PROJECT MANUAL
FOR
Renovation of

OTTER AND BUSHDOG EXHIBIT
LITTLE ROCK ZOO

LITTLE ROCK, ARKANSAS
April 1, 2015

Little Rock Bid #14160-R

Project No. HW14-630B

REAL. LIVE. ENTERTAINMENT.
LITTLE ROCK ZOO

H+W

Heiple + Wiedower Architects
319 President Clinton, Suite 201
Little Rock, AR

AFH Design
PLANNING • DESIGN • CONSULTING

LR Zoo Renovation Otters/Bush Dogs Exhibit
Bid Number: 14160-R
Closing Date: 4/27/15 at 3 PM

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MIKE BEEBE
GOVERNOR

STATE OF ARKANSAS
ARKANSAS DEPARTMENT OF LABOR
PREVAILING WAGE DIVISION

RICKY BELK
DIRECTOR

10421 WEST MARKHAM • LITTLE ROCK, AR 72205-2190
Phone: 501-682-4536 Fax: 501-682-4508 TRS: 800-285-1131

February 17, 2015

Tim A. Heiple
Heiple & Wiedower
319 President Clinton Avenue
Little Rock, AR 72201

RE: Construction of Otters & Bush Dog Exhibit
Little Rock Zoo
Little Rock, Arkansas
Pulaski County
Determination #14-087

Dear Mr. Heiple:

Please be advised that the expiration date of the above-referenced project has been extended until August 6, 2015.

The expiration date is for bidding purposes only. If the job is bid before the expiration date and awarded within one (1) year of that bid date, the wage scale shall apply for the lifetime of the project.

Please note that new wage rates will be certified on July 1, 2015. If the job has not bid by the new expiration date, you will need to request a new wage determination to supersede #14-087.

Also, please note that you may access a copy of the Prevailing Wage Law, the Rules & Regulations and request forms at http://www.labor.ar.gov .

If I can be of further assistance, feel free call me at (501) 682-4536 or fax (501) 682-4508.

Sincerely,

Lorna Kay Smith

Lorna Kay Smith
Prevailing Wage Division

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Tim A. Heiple
Heiple & Wiedower Architects
319 President Clinton #201
Little Rock, AR 72201

August 6, 2014

RE: CONSTRUCTION OF OTTERS & BUSH DOG EXHIBIT
LITTLE ROCK ZOO
LITTLE ROCK, ARKANSAS
PULASKI COUNTY

Dear Mr. Heiple:

In response to your request, enclosed is Arkansas Prevailing Wage Determination Number **14-087** establishing the minimum wage rates to be paid on the above-referenced project. These rates were established pursuant to the Arkansas Prevailing Wage Law, Ark. Code Ann. §§ 22-9-301 to 22-9-315 and the administrative regulations promulgated thereunder.

If the work is subject to the Arkansas Prevailing Wage Law, every specification shall include minimum prevailing wage rates for each craft or type of worker as determined by the Arkansas Department of Labor Ark. Code Ann. § 22-9-308 (b) (2). Also, the public body awarding the contract shall cause to be inserted in the contract a stipulation to the effect that not less than the prevailing hourly rate of wages shall be paid to all workers performing work under the contract. Ark. Code Ann. § 22-9-308 (c). Additionally, the scale of wages shall be posted by the contractor in a prominent and easily accessible place at the work site. Ark. Code Ann. § 22-9-309 (a).

Since this determination contains both Building and Heavy construction classifications, please be advised that "Building construction" means generally the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving. Additionally, such structures need not be "habitable" to be building construction. The installation of heavy machinery and/or equipment does not generally change the project's character as a building. "Heavy construction" means those construction projects that are not properly classified as "building", "highway", or "residential".

I have enclosed a copy of the 2 sections of the Prevailing Wage Administrative Regulations which apply to a multiple determination (e.g., building and heavy rates). You can access a complete copy of the Arkansas Prevailing Wage Law and Regulations from our website at www.arkansas.gov/labor.

