



**COLUMBIA PARK POOL ENCLOSURE  
BUREAU OF PARKS & RECREATION  
FOR CITY OF PORTLAND**

**FILMED** JUL - 1975

**JOB NO. 73.007**



PROPOSAL: Columbia Park Pool Enclosure  
Bureau of Parks & Recreation  
For City of Portland

TO: City of Portland, Oregon  
% Purchasing Agent  
Room 209 City Hall  
Portland, Oregon 97204

APPROVED NOV 15 1973  
SUBJECT TO PROVISIONS IN LETTER DATED

OREGON STATE HEALTH DIVISION  
By: *Geo. S. Farr Jr.*  
DIRECTOR, OFFICE OF PUBLIC HEALTH ENGINEERING

Gentlemen:

1. The undersigned, having full knowledge of the requirements and conditions and having inspected the premises on which the work is to be done, hereby proposes to furnish all materials, labor and equipment for "Columbia Park Pool Enclosure, Bureau of Parks & Recreation for City of Portland" in strict accord with the drawings and specifications for same dated October 8, 1973 and any addenda thereto issued prior to the date of bid opening, all as prepared by Facilities Planning, City of Portland, Loyal C. Lang, A.I.A., Supervising Architect, for the following sum:

Basic Bid: (All work complete except that which is included in the following additive alternate)

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

Alternate No. 1 (To sandblast and refinish the present pools).

ADD \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

2. All work shall be completed within 120 calendar days from and including the date on which a 'Proceed Order' is issued by the Architect.
3. The undersigned bidder understands that determination of the successful bidder and award of the contract is subject to review and determination by the City Attorney as to legal sufficiency of any submittal.
4. Enclosed herewith or previously filed with the City of Portland is a certified check or an approved bid bond in an amount equal to at least ten percent (10%) of the amount of the basic bid, and payable to the order of the City of Portland. Said amount shall be paid to the City of Portland as liquidated damages if the undersigned is tendered a contract for this project and neglects or refuses to sign the contract or to furnish an approved performance bond, and to furnish evidence of required insurance, all within ten (10) days after receiving the form of agreement from the City Auditor. A copy of the form of the required Performance Bond may be inspected at the office of the City Attorney. All such checks or bid bonds shall be retained by the City of Portland for a period of time as set forth in Ordinance No. 130672, Code of the City of Portland, Oregon, Section 5.44.030 Retention of Bid Guaranty.

FILMED JUL 1975



BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, \_\_\_\_\_

\_\_\_\_\_, as Principal, and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_ and duly authorized to transact a surety business in the State of Oregon, as surety, are held and firmly bound unto the CITY OF PORTLAND, a municipal corporation of the State of Oregon, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)

Tawful money of the United States of America, for the payment whereof well and truly to be made, we and each of us, jointly and severally bind ourselves, or and each of our heirs, executors, administrators, successors and assigns, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that whereas the Principal has submitted or is about to submit a proposal to the Oblige on a contract for \_\_\_\_\_:

NOW THEREFORE, in the event the Principal in this bond is awarded the contract and the said Principal shall fail, neglect or refuse to enter into a contract to perform said work and furnish said labor, equipment and/or material, and to furnish performance and labor and material payment bonds as required within the time specified, then the amount herein stated shall be declared to be forfeited and become due and payable to the City of Portland.

SIGNED, SEALED AND DATED this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_.

Principal

Address

By

Title

Surety

By

Attorney in Fact

Oregon Agent for Service

Address

Corporate Seal (Principal)

Corporate Seal (Surety)



THE CITY OF  
**PORTLAND**



**OREGON**

BUREAU OF  
FINANCIAL AFFAIRS

K.M. HAMMON  
FINANCE OFFICER

DIVISION OF  
PURCHASES & STORES

1220 S.W. FIFTH AVE.  
PORTLAND, OR, 97204  
503/248-4000

A D D E N D U M    N O . 1  
November 14, 1973

**Project:** Columbia Park Pool Enclosure  
Bureau of Parks & Recreation  
For City of Portland  
October 8, 1973

**Notice to Bidders:**

All changes included in addenda issued prior to the bid date are to be included in the bidders' proposal and the contents of such addenda become a part of the contract documents for this project.

Bid Opening Date

The due date for bid opening has been changed from November 19, 1973 @ 10:00 A.M. to November 21, 1973 @ 2:00 P.M.

Proposal Form

Delete the entire statement contained in para 2. and insert the following:  
All work shall be completed within 120 calendar days from and including the date on which a 'Proceed Order' is issued by the Architect.

General Requirements - Division #1

(114) Time for Completion

Delete the entire statement and insert the following:

Within 120 calendar days from and including the date on which a 'Proceed Order' is issued by the Architect to the Contractor, the Contractor shall fully complete the work required by this contract.



Concrete - Division #3

1. The concrete footing requirements for walls between columns has been changed as shown on the accompanying drawing No. 1 A.

2. The concrete deck slab surrounding the pools shall be raised 4" higher than the elevations shown on the drawings. The slope to floor drains shall be held to a minimum of 1/4" to 1 foot. Raise manhole cover to new level.

3. Omit steel trowelling of deck slab and use Master Builders "Mastercron" aggregate dry mix and machine float to obtain a medium fine non-slip finish around pools.

4. Omit dustproofing as specified in (303) 6 and apply Master Builders 'Masterseal' as directed by the manufacturer at the rate not to exceed 450 sq. ft. per U.S. gallon.

5. The cutting of the present pool walls and the concrete work required for the placing of underwater lights shall be provided by the General Contractor.

Metals - Division #5

(502) 5-Skylight Ventilator

The following are approved for bidding:

Wonder Metal Model L-445  
Aiolite Model 609A  
Air Louvers Model 125  
American Warming Model SHW-P-200

Carpentry - Division #6

(602) 4-Protection

Delete the requirement that members be individually wrapped. All structural members shall be treated with water repellent Penta after fabrication, treatment to be suitable for receiving heavy body stain after erection.

Moisture Protection - Division #7

(707) Skylight

Panelux sandwich panel (2-3/4" in thickness) by Cemcel Corp. is approved for bidding.

**FILMED**

JUL - 1975



Finishes - Division #9

(901) Acoustical Panels

Change exposed grid tees, crosstees and perimeter channels from cold-rolled steel to Cupples or K.E. Gordon aluminum with white baked enamel finish. Edge channel to be 1/8" x 1-1/2".

Mechanical - Division #15

(15D-8) Sound Trap

The following is approved for bidding:

Buensod 3' Type 66.

Electrical - Division #16

(1620) Underwater Lights

Conduit from junction boxes to type "C" fixtures must be brass. The cutting and patching for underwater fixtures shall be provided by the General Contractor.

(1621) Lighting Fixtures and Lamps

The following fixtures are approved for bidding:

Type "B" - Benjamin FA-2324-4

Type "C" - Hubbell 425-3

1712-1A Junction Box

1712-2A Junction Box

Kim FW S10 LG

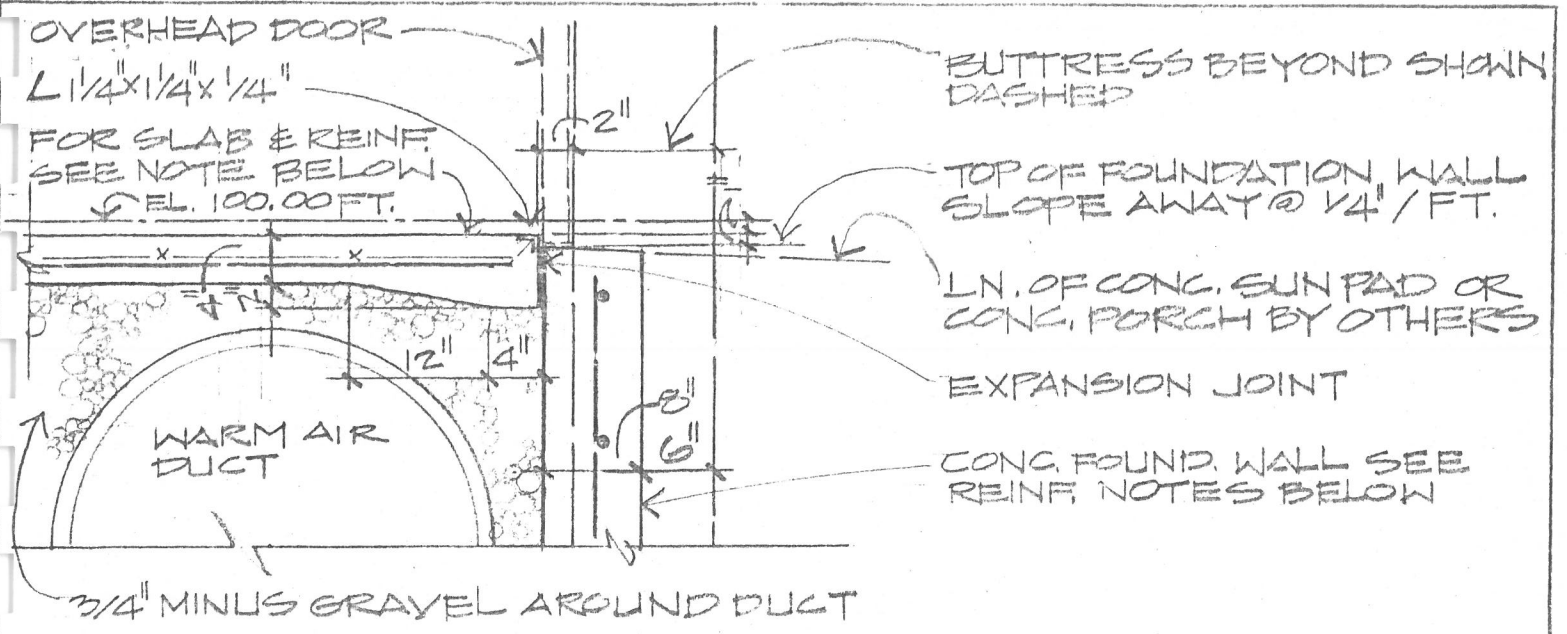
Type "D" - Benjamin OWW-100

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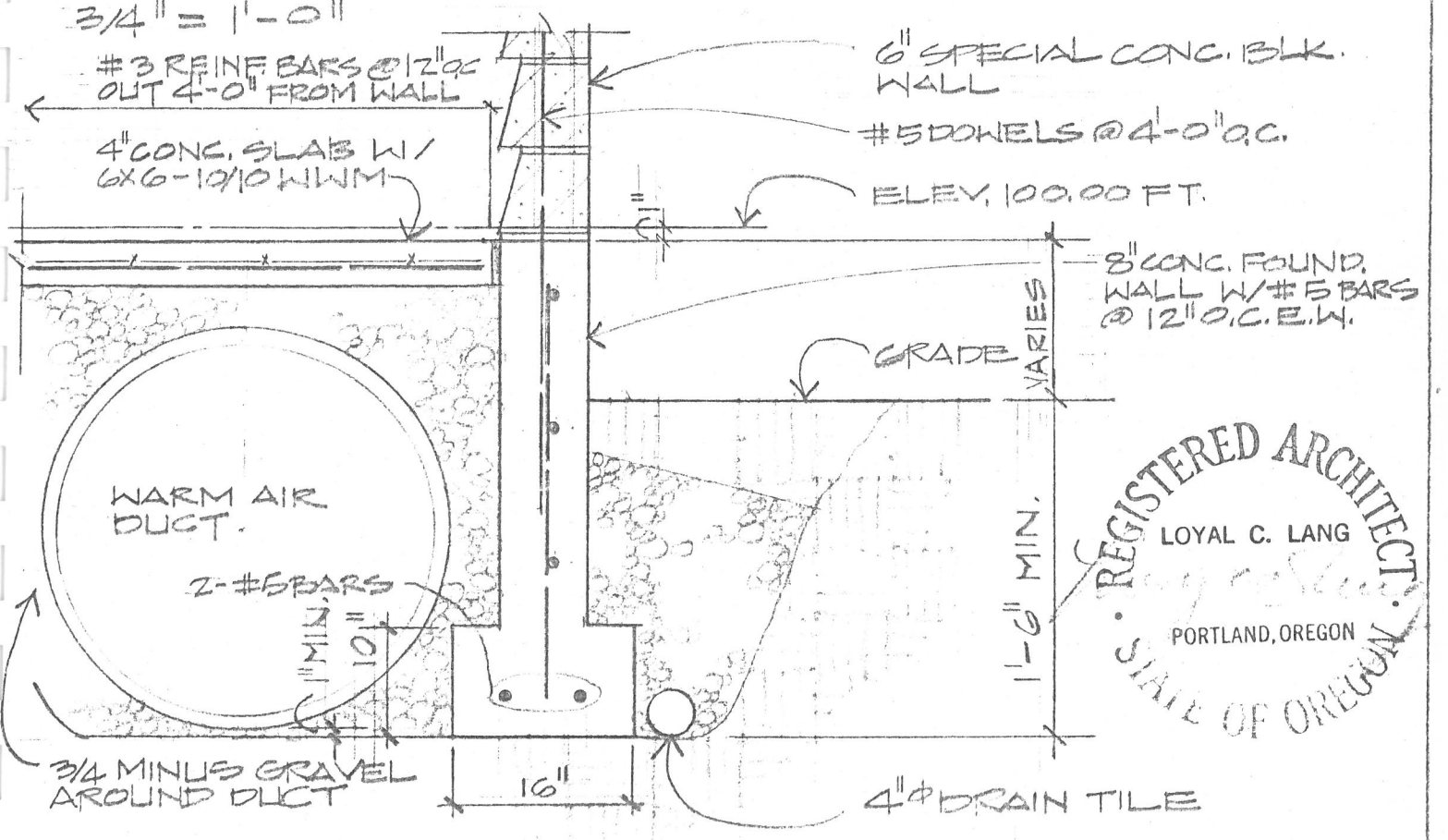
*K. M. Hammon*

K. M. Hammon  
Purchasing Agent





**FOUNDATION @ OVERHEAD DOORS**



**FOUNDATION @ TYP. MASONRY WALL**

3/4" = 1'-0"

**ADDENDUM NO. 1**  
**COLUMBIA PARK POOL ENCLOSURE**

FACILITIES PLANNING DIVISION				1-A OF 1
JOB NO. 73.007	DATE 11-14-73	DRAWN BY: JFS	APPROVED BY:	



PROPOSAL: Columbia Park Pool Enclosure  
Bureau of Parks & Recreation  
For City of Portland

TO: City of Portland, Oregon  
% Purchasing Agent  
Room 209 City Hall  
Portland, Oregon 97204

**BIDS OPEN**

DATE NOV 19 1973  
CERTIFIED CHECK OR BIDDERS BOND  
must accompany bid.  
See specifications for  
performance bond requirements.

**TO A.M.**

Gentlemen:

1. The undersigned, having full knowledge of the requirements and conditions and having inspected the premises on which the work is to be done, hereby proposes to furnish all materials, labor and equipment for "Columbia Park Pool Enclosure, Bureau of Parks & Recreation for City of Portland" in strict accord with the drawings and specifications for same dated October 8, 1973 and any addenda thereto issued prior to the date of bid opening, all as prepared by Facilities Planning, City of Portland, Loyal C. Lang, A.I.A., Supervising Architect, for the following sum:

Basic Bid: (All work complete except that which is included in the following additive alternate)

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

Alternate No. 1 (To sandblast and refinish the present pools).

ADD \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

2. All work shall be completed within 120 calendar days from and including the date on which a 'Proceed Order' is issued by the Architect.
3. The undersigned bidder understands that determination of the successful bidder and award of the contract is subject to review and determination by the City Attorney as to legal sufficiency of any submittal.
4. Enclosed herewith or previously filed with the City of Portland is a certified check or an approved bid bond in an amount equal to at least ten percent (10%) of the amount of the basic bid, and payable to the order of the City of Portland. Said amount shall be paid to the City of Portland as liquidated damages if the undersigned is tendered a contract for this project and neglects or refuses to sign the contract or to furnish an approved performance bond, and to furnish evidence of required insurance, all within ten (10) days after receiving the form of agreement from the City Auditor. A copy of the form of the required Performance Bond may be inspected at the office of the City Attorney. All such checks or bid bonds shall be retained by the City of Portland for a period of time as set forth in Ordinance No. 130672, Code of the City of Portland, Oregon, Section 5.44.030 Retention of Bid Guaranty.

Written protest against any portion of this specification must be filed in the Office of the Purchasing Agent at least 48 hours (2 working days) before date of opening of bids, as no specification changes will be considered after bids are opened.

PROPOSAL: Columbia Park Pool Enclosure  
Bureau of Parks & Recreation  
For City of Portland

5. The bidder states below whether he is doing business as an individual, a co-partnership, or as a corporation. If a co-partnership, all partners are named and the person signing on behalf of the co-partnership states his position with the co-partnership. If a corporation, the bidder gives the State of incorporation, whether it is licensed to do business in the State of Oregon, and the position of the person signing in behalf of the corporation.

Firm: \_\_\_\_\_

Business as: \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

Licensed to do Business in Oregon \_\_\_\_\_

Partners: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_

(Signature and Title)

Address: \_\_\_\_\_

Date: \_\_\_\_\_

**FILMED**

JUL - 1975



PROJECT: Columbia Park Pool Enclosure  
Bureau of Parks & Recreation  
For City of Portland

BIDDER \_\_\_\_\_

List of Proposed Sub-Contractors

<u>Firm Name</u>	<u>Address</u>	<u>Trade</u>
_____	_____	Excavation
_____	_____	Concrete
_____	_____	Masonry
_____	_____	Steel
_____	_____	Roof Structure
_____	_____	Roofing & Sheet Metal
_____	_____	Finish Carpentry
_____	_____	Rolling Steel Doors
_____	_____	H. M. Doors & Frames
_____	_____	Metal Specialties
_____	_____	Millwork
_____	_____	Acoustical
_____	_____	Finish Hardware
_____	_____	Painting
_____	_____	Skylights
_____	_____	Plumbing
_____	_____	Heating & Ventilating
_____	_____	Electrical
_____	_____	
_____	_____	
_____	_____	

Note: List all sub-contractors you will require and submit this list with proposal.

BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, \_\_\_\_\_

\_\_\_\_\_, as Principal, and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_ and duly authorized to transact a surety business in the State of Oregon, as surety, are held and firmly bound unto the CITY OF PORTLAND, a municipal corporation of the State of Oregon, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) lawful money of the United States of America, for the payment whereof well and truly to be made, we and each of us, jointly and severally bind ourselves, or and each of our heirs, executors, administrators, successors and assigns, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that whereas the Principal has submitted or is about to submit a proposal to the Obligee on a contractor for \_\_\_\_\_

NOW THEREFORE, in the event the Principal in this bond is awarded the contract and the said Principal shall fail, neglect or refuse to enter into a contract to perform said work and furnish said labor, equipment and/or material, and to furnish performance and labor and material payment bonds as required within the time specified, then the amount herein stated shall be declared to be forfeited and become due and payable to the City of Portland.

SIGNED, SEALED AND DATED this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Address

By \_\_\_\_\_  
(Title)

\_\_\_\_\_  
Surety

By \_\_\_\_\_  
Attorney in Fact

\_\_\_\_\_  
Oregon Agent for Service

\_\_\_\_\_  
Address

Corporate Seal (Principal)

Corporate Seal (Surety)



NOTE

If Principal is operating under an assumed business name, there must also be set forth in the first paragraph of the bond the names of all the partners or the individual owning the business, and the bond must be executed by one of them.

If the Principal is a corporation, the bond must be executed by one of the officers authorized to execute bonds, showing his official title and the seal of the corporation.

The bond must be executed by an attorney-in-fact for the surety company, show on the face thereof the Oregon agent for service, and bear the seal of the surety company. Where the bond is executed by a person outside the State of Oregon, his authority to execute bonds should be shown.

