OFF STATUS - Status of On or Off is displayed at CCS for items listed.