Also enclosed is a "**Statement of Intent to Pay Prevailing Wages**" form that should be put in your specifications along with the wage determination. The General/Prime Contractor is responsible for getting this form filled out and returned to this office within 30 days of the Notice to Proceed for this project. **When you issue the Notice to Proceed for this project, please send a copy of the notice to my office.**

If you have any questions, please call me at (501) 682-4536 or fax (501) 682-4508.

Sincerely,

Lorna Kay Smith

Lorna K. Smith
Prevailing Wage Division

Enclosures

Memorandum

To: All Architects and Engineers

From: Lorna Smith, Prevailing Wage Division

Re: Sections of the Prevailing Wage Administrative Regulations.

Enclosed are sections 1.101 (2), (8), & (9) and 2.100 (i) (1) & (2) of the Prevailing Wage Administrative Regulations. Please take a few moments to review the sections and share with your associates.

If you would like a complete copy of the Administrative Regulations and/or the Arkansas Prevailing Wage Law, Ark. Code Ann. §§ 22-9-301 through §§ 22-9-315, please use our web site at www.arkansas.gov/labor or call (501) 682-4536.

1.101 Definitions.

(2) "Building construction" means generally the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level as well as incidental grading, utilities and paving, unless there is an established area practice to the contrary. Additionally, such structures need not be "habitable" to be building construction. The installation of heavy machinery and/or equipment may not change the project's character as a building. Examples of building construction follow:

Alterations and additions to nonresidential buildings
Apartment buildings (5 stories and above)
Arenas (enclosed)
Auditoriums
Automobile parking garages or decks
Banks and financial buildings
Barracks
Churches
City halls
Civic centers
Commercial buildings
Court houses
Detention facilities
Dormitories
Farm buildings
Fire stations
Hospitals
Industrial buildings
Institutional buildings
Libraries
Mausoleums
Motels
Museums
Nursing & Convalescent facilities
Office buildings
Out-patient clinics
Passenger and freight terminal buildings
Police stations
Power plants
Prefabricated buildings
Remodeling buildings
Renovating buildings
Repairing buildings
Restaurants
Schools
Service stations
Shopping centers
Stores
Subway stations
Theaters
Warehouses
Water & Sewage treatment plants (building only)

(8) "Heavy construction" means those construction projects that are not properly classified as either "building", "highway", or "residential". Unlike these classifications, heavy construction is not a homogenous classification. Because of its catch-all nature, projects within the heavy classification may sometimes be distinguished on the basis of their particular project characteristics, and separate wage determinations. Examples of heavy construction follow:

Antenna towers
Bridges (major bridges designed for Commercial navigation)
Breakwaters
Caissons (other than building or highway)
Canals
Channels
Channel cut-offs

Chemical complexes or facilities (other than buildings)
Cofferdams
Coke ovens
Dams
Demolition (not incidental to construction)
Dikes
Docks
Drainage projects
Dredging projects
Electrification projects (out-door)
Flood control projects
Industrial incinerators (other than building)
Irrigation projects
Jetties
Kilns
Land drainage (not incidental to other construction)
Land leveling (not incidental to other construction)
Land reclamation
Levees
Locks, waterways
Oil refineries
Parking lots
Pipe lines
Ponds
Pumping stations (prefabricated drop-in units)
Railroad construction
Reservoirs Revetments
Runways
Sewage collection and disposal lines
Sewers (sanitary, storm, etc.)
Shoreline maintenance
Ski tows
Storage tanks
Swimming pools (out-door)
Subways (other than buildings)
Taxiways
Tipples
Tunnels
Unsheltered piers & wharves
Viaducts (other than highway)
Water mains
Waterway construction
Water supply lines (not incidental to building)
Water and sewage treatment plants (other than buildings)
Wells

(9) "Highway, road, street, or bridge construction" shall include the construction, alteration or repair of roads, streets, highways, alleys, trails, paths, and other similar projects not incidental to building or heavy construction. Examples of such construction may include:

Alleys
Excavation and embankment (for road construction)
Fencing (highway)
Grade crossing elimination (overpasses or underpasses)
Guard rails on highway
Highway signs
Highway bridges (overpasses; underpasses; grade separation)
Medians
Resurfacing streets and highways
Roadbeds
Roadways
Shoulders
Stabilizing courses
Storm sewers incidental to road construction
Street paving
Taxiway
Traffic signals

Such "highway" construction, which does not qualify for the exemption, contained in Ark. Code Ann. §§ 22-9-303 (b) and Regulation 1.100 (d) (5) shall be considered "heavy construction."