Columbia Park Pool Enclosure  
Bureau of Parks and Recreation  
For City of Portland

October 8, 1973



I N D E X

Instructions to Bidders

Pages 1 - 3

SPECIFICATIONS

Articles

General Conditions

1-20

Div.	1. General Requirements	101-120
	2. Site Work	201-209
	3. Concrete	301-303
	4. Masonry	401-402
	5. Metals	501-502
	6. Carpentry	601-603
	7. Moisture Protection	701-709
	8. Doors, Windows & Glass	801-804
	9. Finishes	901-904
	10. Specialties	1001-
	15. Mechanical - General	15A-1-15A-16
	Basic Materials & Methods	15B-1-15B-16
	Plumbing	15C-1-15C-15
	Heating & Ventilating	15D-1-15D-11
	16. Electrical	1601-1621

(Div. 11, 12, 13, 14 not used)



DRAWINGS

- Nos. 1. Site Plan, Location Map, Index
- 2. Floor Plan, Door Schedule, Details
- 3. Foundation Plan, Details
- 4. Reflected Ceiling Plan, Details
- 5. Roof Plan, Details
- 6. Exterior Elevations
- 7. Building Sections
- 8. Wall Sections, Details
- 9. Miscellaneous Details
- 10. Miscellaneous Details
  
- M-1. Site Plan - Mechanical, Location Map
- M-2. Foundation Plan - Mechanical
- M-3. Floor Plan - Mechanical, Detail
- M-4. Roof Plan - Mechanical
  
- E-1. Site Plan & Reflected Ceiling Plan - Electrical  
Symbols, Riser Diagram, Details
- E-2. Floor Plan - Electrical, Exit Light Wiring Diagram

Prepared by Facilities Planning Division, City of Portland  
Loyal C. Lang, A.I.A., Supervising Architect  
1020 S. W. Front Avenue Telephone: 248-4380

Project No. 73.007

## INSTRUCTION TO BIDDERS

### PROPOSAL

Proposals and bid bond, certified check or cashier's check shall be enclosed in a sealed envelope and addressed as required in the Notice to Contractors and filed as required therein. The Drawings and Specifications must be returned with the proposal.

All proposals must be clearly and distinctly typed or written with ink or indelible pencil without any erasures or changes, and any erasure or change may invalidate the proposal.

All proposals must be on the form furnished by the City. Any statement accompanying and tending to qualify a bid may cause rejection of such bid, unless such statement is required in a proposal embracing alternative bids.

### WITHDRAWAL OF PROPOSAL

A proposal may be withdrawn on written or telegraphic request of the bidder received prior to the scheduled closing time for filing bids. Negligence on the part of the bidder in preparing his proposal confers no right to withdraw his proposal after the scheduled closing time for filing bids.

### LATE PROPOSALS

Proposals received after the scheduled closing time for filing bids, as set forth in the Notice to Contractors, will be returned to the bidder unopened, unless such closing time is extended by the City.

### ALTERATION OF DOCUMENTS

Except as may be provided otherwise herein, proposals which are incomplete, or fail to cover all items of the Drawings or Specifications or which have been altered by the bidder may be rejected.

### MODIFICATION OF PROPOSAL

Change in a proposal already delivered will be permitted only if a request for the privilege of making such modification is made in writing signed by the bidder and the specific modification itself is stated and received prior to the scheduled closing time for filing bids. However, a modification which is received from an otherwise successful bidder and which makes the terms of the bid more favorable or advantageous to the City will be considered at any time it is received and may thereafter be accepted. To be effective every modification must be made in writing over the signature of the bidder.

### BID GUARANTY

Each proposal must be accompanied by a corporate surety bond, certified check or cashier's check payable to the City Treasurer for an amount not less than ten percent (10%) of the total amount of the bid. If a bid bond is submitted in lieu of a certified check, such bid bond shall be on the form provided with these specifications.

Such check or bid bond shall be forfeited to the City as liquidated damage in case the bidder fails or refuses to enter into a contract and furnish a

satisfactory bond within ten (10) calendar days after tender of form of contract by the City.

Whenever the City receives a signed approved contract together with the required evidence of insurance and performance bond, or rejects all bids, the bid guaranties then being held by the City will be returned. In any case, no more than thirty days after award of the contract, the bid guaranties of all except the successful bidder and the next best bidder will be returned.

If the successful bidder fails, neglects or refuses to enter into a contract, the City may award the contract to the next best bidder.

#### ADDENDA TO PLANS OR SPECIFICATIONS

Requests for additional information or for interpretation of the contract documents shall be delivered to the Architect, in writing, at least six (6) days before the date set for opening of bids. If, in the opinion of the Architect, additional information or interpretation is needed by the bidders, an addendum will be issued to all planholders. The provisions of any written addenda issued by the Architect at least forty-eight (48) hours before the time set for the opening of bids shall be binding upon the bidders and failure of a bidder to obtain such addenda shall not excuse him from complying therewith, if he is awarded the contract.

#### BASIS OF AWARD

The award will be made by the City Council to the responsible bidder submitting the most advantageous bid to the City. In determining such bidder, the City will take into account among other factors, the prices bid and the experience and ability of the Bidder to perform the work.

Any determination of the responsible bidder submitting the most advantageous bid and award are subject to review and determination by the City Attorney as to legal sufficiency of any bid submitted.

The City reserves the right to reject any or all bids, or waive irregularities not affecting substantial rights.

#### OREGON PRODUCTS

Contractor must use Oregon produced or manufactured materials with respect to common materials such as cement, sand, crushed rock, gravel, plaster, etc. in all cases where bid prices of such materials are no greater than those of similar materials produced or manufactured outside the State, in accordance with O.R.S. 279.038.

When a project involves the use of non-metallic mineral construction material or materials except cement, sand, gravel, crushed rock and plaster, and if said materials are or can be produced in Oregon, the bidder shall submit alternate bids covering use of such Oregon materials and use of materials from outside the State, if bidder proposes to use such materials from outside the State, in accordance with O.R.S. 279.040.



## PREQUALIFICATION OF BIDDERS

Attention of bidders is called to the requirements of Oregon Revised Statutes, Chapter 279, relating to prequalification of bidders on public contracts, and to Title 17, Public Improvements, Ordinance No. 130672, Code of the City of Portland, Oregon, Chapter 17.20, Bidding Prerequisites, Section 17.20.010 relating to forms, statements and other prequalification matters. Bidders are warned to file any prequalification statements required at least ten (10) days prior to the scheduled closing time for filing bids. In the event a prequalification statement has been filed with the City within the current calendar year and a bidder has been accepted as a qualified bidder upon City projects, a review of the previous statement may be made to determine whether a prospective bidder is qualified to bid upon the work under consideration and additional statements may be required. The City reserves the right to reject the proposal of any bidder who has not been prequalified for the class of work involved in the project.

## "OR APPROVED EQUAL" CLAUSE

In order to establish a basis of quality, certain processes, types of machinery and equipment or kinds of materials may be specified on the plans or herein, either by description of process or by designating a manufacturer by name and referring to his brand or product designation or by specifying a kind of material. It is not the intent of these specifications to exclude other processes, equipment or materials of equal value, utility or merit.

Whenever a process is designated or a manufacturer's name, brand or item designation is given or whenever a process or material covered by patent is designated or described, it shall be understood that the words "or approved equal" follow such name, designation or description, whether in fact they do so or not.

If the bidder proposes to furnish an item process or material which he claims to be of equal value, utility or merit to the brand or manufacturer named, product or material designated, or process involved in the specifications, he shall, at least 6 days prior to the date set for opening of proposals, submit to the Architect a written statement describing or naming the item, material or process which he claims to be of equal value, utility or merit, together with samples, supporting data (including pertinent physical, mechanical, electrical, and chemical details), specifications, results of prior tests if available, a statement itemizing and explaining the differences between the item, material, or process he proposes and the specifically named or described item, material or process called for by the specifications, and other details sufficient to permit the Architect to evaluate the same. The Architect may require demonstration, additional tests, and additional data, either before or after bid opening, all to be supplied at the expense of the claimant. If the Architect determines that the proposed item, material or process is of equal value, utility or merit to the City compared to that specified, a proposal including the substitute item, material or process shall be deemed responsive, and not otherwise, to the specifications in that respect. Failure to submit such statement and data prior to bid opening shall be deemed a waiver of any objection on such ground and failure to supply additional material required after such submission shall be deemed an admission for the purposes of the bid that the item, material or process proposed shall not be approved as equal to that specified. The decision of the Architect on the proposed substitute shall be final and binding upon the bidder.

## GENERAL CONDITIONS

### ARTICLE 1. CONTRACT DOCUMENTS

The contract includes the Agreement, the General Conditions, the General Requirements, the Drawings, and the Specifications. Three or more copies of each, as required, shall be signed by both parties, and one signed copy of each retained by each party.

The intent of these documents is to include all labor, materials, appliances and services of every kind necessary for the proper execution of the work, and the terms and conditions of payment therefor.

The documents are to be considered as one, and whatever is called for by any one of the documents shall be as binding as if called for by all.

### ARTICLE 2. SAMPLES

The Contractor shall furnish for approval all samples as directed. The work shall be in accordance with approved samples.

### ARTICLE 3. MATERIALS, APPLIANCES, EMPLOYEES

Except as otherwise noted, the Contractor shall provide and pay for all materials, labor, tools, water, power and other items necessary to complete the work.

Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of good quality.

All workmen and subcontractors shall be skilled in their trades.

### ARTICLE 4. ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the City harmless from loss on account thereof. The City is the City of Portland, a municipal corporation of the State of Oregon, acting by and through its Council and its duly authorized representatives.

### ARTICLE 5. SURVEYS, PERMITS, AND REGULATIONS

The City (as defined in Article 4 above) shall furnish all surveys unless otherwise specified. Permits and licenses necessary for the prosecution of the work shall be secured and paid for by the Contractor. Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the City, unless otherwise specified. The Contractor shall comply with all laws and regulations bearing on the conduct of the work and shall notify the City if the drawings and specifications are at variance therewith.

ARTICLE 6. PROTECTION OF WORK, PROPERTY, AND PERSONS

The Contractor shall adequately protect the work, adjacent property and the public and shall be responsible for any damage or injury due to his act or neglect.

ARTICLE 7. ACCESS TO WORK

The Contractor shall permit and facilitate observation of the work by the City and its agents and public authorities at all times.

ARTICLE 8. CHANGES IN THE WORK

The City may order changes in the work, the Contract Sum and/or Contract Time being adjusted accordingly. All such orders and adjustments shall be in writing. Claims by the Contractor for extra cost must be made in writing before executing the work involved.

ARTICLE 9. CORRECTION OF WORK

The Contractor shall re-execute any work that fails to conform to the requirements of the contract and that appears during the progress of the work, and shall remedy any defects due to faulty materials or workmanship which appear within a period of one (1) year from the date of completion and acceptance of the work under the contract, all without additional cost to the City. The provisions of this article apply to work done by subcontractors as well as to work done by direct employees of the Contractor.

ARTICLE 10. TRANSFER OF INTEREST

Contractor hereby agrees that neither this contract nor any interest herein shall be transferred to any other party or parties without the prior written consent of the City, and in case of such transfer without the prior written consent of the City, City may refuse to carry out this contract with either the transferor or the transferee, but all rights of action for any breach of this contract by Contractor are reserved to City, and no officer of City nor any person employed in its service is or shall be permitted any share or part of this contract or is or shall be entitled to any benefit which may arise herefrom.

ARTICLE 11. CITY'S RIGHT TO TERMINATE CONTRACT

Should the Contractor neglect to prosecute the work properly, or fail to perform any provision of the contract, the City, after seven days' written notice to the Contractor, and its surety, if any, may without prejudice to any other remedy he may have, make good the deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor, or at its option may terminate the contract and take possession of all materials, tools, and appliances and finish the work by such means as the City sees fit, and if the unpaid balance of the contract price exceeds the expense of finishing the work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor shall pay the difference to the City.



ARTICLE 12. CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

Should the work be stopped by any public authority for a period of thirty days or more, through no fault of the Contractor, or should the work be stopped through act or neglect of the City for a period of seven (7) days, or should the City fail to pay the Contractor any payment within seven (7) days after it is due, then the Contractor upon seven additional days' written notice to the City, may stop work or terminate the contract and recover from the City payment for all work executed.

ARTICLE 13. PAYMENTS

Payments shall be made as provided in the General Requirements and/or in the Agreement. The making and acceptance of the final payment shall constitute a waiver of all claims by the City, other than those arising from unsettled claims or from faulty work appearing thereafter, as provided for in Article 9, and of all claims by the Contractor except any previously made and still unsettled. Payments otherwise due may be withheld on account of defective work not remedied, claims filed, damage by the Contractor to others not adjusted, or failure to make payments properly to subcontractors or for material or labor.

ARTICLE 14. CONTRACTOR'S INSURANCE

a) The Contractor shall maintain such public liability and property damage insurance as will protect the Contractor and the City from any and all claims for damage or bodily injury, including death, which may arise from operations under the Agreement or in connection therewith, including all operations of subcontractors. Unless otherwise required by the General Requirements, such insurance shall provide coverage for not less than \$100,000 for bodily injury to each person, \$300,000 for each occurrence and \$300,000 for general property damage per occurrence, OR a single limit policy of not less than \$300,000 per occurrence. Such insurance shall be without prejudice to coverage otherwise existing, and shall name as additional insureds the City of Portland and all other governmental bodies with jurisdiction in the area involved under the Contract Documents, their officers and employees, and shall further provide that the policy shall not terminate or be cancelled prior to the completion of the Agreement without first giving thirty (30) days notice in writing to the Auditor of the City of Portland.

Notwithstanding the naming of additional insureds, the said policy shall protect each insured in the same manner as though a separate policy had been issued to each; but nothing herein shall operate to increase the insurer's liability as set forth elsewhere in the policy beyond the amount or amounts for which the insurer would have been liable if only one person or interest had been named as insured.

Such insurance shall be subject to the approval of the City Attorney on behalf of the City as to the adequacy of protection.

b) The Contractor shall be held responsible for all damage to the work under construction, whether from fire, water, high winds or other cause, during construction and until final completion and acceptance, even though partial payments or progress payments have been made under the Agreement. The Contractor shall, at his sole expense, obtain property insurance against the perils of fire, extended coverage, vandalism and malicious mischief, in form, amount, coverage and with a company satisfactory to the City. Such insurance shall include all items of labor and materials connected with the work, whether in or adjacent to the structure or work insured, materials in place, or to be used as a part of the permanent construction, including surplus materials and miscellaneous materials and supplies incident to the work, in an amount equal to one hundred percent (100%) of the insurable value thereof. The loss, if any, shall be made adjustable with and payable to the City as trustee for whom it may concern. Any payments made under any such policy shall inure to the benefit of the City to the extent of any loss suffered by the City, and to the Contractor as to any remaining balance, for the replacement of the loss suffered. The policy of insurance shall provide that it shall not terminate or be cancelled prior to the completion of the Agreement without first giving ten (10) days' written notice to the Auditor of the City of Portland.

#### ARTICLE 15. CONTRACTOR'S PERFORMANCE BOND

For the faithful and punctual performance of the contract, the Contractor hereby agrees to furnish to City a good and sufficient bond in the penal sum equal to the full amount of the contract to be approved by the Mayor of the City of Portland, conditioned that Contractor shall faithfully, punctually and completely perform and abide by all covenants, conditions, and agreements of the contract, and with all laws, ordinances, regulations and orders of the State of Oregon, and the City of Portland, and the agencies and bureaus thereof, directly or indirectly governing, or applicable to Contractor's performance under this contract, including but not limited to Oregon Revised Statutes 279.510, which hereby is made a part hereof as if fully copied herein, and shall make payment promptly, as due to all subcontractors and to all persons supplying to the principal or his subcontractors equipment, supplies, labor or materials for the prosecution of the work or any part thereof, provided herein; said performance bond shall specifically allow modifications in the terms and provisions of this contract without notice to the surety, not to exceed twenty-five percent (25%) of the original amount of this bond.

#### ARTICLE 16. SATISFACTION OF CLAIMS

The retained percentage of payments due under the Agreement, or, if none is provided for, the final payment shall not become due until the Contractor shall have first executed a receipt for all amounts paid or payable by the City under the Agreement and a release and waiver of all claims against the City growing out of and/or connected with the Agreement, in form approved by the City Attorney, and shall have furnished satisfactory evidence that all amounts due for labor, materials and other obligations under the Agreement have been paid by Contractor and that all actions for injuries or damage arising out of operations under the Contract Documents have been fully and finally settled or are fully covered by insurance protecting the City, its officers, and employees as well as Contractor.

#### ARTICLE 17. SEPARATE CONTRACTS

The City has the right to let other contracts in connection with the work, and the Contractor shall properly cooperate with any such contractors.

ARTICLE 18. LABOR AND SUPPLIERS

a) All statutory, charter and ordinance provisions that are applicable to public contracts in the City of Portland and the State of Oregon shall be followed.

b) Contractor shall make payment promptly, as due, to all persons supplying to him labor or materials for the prosecution of the work. Contractor shall pay all contributions or amounts due from him to the State Industrial Accident Fund and shall pay to said Fund all amounts due from any subcontractor and remaining unpaid, incurred in the performance of the work. Contractor shall not permit any lien or claim to be filed or prosecuted against the City on account of any labor or material furnished. Contractor shall pay to the Department of Revenue of the State of Oregon all sums withheld from employees pursuant to ORS 316.167.

c) Contractor hereby agrees that, pursuant to Oregon Revised Statutes 279.314, if Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to Contractor or a subcontractor by any person in connection with this contract as such claim becomes due, the City may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due Contractor by reason of this contract. Contractor further agrees that payment by City of such a claim shall not relieve the Contractor or its surety from his or its obligation with respect to any unpaid claims.

d) Contractor hereby agrees, pursuant to Oregon Revised Statutes 279.316, no person shall be employed for more than eight hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases the laborer shall be paid at least time and a half for all overtime in excess of eight hours a day and for work performed on Saturday and on any legal holiday specified in Oregon Revised Statutes 187.010, except Veterans Day. However, when specifically agreed to under a written labor-management negotiated labor agreement, a laborer may be paid at least time and a half pay for work performed on Veterans Day or on any legal holiday specified in ORS 187.020.

It is understood and agreed by the parties hereto that the paragraph next preceding shall not apply to labor performed in the manufacture or fabrication of any material ordered by Contractor or manufactured or fabricated in any plant or place other than the place where the main contract hereunder is to be performed.

e) Contractor hereby agrees, pursuant to Oregon Revised Statutes 270.320, that Contractor shall make promptly, as due, payment to any person, copartnership, association or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury to the employees of Contractor, of all sums which Contractor collected or deducted from the wages of its employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.

f) Contractor hereby agrees that, pursuant to Oregon Revised Statutes 279.352, the minimum prevailing wages to be paid by Contractor for work performed hereunder shall be the minimum prevailing wages on file in the office of the State Labor Commissioner applicable to the Portland, Oregon, area, as of the date of signing of this contract by the parties hereto, which schedule of prevailing wages shall be and hereby is made a part hereof by this reference as though fully set forth herein.



g) Contractor hereby agrees that, before payment is made hereunder, Contractor or his or its surety, and every subcontractor and his or its surety, performing work on the project covered by the payment, shall first file, pursuant to Oregon Revised Statutes 279.354, with the Auditor of the City of Portland a statement in writing under oath, in form prescribed by the State Labor Commissioner, certifying the hourly rate of wage paid each classification of work, and further certifying that no workman employed by Contractor upon such work has been paid less than the prevailing rate of wage, as required by Oregon Revised Statutes 279.350 and 279.352 and by the paragraph herein next preceding. Contractor agrees that certificates shall be supplied by Contractor and all subcontractors of Contractor who have performed any work up to the time of such payment, and shall comply with Oregon Revised Statutes, Chapter 279.