2.100 Obtaining and Compiling Wage Rate Information.

(1) In some cases a project includes construction items that in themselves encompass different categories of construction. Generally, a project is considered mixed and a "multiple determination" issued if the construction items are substantial in relation to project cost – more than 20 percent. Only one determination is issued if construction items are "incidental" in function to the overall character of a project (e.g., paving of parking lots or an access road on a building project), and if there is not a substantial amount of construction in the second category.

(2) In cases involving a mixed project on which a multiple determination (e.g., building and heavy rates) is issued, building rates shall be applicable for a distance extending five (5) feet from any building on the project.

Arkansas Department of Labor
Prevailing Wage Determination Building and Heavy

Date: 8/6/2014

Project: CONSTRUCTION OF OTTERS & BUSH DOG EXHIBIT

City: Little Rock

Determination#: 14-087

Project County: Pulaski

Expiration Date: 2/6/2015

Survey #: 714-AM01

CLASSIFICATION	Class	Basic Hourly Rate	Fringe Benefits
Asbestos Worker/Insulator	building	$13.30	$1.29
Boilermaker	building	$17.78	$5.04
Bricklayer/Pointer, Cleaner, Caulker, Stone Mason	building	$21.20	$0.00
Bricklayer/Pointer, Cleaner, Caulker, Stone Mason	heavy	$16.77	$3.88
Carpenter	building	$17.25	$0.00
Carpenter	heavy	$17.45	$0.00
Concrete Finisher/Cement Mason	building	$15.80	$0.00
Concrete Finisher/Cement Mason	heavy	$16.86	$1.09
Electrician/Alarm Installer	heavy	$23.35	$4.70
Elevator Mechanic	building	$24.30	$12.18
Glazier	building	$15.20	$2.90
HVACR Mechanic (Excludes Duct Work)	building	$18.00	$0.90
Ironworker (Including Reinforcing Work)	building	$19.85	$0.00
Ironworker (Including Reinforcing Work)	heavy	$26.50	$0.00
Laborer	building	$12.00	$0.00
Laborer	heavy	$11.70	$0.00
Marble/Tile/Terrazzo	building	$25.00	$0.00
Metal Building Erector	building	$13.25	$0.00
Millwright	building	$21.30	$7.71
Millwright	heavy	$19.50	$7.36
Painter/Sheet Rock Finisher	building	$13.05	$0.00
Painter/Sheet Rock Finisher	heavy	$18.15	$0.00
Pipelayer	building	$12.50	$1.09
Pipelayer	heavy	$13.70	$0.00
Plasterer	building	$15.00	$3.70
Plumber/Pipefitter	building	$20.80	$8.42
Roofer	building	$16.55	$1.35

CLASSIFICATION	Class	Basic Hourly Rate	Fringe Benefits
Sheet Metal (Includes Duct Work)	building	$18.35	$5.60
Soft Floor Layer	building	$12.00	$0.00
Sprinkler Fitter	building	$22.95	$2.85
Waterproofer	building	$14.15	$1.15
Group 1 - Operator	building	$15.00	$0.00
Group 2 - Operator	building	$15.70	$3.51
Group 3 - Operator	building	$12.00	$0.00
Group 4 - Operator	building	$15.15	$0.00
Aggregate Spreader	heavy	$12.20	$0.00
Asphalt Paving Machine	heavy	$15.85	$0.00
Backhoe - Rubber Tired (1 yard or less)	heavy	$15.65	$0.00
Bulldozer, finish	heavy	$15.00	$0.00
Bulldozer, rough	heavy	$13.00	$0.00
Crane, Derrick, Dragline, Shovel & Backhoe, 1.5 yards or less	heavy	$17.95	$0.00
Crane, Derrick, Dragline, Shovel & Backhoe, over 1.5 yards	heavy	$17.95	$0.00
End Dump (Dump Truck)	heavy	$14.80	$0.00
Finishing Machine	heavy	$12.20	$0.00
Front End Loader, finish	heavy	$13.30	$0.00
Mechanic	heavy	$17.80	$0.00
Oiler and Greaser	heavy	$12.20	$0.00
Roller	heavy	$15.00	$0.00
Scraper	heavy	$12.20	$0.00
Laborer (Brick/Stone Tender)	building	$12.00	$0.00
Low Voltage/Alarm Installer	building	$17.15	$3.05
Excavator/Trackhoe	heavy	$16.60	$0.00
Truck Driver (Excludes Dump Truck)	building	$13.00	$0.00
Truck Driver (Excludes Dump Truck)	heavy	$17.80	$0.00
Electrician	building	$23.54	$10.16