If progress payments are authorized under the contract, Contractor shall furnish wage certification statement under oath once before the first payment and each time the prevailing wage rate changes, and once before final payment is made of any sum due hereunder, pursuant to ORS 279.354.

h) The Contractor and all his Subcontractors engaged on the work shall provide Workmen's Compensation coverage for all persons employed on the work to be done under the Agreement. The Contractor and all his Subcontractors shall be required to assure that his subject workmen will receive the compensation for compensable injuries provided in ORS 656.001 to 656.794 by either:

- (1) contributing to the Industrial Accident Fund as a contributing employer; or
- (2) qualifying as a direct responsibility employer under ORS 656.405 and 656.409.

In the event that the Contractor or any of his Subcontractors shall elect to fulfill this responsibility by qualifying as a direct responsibility employer under ORS 656.405 and 656.409, satisfactory proof of such fact shall be required. In the event that the certification as a direct responsibility employer is withdrawn, as provided in ORS 656.417, the Contractor or any Subcontractor hereunder shall thereafter, on the effective date of the withdrawal of certification, become a contributing employer.

#### ARTICLE 19. CITY'S REPRESENTATIVE

The Architect or other appropriate official shall be designated by the City as its representative during the construction period. He has authority to stop the work if necessary to insure its proper execution. He shall certify to the City when payments under the contract are due and the amounts to be paid.

#### ARTICLE 20. CLEANING UP

The Contractor shall keep the premises free from accumulation of waste material and rubbish and at the completion of the work he shall remove from the premises all rubbish, implements and surplus materials and leave the building broom-clean.

## GENERAL REQUIREMENTS

### DIVISION #1

#### General Scope

(101)

The bidder, in his proposal, shall include all plant, labor, materials, equipment and tools and perform all operations required for the construction and completion of all elements of this project, indicated in the contract documents, to the point where each element is finished, complies with all applicable codes, and is capable of functioning in accord with its reasonably inferrable purpose unless specific individual exceptions to this requirement are listed.

The work covered by these documents shall be performed under a single contract.

#### Examination of Site and Conditions

(102)

Bidders are directed to visit the site and to inform themselves of all existing observable conditions. Failure to so inform himself will in no way relieve the successful bidder from the responsibility of furnishing any material and performing any work that may be required for completion of the project in accord with the drawings and specifications.

No statement made by an officer, agent, or employee of the City in relation to the physical conditions pertaining to the site of the work will be binding on the City.

#### Laying Out Work

(103)

The Contractor shall, immediately upon entering the project site for the purpose of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction; layout his own work and be responsible for all lines, elevations, and measurements of the building, and any other miscellaneous work to be executed under the contract. He must exercise proper precaution to verify figures shown on the drawings before laying out work, and will be held responsible for any error resulting from his failure to exercise such precaution.

#### Precedence

(104)

Should there appear any discrepancy between the drawings and the specifications, variations between dimensions and scale of the drawings, doubt as to kind, quality, or detail of any materials, or any other matter, it shall be referred to the Architect immediately for his interpretation or correction. If such action is not taken by the contractor and an error appears or question arises at a later date, the Contractor, sub-contractor and material men shall be held to the Architect's interpretation of the drawings and specifications.

Workmanship

(105)

All work shall be done or supervised by skilled mechanics, fully experienced and qualified as journeymen in the work which they perform. All work shall be done according to the best current practices. Any work not acceptable to the Supervising Architect shall be removed and re-done.

Superintendent

(106)

The Contractor shall employ a competent superintendent who shall be in attendance at the project site at all times during the progress of the work. The superintendent shall be satisfactory to the Architect, and shall not be changed except with the consent of the Architect, unless the superintendent proves unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor, and all communications given to the superintendent shall be as binding as if given directly to the Contractor.

Shop Drawings

(107)

The Contractor shall review, stamp with his approval and submit with reasonable promptness and in orderly sequence, all Shop Drawings required by the Contract Documents or subsequently by the Architect as covered by Modifications. At the time of submission the Contractor shall inform the Architect in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents.

Patching

(108)

Every exposed irregularity in the materials or finish and all cuts through walls, floors and ceilings in any space where work is done under this contract shall be repaired and/or refinished to match similar adjoining finished surfaces.

Use and Prior Occupancy

(109)

The Owner reserves the right to use and occupy the whole or any part of this improvement which has been completed sufficiently to permit use and occupancy and such use and occupancy shall not be construed as an acceptance of the work, or any part thereof, and any claim which the Owner may have against the Contractor shall not be deemed to have been waived by such use and occupancy.

Insurance

(110)

The Contractor shall, at his sole expense, obtain property insurance against all damage to the work under construction as stated in Article 14 (b) (Contractor's Insurance) of the General Conditions.

Hold Harmless Clause

(111)

"Contractor shall hold the City of Portland, its officers and employees free and harmless and shall indemnify the City for any claims for damage to property or injury to persons which may be occasioned by any work and/or construction and/or services furnished or carried on under the terms of the contract."



Anti-Discrimination Statute

(112)

Attention of the contractors located in Oregon and of any contractor performing work in Oregon is called to the provision of Oregon Revised Statutes Chapter 659 prohibiting discrimination in employment.

Changes

(113)

Changes in the work, which in the aggregate involve no more than five percent (5%) of the contract amount, may be authorized by the Commissioner of Public Safety without further Council action.

Time for Completion

(114)

Within 120 calendar days from and including the date on which a 'Proceed Order' is issued by the Architect to the Contractor, the Contractor shall fully complete the work required by this contract.

Liquidated Damages

(115)

Time shall be considered the essence of the contract. If the contractor fails to complete the project within the time specified in his proposal or any extension thereof by the City Council the actual damage to the City for the delay will be substantial but will be difficult or impractical to determine and therefore, in lieu thereof the contractor shall be charged and will pay to the City as fixed, agreed and liquidated damages for each and every calendar day of delay, the sum of \$100.00. Upon written application by the contractor to the Architect, extensions of time for completion will be allowed by the City Council only if the contractor establishes beyond a reasonable doubt that he has been subjected to unforeseen and unavoidable delay through no fault of his own.

Payments

(116)

Progress payments shall be made subject to the following provisions:

Contractor shall make written application to the City's Architect at or near the end of each month hereunder, for payment showing progress estimates of the work performed up to the date of such application and supported by such data substantiating the Contractor's right to payment as the City's Architect may require; the amount of the approved value of labor and materials worked into the project hereunder up to the time for application for payment, less five percent (5%) retainage and the aggregate of previous payments will be paid on or about the 15<sup>th</sup> day of the month following Contractor's application for payment. Upon completion of the entire project and acceptance thereof by the City Council, a sum sufficient to increase the total payment to ninety-five percent (95%) of the contract price will be paid. Within thirty (30) days thereafter, the balance of the contract will be paid, PROVIDED that the entire project, including administrative requirements, is then fully performed.

It is understood and agreed by the parties hereto that progress or partial payments by the City shall not be construed by the Contractor as

acceptance or approval of the work covered thereunder or waiver by the City of any defects therein.

Prior to payment of the retained percentage, Contractor agrees to execute, in form approved by the City Attorney, a receipt for all amounts paid or payable by City hereunder, and to furnish satisfactory evidence that all amounts due for labor, materials and other obligations under this contract have been fully paid by the Contractor and that all actions for injuries to person or damage to property arising out of operations hereunder have been fully and finally settled or are fully covered by insurance protecting the City, its officers and employes, as well as Contractor. It is agreed by the parties hereto that, if Contractor shall fail to complete the project hereunder within the time limit fixed hereinabove or any extension thereof by the City Council, no payment shall thereafter be made hereunder until the project shall be finally completed.

Temporary Facilities

(117)

Limited water service, telephone, electrical service and toilet facilities are available within the building. They may be utilized by the Contractor only to the extent which will not interfere with the present occupants and operations.

Sub-Contractor List

(118)

Each bidder shall submit with his proposal a list of the firm names and addresses of all sub-contractors who he will employ for this project if awarded the contract.

Supervision

(119)

The work will be supervised and the specifications interpreted by Facilities Planning, City of Portland, Loyal C. Lang, A.I.A., Supervising Architect, Telephone 248-4380.

Alternates

(120)

The basic bid shall include all the work complete as called for by the contract documents for this project except that which is specifically included in the following additive alternate.

Alternate No. 1.

This alternate shall state the amount to be added to the basic bid for all labor, materials, equipment and incidentals required to sandblast and refinish the present pools as specified in Finishes, Division #9.

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SITE WORK

DIVISION # 2

Scope

(201)

Provide all plant, labor, equipment, tools and materials to perform all operations necessary to prepare site for construction work including but not limited to clearing of site and site grading, excavation and backfilling, concrete footings and slabs, site drainage and site improvements, all as shown on the drawings and as called for in this specification.

Work Not Included

(202)

1. The existing chain link fence and steel support posts will be removed and stored by Owner.

2. The existing Life Guard platforms and Diving Board and supports will be removed and stored by Owner.

Clearing Of Site

(203)

1. Remove existing concrete deck around pool. Care shall be used in breaking away concrete from pool edge coping. All coping damaged shall be replaced by this Contractor.

2. Old concrete footings and walls at existing fence line surrounding pool shall be removed or cut down to a minimum of 8 inches below bottom of new concrete deck.

Protection

(204)

1. Protect against damage to all trees, planting, walks and other work that is to remain on property.

2. Protect and maintain all conduits, pipes, drains and sewers that are to remain in place.

3. Present manhole and concrete cover at East side of deep pool shall remain and shall be made a part of the new surface surrounding the pool.

Earthwork

(205)

1. This work includes the site grading, excavating and backfilling, sub-drainage and soil compaction required for site development. Excavation, grading and backfilling for plumbing lines shall be by the Mechanical Contractor.

2. The top soil shall be stripped and stockpiled to be used in the finish grading by the Bureau of Parks.

3. Excavate to proper depth and sufficient to allow for erection of forms, shoring and inspection of foundation work. Footings shall be excavated a minimum of one (1) foot into undisturbed bearing soil and not less than eighteen inches (18") below finish grade.

4. Leveling fill under all concrete slabs to be a minimum of 4" of clean 3/4" minus gravel, graded evenly and compacted as required to prevent settlement. Grading of slab shall be as shown on the drawings and shall pitch to floor drains and away from the pool edge coping.

5. Filling and backfilling shall be carried out only after form materials are completely removed and the construction to be covered has been inspected and accepted by the Architect and the Contracting Officer. Backfill shall be placed in layers of 6 inches and compacted.

a. At interior footings and foundations: Backfill with gravel up to subgrade of gravel base for concrete slabs.

b. At exterior foundation walls: Backfill with gravel to within 12 inches of finish grade and level off with clean earth or sand.

c. Under bearing walls and footings: Excess excavation must be replaced with concrete.

d. Pipe trenches: Fill and level with clean gravel and finish to subgrade of gravel base in paved areas and/or to within 12 inches of finish grade in areas to be seeded.

#### Utilities

(206)

1. For information concerning water lines, fill lines, drain lines and sewer connections see Mechanical drawings and Specifications, Div. #15.

2. For information concerning electrical service see Electrical drawings and Specifications, Div. #16.

#### Relocation Work

(207)

1. The plans show the area of new concrete slab work to replace the concrete deck around pool. This work shall also include the re-location and placement of Life Guard chairs and the placement of concrete footing and anchors for the replacement of the diving board.

2. The construction of the connection between the new structure and the present building requires the replacement of stucco finish on the East wall of the present building. See detailed drawings for the extent of this work.



Landscaping

(208)

The yard improvements such as paved areas outside the structure, fencing, screen walls, finish grading incorporating top soil and fertilizers and the planting of lawn areas, trees and shrubs shall be provided by the Owner.

Removal And Clean-Up

(209)

1. Preserve in good condition all surfaces which are to remain.
2. All damaged surfaces in the areas of this operation shall be restored and finished to match adjacent surfaces.
3. Upon completion of the construction work remove from the site all excess materials and debris leaving all hard surfaces broom-clean.

CONCRETE

DIVISION # 3

Concrete Formwork

(301)

1. Construct and place forms for all poured concrete work as shown on the drawings and called for in the following specification.

2. Materials:

a. Wood forms to be "plyform" Class I, B-B Ext. DFPA, 3/4" thick.

b. Form ties to have minimum working strength when fully assembled of 3,000 pounds, adjustable in length to permit tightening forms, designed to leave no metal closer than 1/2" of finished surface.

c. Fiber forms all round concrete columns, posts, piers, etc., shall be formed with seamless 'Sonotube' fiber forms, as manufactured by Sonoco Products Company or approved substitute.

3. Construction Procedure:

a. Forms shall be substantially built and erected, tight enough to prevent leakage of mortar, of ample strength to sustain the weight of freshly poured concrete and any construction loads likely to come upon them.

b. Dowel steel, anchors, bolts, etc. shall be placed in the forms before the concrete is poured. The mechanics of each trade involved shall be given the opportunity to place their ties, sleeves, anchors, piping, etc. in the forms before concrete is poured.

c. All forms shall be removed after the concrete has set sufficiently to carry the dead loads and any construction loads likely to occur. Form ties shall be removed.

Concrete Reinforcements

(302)

1. Material:

a. Deformed reinforcing bars rolled from new billet steel complying with ASTM A-615-68, Grade 40.

b. Welded wire mesh shall conform to ASTM A-185.

c. Tie Wires shall be 18 gauge diameter or larger.

2. Placement:

a. Reinforcement shall be placed as shown on the drawings in accordance with A.C.I. and C.R.S.I. recommended practice. All supports shall be incombustible, reinforcing shall be securely wired in place so as to stay in proper position during concrete placing and vibrating.

b. An overlap of at least 24 bar diameters and not less than 12 inches for all splices of deformed bars.

c. Lap all welded wire mesh a minimum of 6 inches.

Cast-in-Place Concrete

(303)

1. All concrete shall be mixed and placed in accordance with ACI Standard "Building Code Requirements for Reinforced Concrete."

2. Materials:

a. "Ready-Mix" Concrete: 3000# @ 28 days equal to 1-2-4  
5½ sack mix.

1375# - 1400# sand

1175# - 1225# 3/4" to #4 Round River Rock

750# - 800# 1-1/2 to 3/4" Round River Rock

5 to 5-1/2 gals. water per sack cement

4" slump plus or minus 1"

Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in U.B.C. Standard No. 26-12-70.

b. Grout: Shall be highly fluid consisting of one part cement, three parts sand and two parts pea gravel (3/8" to #4).

3. Placement:

a. Clean out and wet down forms before placing.

b. Place concrete within 60 minutes of start of mixing. Under no circumstances shall concrete that has attained its initial set be used.

c. Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of the materials.

d. All laitance and other unsound material shall be removed from hardened concrete before additional concrete is added.

e. All concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around the reinforcement and embedded fixtures and into the corners of the forms.

f. Screed concrete level and finish by tamping the coarse aggregate away from surface, screeding and floating with a straight edge to bring the surface to the required finish level and grades as per plan. Steel trowel all surfaces to a smooth, dense, hard finish.

4. Expansion Joints:

Where expansion joints are called for or shown on the drawings install 1/2" pre-moulded expansion joint material of clean granular cork, such as "Kork-Pack" by Grace Construction Materials Co. Joint sealant shall be as recommended by and applied in strict accordance with the manufacturers specification.

5. Curing:

All slabs and other horizontal surfaces shall be kept constantly wet for seven days after finishing, or covered with suitable sisal-kraft paper as approved by the Supervising Architect.

6. Dustproofing:

a. Concrete deck surrounding the pools shall be treated with W. R. Meadows, Inc. "Pena-Lith" consisting of three consecutive applications to harden and dustproof the floor.

b. Preparation - surface must be completely clean, dry and free of all dirt, dust, sealers, wax, oils, curing compounds or any type of foreign matter. Concrete must be cured for at least 30 days before application.

c. Application - Pena-Lith may be sprayed or poured onto the surface and spread evenly with a squeegee or hair-broom. Dilute the Pena-Lith, apply and spread evenly on the surface in three consecutive applications, following the specific instructions of the manufacturer for dilution and application.

d. Precaution - The product is toxic and appropriate precautions should be exercised. Rubber boots and gloves should be worn when applying. Do not permit contact with glass, fabric, metal or painted surfaces. If contact occurs wash immediately with a clean water-saturated cloth and wipe with a clean dry cloth.

7. Treatment of exposed concrete on exterior:

All exposed vertical surfaces of concrete on the building shall be plastered with one coat of mortar. Mortar shall consist of one part Monolith or Plastite waterproof cement to two parts clean sharp 30 mesh sand, tempered with 10% hydrated lime. Plastering shall be thick enough to straighten the surfaces, and shall be sand float finished. The plastering shall extend down 6 inches below finished grades.



MASONRY  
DIVISION #4

(401)

Mortar

1. All masonry units shall be set with cement mortar.
2. Materials:
  - a. Cement mortar shall be Type "S" conforming to ASTM C-270 proportions by volume:
    - 1 part masonry cement
    - 3 parts mason's sand
    - or
    - 1 part (94 lbs.) Portland cement
    - 1/2 part (25 lbs.) hydrated lime
    - 4-1/2 parts (4-1/2 cu. ft.) mason's sand
  - b. Hydrated lime putty shall stand 48 hours before mixing with sand. Cement shall not be added until just before mortar is to be used. No mortar shall be used which has stood more than 30 minutes after cement has been added.
  - c. Aggregates shall conform to provisions set forth in U.B.C. Standard No. 24-21-70 and ASTM C-144.
3. Minimum compressive strength equal to 1800 psi at 28 days.

Concrete Unit Masonry

(402)

1. Light weight concrete block walls where indicated on the drawings.
2. Materials:
  - a. 6" x 8" x 16" units designated 600 regular and 600-AO open end units at head of exterior door openings; 8" x 8" x 16" units designated 800 tapered (Special), all Grade P-1, ASTM C90-70T.
  - b. Aggregate shall be light weight expanded shale, ASTM C331.
  - c. Linear shrinkage not to exceed .035 and moisture content not to exceed 30% of total absorption, ASTM 140. Manufacturer shall submit written certification of compliance. Mason contractor shall be responsible for moisture content of block after delivery to job site until laid in wall.
  - d. Concrete grout shall be 2500 psi at 28 days as specified in Division #3, para. 303, 2-b, of pumping consistency.
  - e. Reinforcing bars shall be as specified for concrete, Division #3 para. 302, 1-a. Size as shown on drawings.
  - f. Horizontal joint reinforcing shall be standard weight Dur-O-Wal or Krimplok galvanized steel, welded truss type.

3. Installation:

- a. All walls shall be laid plumb and true to lines in a stack bond.
- b. Starting course shall be dowelled to concrete floor slab. Lap dowel steel with vertical rebar a min. of 12" and fill cells with concrete grout full height of wall.
- c. Mortar joints shall be 3/8" with full coverage on vertical and horizontal face shells, strike off flush with face of units and after initial set, tool joints by compressing mortar tightly against masonry units. Tooling of horizontal joints to produce a slightly concave joint when compressed.
- d. Install specified horizontal reinforcing at 16" and/or 24" o.c. using 6 inch lap at joints and corners. Construct bond beam with reinforcing as shown and fill with concrete grout full length.
- e. Metal Door Frames, reinforcing, piping, conduit, sleeves, anchors, etc., shall be built-in where required.
- f. No masonry shall be laid when temperature is below 40° F. unless approved means are provided for heating materials and masonry is protected from frost until mortar has hardened. Accelerating admixtures in mortar may be used for extreme conditions if prior approval has been obtained from the Supervising Architect.
- g. Clean the mortar off face of work as the walls are laid. Before the painter is to begin work on concrete masonry, surfaces shall be thoroughly washed and rinsed to remove all dirt, grease and stains.

4. Workmanship:

All work shall be free from defects, performed in a workmanlike manner by skilled mechanics, fully experienced in the work which they perform.

5. At completion of the work, all holes in exposed masonry shall be pointed, and where necessary, defective joints shall be cut and repointed, then cleaned off.

METALS  
DIVISION # 5

Scope

(501)

1. To provide all miscellaneous metal work, special fabrication, angle sills, railings, and anchors necessary to complete the construction of the work as indicated on the drawings and in the specification.