Welders-receive rate prescribed for craft performing operation to which welding is incidental.

Certified 7/1/2014

Classifications that are required, but not listed above, must be requested in writing from the Arkansas Department of Labor, Prevailing Wage Division. Please call (501) 682-4536 for a request form.

Power Equipment Operators:

Group I
Operators engaged in operating the following equipment: Cranes, draglines, shovels and piledrivers with a lifting capacity of 50 tons or over, and operators of all tower climbing cranes and derricks required to work 25 feet or over from the ground, blacksmith and mechanics.

Group II
Operators engaged in operating the following equipment or performing work relative to the engineer's jurisdiction: Hydraulic cranes, cherry pickers, backhoes, and all derricks with a lifting capacity less than 50 tons, as specified by the manufacturer, all backhoes, tractor or truck type, all overhead & traveling cranes, or tractors with swinging boom attachments, gradealls all above equipment irrespective of motive power, leverman (engineer), hydraulic or bucket dredges, irrespective of size, trackhoes, excavators.

Group III
Heavy Equipment Operators. Operators engaged in operating the following equipment: all bulldozers, all front end loaders, all sidebooms, skytracks, forklifts, all push tractors, all pull scrapers, all motor graders, all trenching machines, regardless of size or motive power, all backfillers, all central mixing plants, 10S and larger, finishing machines, all boiler fireman high or low pressure, all asphalt spreaders, hydro truck crane, multiple drum hoist, irrespective of motive power, all rotary, cable tool, core drill or churn drill, water well and foundation drilling machines, regardless of size, regardless of motive power and dredge tender operator, asphalt paving machines.

Group IV
Light Equipment Operators. Operators engaged in operating the following equipment: Oilerdriver motor crane, single drum hoists, winches and air tuggers, irrespective of motive power, winch or A frame trucks, rollers of all types and pull tractors, regardless of size, elevator operators inside and outside when used for carrying workmen from floor to floor and handling building material, Lad-A-Vator Conveyor, batch plant, and mortar or concrete mixers, below 10S, end dump euclid, pumpcrete spray machine and pressure grout machine, air compressors, regardless of size. All light equipment, welding machines, light plants, pumps, all well point system dewatering and portable pumps, space heaters, irrespective of size, and motive power, equipment greaser, oiler, mechanic helper, drilling machine helper, asphalt distributor and like equipment, safety boat operator and deckhand.

STATEMENT OF INTENT TO PAY PREVAILING WAGES

PROJECT: **CONSTRUCTION OF OTTERS & BUSH DOG EXHIBIT**
LITTLE ROCK ZOO
LITTLE ROCK, ARKANSAS
PULASKI COUNTY

This is to certify that we, the following listed contractors, are aware of the wage requirements of the Arkansas Prevailing Wage Law and by signature below indicate our intent to pay no less than the rates established by **Arkansas Prevailing Wage Determination Number 14-087** for work performed on the above noted public project. I understand that contractors who violate prevailing wage laws, i.e., incorrect classification/scope of work of workers, improper payments of prevailing wages, etc., are subject to fines and will be required to pay back wages due to workers.

	Business Name	Address	Phone#	Signature and Title of Business Official
General/Prime Contractor				
Electrical Subcontractor				
Mechanical Subcontractor				
Plumbing Subcontractor				
Roofing/ Sheet Metal Subcontractor				

THE GENERAL/PRIME CONTRACTOR IS RESPONSIBLE FOR GETTING THIS FORM FILLED OUT AND RETURNING IT TO THE ARKANSAS DEPARTMENT OF LABOR ***WITHIN 30 DAYS OF THE NOTICE TO PROCEED*** FOR THIS PROJECT. RETURN COMPLETED FORM TO THE ARKANSAS DEPARTMENT OF LABOR, PREVAILING WAGE DIVISION, 10421 W. MARKHAM, LITTLE ROCK, ARKANSAS, 72205.