2. All metal fabrication, welding and erection shall be in accord with AISC Specification and Code of Standard Practice. Field welds shall be performed with the same care and quality as shop welds. All welds shall be ground smooth, and thoroughly cleaned.

3. All metal work, except galvanized, aluminum or stainless steel, shall be given an approved shop coat of red lead or zinc chromate primer before being delivered to the job site. All field welds shall be given a coat of paint as per shop coat. Touch-up and finish painting, where required, is specified in Division #9.

Miscellaneous Metal

(502)

1. Work in other Divisions:

a. Hollow Metal Doors and Frames and Steel High Lift Overhead Doors are specified in Div. #8 (Doors).

b. Anchors, bolts and sleeves for mechanical and electrical work are specified in Div. #15 (Mechanical) and Div. #16 (Electrical).

c. Ventilation louvers and grilles are specified in Div. #15 (Mechanical). (Exception - skylight ventilator with damper).

d. Roof Framing Steel Shapes - All necessary hardware and steel shapes required for assembly and erection of roof dome except the anchor bolts which are embedded in masonry shall be furnished by the Roof Framing Fabricator. See Div. #6 (Carpentry).

2. Structural Devices shown on the drawings and/or required for properly supporting and securing the work such as:

a. Steel plates and shapes to be ASTM A 36 with minimum yield of 36,000 p.s.i., new material free from defects impairing durability.

b. Sleeve Anchors - insert, expansion type for use in pre-drilled holes as Phillips Red Head or approved, sizes as required, use in concrete block or solid masonry walls. Meet Federal Specification FF-S-325, Group II Type 3.

c. Hanger Rod Anchors - self-drilling, internally threaded type as Phillips Red Head or approved, use with threaded rod. Meet Federal Specification FF-S-325, Group III, Type 1.

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d. Stud Anchors - expanding type set in pre-drilled hole, of diameter and length required. Phillips Red Head Stud concrete Anchors or approved. Meet Federal Specification FF-S-325, Group VIII, Type 2.

e. Lag screws and anchor bolts of stock sizes - zinc coated.

3. Steel Angle Sills - size as indicated on drawings, cut for hardware if required. Weld strap anchors near ends and not over 12 inches apart between. Install in correct position with door jamb, in true line, flush with finish floor.

4. Pipe Railing - Standard weight 1-1/2" I.D. steel pipe with welded joints ground smooth and hot-dipped galvanized after fabrication. Secure with flanged base and stud anchors into concrete, minimum size 3/8". Finish as called for in Division #9 (Painting).

5. Skylight Ventilator - The louvered ventilators with backdraft dampers, located at skylight, are a part of this work.

a. Louvered ventilators are to be furnished in mullion frames - each unit approximately 42" wide by 26" high with 16 ga. frame with joining mullion and 20 ga. blades. Design to be similar to Carnes Model L-41 or L-41F with galvanized 1/2" mesh .041" wire screens. Assembly to be galvanized after fabrication.

b. Backdraft dampers shall be maximum of 30" wide by 24" high. Design to be similar to Air Balance, Inc. Model 1002-V.

c. Furnish shop drawings as called for in General Requirements, Division 1, Article (107).



CARPENTRY  
DIVISION # 6

(601)

Rough Carpentry

1. Provide all materials, tools, equipment and labor to complete the rough framing of all elements of this construction.

2. Materials:

a. Structural joists and framing (2" to 4" thick, 6" and wider) - Douglas Fir surfaced 4 sides to standard dimensions, No. 1 Grade, WWPA para. 62.11.

b. Light framing (2" to 4" thick, 2" to 4" wide) - Douglas Fir surfaced 4 sides to standard dimension, Construction grade, WWPA para. 40.11.

National Grading Rules for Dimension Lumber as approved by the Board of Review, American Lumber Standards Committee, effective June 1, 1972 to govern.

c. Softwood plywood - Douglas Fir to conform to US Product Standards, PS 1, thickness and sheet size as required. Application shall be in accordance with recommendations of the American Plywood Association. All plywood which has any edge or surface permanently exposed to the weather shall be of Exterior type.

d. Wood decking - Standard decking patterns in 2" single T & G and 3" and 4" double T & G with vee joints on one face. 'Selected' grade Hem-Fir, WWPA para. 55.11 (1972 Grading Rules) MC 15. (Pressure treated).

e. Glue-Laminated Beams - conform to the U.S. Department of Commerce Commercial Standard CS 253-63 for Structural Glued Laminated Timber. Laminations shall be 1-1/2" for both horizontal and vertical laminated beams, all Coast Region Douglas Fir, stress graded for 2200 psi in bending. Surfaced 4 sides, Architectural appearance grade, sizes as shown on the drawings.

f. Provide all rough framing hardware necessary to complete the work, sizes and quantities as shown on the drawings or required by Building Code.

3. Framing:

a. Erect all framing true to line, plumb and straight.

b. Adequately brace and securely attach to ceiling, wall and floor system.

c. The roof deck shall be capable of supporting an average uniformly distributed load of 40 pounds per square foot over recommended spans.

d. Nails shall be galvanized and shall be a minimum of 1 inch longer than the thickness of the specified deck plank. Nails shall be spaced so as to develop a minimum of 30 lbs/sq. ft. uplift resistance.

e. All roof deck installed in place shall be made watertight as soon as possible, preferably by the application of roofing. Before roofing, roof deck units shall be inspected by the Supervising Architect and any defective planks shall be replaced.

Dome Structure and Wood Decking

1. This section is intended to cover the design, furnishing and erection of the triangular laminated beam pattern dome, tension ring and roof decking.

2. The basic layout and type of system required for the laminated wood beam "Lamella" wood framing system is shown on the drawings.

3. The design shall comply with the provisions of the following codes, specifications and standards:

Portland Building Code, UBC, AITC, AISC.

4. Materials:

Lumber:

Lumber for the structural members of the dome shall be Douglas Fir and shall meet the structural requirements of the design, 24F, pressure treated for wet condition use.

Adhesives:

The Glulamated members shall be bonded with waterproof adhesives that meet the requirements of the Commercial Standard #CS-253-63.

Appearance:

Glued laminated members shall be furnished to AITC Architectural appearance grade.

A coat of end sealer shall be applied to the ends of all members as soon as practicable after end trimming.

Protection:

Members shall be individually wrapped to afford protection in transit.

Quality Marks:

All principal structural members shall be marked with an AITC Quality Mark indicating conformance with the proposed Commercial Standard for Structural Glued Laminated Timber.

Hardware and Steel Shapes:

The fabricator shall design and furnish all necessary hardware and steel shapes required for assembly and erection of the dome except the anchor bolts which are embedded in masonry. All hardware and steel shapes shall be galvanized after fabrication.

The Tension ring shall permit free radial movements without allowing any circumferential movement.

The welded assemblies used to join the dome members to each other shall be designed to resist both tensile and compressive stresses encountered during erection and in service. The top surface of these assemblies shall be dapped flush into the laminated members so the roof decking will fit tight against the member.

The fabricator shall include the steel tension ring and the base plates required to complete the structural roof system.

Roof Decking:

Roof decking shall be kiln dry 2x6 Douglas Fir or Hemlock Select or Commercial appearance, EVIS. Install as 2-span layup with all joints on supports with two 16d face nails at each bearing. Draw adjacent boards tightly together before nailing. All Decking to be pressure treated for moisture protection.

Erection:

The dome, steel tension ring, and the decking shall be erected in place by the supplier of this material. The General Contractor shall be responsible for furnishing and setting anchor bolts in masonry wall according to the shop details supplied by the dome designer. He shall further cooperate with the erector by furnishing access to the building and clear floor space during the assembly and erection operations.

5. Fabricator Approval:

The fabricator desiring to bid under this section must be approved by the Architect in writing prior to the bid date. In order to receive proper consideration for approval, the fabricator shall submit to the Architect evidence of his experience in the design, fabrication and erection of this type of dome structure. Further, he shall accompany his request with preliminary design drawings and calculations. The preliminary drawings shall fully define his proposal by including dimensioned plan and elevation views, a typical node connection detail, a typical tension ring support detail, and the member sizes he proposes to furnish. The fabricator also shall commit himself to furnishing, with the dome materials, a complete design check of his proposed dome structure.

Finish Carpentry

(603)

1. Installation of doors and frames, hardware and all trim, facia and other finish necessary to complete the work in all locations as shown on drawings and as specified herein.

2. Materials:

a. Finish lumber (Softwood) Douglas Fir and Hemlock, C Select grade, kiln dried. Used for all wood trim and facia.

b. Plywood (Softwood) ± DFPA, Standard with Exterior glue, C-D (plugged) comply with Product Standard PS 1-66. Thickness as required.

3. Installation:

a. Doors and frames, as specified in Div. #8 and in door schedule on the drawings, shall be hung with proper clearance, evenly spaced and without bind.

b. Hardware as specified in Div. #8 shall be installed as required and/or scheduled, adjusted for proper operation and removed before painting.

c. All finish lumber shall be installed using galvanized nails.

MOISTURE PROTECTION  
DIVISION #7

Scope

(701)

Work under this division includes the furnishing of all materials, tools, equipment and labor for complete protection against moisture entering into the areas comprising this construction.

Membrane Roofing

(702)

1. This section covers the application of a monolithic membrane roof protection including the vapor barrier, the insulation and the membrane roofing and color coating.

2. Materials:

- a. Vapor barrier - Flintkote All-weather Base Sheet.
- b. Insulation - 1-1/2" urethane - rigid 2' x 4' panels or spray foam urethane application.
- c. Roofing felts - Owens-Corning Fiberglas permaply R9.
- d. Asphalt - Steep Grade 810-10
- e. Protective Coating - Flintkote Monoform FM-100 Compound.
- f. Glass Roving - Monoform Glass Roving.
- g. Reflective Coating - Flintkote REXKOTE-Spectra.
- h. Flashing Compound - Flintkote 810-21.
- i. Plastic Cement - Flintkote 810-22.
- j. Filler - Flintkote 900-15 Filler Coat Binder.
- k. Nails - 1" head ring-shank 1-1/2" length.

3. Application:

a. Place vapor barrier over T & G wood deck construction in 2 layers - nail first sheet to wood deck with nails 18" o.c., mop second sheet using 25 lbs steep asphalt per 100 sq. ft. Apply shingle method lapping 19" on sides. Nail each layer in one row 1" down from top side, 12" o.c.

b. Embed rigid insulation panels in 25 lbs steep asphalt per 100 square feet with staggered joints. Apply insulation flush to vertical walls or wood nailers and wrap extended base sheet around edges and fold over top, sealing with steep asphalt. If spray foam insulation is used omit the 25 lbs steep asphalt per 100 square feet and apply foam insulation directly to vapor barrier.

c. The Electrical Contractor shall install the electrical conduit over the vapor barrier and the roofing contractor shall lay the rigid insulation to each side of conduit and fill the gap with spray foam insulation flush with the applied rigid insulation.



d. Prior to application of membrane roofing, insulation shall be dry, smooth, clean and secure. Metal fittings shall be in place before roofing applicator begins work.

e. The membrane roofing shall be applied by a roofing contractor approved by the roofing manufacturer.

f. Apply asphalt at temperatures between 375°-450° - do not heat to more than 450°.

g. Membrane Roofing

(1) Base Sheets

- (a) Cut base sheets in lengths not to exceed 18' and allow to flatten.
- (b) Nail one layer of base sheet beginning at top of dome in strap fashion.
- (c) Butt all side and end laps - sheets may be overlapped and cut to insure tight fit.
- (d) End laps will not be less than 3' apart.
- (e) Solid mop second base sheet with 25 lbs. steep asphalt and embed 1-layer base sheet butting on sides and ends - end laps will be not less than 3' apart.
- (f) Turn up base sheets and mop to cant strip and trim at vertical walls.
- (g) Upon completion of butting of base sheets, trowel on and smooth in to avoid any seams filler coat and filler coat binder if necessary to achieve monolithic surface - utilize this procedure with both base sheets.
- (h) All nails will be treated in same manner.

(2) Protective Coating

- (a) Sweep roof area clean.
- (b) Spray entire roof membrane with 9-gallons of Monoform FM-100 Compound and 3 lbs Monoform glass roving.

(3) Reflective Coating

- (a) Roof area must be clean.
- (b) Oxidized areas will be scrubbed with water and flushed clean.
- (c) Apply 2-coats to roof and base flashings.
- (d) First coat 1/2 gallon 810-16 Sta-Kool Aluminum Coating.
- (e) Second coat 2/3 gallon 800-26 Rexkote-Spectra Reflective Coating.

h. Outlets

- (1) Set drain outlets below roof deck to permit free flow of water and to prevent forming waterdam at rims.
- (2) Seal roofing around drains and fill metal base of ring type drains with flashing compound.
- (3) After roofing is applied, install ring and tighten.

i. Cant Strip

- (1) In angles of roof deck and vertical walls or curbs the roofing contractor will furnish and install a 3" minimum cant strip.
- (2) Cant strip will fit flush at ends and to wall surface.
- (3) Embed cant strip in asphalt to roof deck.
- (4) Where scuppers occur, apply cant strip 2" back from flange and bevel cant 8" from ends.

j. Parapet Wall

- (1) Coat the inside and top of all masonry walls with C-13-C4 emulsion.
- (2) Apply with spray or soft-fibered brush using 3-gallons per 100 feet.

Sheet Metal Work

(703)

1. All flashings, curbs, cants and sleeves necessary to make roof penetrations, required in this work, watertight.

2. Materials: Sheet metal flashing shall be 26 gauge galvanized steel minimum.

3. Application:

a. Prepare surface of roof by removing all loose materials adjacent to area of penetration. Provide a smooth, clean surface for application of flashing materials.

b. Flash and counterflash curbs, cant strips and vents extending through roof to insure watertight seals at all vertical surfaces.

Reglet Flashing Systems

(704)

1. Provide and install reglet flashing systems as required and shown on the drawings.
2. Three reglet flashing systems are required.
  - a. Flashing system for poured concrete walls.
  - b. Flashing system for concrete masonry walls.
  - c. Flashing system for stucco walls.
3. Materials:
  - a. Reglet and counterflashing to be 24 ga. galvanized steel in 10'-0" lengths. Both reglet and flashing shall have a 3" end lap joint.
  - b. Springlock to retain counterflashing.
  - c. Protect reglet for concrete wall against grout getting into the reglet during construction of the wall.
4. Flashing and reglet shall be made by same manufacturer and both are to be installed as a Flashing System.
5. The flashing systems of Fry Reglet Corporation of Los Angeles, Calif. are approved for this application.

Gutters and Rain Drains

(705)

1. All sheet metal gutters and exterior rain drains shall be included in this work.
2. Materials:
  - a. Gutters - 4" W x 5" H - rectangular of 26 ga. galvanized iron.
  - b. Downspouts - 2½" x 3½" rectangular of 26 ga. galvanized iron.
3. Secure gutter to roof fascia and downspouts to building wall with proper supports.
4. Painting of metal as called for in Painting Division #9 (Finishes).
5. Remove fascia and gutter on present building, where new construction joins, and replace with wood ledger as detailed.

Composition Shingles

(706)

1. Remove composition shingles on present roof as shown and reuse these to complete roof protection.

Skylight

1. Provide all materials and labor to install sectional skylight of sandwich construction at high point of dome.

2. Materials:

a. Panels to be 2-3/4" Kalwall translucent skyroof complete with Kalwall low silhouette extruded aluminum framing members.

b. Exterior skin to be Bronze tone and interior skin to be Crystal.

c. Roof panels to be true sandwich of flat fiberglass sheets bonded to Kalwall Shoji grid, 8" wide by 20" long, with continuous appearance cross members and shall meet the recommendations of ICBO Report No. 1705 dated July, 1973, and the Bonding Strength Test of Forest Products Laboratory, ASTM D1037-SST.

3. Aluminum Frame

The aluminum frame shall be of extruded 6063-T5 aluminum. This frame shall be altered and heli-arc welded. The frame will be sealed to the panel at the factory. Clamp fasteners shall be stainless steel.

4. Erection

Contractor shall erect skylights in strict accordance with approved shop drawings as supplied by manufacturer. Fastening and sealing shall be in accordance with the manufacturer's recommendations. Skylights shall be carefully stored under cover by contractor before erection. All aluminum shall be clean before sealants are applied. After other trades have completed work on adjacent materials, carefully inspect skylight installation and make adjustments necessary to insure efficient installation and weather-tight conditions. Final cleaning of all materials to be done by the General Contractor.

All staging, lifts, and hoists required by Kalwall installer to be provided, set up and maintained by General Contractor.

Experience-Upon request of the architect, manufacturer shall submit satisfactory proof of 5 years experience in the lamination of dissimilar materials.

Finally-General Contractor shall provide protection for all materials at jobsite.

Calking and Sealants

1. Joints between different materials and around exterior metal door frames shall be calked tight. The space provided for calking shall be thoroughly cleaned and a polyethylene foam sealant backer rod shall be compressed in the joint to the proper depth so that the sealant thickness can be applied as recommended by the sealant manufacturer. Dow "Ethafoam" SB brand sealant backer rod and Dow Corning 780 silicone rubber, non-acid sealant or G.E. Silicone Construction Sealant or approved.

2. Application:

a. Apply building sealant and surface conditioner in strict conformance with manufacturers recommendation.

b. Sealant bonding surfaces should be sound, clean, dry and free of contamination by laitance, form release agents, curing compounds or other surface treatment.

c. Areas adjacent to joints shall be masked if necessary, to obtain a neat sealer line.

d. Clean excess sealant off by approved method.

e. Sealed joint shall not be disturbed for at least 48 hours in order to allow for complete cure.

Guarantee

(709)

Maintain all moisture protection of building for a period of two years after final acceptance at no cost to the City.



## DOORS, WINDOWS & GLASS

### DIVISION #8

#### Hollow Metal Doors & Frames

(801)

1. Provide all metal doors and frames to complete the work as shown on the drawings, in door schedules and as specified herein.

2. Conform to "Recommended Specifications, Standard Steel Doors and Frames, SDI 100" of Steel Door Institute.

3. Furnish to the Architect for his approval details of standard stock items, and detailed shop drawings for variations from standard. Div. #1, para. (107).

#### 4. Doors:

a. 1-3/4" doors to be standard duty Steel Door Institute Type I, Style 2, full flush hollow steel construction. 18 gauge.

b. Doors shall be factory prepared to receive hardware as called for in the hardware schedule, this division of specification.

c. All H.M. doors shall be provided with an approved sound deadener and with a baked-on primer for field painting.

d. Fenestra, Atlas Universal, Ceco and Amweld Full Flush Doors are approved for the above doors. Other makes may be furnished if prior approval has been obtained in writing from the Supervising Architect.

#### 5. Frames:

a. All metal frames shall be 16 gauge of welded construction for installation in masonry openings. See drawings for typical detail.

b. Fenestra, Atlas Universal, Ceco and Amweld Standard Frames are approved, other makes may be furnished if prior approval has been obtained in writing from the Supervising Architect.

c. All frames shall be bonderized and receive one shop coat of baked on metallic primer.

#### Steel Overhead Door

(802)

1. Provide and install flush steel sectional upward-acting overhead door assembly complete at openings 6, 7, 8 & 9.

#### 2. Materials:

a. Door to be for a 12'-0" wide x 10'-1-1/2" high opening mounted on the inside face of opening and shall be power operated.

b. Door sections of rolled steel, 16 gauge galvanized with 1.75 oz. of zinc per square foot (ASTM Standards). Sections to be formed to provide a rabbeted weatherjoint, 2" nominal thickness with a flush outside face. Bottom section to have neoprene weatherstrip. Top section to have an adjustable seal strip. Fill inside void with urethane and cover with 16 ga. flush inside face plate.

c. Guides shall be formed of standard rolled steel angles 1/4" in thickness and of sufficient depth to retain curtain in place against wind pressure of 20 lbs per sq. ft. Attach to jamb with 1/2" A.B. @ 2'-0" on center.

d. Hardware - steel hinges and fixtures, full floating hardened steel ball bearing rollers, 2" angle mounted high lift track to follow roof slope and with rear spring bumpers at upper end.

e. Finish - all galvanized materials shall be chemically cleaned and bonderized for paint bond, and shall be given one shop coat of rust-inhibiting paint.