Section 00100
INSTRUCTION TO BIDDERS
LR BID #14160-R

To be considered responsive, Bids must be made in accordance with the following instructions:

1. **PRE-BID CONFERENCE:** There will be a **mandatory pre-bid conference** at the Little Rock Zoo on **Monday, April 20, 2015 at 10:00 AM**. Access will be via Administrative Entrance on Monroe Street, by requesting gate access at post mounted intercom on left side of street. Upon entering the Zoo park and enter the administration building immediately to the left. The meeting will begin in the Administration Building Conference Room and will proceed to the job site. Access to the site at any other time must be scheduled in advance with the Zoo Facilities Operations Manager.

2. **AVAILABILITY OF DOCUMENTS:** The BID DOCUMENTS may be examined at the following locations:

   F. W. Dodge
   1701 Center View Drive Suite 119
   Little Rock, Arkansas

   Southern Reprographics
   907 West 7th Street
   Little Rock, Arkansas

   Copies of the BID DOCUMENTS may be obtained at Southern Reprographics, 907 West 7th Street, Little Rock, Arkansas. Bonafide Bidders and subcontractors may purchase sets of documents at Southern Reprographics for the cost of printing.

   Direct inquiries to: Tim Heiple, A.I.A.
   Heiple Wiedower Architects
   319 President Clinton Ave, Suite 201
   Little Rock, Arkansas 72201
   501-707-0115 phone
   501-707-0118 fax
   tim@hwarch.com email

3. **RECEIPT AND OPENING OF BIDS:** The City of Little Rock (hereinafter called the "Owner") invites Bids on the **Renovation of the Otter and Bush Dog Exhibit** at the Little Rock Zoo. Bid Form attached hereto, all blanks which must be appropriately filled in. Bids will be received by the Owner at the Purchasing Office of Little Rock City Hall, 500 West Markham Street, Room 300, Little Rock, Arkansas, **until 3:00 p.m. Monday April 27, 2015**.

   The Owner may consider informal any Bid not prepared and submitted in accordance with the provisions hereof and may waive any irregularities or reject any or all Bids. Any bid may be withdrawn prior to the above scheduled time for the opening of Bid or authorized postponement thereof. Bids received prior to the time of opening will be kept, unopened. Any Bid received after the time and date specified will not be considered. No responsibility will be assumed by any person for the premature opening of a bid not properly addressed and identified.

4. **PREPARATION OF BID:** Use Bid Form bound in Project Manual. Bid prices must be written in ink or typewritten, in both words and numbers. The signature of the individual authorized to bind the Bidder shall be in longhand. Each Bid must be submitted in a sealed envelope bearing

on the outside the name of Bidder, his address, and name of project for which Bid is submitted.

5. **MINORITY PARTICIPATION:** The City of Little Rock encourages participation of small, minority, and woman own business enterprises in the procurement of goods, services, professional services, and construction, either as a general contractor or sub-contractor. It is further requested that whenever possible, majority contractors who require sub-contractors, seek qualified small, minority, and woman businesses to partner with them.

6. **BOARD OF COMMISSIONERS NOTICE:** the City of Little Rock selects its board and commission members through a process that utilizes an executive session. Under Arkansas law, this fact deems a volunteer an employee for a limited purpose. The City cannot contract with an employee, and cannot contract with a corporation with an employee in an executive or managerial position who also serves as a volunteer on a City board or commission unless it first passes an ordinance to approve the contract. Is any person involved with this bid an employee of the City, or a volunteer board or commission member who also holds an executive or managerial position with the Bidder? If the answer is "yes," please identify the person(s) and the nature of the relationship. THIS DOES NOT MEAN that the bidder is disqualified; but, the apparent successful bidder will not be selected if the board of directors fails to pass an ordinance to authorize the contract, regardless of the amount.