3. Door shall be electrically operated, powered by jack shaft operator of sufficient horsepower to operate door at rate of one foot/second. Motor shall be "Gearhead" type with 208/220 - 60 cycle 3 phase service, minimum of 1/2 HP. Door manufacturer to furnish all controls including limit switches, starters and timing devices. Coordinate with Electrical Work as specified in Div. #16 (Elec.)

4. The flush steel, 16 gauge sectional high lift door and operator as manufactured by Overhead Door Company of Portland is approved.

5. Work not furnished by Door Manufacturer:

- a. Field painting after erection.
- b. Preparation of opening to receive door.
- c. Structural or miscellaneous iron work.

#### Finish Hardware

(803)

1. Includes all finish hardware required for the project, each item complete with screws or other attachment and all delivered to the job site as the Contractor may designate.

2. The catalog numbers used in the following specifications give the requirements as to design, quality and finish. They designate McKinney, Pemko, Sargent, and Best Universal. Other makes may be furnished if first approved in writing by the Architect.

3. All locks shall be keyed alike in the building with "Best Universal" locks master keyed to present Park Bureau series. Contractor to furnish and install construction cores to be exchanged by Park Bureau for coded cores. Coded cores shall be shipped directly to the Owner by the manufacturer.

4. The supplier shall take off quantities and prepare a completely itemized list of all the required hardware, each item properly identified. The hardware shall be packaged and labeled to conform to the list. A copy of the list shall be given to the Architect.

5. Furnish the Hollow Metal Door manufacturer all necessary templates for butts, locks, closers and panic devices to facilitate manufacturer's fabrication.

6. Schedule:

Group #1

SGL DR 1, 3, 5 & 10 - Exterior - 3'-8" x 6'-8" x 1-3/4"

1-1/2 pr Butts TA 2314 - 4-1/2 x 4-1/2 x 26D x NRP  
1 Exit Alarm Best Model B with outside Control Cylinder  
1 Threshold 170A-211A  
1 Weatherstrip 306A

Group #2

PR DR 4 - Exterior - 2'-6" x 6'-8" x 1-3/4"

3 pr Butts TA 2314 - 4-1/2 x 4-1/2 x 26D x NRP  
1 Exit Device 9904 x 9710 x 26D  
1 Best Cylinder - Mortise 1E74  
1 Alarm - Best Model B x EL 200 with outside Control Cylinder  
1 Threshold 170A-211A  
1 Weatherstrip 306A  
1 Astrgal

Group #3

SGL DR 2 - Exterior - 3'-8" x 6'-8" x 1-3/4"

1-1/2 pr Butts TA 2314 - 4-1/2 x 4-1/2 x 26D x NRP  
1 Lockset 4823 x 26D  
1 Best Cylinder - Mortise 1E74  
1 Closer EN 155P  
1 Pull 2810P x 32D  
1 Push Plate 550K x 32D  
1 Threshold 170A-211A  
1 Weatherstrip 306A

Glass and Glazing

No glass and glazing required for this work. See Division #7 for glazing of skylights.

(804)

FINISHES  
DIVISION # 9

Acoustical Panels

(901)

1. Provide and install suspended acoustical panels over the entire ceiling area of the pool enclosure.

2. The acoustical panels shall be triangular in form and shall be suspended from the structural framework of the dome.

3. Materials:

a. Exposed grid panels to be made up of Donn DV main tees and crosstees attached to a 20 ga. perimeter channel frame.

b. Main tee runners @ 4'-0" o.c.

c. Crosstees @ 2'-0" o.c.

d. Commercial quality cold-rolled steel, electro-zinc coated and prepainted a low sheen satin white. Positive interlock.

e. Acoustical tile - Owens Corning Fiberglas 48" x 48" x 1" and 48" x 96" x 1" lay in Class I, noncombustible Class 25 (Fed. Spec. SS-S-118a). Glass Cloth Faced finishes, Nubby texture, Light reflectance range .75 or more.

4. Installation:

a. Follow manufacturers recommended procedure.

b. Suspend grid panels from structural ceiling by No. 12 W & M gauge galvanized wire @ 4'-0" o.c. Attach to screw type eye-pins. Provide additional hanger wires where necessary to stabilize panels.

c. Provide stabilizer bar as needed @ center of 8'-0" panels.

d. Provide detailed shop drawings and a reflected ceiling plan for the approval of the Architect. Refer to General Requirements, Article 107.

Plastering

(902)

1. Repair and plaster present gables at junction with new structure.

2. Plaster and finish to match present surrounding surfaces.

Painting

1. Provide all materials, tools, equipment and labor to paint all work as shown on the drawings and/or called for in these specifications.

2. Materials:

a. All paints, enamels, varnishes, stains and all formulated materials shall be catalogued, regularly manufactured materials having satisfactory documented performance records.

b. Products manufactured by Millers Paint Co.,; Pratt and Lambert; and Sherwin-Williams have been designated in finish schedule to establish kind, quality and function; the products of other manufacturers may be substituted based on compliance with product standards as approved by the Oregon Council, Painting and Decorating Contractors of America, latest edition.

c. All materials shall be of the brand and quality specified and all shall be delivered to the site of the work in the original containers with seals unbroken and labels intact.

d. Color and texture samples shall be prepared for each area from color selection as furnished by the Supervising Architect.

3. Surface Preparation

a. Repair all voids, cracks or rough and defective areas by filling with approved materials and finishing to match surrounding surfaces.

b. Surfaces to be painted shall be cleaned of all foreign matter prior to an application of specified coatings.

c. Surfaces shall be thoroughly dry before application of any protective or decorative coating.

d. Finish hardware, contact plates, electrical coverplates, etc. shall be fitted and removed before painting.

4. Application:

a. Painting may be applied by brush or roller; in all cases material shall be applied so as to produce a uniform surface, texture and color, without runs, sags or holidays.

b. The manufacturer's directions for application of his product must be followed in its entirety as to the method, number of coats, maximum coverage per gallon and drying time between coats.



5. Workmanship:

a. All work shall be executed by skilled craftsmen, experienced in their trade, using recognized standards of the industry for method, performance and finish as recommended by the Oregon Council, Painting and Decorating Contractors of American in their "Painting Specification Guide for the Pacific Northwest".

6. Schedule of Paint Finishes:

- a. Surface: Exposed concrete walls  
Type: Two coats Acrylic  
Finish: Semi-gloss, sheen as selected.  
One coat Millers No. 6040 primer.  
One coat Millers No. 7054 Acrilite semi-gloss.
- b. Surface: Metal Work (non-ferrous)  
Type: Prime and two coats Oil-base  
Finish: Gloss, sheen as selected.  
Rust Control Primer No. 468.  
Two Coats Millers No. S-626 or  
S-W Hi-Level Ext. Gloss.
- c. Surface: Metal work (galvanized)  
Type: Zinc primer and two coats Oil-base  
Finish: Gloss, sheen as selected.  
Zinc Dust Primer No. 479.  
Two Coats Millers No. S-626 or  
S-W Hi-Level Ext. Gloss.
- d. Surface: Concrete Block Walls  
Type: Two coats Acrylic over Filler  
Finish: Semi-gloss, sheen as selected.  
Millers No. 6030 Kril Block Filler @ rate of  
75 sq. ft. per gal. Brush applied.  
One coat Millers No. 6040 Primer.  
One coat Millers No. 7054 Acrilite Semi-gloss.
- e. Surface: Metal doors and frames, grilles & railings.  
Type: Enamel (two coats)  
Finish: Semi-gloss Eggshell.  
Metal to be factory primed with touch-up by painter.  
1 coat P & L Vitralite Enamel undercoat.  
1 coat P & L Vitralite Enamel Eggshell.

- f. Surface: Wood Bench Tops.  
 Type: Stain & Varnish.  
 Finish: Gloss.  
 P & L Penetrating Rustic Stain.  
 3 coats P & L Vitralite UVA Spar Varnish.  
 Allow 12 hours drying between coats.
- g. Surface: Exterior wood facia and trim.  
 Type: Oil-base.  
 Finish: Semi-gloss  
 1 coat Millers Oil Primer No. 240 - Allow 24 hours to dry - putty all defects.  
 1 coat, equal parts No. 240 primer and Millers pure No. 200. 8 hrs. drying time.  
 1 coat Millers semi-gloss No. 200, no thinning.
- h. Surface: Glu-lam Beams & Purlins & Exposed Decking.  
 Type: Heavy Body Stain  
 Finish: Two coats Sherwin Williams Latex Timber Stain.
- i. Surface: Wall of Present building which is enclosed within this construction.  
 Type: Paint to match adjacent surfaces.  
 Finish: Wood surfaces - Miller semi-gloss No. 200, no thinning.  
 Plaster surfaces - Miller No. 7054 Acrilite Semi-gloss.

Alternate No. 1 To sandblast and refinish the present pools:

(904)

1. Sandblast the present paint film completely off all surfaces.
2. Apply Kelley Technical Coatings, Inc. "Poxolon" in strict accord with the manufacturers printed directions using "Poxoprime" to prime the surface and finish with one coat of "Poxolon" prepared exactly as directed.
3. Apply all coatings at the temperature recommended by the manufacturer.
4. While the "Poxolon" is still tacky, white silica sand should be lightly sifted on the bottom of the wading pool, steps and shallow areas in pools where water is under two feet in depth. After the "Poxolon" sets up, the excess sand should be brushed or vacuumed from the surface. A very light concentration of sand will make the surface slip-proof.

SPECIALTIES  
DIVISION # 10

Posted Sign

(1001)

1. Provide and install two signs designating the maximum occupant load allowed within the pool shelter.

2. Sign to read "230 MAXIMUM OCCUPANT LOAD".

3. Materials:

a. Signs to be .125" acrylic plastic in standard color with a satin matte finish.

b. Satin finish cast metal frame in color as selected, mechanically mounted.

c. Letters to be 72 pt. Helvetica Regular.

4. Two signs required - Vomar ES100 Series or approved substitute.



DIVISION 15

SECTION 15A GENERAL MECHANICAL

15A-1 SCOPE OF THE WORK

- A. GENERAL: Complete mechanical work shall be installed as shown and specified, and material, labor and equipment furnished therefor, all in accordance with the drawings or these specifications, or both, together with any incidental items not shown or specified which can reasonably be inferred or taken as belonging to the work and necessary in good practice to provide complete systems described or shown, as intended.
- B. WORK INCLUDED: In general the work includes:
1. Modifications and additions to domestic water system
  2. Modifications and additions to sanitary and storm drainage system
  3. Modifications and additions to gas system
  4. Air distribution system
  5. Automatic control system
  6. Insulation.

15A-2 DOCUMENTS INCLUDED

- A. SPECIFICATIONS: Instructions to Bidders, General Conditions, Supplementary General Conditions and General Requirements, bound herewith, are a part of these specifications. The Contractor shall consult them in detail for instructions pertaining to the work.
- B. DRAWINGS: The drawings on which this contract is based are listed in the index and are hereby made a part of these specifications. All architectural, electrical and structural drawings shall be examined, all conditions that may affect the work noted, and such conditions cared for in executing the contract.

15A-3 REGULATIONS AND PERMITS

All work hereunder shall be strictly in conformance with applicable codes and regulations. All permits and licenses necessary to install the work, arrangements for required inspections, and certificates of approval for all work from authorities having jurisdiction shall be obtained and paid for hereunder, and shall be submitted to the Architect before application for final payment.



15A-4 ABBREVIATIONS

Abbreviations used are defined as follows:

AGA	- American Gas Association
AMCA	- Air Moving and Conditioning Association
ASA	- American Standards Association
ASME	- American Society of Mechanical Engineers
ASTM	- American Society for Testing and Materials
AWWA	- American Water Works Association
CISPI	- Cast Iron Soil Pipe Institute
CS	- Commercial Standards
FS	- Federal Specifications
NBFU	- National Board of Fire Underwriters
NEMA	- National Electrical Manufacturers Association
NFPA	- National Fire Protection Association
PDI	- Plumbing Drainage Institute
SMACNA	- Sheet Metal and Air Conditioning Contractors National Assn. Inc.
UL	- Underwriters Laboratories, Inc.

15A-5 STANDARD SPECIFICATIONS AND CODES

References made herein to standard specifications and codes refer to editions in effect at the dates of proposals. Such references include current addenda and errata, if any.

15A-6 COOPERATIVE WORK

The work hereunder shall be coordinated with the work specified under other divisions or contracts toward rapid completion of entire project. If any cooperative work must be altered due to lack of proper supervision hereunder, or failure to make proper provision in time, then the work hereunder shall include all expense of such changes as are necessary to be made in the work under this division, other divisions or contracts, and such changes shall be directly supervised by the Architect, and shall be made to the satisfaction of the Architect. The work included under respective divisions of the contract relating to the mechanical work is as follows:

- A. Pipe chases
- B. Framed openings in masonry and other architectural elements
- C. Wood grounds, and nailing strips in masonry and concrete
- D. All painting except that specified herein
- E. Power wiring to equipment.

15A-7 SEQUENCE OF WORK

The various portions of the work shall proceed in the order directed by the Architect. The work shall be stopped at any particular point temporarily and men transferred to such points, and such portions of the work executed, as ordered by the Architect when, in the judgment of the Architect, it becomes necessary in order that the work under other sections or divisions of the specifications may be properly performed.



15A-8 WORKMANSHIP

The work hereunder shall be done by competent workmen in a manner acceptable to the Architect.

15A-9 TEMPORARY HEAT AND PLUMBING

Temporary heat and plumbing shall be supplied as called for in the General Conditions and/or the General Requirements. Air units shall not be operated unless respective air filters are in place. The responsibility for the cleanliness of the air ducts and changing of the air filters is included hereunder.

15A-10 FIELD MEASUREMENTS

All measurements shall be verified at the site. The existing conditions shall be fully observed before beginning work hereunder, and the work hereunder shall be in full coordination with existing conditions observed. Variations apparently necessary due to existing conditions shall be made only on approval of the Architect in writing.

15A-11 APPROVALS

- A. APPROVED MANUFACTURERS: Trade names and catalog numbers of manufactured products stated herein are intended to indicate the grade or quality of the equipment and material desired.
1. Where indicated "A, B and C", manufacturers A, B and C are approved, subject to full compliance with the specifications.
  2. Where indicated "manufacturer D; similar and equal manufacturer E and F", manufacturers D, E and F are approved with E and F requiring the same features, construction, etc., as manufacturer D.
  3. Where indicated "similar and equal to manufacturer G", the item can be of any manufacturer, without pre-bid approval, but subject to full compliance with the specifications, and with the same features, construction, etc., of manufacturer G.
  4. Where a manufacturer is not indicated, the item can be of any manufacturer, without pre-bid approval, but subject to full compliance with the specifications.
- B. FURTHER APPROVAL: Where pre-bid approval is required, paragraphs A1 and A2 above, other manufacturers must, in writing, request approval. Request will be considered and such equipment or material may be used upon approval of the Architect in writing. No request for approval will be considered later than the time indicated in the General Conditions and/or the General Requirements.



15A-12 SUBMITTAL DATA

- A. SCOPE: Where submittal data are required, the specific kind of data is indicated in the article specifying the equipment or material. Other additional data, as the Architect may deem necessary, shall also be provided when requested.
- B. SUBMITTAL DATA REQUIRED: Where indicated in the article specifying the equipment, and for all equipment and material where pre-bid approval is not required. See APPROVALS.
- C. ACCEPTANCE: Acceptance of the submittal data shall not eliminate responsibility for compliance with the drawings and/or specifications, unless specific attention has been called, in writing, to proposed deviations at the time of transmittal, and such deviations have been approved, nor shall it eliminate the responsibility for freedom from errors of any sort in the data. Where the specifications require data, the installation of the equipment or material prior to approval of the data shall be sufficient cause for removal thereof, at the Architect's direction and for re-installation in accordance with specific instructions of the Architect.
- D. CONTRACTOR'S RESPONSIBILITY: Where the specifications do not require data, it is the Contractor's responsibility to make selections of equipment and material from those approved in full conformity with the specifications.

15A-13 OPERATING AND MAINTENANCE DATA

- A. MANUFACTURER'S LITERATURE: Four sets of manufacturer's instructions for operation and maintenance of all mechanical equipment and specialties. Including replacement parts list, specifications and/or shop drawings of installed equipment, and make and size of all bearings. All data on 8-1/2 x 11 inch sheets or catalogs, suitable for side binding.
- B. WIRING AND CONTROL DIAGRAMS: Four sets of all as-built wiring and control diagrams for the automatic control system and all applicable equipment.
- C. MAINTENANCE INSTRUCTIONS: Four typewritten copy of instructions for maintenance of all systems and equipment, in itemized form with time schedule for maintenance work. The instructions shall list each item of mechanical equipment requiring inspection, lubrication, or service of any kind, and describe the performance of such maintenance. The list shall include the type of bearing for each piece of equipment, type of lubricant required, and the frequency of lubrication. The operating personnel shall be instructed in the care of the system and equipment in accordance with the approved instructions.



15A-13 OPERATING AND MAINTENANCE DATA (Continued)

D. DISPOSITION: The above literature, drawings, instructions and adjustment data shall be bound in four sets of looseleaf notebooks and forwarded to the Architect for approval. The notebooks shall be properly identified and indexed.

15A-14 ADJUSTMENT OF SYSTEM

A. DESCRIPTION: At the completion of the work, the Contractor shall adjust all air systems.

B. SCOPE: The Contractor shall:

1. Adjust air flows to within plus or minus 10 percent of the shown volume.
2. Make required drive changes.
3. Adjust minimum ventilation air settings.
4. Record final fan rpm, amperage, voltage, etc.
5. Furnish the Architect one copy of all the adjustment and fan data.
6. Furnish four copies for inclusion in the Operating and Maintenance Data.

15A-15 GUARANTEE

The Contractor shall furnish a written guarantee that he will make good at his own expense, any defects in materials or in workmanship which develop within a period of one year from the date of completion of the entire contract. Any part of any piece of equipment which is found defective shall be replaced without expense to Owner.

15A-16 COMPLETION

- A. AS-BUILT DRAWINGS: As specified in the General Requirements Division, the Contractor shall show location and elevation of underground piping and all changes in location of equipment and materials accurately dimensioned from the building lines.
- B. OPERATION: The entire installation shall be turned over to the Owner in a finished and satisfactory working condition.
- C. ACCEPTANCE: The work hereunder will not be inspected for final acceptance until the As-built Drawings, Operating and Maintenance Data and Adjustment Data specified herein have been received and accepted.



## DIVISION 15

## SECTION 15B BASIC MATERIALS AND METHODS

15B-1 MATERIALS AND EQUIPMENT

- A. GENERAL: Unless specified otherwise, all equipment and materials furnished and employed in the permanent construction of the installation shall be suitable for space provided, American-made, new and full weight, and in first-class condition. Capacities, size and dimensions shown or specified are minimum unless otherwise indicated.
- B. MANUFACTURED PRODUCTS: Identical with apparatus or equipment which has been in successful operation for at least two years. Products of similar class or service of one manufacturer.
- C. STORAGE: All manufactured products shall be delivered and stored in their original containers, which shall indicate clearly the manufacturer's name, the brand, and the identifying number.
- D. ELECTRICAL POWER CONNECTION: Equipment shall be suitable for the phase, voltage and number of power connections shown on the electrical drawings. Any modifications required in the equipment or the electrical service shall be the responsibility of this Contractor and shall be made without additional expense to the Owner and as approved by the Architect.
- E. INSTALLATION: All equipment specified herein or shown on the drawings shall be installed strictly in accordance with manufacturers' instructions unless otherwise indicated. Where installation is shown or specified contrary to the recommendation of the manufacturer of the equipment furnished, the Contractor shall advise the Architect of the differences apparent.
- F. ACCESSIBILITY: Equipment or specialties requiring frequent reading, adjustment, service or inspection shall be conveniently and accessibly located with reference to the finished building. Access doors and/or panels shall be installed, if required, to provide accessibility.

15B-2 PAINTING

- A. DESCRIPTION: Paint of color selected by the Architect, unless noted otherwise.
1. Insulation: Two coats of rubber base paint.
  2. Metal Surfaces: Primed with primer suitable for type of metal and painted one coat of rust-inhibiting, metallic paint suitable for hot surfaces. If metal does not require priming, painted two coats of paint.

15B-2 PAINTING (Continued)

B. APPLICATION: Unless noted otherwise, painted as follows:

1. Concealed and Exposed Throughout the Building
  - a. Pipe Threads: Painted two coats of red lead or paint specified above after joint is made.
  - b. Ductwork: Ductwork visible through face of grilles and diffusers painted one coat of dull black. Priming not required.
  - c. Motors, Fans, Air Units, Valves, etc., Which Have Suitable Undamaged Finished Surface: Not painted. If the surface is damaged, painted as approved by the Architect.
  - d. Diffusers, Grilles, Uninsulated Ductwork, Galvanized Rods or Straps, etc: Not painted.
2. Exterior
  - a. Ductwork or Other Metalwork and Uninsulated Piping: Painted as specified hereinbefore.
  - b. Insulation: Painted with two coats of waterproof paint.
3. Other Painting: All surfaces of unpainted insulation and metalwork left in a clean condition for painting under another division.

15B-3 EXCAVATION AND BACKFILL

As specified under Sitework Division. Includes all necessary excavation and backfill for installation of underground piping and equipment furnished under this division. Necessary shoring and sheet piling and bracing to keep trenches free and clear of earth and protect other building construction from settling. Provisions made for maintaining trenches free of water. Surfaces restored to original condition.

- A. EXCAVATION: Excavation for pipe accurately to grade so that the entire length of pipe will rest on undisturbed ground. Bell holes cut in bottom of all trenches at all bell-and-spigot joints to rest the pipe barrel on solid ground.
- B. BACKFILL: Upon completion, testing and acceptance by the Architect of piping to be buried, the excavation backfilled as specified in Sitework Division.



15B-4 ELECTRICAL WORK

Includes control wiring for the electrical equipment specified herein. Such wiring shall be provided as required, whether it is shown or not. The work shall be installed in accordance with Electrical Division and applicable codes. Control wiring in conduit or otherwise protected. All conduit and wiring in finished spaces concealed unless approved otherwise by the Architect.

15B-5 CONNECTION TO EXISTING SYSTEMS

At times selected by and coordinated with the Owner.

15B-6 CUTTING AND PATCHING

- A. SCOPE: Except as otherwise indicated on the drawings, all cutting and patching for installation of the mechanical work shall be included in the mechanical work.
- B. CUTTING: Cutting of openings for pipes, ductwork, equipment, etc., through floors, walls and ceiling, as approved by the Architect for each case. Adequate protection of furnishings and finished surfaces. Holes in concrete for piping core drilled.
- C. PATCHING: Concrete and masonry elements replaced as required to match existing construction. Other damaged surfaces finished to match original finish.

15B-7 MOTORS AND STARTERS

- A. MOTORS: 60 cycle with phase and voltage as shown on the Electrical Drawings. 1750 rpm maximum unless noted otherwise.
  1. Single Phase Motor: NEMA Standards MG 1-2.07 and MG 1-4.08. Capacitor starter, open enclosure, continuous duty. Direct connected motor less than 1/8 hp on fans and less than 1/3 hp on pumps and other equipment may be split phase or shaded pole.
  2. Three Phase Motor: NEMA Design B. Continuous duty, open enclosure.
- B. MOTOR STARTING EQUIPMENT: In accordance with NEMA standards, as follows unless specified otherwise. Located on mounting boards near motor served, or located where shown.
  1. Motor Less than 1/2 hp
    - a. Motors Without Integral Overload Protection: With manual switch having thermal overload protection
    - b. Motors With Integral Overload Protection: With Auto-Off-Manual switch.

15B-7 MOTORS AND STARTERS (Continued)

## B. MOTOR STARTING EQUIPMENT (Continued)

## 2. Motor 1/2 hp and Larger

- a. Motors Without Integral Overload Protection: Across-the-line magnetic starter with contactors of proper NEMA rating, with thermal overload protection in all legs, and suitable for maintained contact type control. With reset button and Auto-Off-Manual switch on starter cover.
- b. Motors with Integral Overload Protection: A contactor with contacts of proper NEMA rating and with Auto-Off-Manual switch on cover may be used in lieu of a magnetic starter.

15B-8 VIBRATION ISOLATION

- A. EQUIPMENT SUPPORTS: On all fans, air supply units and where specified or shown, vibration of equipment effectively isolated to prevent transmission to the building and piping. Consisting of bases, rails, suspension hangers as applicable. Selected for uniform deflection. Rubber-in-shear type housed for protection from oil and with facilities for bolting to both equipment and supporting structures. Spring isolators with deadening pads between the springs and the supports and with leveling adjustment. Designed for absorption of 90 percent of frequency of lowest speed involved.
- B. PIPING: Under no circumstance shall uninsulated piping be installed to be in direct contact with the building structure or framing.
- C. DATA REQUIRED: Selection data provided for support and isolators with approval data on each piece of equipment.

15B-9 PIPE AND FITTINGS

- A. PIPING: See applicable articles of this division for the type of materials used for piping in the various systems.
- B. DESCRIPTION OF MATERIALS
  1. Steel: FS WW-P-406b, Weight A, unless indicated otherwise. Black or galvanized as indicated. With beveled ends if welded joints are used.
  2. Copper: Hard drawn copper tubing, in straight lengths. FS WW-T-799b, Type L, unless noted otherwise. With wrought copper solder fittings.
  3. Extra Heavy Cast Iron: Coated, bell-and-spigot pipe and fittings, FS WW-P-401(3), with caulked or rubber ring joints.

15B-9 PIPE AND FITTINGS (Continued)

## B. DESCRIPTION OF MATERIALS (Continued)

4. Service Weight Cast Iron: Bell-and-spigot, coated pipe and fittings, as listed by CISPI with caulked or rubber ring joints.
5. Standard Weight Cast Iron: Coated no hub pipe and fittings as listed by CISPI.
6. Concrete Sewer Pipe: Concrete sewer pipe ASTM C-41, Standard weight unless shown otherwise. Manufactured for rubber ring joints.
7. Drainage Pattern Fittings: Coated, threaded, cast iron, FS WW-P-491a(1).
8. Steam Pattern Fittings: Threaded, cast iron, ASA B.16.4-1963. Flanged where shown or required, ASA B16.2-1960.
9. Malleable Iron Fittings: FS WW-P-521d, Type II, galvanized in galvanized pipe; otherwise black.

## C. JOINTS IN PIPING

1. Piping With Caulked Joints: Made by caulking joints with picked oakum and pouring pure soft lead, run full at one pouring. Joints 25 percent oakum and 75 percent lead. Not less than one pound per inch of nominal pipe size to each joint.
2. Piping With Rubber Ring Joints: Continuous rubber ring gasket of uniform cross section, designed for use with pipe furnished. Installed strictly according to the manufacturer's instructions.
3. Screwed Piping: Cleancut threads to standard length. Ends of pipe reamed to full inside diameter. Joints made up with pipe compound, applying compound to male threads only.
4. Copper Piping: With silver solder as approved. Piping cut to exact length with pipe cutter to an even, square cut. Reamed to remove burrs. Outside of tubing and inside of fittings thoroughly cleaned. A light coat of soldering flux, recommended by the manufacturer of the tubing, applied to both tubing and fitting. Joints slipped together, heated, and solder fed in through opening provided until a uniform line of solder appears at the joint.
5. Standard Weight Cast Iron: With stainless steel straps. Strictly in accordance with the manufacturers' recommendations.

15B-9 PIPE AND FITTINGS (Continued)

- B. **INSTALLATION:** Arranged as shown on the drawings and as required for complete system shown, as intended. Run straight and true to line with risers plumb. Installed without springing or forcing using offsets in branch piping as necessary to prevent undue strain. Installed with fittings for branches and changes in direction. Bending or mitering will not be permitted. Use of close nipples not permitted. Bushings permitted only if nominal size of the larger pipe is twice the smaller. Interior of all piping cleaned before installation.

15B-10 PIPE SUPPORTS

- A. **HORIZONTAL PIPING:** To provide for proper support and movement of piping due to expansion, without damage or distortion of piping. Supports on steel and copper piping supported not more than 10 feet on center and 2 feet from each change of direction. Supports on bell-and-spigot piping at each hub. Hangers: Similar and equal to Grinnell 260 steel clevis type, except Grinnell 101 or 101B adjustable, malleable iron, ring type hangers, may be used on piping 3 inches and smaller. Hangers hung from framing clamps, or wall brackets as applicable. With galvanized full threaded rods similar and equal to Grinnell Fig. 146 and of sizes recommended by the manufacturer.
- B. **PIPING ON ROOF:** Supported as detailed, or as approved.

15B-11 PIPE TESTS

- A. **DESCRIPTION:** Enclosed piping tested before concealing. Tests made in the presence of the Architect, as specified otherwise, and as follows:
1. **Water Piping:** Tested hydrostatically at 125 psi.
  2. **Drainage, Waste and Vent Piping:** Tested hydrostatically by filling piping with water to highest point.
  3. **Gas Piping:** Tested in accordance with NFPA Pamphlet 52.
- B. **PERFORMANCE:** The system under test shall remain tight, without leaks, displacement, or straining for at least four hours. Leaks developing during tests shall be corrected and tests renewed until a perfectly tight job is obtained. Except for bell-and-spigot piping, leakage repaired without caulking, and system retested.

15B-12 SYSTEM VALVES

- A. DESCRIPTION: 125 psi working pressure. Name and trademark of manufacturer and guaranteed working pressure stamped or cast on.
1. Gate, Globe and Check: Gate unless otherwise shown or specified. Globe valve for water, with renewable composition disc. All valves one manufacturer.
    - a. 2-inch and Smaller: All bronze, screwed. Gate: Wedge discs, FS WW-V-54b, Type I. Angle, Globe: FS WW-V-51a(2).
    - b. 2-1/2 inch and Larger: Cast iron or steel, as applicable, brass mounted, flanged. Gate: FS WW-V-58(1), Type I.
  2. Gas Cocks: Bronze body, packless, leakproof, type with lever handles.
  3. Drain Valve: Hose end with wheel handle. Similar to Repcal B-105.
  4. Valves in Copper Piping: As specified above, modified for solder connections.
- B. MANUFACTURER: Crane, Powell, OIC, Kennedy, PRC, Walworth, Jenkins, Lunkenheimer, Stockham, NIBCO.
- C. INSTALLATION: Where shown, and at all equipment connections. Gate valves at equipment connections which are smaller than pipe size shown may be same size as connection provided. All other valves same size as piping.

15B-13 FLOOR, WALL AND CEILING PLATES

Nickel or chrome plates cast brass or steel plates of sufficient size to completely cover pipe sleeve or opening. Installed on all exposed uninsulated pipes passing through finished walls, floors and ceilings. Wall and ceiling plates secured to pipe. Same diameter as pipe. Not required in unfinished spaces or mechanical spaces.

15B-14 UNIONS

- A. DESCRIPTION: Working pressure same as required for piping, as follows:
1. In Steel and Cast Iron Pipe: Galvanized in galvanized pipe; otherwise black. 2-inch and Smaller: Ground-joint, screwed, malleable iron, FS WW-U-531a. 2-1/2 inch and Larger: Cast iron, flanged, FS WW-F-406a(1).
  2. In Copper Pipe: Brass or bronze. 2-inch and Smaller: FS WW-U-516, modified for copper tubing. 2-1/2 inch and Larger: Bronze, flanged, FS WW-F-406a(1).



15B-14 UNIONS (Continued)

B. INSTALLATION: In piping connections to equipment, where shown or required to facilitate removal or replacement. Flange type with proper gasket required for type of service.

15B-15 TOOLS

Furnish all special tools necessary for proper care and operation of all equipment installed.

15B-16 MACHINERY GUARDS

All moving parts of machinery, such as shaft couplings and belt drives, adequately covered with removable metal guards to protect personnel from possible injury. Inlet and outlet openings of centrifugal fans, not otherwise protected, shall be provided with a large mesh, woven wire, inlet or outlet screen of standard design.

DIVISION 15  
SECTION 15C PLUMBING

15C-1 GENERAL

- A. SCOPE: In general, the work includes
1. Modifications and additions to sanitary and storm drainage systems.
  2. Modifications and additions to water systems.
  3. Modifications and additions to gas system.
- B. REQUIREMENTS: Sections 15A and 15B apply to all work herein.

15C-2 WALL HYDRANTS (WH)

- A. DESCRIPTION: 3/4-inch key operated brass with polished brass face plate, hose end and valve removable for repairs from outside.
1. Wall Hydrant (WH-1): Non-freeze type, length as required, galvanized wall sleeve and lock nuts.
  2. Wall Hydrant (WH-2): Box type with concealed hose end.
- B. MANUFACTURER
1. WH-1: Jay R. Smith Series 5610; similar and equal Josam, Zurn.
  2. WH-2: Jay R. Smith Series 5710; similar and equal Josam, Zurn.
- C. INSTALLATION: Where shown. With face plate flush with wall surface.

15C-3 TRAPS

P-traps connected on floor drains, and where otherwise required or shown. Coated cast iron, recessed, screw jointed or coated bell-and-spigot. Traps on drains and floor sinks primed from nearest water closet, or by state approved priming device.

15C-4 CLEANOUTS

- A. DESCRIPTION: 4" maximum; otherwise full size of piping. Brass or cadmium plated cast iron cleanout.
1. In Floors, Sidewalks and Paved Areas: With cleanout spigot body with cutoff grooves, countersunk plug, adjustable cast iron extension, nickel bronze checkered access plate and vandalproof screws.

15C-4 CLEANOUTS - Continued

## A. DESCRIPTION - Continued

2. In Walls: Cleanout T with cleanout plug, nickel bronze access cover, and vandalproof screws. Zurn Z-1320.
3. Unfinished Areas: Cleanout with hex head installed in sanitary T or wye as applicable. Zurn Z-1300.

B. MANUFACTURER: Zurn as listed and similar and equal Josam, Jay R. Smith.

15C-5 FLOOR DRAINS (FD)

Coated, cast iron body with outlet the size of the piping. With 8-inch diameter adjustable polished brass or bronze top and strainer, with double drainage flange and bottom outlet. Jay R. Smith Series 2000; similar and equal Zurn or Josam.

15C-6 DOWNSPOUT CONNECTIONS (DSC)

4-inch extra heavy or service weight cast iron sewer piping. Terminated with hub 6 inches above grade, extended 5 feet from building. Downspout grouted into hub.

15C-7 ROOF DRAINS (RD)

A. DESCRIPTION: Coated, cast iron with gravel stop, clamping ring, underdeck clamp, and vandalproof dome with area not less than 3-1/2 times the area of the outlet. Size as shown on the drawings with 16-inch diameter top. With integral expansion joints.

B. MANUFACTURER: Jay R. Smith Series 1030; similar and equal Josam or Zurn.

C. INSTALLATION: Installed with 4-pound sheet lead flashing extended 12 inches all around the drain body and mopped between layers of roofing.

15C-8 GAS WATER HEATER

A. DESCRIPTION: AGA certified with glass lined tank for 100 psi working pressure, automatic gas shutoff device, 100 percent safety shutoff, high temperature limit control, adjustable operating thermostat, baffled internal flue, magnesium anode, and draft diverter. Set to maintain 140 degrees F.

B. MANUFACTURER: National, ABCO, Burkay, PVI, Republic, Lochinvar.

C. CAPACITY: As shown with 1/2 inch gas pressure.

D. INSTALLATION: With relief valve as required by state code. Connected to existing water piping as approved.

15C-9 WATER PIPING

Pitched to permit drainage. After installation and before final connections with fixtures, all piping flushed out with water and disinfected prior to use, in accordance with standards of the State Board of Health.

- A. ABOVE GROUND: Galvanized steel pipe, with malleable iron fittings or Type L copper.
- B. BELOW GROUND: Galvanized steel with electrical insulating coating or Type L copper. Both with dielectric unions or flanges at connection to above ground galvanized piping.

15C-10 SANITARY AND STORM DRAINAGE PIPING

A. DESCRIPTION: Extended to 5 feet from building line and capped and marked for future connection, in accordance with state and local codes as follows:

1. Underground 5 feet Outside of Building: Concrete sewer pipe.
2. Underground to 5 feet Outside of Building: Any combination of extra heavy cast iron, service weight cast iron and standard weight cast iron sewer pipe as allowed by local and state codes.
3. Above Ground: Any combination of extra heavy cast iron, service weight cast iron, standard weight cast iron, galvanized steel pipe, drainage pattern fittings or steam pattern fittings as allowed by the local and state codes.

B. INSTALLATION: Laid true to line and grade.

15C-11 GAS PIPING

A. DESCRIPTION: Black steel pipe with malleable iron fittings.

B. INSTALLATION: Pitched to equipment or gas service connection. Piping, not drainable to these points, with scale pockets at low points. Scale pockets consisting of 12-inch capped dirt leg.

15C-12 WATER CONNECTION

To existing mains as shown.

15C-13 SEWER CONNECTIONS

To existing mains as shown.

15C-14 GAS SERVICE CONNECTION

Make arrangement for the gas serving agency for checking adequacy of existing meter; installing new meter, if required, and pay all charges thereto.

15C-15 FLOW RESTRICTORS

Dole Model 60 2.5 gpm chromium plated restrictor installed in each of the existing ten shower heads.

## DIVISION 15

## SECTION 15D HEATING AND VENTILATING

15D-1 GENERAL

- A. SCOPE: In general, the work includes space heating, air distribution systems and exhaust systems.
- B. REQUIREMENTS: Sections 15A and 15B apply to all work hereunder.

15D-2 UNIT HEATERS (UH)

- A. DESCRIPTION: Gas fired horizontal type with heat exchanger, burner, direct driven propeller fan and draft diverter, and contained in an enameled steel casing. Casing with adjustable vertical and horizontal outlet louvers.
- B. CAPACITIES: As shown at 80 percent efficiency.
- C. MANUFACTURER: Lennox LF Series; similar and equal Reznor, Carrier, Young, Trane, Modine, Sterling.
- D. CONTROL: With automatic pilot, 100 percent safety shutoff, high limit control and thermostat, with summer-winter-off subbase switch and gym guard.
  - 1. Summer: Fan to operate, burner inoperative.
  - 2. Winter: Fan and burner gas valve to operate by thermostat except burner closed by high limit control.
  - 3. Off: Fan and burner inoperative.
- E. INSTALLATION: Hung from existing framing.

15D-3 AIR SUPPLY UNIT (ASU)

- A. DESCRIPTION: For rooftop installation. Consisting of fan section and burner sections, all mounted on a single structural channel iron base.
  - 1. Fan Section: Belt driven centrifugal fan with motor and fan isolated from cabinet.
  - 2. Burner Section: AGA certified. With stainless steel heat exchanger, stainless steel burners and power vent. Burner pullout from accessible side of unit.
  - 3. Cabinets: Designed for unified appearance with enamel finish and access to all components and controls.

**FILMED** JUL 1975



15D-3 AIR SUPPLY UNIT (ASU) - Continued

- B. CAPACITY AND CHARACTERISTICS: As shown on the drawings with 1/2 inch WC gas pressure.
- C. CONTROLS
  - 1. Burner: Automatic with limit controls, four-stage gas valves, electric re-ignition, pre-purge, post-purge, glow coil igniter and required safety controls. Suitable for and compatible with the operating controls specified under Automatic Controls.
  - 2. Fan: Control specified under Automatic Controls.
- D. MANUFACTURER: Reznor RPVAK.
- E. INSTALLATION: Where shown on stand with 6 pipe or angle legs with gussets or cross bracing as required. Secured to roof as shown on support leg detail. Legs and cross bracing located in a manner not to obstruct access to equipment below the unit. Stand extended to support filters, sound trap and associated ductwork.
- F. SUBMITTAL DATA REQUIRED: Capacities, characteristics and dimensional data on the unit and shop drawings on the stand.