7. **BID SECURITY:** Bids must be accompanied by a bidder's bond in an amount equal to 5% of the bid, executed by a surety company approved by the Owner, and authorized to do business in the State of Arkansas. The Bidder may furnish a certified check, in an amount equal to 5% of bid, drawn on a national bank or a bank having a membership in the Federal Reserve System and signed by the President or Cashier, in lieu of Bond. Such bond or check and the amount thereof shall become the property of the Owner as noted in the bid form, as liquidated damages, if the Bidder whose Bid is accepted shall fail upon receipt of written notice of the acceptance of his bid, to execute a contract in accordance with good and sufficient surety or sureties, within ten calendar days after the prescribed forms are presented for signature.

8. **BOND REQUIREMENTS:** Pursuant to Act 1015 of 2013 which becomes effective on August 16, 2013, all bonds submitted to CLR (bid bonds and Performance/Payment Bonds) must be issued by surety companies that are listed on current United State Department of Treasury's Listing of Approved Sureties. On and after this date:

   Any bid bonds submitted by a bidder that are not issued by a surety company qualified and authorized to do business within Arkansas and listed as an approved surety on the US Department of Treasury list will be rejected.

   Any performance and payment bonds provided by the Contractor that are not issued by a surety company qualified and authorized to do business within Arkansas and listed as an approved surety on the US Department of Treasury list shall be considered as a contractor's default in failing to execute and deliver the contract and bonds. The contractor is liable to the project owner in the amount of the 5% bid surety.

   To verify current list of surety companies, please go to: www.fms.treas.gov/c570/c570 a-z.html and search surety company name in the A to Z database listing.

9. **CONDITIONS OF WORK:** Before submitting a Bid, Bidders shall carefully examine the Drawings and the Specifications under this work, visit the site of the work, fully inform themselves as to

all existing conditions and limitations, and shall include in the Bid the sums to cover the cost of all items included in the Contract.

Insofar as possible, the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of, or interference with, the work of any other Contractor.

10. **SPECIAL CONDITIONS FOR WORK IN THE LITTLE ROCK ZOO:** Contractor's employees must at no time interact with animals, i.e. yelling, teasing, feeding, etc. The contractor is required to coordinate carefully with the owner to ensure the safety of visitors, employees, and animals. Admittance into habitats or enclosures occupied by animals is strictly forbidden.

    Contractor will be provided staging/storage area and construction limits, which must be maintained at all times.

    Contractor to provide catch barriers at all animal areas adjacent to construction zone. If any construction materials fall into an animal area, the Keepers must be notified immediately.

    Contractor will be allowed access for vehicles to unload personnel and tools only, but vehicles must be removed from work area to assigned parking spaces during Zoo hours of 9-5.

    Working hours will be from 7am to 5 pm, Monday through Friday, unless special permission is granted.

11. **SERVICES AND MATERIALS PROVIDED BY OWNER:** The following items will be provided by the Owner including all materials and labor. Only coordination with the contractor will be required, since this work will be completed as the contractors work is done:

    - The owner will provide water, electricity, sewer, etc. as utilities that the bidder can use in the construction. Bidder must supply his own toilet facilities, as well as phone and email service.

12. **SUBSTITUTIONS:** To obtain approval to use unspecified products, bidders must submit written requests at least three days before the bid date and hour. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Architect will approve it in an addendum issued to all prime bidders on record.

13. **ADDENDA AND INTERPRETATIONS:** Should a Bidder find discrepancies in, or omissions from the Drawings, Specifications or other pre-bid documents, or should the Bidder be in doubt as to their meaning, the Owner should be notified at once. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Bid Documents which, if issued, will be posted to the City website not later than three days prior to the date fixed for the opening of bids. All addenda so issued shall become part of the Contract Documents and all Bidders are required to acknowledge receipt of all addenda on their bid.

14. **SUBMISSION OF POST-BID INFORMATION:** Upon receipt of written notice of contract award, the successful Bidder shall execute a contract, in accordance with good and sufficient surety or sureties, within ten calendar days after the prescribed forms are presented for signature. Required bond and insurance documents shall be furnished with the executed contract.