15D-4 AIR FILTERS

- A. DESCRIPTION: Viscous coated 2-inch thick throwaway type with frames. Size and number as shown.
- B. INSTALLATION: In double V bank as shown. Removable from clean air side.

15D-5 ROOF EXHAUST FAN (REF)

- A. DESCRIPTION: Belt driven centrifugal fan with aluminum or steel wheel, aluminum housing, aluminum screen, back draft damper and motor outside of airstream.
- B. MANUFACTURER: Jenn-Air BCR Series; similar and equal Carnes, Domex, Ilg, Cook Greenheck, PACE, Acme.
- C. INSTALLATION: Installed on pre-fabricated curb. Curbs constructed with the top horizontal and compatible with the type of roof where installed. Curb flashed and counterflashed to roof.

15D-6 SUPPLY GRILLES

AF250 extruded aluminum construction with welded assembly, with satin finish, 1-inch margins, 1/4-inch bars spaced 1/2-inch on centers with 15 degree deflection. With debris screen and with concealed means to secure grille to duct. Clips or springs will not be acceptable. Tuttle and Bailey AF250; similar and equal Titus, Carnes, Krueger, Anemostat, Connors.

15D-7 EXHAUST GRILLES

Rectangular aluminum with zero deflection bars parallel to long dimension and anodized finish of color selected by the Architect. Tuttle and Bailey A70; similar and equal Titus, Carnes, Krueger, Anemostat, Connors. Where noted FD, with approved fire damper. With rubber gasket under flanges, and secured with flat head, countersunk screws with finish to match grille finish.

15D-8 SOUND TRAP

- A. DESCRIPTION: Rectangular with 22 gage steel outer casing, 24 gage perforated steel inner partitions, inorganic mineral or glass fiber filler and airtight construction. The filler shall have a flame spread rating not over 25 and a smoke developed rating not over 50.
- B. CAPACITIES AND CHARACTERISTICS: For 10,000 cfm with a nominal depth of 24 inches, maximum outlet velocity of 1000 fpm at 0.06 inches maximum pressure drop and a nominal length of 36 inches.
- C. MANUFACTURER: Industrial Acoustics Type L.
- D. INSTALLATION: In accordance with the manufacturer's instructions.

15D-9 DUCTWORK

- A. DESCRIPTION: Includes sheet metal and polyester ductwork, manually operated dampers, equipment connections, fire dampers, access panels, access doors and sound attenuation.
1. Underground Ductwork: Mains either polyester impregnated fiberglass filaments wound into a glass resin and/or polyvinyl chloride (PVC) coated spiral wound, galvanized sheet metal, with hard cast joint system. Spiral wound similar and equal to Rolok. Transitions, fittings and branch takeoffs to grilles of galvanized steel of one gage heavier than specified for low pressure ducts in the latest ASHRAE Guide and Data Book.

15D-9 DUCTWORK - Continued

## A. DESCRIPTION \_ Continued

2. Other Ductwork: Of galvanized steel with gages, transverse joints, spacing of joints and intermediate bracing as shown for low pressure ducts in the latest ASHRAE Guide and Data Book.
3. Sound Attenuated Ducts: Lining of ducts and plenums UL labeled 1 inch thick moisture resistant, fire resistant, coated 1-1/2 pound density, glass or mineral wool sound absorbing duct liner. Dimensions of duct shown are net inside of the liner. With a flame spread rating not over 25 and a smoke developed rating not over 50. Liner adhesives and mechanical fasteners to conform to latest SMACNA duct liner manual.
4. Equipment Connections: Flexible connections between ducts and all fans to provide 2-inch clearance between metal parts. Consisting of neoprene coated glass fiber sleeves; similar and equal to Vent Fab's Vent-Glas. Connections to range hood exhaust fans as required by applicable codes.
5. Fire Dampers (FD): In accordance with NFPA Pamphlet 90A with 165F links. Installed in ducts where shown and required by the local and state codes. With fusible link eccentric weight and closing stop. Access panels provided to fusible links. Ducts area increased in size for the restriction of a damper or with damper outside of the airstream.
6. Access Panel in Ducts: At each fire damper and where shown. 12 x 10-inch minimum. Gasketed and secured with wing nuts. Similar and equal to PACE inspection plates.
7. Access Doors: Reinforced with steel angles. Hinged and latched with sponge rubber gasket to provide airtight seal. With 20 gage back plate and sound attenuation between door and back plate. One latch on doors up to 24 inches high, two latches on doors 25 to 42 inches high, and three latches on doors 43 inches and higher. Latches similar and equal to Ventlock 310.
8. Manual Dampers: Single blade of 18 gage galvanized steel with 3/8-inch continuous rod.
9. Manual Damper Operators and Bearings: Young regulator as listed or similar and equal Ventlock or Dura-dyne.

15D-9 DUCTWORK - Continued

## A. DESCRIPTION - Continued

- a. Dampers in Concealed Ducts: With two 656 or 656RD end bearings and No. 325 concealed damper regulator with chromium plated cover.
- b. Dampers in Exposed Ducts: With one 656 or 656RD end bearing and No. 403 surface mounted damper regulator.

## B. APPLICATION:

1. Sheet Metal: All ductwork unless shown or specified otherwise.
2. Sound Attenuated Sheet Metal: Where shown and all exterior ductwork.

## C. INSTALLATION

1. Sound Attenuation: In accordance to latest SMACNA duct liner manual.
2. Sheet Metal and Sound Attenuated Ductwork: Secured against displacement and vibration. Anchored to structural parts of the building at intervals not greater than 10 feet. Suspended with 18 gage straps. Concealed ducts may be suspended with No. 8 wire anchored in framing. Joints sealed with 12 pound asbestos paper applied with adhesive or Aero duct tape. Pittsburgh locks and double seams excepted.
3. Underground Ductwork: Installed to be completely watertight. With sand or pea gravel bedding and backfill from 6 inches below to 6 inches above top of duct. Transitions, fittings and branch takeoffs to grilles shop fabricated by the manufacturer. All field joints strictly in accordance with the manufacturer's instructions. Joints in straight runs either flanged or slip types. Takeoffs from mains with flanged joints. All shop and field joints in metal duct with pop-riveted or screwed prior to application of hard cast joint system.
4. Changes in Direction and Size: Rectangular elbows with a centerline radius ratio (R/D) of 1.25. Round elbows of 4-piece construction with a centerline radius ratio of 1.5. Ducturns used where indicated and where indicated and where radius elbows are not feasible, as detailed or approved. Transitions with lengths not shorter than those shown. Streamlined offsets not allowed.
5. Automatic Dampers: Specified and furnished under Automatic Control. Connected to ductwork hereunder.



15D-9 DUCTWORK - Continued

## C. INSTALLATION - Continued

6. Ducts Through Floors and Walls: Through floors containing a possible source of water flooding, ducts sealed to floor to provide a permanent watertight connection. In walls and other floor openings sealed by caulking with asbestos rope to provide an airtight seal.
7. Ducts Through Roof: Flashed and counterflashed to provide permanent watertight connection.

D. CERTIFICATION: The manufacturer of the underground ducts shall certify in writing that their portions of the duct system have been installed in compliance with the manufacturer's recommendations.

E. SUBMITTAL DATA REQUIRED: Shop drawings of access doors, access panels, and fire dampers. Descriptive literature on sound attenuation material and materials for equipment connections. Samples of typical underground duct joint.

15D-10 GAS VENT

Single and/or double walled steel as required by applicable codes. Vent flashed and counterflashed to roof and terminated with top. Similar and equal to Metalbestos round top.

15D-11 AUTOMATIC CONTROL

A. DESCRIPTION: A complete system of automatic controls installed to control the equipment specified in this division, except controls specified under the equipment are not included hereunder. Consisting of pneumatic-electric or electronic-electric controls to provide the results specified, as intended, and as shown on the drawings. All controls provided shall be responsibility of a single manufacturer.

1. Pneumatic System: For 20 psi nominal air pressure. With pneumatic electric switches controlling operations necessarily electrical. The system shall include the following:
  - a. Compressor: With receiver, pressure switches, gages, air filters, muffler, relief valves, and other accessories required for automatic operation. Receivers with drain valve, automatic drain and refrigerated cooler. The air intake for the compressors located outside the building as approved. Power wiring is included hereunder.

15D-11 AUTOMATIC CONTROL - Continued

## A. DESCRIPTION - Continued

- b. Air Piping: Copper tubing with soldering fittings. Air mains 3/8-inch IPS, branches 1/8-inch IPS. Pitched to provide drainage of condensate, with drip pockets where necessary. Installed to be easily accessible. Plugged tee at each controlled device, controlling instrument, and relay, for use with test gage. No copper tubing installed in concrete. Approved plastic tubing may be used in concealed spaces, mechanical rooms and where concealed in panels. In mechanical rooms, plastic tubing in gutters to be completely accessible or in conduit with pull boxes as required.
- c. Air Pressure Gage: 1-1/2-inch dial, 0-30 psi scale, 1/8-inch back connections. Black case and rim. Installed in main and branch connections to each controlling instrument except room thermostat. Gage in main air connection not required where instruments are located in groups, except one gage shall be provided for each group.

2. Electronic-Electric System: Modulating controls electronic or potentiometer type. Other controls may be electric. Mil-Amp Meter or other means to indicate control voltage installed at locations specified for air pressure gage on pneumatic system.

B. CONTROL DEVICES: Consisting of thermometers, thermostats, dampers, damper operators, relays, switches, and accessories required to provide control results specified. Item specified are basically for pneumatic system. If electronic-electric system is used, the items shall provide the same results.

1. Room Thermostat: Modulating type with 60F to 80F range, concealed or remote differential, vandalproof means for removal of cover and gym guard.
2. Immersion Thermostat: Includes all fluid temperature sensing instruments. Suitable for medium where used, system conditions, and ambient temperature. With separable socket for water. Internal or remote closing adjustment. Where required, suitable for remote readjustable control. With adjustable sensitivity for controlling pilot-operated devices and removable cover suitable for protection against dust and dampness.
3. Humidistat: Positive acting with concealed adjustable setting and gym guard.

15D-11 AUTOMATIC CONTROL - Continued

## B. CONTROL DEVICES - Continued

4. Program Clock: Sangamo 7-day type with weekend skip provision and with 12 hour electrically wound spring motor which operates clock during power outages. Located in check area as approved.
5. Time Switches: Flush mounted. Manually set, adjustable dial with 6-hour range. Dial to show unexpired time. Without manual On lever. Located adjacent to program clock.
6. Damper Operators: Suitable for space provided. Size sufficient to operate damper. Arranged to close outside air intake damper on failure of control air pressure or electricity.
7. Automatic Dampers: Fabricated of 16 gage, hot rolled steel sheets with black lacquer finish. With opposed blades for modulating action.
8. Specialties: All additional equipment required to effect control sequences, including transformers, protective devices, relays, etc.

## C. OPERATION

1. Air Supply Unit (ASU)
  - a. Fan Operation: Regardless of other control, with time delays so that both fans cannot start at the same time. Program clock to control fan operation as follows:
    - (1) Day: Fans to operate.
    - (2) Night: Fan to operate by night low limit thermostat, time switch or the unit's humidistat.
  - b. Temperature Control: With the unit's fan operating, immersion thermostat in discharge of the unit, reset by the room thermostat to maintain 55F discharge temperature at 72F room temperature to 100F discharge temperature at 75F room temperature by modulating the gas valves, and the mixed air dampers in sequence. Control of the gas valve through the limit and safety controls of the unit. The installed controls shall be coordinated and compatible with the control on the unit.
  - c. Humidity Control: Humidistat to start the fan of the unit and to position the mixed air dampers to full outside air when the humidity rises above 50 percent.

15D-11 AUTOMATIC CONTROL - Continued

## C. OPERATION - Continued

- d. Mixed Air Damper: ID and RD modulate by the duct thermostat, except the control from the humidistat to override the control of the thermostat. ID damper with adjustable minimum outside air set at 10 percent. ID damper to fully close when the fan is inoperative or is operated by the night low limit thermostat. Otherwise to operate from minimum outside air to full outside air by the temperature and humidity control. With low limit thermostat in inlet of the unit to preclude temperatures below 50F from entering the unit.
2. Roof Exhaust Fan: To operate by program clock and time switch.
- D. WIRING: Line voltage or low voltage as required. Includes all control wiring to complete the system and provide control arrangements specified or shown on drawings. Low voltage wiring protected as approved. Voltage in control circuits shall not be greater than 120 volts, except that higher voltage may be used from the motor terminals to the motor starter. The responsibility for proper voltage of coils of starters is included hereunder. Concealed unless approved otherwise.
  - E. MANUFACTURER: Johnson Service Co., Honeywell, Powers Regulator Co., Robert-Shaw.
  - F. INSTALLATION, SUPERVISION, ADJUSTMENT AND INSTRUCTION OF PERSONNEL: By manufacturer's agent.
  - G. SUBMITTAL DATA REQUIRED: Diagrams of control system, catalog data for control devices and shop drawings of control panel.
  - H. GUARANTEE: One-year emergency service, dating from the time of acceptance.



## ELECTRICAL WORK

### General Conditions

(1601)

1. The listing herein of an article or material, operation or method, requires that the Contractor shall provide each item listed of the quality or subject to the qualifications prescribed according to the conditions stated, providing all necessary labor, equipment and incidentals.
2. All General and Special Conditions specified governing the General contractual agreement shall also govern this division of the work.
3. Bidders shall view the site to determine job conditions, and all other factors affecting the execution of this work as shown on the plans and specified herein. All costs shall be included in the original proposal.
4. Obvious omissions from the drawings or specifications or differences between drawings and specifications shall be called to the Architect's attention at least 10 days prior to bid date for clarification. Failure to do so shall be construed as the willingness of this Contractor to supply all necessary materials and labor required for the proper completion of this work in a manner approved by the Architect.

### Permits, Codes and Inspections

(1602)

1. Comply with the Electrical Code of the City of Portland, Oregon, and all applicable safety regulations.
2. Obtain all necessary permits and inspections required by Code or governing authorities having jurisdiction over this work.
3. Furnish to the Architect a certificate of approval from the inspection authority at the completion of the work, prior to application for final payment.
4. All materials and equipment shall be new, approved by Underwriters' Laboratories, Inc., or by the local inspection authority, and shall be in new undamaged condition when installed. Refer to protection of the work herein.

### Record Information

(1603)

1. As-built records shall be kept by the Contractor by marked up drawings kept up to date as the work progresses, showing all changes, deviations, change orders, omissions or other variations from the contract drawings. At completion of the work, before final acceptance, the Contractor shall transcribe the complete as-built information to a set of transparencies or prints, in a neat, clear, legible manner and deliver this set to the Architect. Incomplete, unclear or illegible prints will not be accepted as the required records. Upon request the Architect will furnish the transparencies or prints, as he may require, to be finally marked up "as-built."



Catalog Date Required

(1604)

1. The Contractor shall submit a list of materials in 5 copies, showing the type, size, ratings, style, catalog number and the manufacturer for each of the following items which he proposes to furnish to assure compliance with these specifications. No variations from the Contractor's list will be permitted except by written consent of the Architect, and only for unusual circumstances.

- a. Panelboards with certified dimensions.
- b. Wall switches.
- c. Receptacles, all types.
- d. Lighting fixtures.

2. The catalog data shall be submitted to the Architect in one submittal within 30 days after award of the contract. Partial lists will not be accepted. Failure to comply with these requirements shall be deemed the Contractor's agreement to furnish the exact materials specified or materials selected by the Architect based on these specifications, without change in the contract amount.

3. Catalog data shall be in an orderly bound form. Specific items shall be clearly marked and general catalogs will not be accepted. Sheets shall be clear and legible and reproductions which do not show all details will not be accepted. Specified items need only be listed, e.g., "Switches, Bryant as specified."

Approvals and Substitutions

(1605)

1. The use of manufacturer's names, models and numbers in this specification is intended to establish style, quality, appearance and usefulness.

2. Submissions for approval of equal materials shall be made to the Architect in writing with complete catalog data, drawings or photographs clearly marked to identify the proposed substitution. No consideration will be given general catalogs or simply manufacturer's names, to verbal requests or to unclear or incomplete submissions. The Architect reserves the right to require the submission of an actual sample before the acceptance of any product as an equal to that specified. Such submissions shall be made in writing not less than 10 days prior to bid date. The Architect's approval, if given, shall be in writing or by addendum issued to the palm holders on record.

General Installation Requirements

(1606)

1. The entire installation shall be made in a neat, workmanlike, finished and safe manner, under competent supervision at all times.



2. It is the intent to provide a complete, properly operating system for each item of equipment called for under this division of the work. Installations shall be in accord with the equipment manufacturer's instructions, the best industry practices and the contract documents. Where a conflict in these guide lines appear the Architect shall be requested to provide proper clarification before the work is roughed-in and his decision shall be final. Work installed without such clarification shall be removed and corrected by the Contractor at no cost to the Owner.
3. Panels, cabinets and equipment shall be level and plumb and installed parallel with structural building lines. Panel interiors shall fit tight to trims. Switchgear panels and all electrical enclosures shall fit neatly without gaps, openings or distortion. All unused openings shall be properly and neatly closed with approved devices or methods.
4. Conduits, whether exposed or concealed, shall be securely supported and fastened at intervals of nominally every 6 feet and within 18 inches of each outlet, ell, fitting, panel, etc. Suspended conduits shall be supported by metal ring or trapeze hangers and threaded steel rods having a safety factor of 4. Perforated plumbers tape shall not be used. Wire ties using not less than No. 14 iron wire and "lathers ties" which will prevent displacement may be used for concealed runs only and for rigid conduit up to 1-1/4 inches or for EMT only.
5. Conduit raceways embedded in concrete shall be made up watertight. Conduit threads for runs in damp locations or underground shall be made watertight by painting the entire male thread area with Rustoleum metal primer or equal, before assembly.
6. Surface raceways shall be installed parallel with structural building lines and shall closely follow the surfaces wired over, except where suspended. Exposed conduits shall be neatly offset into boxes and cabinets.
7. Surface panels, devices and outlets shall be fitted with neat, appropriate trims, plates or covers, without overhanging edges, protruding corners or raw edges, to leave a finished appearance.
8. Conceal all wiring in finished spaces and elsewhere so far as practicable.
9. Outlet boxes shall be mounted on substantial metal bar hangers or fastened directly to structural members unless cast in place. Provide fixture studs where necessary for fixture support. Outlet boxes shall finish flush with finish surface lines or not more than 1/8 inch back and shall be level and plumb. Long screws with spacers or shims for mounting devices will not be acceptable. No combustible materials shall be exposed to wiring at outlets.
10. Ceiling outlets shall be coordinated with acoustical tile ceilings where they occur. Outlets shall center on the tiles or on joint intersections or shall be installed as shown on the architectural reflected ceiling plan. Refer to architectural drawings for room finishes and details.



11. Cutting, patching and restoration of finishes necessary for this work shall be included hereunder. Surfaces damaged by this work and spaces around conduits passing through floors or walls shall be neatly patched and finished to match the adjacent construction, including painting or other finishes. All dirt and debris shall be cleaned up and removed. This work shall all be performed to the satisfaction of the Architect.

12. Fixtures installed under this work shall be properly and adequately supported from the building structure except where ceiling construction or other provisions are especially designed to support the fixture units. Fixture supports shall be designed with a safety factor of 4. Supports shall provide proper alignment and leveling of fixtures and shall be arranged to maintain the alignment at all times. Flexible connections where permitted to exposed fixtures shall be neat and straight, without excess slack, preferably following the support device.

13. Electrical plans are diagrammatic, indicating approximate location of outlets. Consult the architectural, structural and mechanical drawings to avoid conflicts with equipment, structural members, etc. In general, the architectural drawings govern but conflicts shall be resolved with the Architect prior to roughing-in.

14. The extent of branch circuiting and control shown shall not be changed and homeruns shall not be combined without approval of the Architect. Minor revisions of conduit runs or arrangements to suit construction conditions is permissible. Feeder runs are not to be combined or altered except by special permission. Refer to Record Information requirements for recording any changes.

15. Minor changes in location of outlets or equipment shall be made without added cost to the Owner if ordered prior to roughing-in.

16. Splices and taps for branch circuit work shall be made up securely, soldered and taped or made up with Scotchlok or Ideal Wing Nut connectors as per manufacturer's instructions. All joints to be made up complete, promptly after wire installation. Single wire pigtails shall be provided for fixture and for device connections. Conductor insulation shall be carefully removed without injury to the wire, with insulation intact up to terminals, lugs and joints. Nicked or damaged conductors of any size shall be removed and replaced as defective material.

17. Feeder lugs and connectors for wire No. 8 and larger shall be compression tool type, equal to T & B or Burndy Hydent, except that compression screw connectors furnished as part of molded case breakers will be permitted if made up tight and retightened after standing at least eight hours. Wire insulation shall butt to the lug shoulder without exposed conductor showing.

18. In general, the mounting heights shall be as noted on the drawings or as listed below, the drawing notes taking precedence. Where no heights are indicated, the Contractor shall request clarification from the Architect. Prior to roughing-in, consult the architectural elevations which may indicate outlet positions, as well as architectural, mechanical and structural drawings, to avoid conflicts.



Light switches -----	48 inches
Convenience receptacles -----	12 inches
Receptacles in unfinished or work areas -----	48 inches
Panelboards to top -----	72 inches

19. The Contractor shall verify the physical dimension of each item of electrical equipment to fit the available space and shall promptly notify the Architect, prior to roughing-in, if conflicts appear. Coordination of equipment to fit into the available space and to the access routes through the construction shall be the Contractor's responsibility.

20. Cleaning of all electrical equipment shall be the responsibility of this division of the work. Plaster, dirt, scraps and all foreign materials shall be removed from outlets, panels and each component furnished in this work. Panels, lighting fixtures and all components shall be free of dust, grit and foreign material, left as new before acceptance of this work. Refer to Protection of the Work herein.

21. Powder actuated or similar shot-in fastening devices will not be permitted for any electrical work except by special permission of the Architect.

22. Conduits crossing expansion or seismic joints where cast in, or built into the construction, shall be provided with appropriate fittings which will permit structural movement, equal to O.Z Manufacturing Company Type DX.

#### Labeling

(1607)

1. It is the intent to have the complete electrical system clearly and properly labeled to indicate the loads served or the function of each item of equipment provided under this work.

2. Branch panel schedules shall be typewritten with protective, clear, transparent covers, accurately accounting for every breaker installed, including spares. Schedules shall use the actual room designations assigned by name or number near completion of the work and not the space designations on the construction drawings. Minimum panel schedule width shall be 4 inches with 3/8 inch height allowed for each circuit line. Where circuits are added or changed in existing panels, provide new, clean, accurate circuit schedules. Panel numbering shall run consecutively down the left side and continue down the right side for all of the single pole circuits. Multipole circuits, located in the lower right hand positions, shall be numbered in sequence following the single pole, with only one number per circuit. Panel schedules shall be similarly arranged to provide a logical chart of the circuits.

3. Branch panels shall be identified with an engraved phenolic nameplate corresponding with the distribution switch labeling, mounted inside of the panel door for flush panels and on the face of the door for surface panels. No brand labels or other markings shall be on the outside of flush branch panels. Multiple section panels shall each be labeled and designated as Section 1, Section 2, etc. The panel circuit schedule related to each section shall be mounted in the door for that section.



4. All distribution switches shall be labeled with engraved phenolic nameplates with 3/16 inch minimum letters to clearly identify each load served.

5. Each contactor, disconnect switch, time switch, relay, junction or pull box for other than branch circuit wiring, unless obviously directly related to equipment, shall be labeled with an engraved or embossed nameplate securely attached. In finished areas such labels shall be inside of the door or cover.

Grounding (Interior Wiring Systems)

(1608)

1. All electrical equipment, raceways and enclosures shall be grounded in accord with code rules and established safety practices.

2. Receptacles shall have their grounding terminal bonded to the raceway system as per code rules except where "green" equipment grounding conductors are called for.

Protection of the Work

(1609)

1. All electrical work and equipment installed under this division shall be protected against damage by other trades, by weather conditions or by any other causes, as a part of this work. Equipment found damaged or in other than new condition will be rejected as defective.

2. Panels, light fixtures and all electrical equipment shall be kept covered or closed to exclude dust, dirt and splashes of plaster, cement or paint and shall be free of all such contamination before acceptance. Enclosures and trims shall be in new condition, free of rust, scratches or other finish defects and if damaged shall be properly refinished in a manner acceptable to the Architect.

3. Conduit and raceways shall be kept closed by suitable plugs or caps during construction, to prevent entrance of dirt, moisture, concrete or foreign objects. Raceway shall be clean and dry before installation of wire and shall be so at the time of acceptance.

4. Wiring shall be made up and insulated promptly after installation of conductors. Wire shall not be pulled in until all bushings are installed and raceway terminations are completed. Wire shall not be left extending out of conduit stubs or incompleated raceways. Wire shall not be pulled into conduit embedded in concrete until after the concrete is poured and forms are stripped.

Completion and Testing

(1610)

1. Each system shall be fully tested and left in proper operation, free of faults, shorts or unintentional grounds. Where existing systems are interconnected, tests shall include both the existing and the new facilities.

2. Demonstration of any system shall be provided in the presence of the Architect, the Owner or their representative when requested by the Architect.



Guarantees

(1611)

1. Guarantee the complete installation made under this division of the work against any defects in materials, equipment or workmanship, which may occur under normal usage of the installation for a period of one year after final acceptance, except as specified below. Such defects shall be promptly remedied to the satisfaction of the Architect without cost to the Owner.
2. Incandescent lamps only will be exempt from the one year guarantee, but all other types shall be included in the guarantee. All lamps and fixtures shall be in place and in proper operation at the time of acceptance of the work.
3. In addition to the above guarantee, the Contractor shall provide all necessary labor and incidentals to carry out manufacturer's guarantee of products furnished under this contract where the manufacturer's guarantee period exceeds the one year guarantee.
4. Electrical discharge lighting system ballasts shall be guaranteed for two years after acceptance.

Work Excluded

(1612)

1. The following items will be furnished and installed under other divisions of the work. Work under this division shall be conducted in a manner to cooperate with the installation of such equipment or items.
  - a. Items of furnishings and portable equipment.
  - b. Heating and ventilating motors, motor starters, control devices and control wiring beyond the provisions shown on the electrical drawings. Refer to Equipment Connections herein.

Wiring Methods and Materials

(1613)

1. Raceways and conduits of approved metallic types shall be provided for all electrical systems wiring with raceway sizes based on new work code tables for type "RHH" covered insulated wire, for all wiring under this work, except where clearly shown or specified.
  - a. Rigid galvanized conduits shall be used for all wiring installed underground, exposed within 8'-0" of the floor, in poured concrete construction, in damp locations and where subject to mechanical injury, with threaded fittings made up tight. Underground conduit threads shall be protected as specified under General Installation Requirements. All conduits to be bushed with heavy duty insulating bushings, equal to T & B No. 1222 series. Fittings attached by set screws shall not be used.
  - b. Electric metallic tubing may be employed in all other dry protected locations but limited to 2 inch maximum trade size. Fittings attached by set screws shall not be used. Connectors shall be factory pre-insulated, with iron or steel bodies, zinc or cadmium coated.



c. Flexible metal conduit will be permitted only where flexibility is necessary, as at motors. Flex shall be limited to nominally 18 inches maximum except where work is fished in. Flex shall be jacketed type, equal to Seal-Tite, at all locations except for concealed fixture connections and work fished into concealed dry locations.

d. Surface metal raceway equal to Wiremold may be used in finished spaces as specified.

e. Conduit sizes shall be not less than permitted by National Electrical Code, Table 3A for type "RHH" insulated wire with outer covering or 40% fill for this type of conductor insulation. Conduit size shall not be reduced for thinner types of insulation unless specifically shown or specified herein. Conduit for conductors may be installed for 40% fill as per N.E. Code, Table 4.

2. Wire shall be copper, No. 12 minimum gauge, Type "THW" except all conductors to receptacles and underwater floodlights shall be wired using moisture and heat resistant cross-linked polyethylene type "XHHW." Wire fill shall not exceed that specified above for conduit sizing, based on "RHH" covered insulation. See lug requirements specified.

3. Boxes for ceiling outlets shall be 4 inch octagon, for wall outlets shall be 4 inches square with appropriate device covers. Larger boxes shall be provided where required by code, by large conduit entrances, by good wiring practices or where noted on the drawings. All boxes to be galvanized or cadmium plated.

4. Wiring devices shall be specification grade, with special devices as noted on the drawings.

a. Wall switches:

(1) Wall switches, 20 ampere, 277 volt, quiet type, Bryant 4901 series, Arrow 1991, Hubbell No. 1221 series or P & S 20 AC1 series, ivory exposed finish.

(2) Key operated single pole switches same as above except with a Sierra No. WPH-1L stainless steel lock type cover.

(3) Key operated momentary for door control, 3 position, two circuit with spring return to center off position, 20 ampere, 120-277 volt, Hubbell No. 1557 with a Sierra No. WPH-1L stainless steel lock type cover.

b. Duplex receptacles, 15 ampere, 3 wire, 2 pole grounding, Bryant, Arrow, P & S or Hubbell No. 5252 series, ivory exposed finish. Refer to grounding requirements specified.

c. Finish plates shall be stainless steel, rustproof alloy No. 302 (18-8), equal to Arrow series 93,000, except in the pool area proper use gasketed stainless steel, Sierra No. WP-8.



Panelboards

(1614)

1. Panelboards shall be circuit breaker type incorporating the following features, Square D, Circle AW, General Electric or I-T-E Imperial.
2. Breakers in branch panelboards shall not be less than one inch on centers to allow for easy operation of handles. Each breaker shall be securely bolted and fastened to prevent movement and trims shall fit neatly and tightly to the breaker assembly. No dummy fillers or trim openings will be permitted in panelboards unless the space is bussed and equipped to receive future breakers.
3. Single pole circuits shall be arranged down the left hand side, continuing down the right hand side, with multipole circuits all placed on the right hand side in lower positions following the single pole circuits. Multipole breakers shall be identified by a single number.
4. Panelboards shall be equipped with door having flush latches and locks using Corbin No. 60 keys. No other key shall be employed. Latches shall operate freely and easily and shall hold the doors tightly closed.
5. Minimum gutters to be 5 inches wide except where feeder conductors enter, as at the feed end a minimum of 6 inches clear shall be provided. Feeder conductors to enter directly in line with lug terminals wherever practicable.
6. Split door and split bus panels shall have nominally 2 inch separation between sections, with no part of any breaker behind the separating section.
7. Panel flush trim shall be finished flat, light gray or tan, suitable for painting over or being left with factory finish. Trims to be separately packed and protected from scratching or marring.
8. Surface panels shall have metal face trims returned around the panel tub sides, nominally 3/4 inch, with no sharp edges or corners. Surface panel tubs shall be finished to match the face trim, with trims packed separately as specified for flush trims.
9. Panelboards shall be equipped with circuit schedules, labeling, numbering and breaker arrangements, and feeder lugs as specified under preceding sections of these specifications and indicated on the drawings.
10. Each circuit supplying receptacles and underwater floodlights in the pool area shall be equipped with G.F.I. circuit interrupters built into the branch panel. The interrupters shall be U.L. listed and comply with the latest N.E.C. ground fault interrupter requirements for swimming pools.

Maintenance of Service

(1615)

1. Electrical service shall be maintained to all functioning portions of the building throughout the construction, except as permitted below, during all hours, as required by the Owner.



2. Outages shall be kept to a minimum and each shall be pre-arranged with the Owner. No outages of electrical service or communications shall be made without this prior approval. Requests for outages shall state the specific dates and hours and the maximum duration, with the outages kept to these specific times. This Contractor shall be deemed liable for any damages resulting from unscheduled outages or for those not confined to the pre-approved times. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance.

3. All costs for temporary facilities, overtime labor and necessary provisions to maintain electrical services shall be included in the initial bid proposal.

Demolition and Salvage

(1616)

1. Remove or relocate all electrical wiring, equipment, fixtures, etc., as may be encountered in removed or remodeled areas in the existing construction affected by this work. Wiring which serves usable existing outlets shall be restored and routed clear of the construction or demolition. Wiring to be abandoned shall be safely cut off and terminated and, unless concealed, shall be removed to leave the site clean.

2. Removed materials shall not be reused in this work.

3. Removed materials shall remain the Owner's property and shall be stored at one location on the site except for scraps of wire and conduit and other unusable items which shall be removed as debris.

Service and Distribution

(1617)

1. Provide revisions and additions at the existing Main Distribution as shown on the riser.

2. The service is existing and will remain.

Equipment Connections

(1618)

1. Provide the electrical power wiring complete to each item of equipment shown on the Electrical drawings, including those for heating, ventilating, plumbing, etc. Verify the exact locations and proper rough-in requirements for each such item. Refer to watertight flex specified above.

2. Starters, contactors and overcurrent equipment furnished under Mechanical work unless otherwise specified or noted, for the heating, ventilating and plumbing equipment, are to be mounted and wired under this work.

3. All code required disconnects shall be furnished under this work whether specifically shown or not.

4. Control devices and control wiring will be furnished and installed under another division of the work except for provisions or items specifically noted on the Electrical drawings or specified herein.



Pool Grounding System

(1619)

1. The grounding system shall be in strict accord with Article 680 of the National Electric Code. Prior to bidding determine all requirements and include all costs in the Base Bid price.
2. Provide grounding to each item of metal equipment within the pool proper, such as diving boards, ladders, drains, water inlets and outlets, structural steel, floodlight housings, etc. Grounding conductor to be copper No. 8 minimum, stranded to form a common ground grid. This grounding shall be made to the existing as well as new equipment.
3. Install a No. 12 ground between the panelboard and the service equipment grounding terminal. In addition, install an insulated unbroken No. 12 conductor in an approved metal raceway from the underwater light fixture junction box to the panelboard ground terminal.
4. Ground clamps shall be non-ferrous, installed exposed for convenient inspection.

Underwater Lights

(1620)

1. This is an existing swimming pool. The sidewalls, endwalls and bottom of pool structure will remain.
2. The underwater lights installed in the side and end walls will be cut into an existing wall structure. All excavation for the lights, cutting and patching of the existing walls will be the General Contractor. The Electrical Contractor shall install the fixtures and conduits in place and coordinate his work with the General.
3. From each floodlight provide a 3 wire No. 16 ST supply cable of sufficient length to reach the junction box at the wall. The standard 12' long cable supplied with the fixture is not long enough to reach the wall junction, verify requirements and provide cable length to suit.
4. Underwater floodlights, wet niche type, stainless steel framing niche, cast bronze lighting fixture with positive locking device and threaded retaining screw lug to secure fixture positioning and holding. The fixture shall be Underwriters' approved for swimming pool use and meet all requirements of Article 680 of the National Electrical Code; Hydrel No. 4421, 120 volt, for use with a Q 500 Par 56 W.F.L. lamp, cord to be of the length required to extend to the wall junction box. Install lens of fixture 18" below water level. Sufficient slack cable shall be coiled in the fixture housing to permit relamping from the top of the deck.
5. Cable junction box, cast bronze natural finish, internal ground connectors, neoprene gasketed with strain reliefs for each fixture cord installed on the sidewall up 18". The box must be capable of handling the cords for up to 3 fixtures, Hydrel No. 1712-1 for 1 fixture entrance and No. 1714-4 for 2 fixture entrance.



Lighting Fixtures and Lamps

(1621)

1. Provide a lighting fixture of the type and wattage indicated by letter and number adjacent to symbols or typical for the location of each and every lighting outlet shown. Refer to fixture support requirements specified above in General Installation Requirements.
2. Fixtures shall be thoroughly cleaned, assembled, lamped and installed in place. All lamps, diffusers, trims and fixture components shall be properly in place and fixtures and lamps shall be in operation at the time of acceptance of the work.
3. Fixtures shall be of recognized manufacture, bearing the Underwriters' approval label. Fixtures installed under canopies, marquees, roofed open porches and similar damp or wet locations shall be U.L. approved and labeled as suitable for damp or wet locations.
4. Sockets for incandescent lamps 300 watts and larger shall be of the heavy duty mogul type. No sockets having fiber insulating liners will be permitted.
5. Fixture wire shall be of the type approved for the maximum heat conditions encountered.
6. Aligners shall be of the ball type providing nominally 45 degree movement either side of center and with their attaching devices shall provide a safety factor of 4.
7. Standard incandescent lamps shall be 120 volt unless otherwise specified, inside frosted, with 300 watt and larger to be mogul base. Reflector lamps, with approved bases, shall be provided for all fixtures designed and cataloged for such lamps, unless otherwise specified, 120 volt rated. Fluorescent lamps shall be 40 watt, "white", rapid start for general use with other types as required by the fixture specified. Lamps to be as manufactured by General Electric, Sylvania or Westinghouse.
8. Ballasts shall be rapid start type, or special types as required by the fixture and lamps specified, with U.L. and C.B.M. approval labels. Each ballast shall be equipped with a thermal overheat cutoff device. Ballasts shall be guaranteed for two years from the date of acceptance of the project.
9. Fluorescent fixtures mounted on low density acoustical tile or combustible materials shall be specifically approved for direct mounting on such material or shall be mounted not less than 1-1/2 inches from the surface of such material. The type and fire rating of ceiling materials shall be ascertained by the Contractor before fixtures are installed.
10. Fixture diameters or dimensions shall be proper for the various wattages noted on the plans as recommended by the fixture manufacturer or as specified herein. Fixture stems or suspensions shall be of lengths specified or noted, or of lengths to provide indicated fixture clearances. Where lengths or clearances are not called out they shall be as determined by the Architect.



11. Fixtures shall be the products of standard recognized manufacturers and shall be of the types specifically approved for this project. Previous approval for other projects does not constitute approval for this work.

12. Fixture Types:

- "A" Mercury vapor fixture, low brightness glass reflector, inbuilt super-quiet constant wattage ballast, 400 W. deluxe white lamp. See drawings for mounting detail, Holophane No. 913-120-ELB-VQ.
- "A-1" Same as "A" except equipped with a 250 W. quartz lamp to automatically operate after a temporary power interruption and turn off when the mercury arc has been restored.
- "A-2" Same as "A" except twin unit, Holophane No. 2913-120-ELB-VQ.
- "B" Ceiling mounted gasketed fluorescent fixture, opal acrylic diffuser, Lithonia No. DV-240-A.
- "C" Recessed underwater floodlight. See Underwater Lights section 1620 of this specification.
- "D" Cast aluminum weatherproof mercury vapor fixture, inbuilt constant wattage ballast, 100 W. deluxe white mercury lamp, asymmetric glass refractor, built in photo electric control, Holophane No. 412-120-PR<sup>2</sup>, color as selected.
- "E" Self contained battery operated emergency supply ceiling mounted exit sign, solid state charging and transfer circuit, rechargeable nickel cadmium batteries, all in one housing, minimum burning time 1-1/2 hours, 5 year guarantee, stencil face on green background. Upon failure of the normal power supply, the battery unit automatically switches on, Lithonia No. ES1GEL-120V.
- "EA" Same as "E" except back wall mounted.
- "F" Double head automatic battery emergency light to turn on whenever the normal building power supply fails. The fixture will include wall mounting bracket, lead calcium batteries, charger, two flood heads with lamps, Dual-Lite Model 36 with 10 year pro-rated guarantee.