15. **SECURITY FOR FAITHFUL PERFORMANCE: :** IF THE AMOUNT OF THE BID IS IN EXCESS OF $20,000, simultaneously with his delivery of the executed contract, the Contractor shall furnish an executed Performance Bond and an executed Labor and Material Payment Bond, each in the amount of 100% of the Contract Sum, as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified. The surety on such bond shall be a Surety Company satisfactory to the Owner and authorized to do business in the State of Arkansas.

16. **POWER OF ATTORNEY:** Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power-of attorney.

17. **LAWS AND REGULATIONS:** The Bidder's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities have jurisdiction over construction of the project and shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though written out in full.

18. **METHOD OF AWARD:** If the Base Bid is within the amount of funds available to finance the construction contract, and the Bidder has met all other qualifications as specified in this and the attached documents, then contract award will be made to that responsible responsive Bidder submitting the low Base Bid.

19. **OBLIGATION OF OWNER:** The Owner, within ten calendar days of receipt of acceptable Bonds and Agreement signed by the party to whom the contract was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may, with WRITTEN NOTICE, withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

    The NOTICE TO PROCEED will be issued within ten calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the ten day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

20. **ALLOWANCES:** N/A

21. **ADDITIVE ALTERNATES:** See description of Additive Alternates #1& #2. Separate prices must be provided for each alternate. Refer to drawings and specifications for information on the alternates and see the drawings for work required if additive alternates are not selected as part of this contract.

    Deductive Alternate #1 includes deleting all 4 of the Visitor Shade Structures in the project. The footings, poles and beams, trellises and fans are included in this deductive alternate.

    Deductive Alternate #2 includes all work in Exhibit #6 including viewing areas and panels, demolition, simulated rockwork, plumbing, fabric animal shades, pool renovation and other miscellaneous items in the Exhibit.

22. **LIQUIDATED DAMAGES:** The Bidder shall understand that, if awarded the Contract, the Contract Time provided in the Agreement is an essential condition of the Contract. If the

Contractor shall neglect, fail, or refuse to complete the work within the time established, or any proper extension thereof, the Agreement will provide that the Contractor pay to the Owner the amount of **$250.00 (Two Hundred Fifty Dollars) not as a penalty, but as liquidated damages for such breach of contract, for each calendar day** that the Contractor shall be in default after the time stipulated in the Contract for completion of the work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages. The Owner would, in such event, sustain and said amount is agreed to be the amount of damages that the Owner would sustain.

23. **Wage Rates:** Arkansas Wage Rate Determination 14-087 and 14-087 ext. shall apply to all work included in this contract**.**

END OF SECTION

SECTION 00300
BID FORM
LR BID #14160-R

Proposal of (hereinafter called "BIDDER")_____
organized and existing under the laws of the State of Arkansas doing business as
_____.
(Insert "a corporation", "a partnership", or "an individual", as applicable.)

To the City of Little Rock (hereinafter called "OWNER").

In compliance with your Invitation to Bid, BIDDER hereby proposes to perform all WORK included in the section in which he is bidding for the **Renovation of Otters and Bush Dog Exhibits** at the Little Rock Zoo, #1 Zoo Drive, Little Rock, Arkansas in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid with any other BIDDER or with any competitor. BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to **complete the entire work of the contract within 150 (one hundred fifty) calendar days**. BIDDER further agrees to pay as **liquidated damages, the sum of $250.00 (two hundred fifty dollars) for each consecutive calendar day** after each of the above mentioned time limits that the construction work exceeds the agreed upon completion date.

Bidder acknowledges that Arkansas Prevailing Wage Rate 14-087ext. will be in effect for this project.

The Bidder, in compliance with your advertisement for bids for the **Renovation of the Otter and Bush Dog Exhibits** @ the Little Rock Zoo, #1 Zoo Drive, Little Rock, Arkansas, having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all the conditions surrounding the construction of the proposed project, including the availability of materials and supplies, agrees to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work as described in the Contract Documents, of which this proposal is a part.

Please note that if this bid amount is over $20,000 a General Contractor's license will be required by Arkansas law.

1. BASE PROPOSAL

BID PROPOSAL: $_____

_____ dollars.

Amount shall be shown in both written form and figures. In case of discrepancy between the written amount and the figures, the written amount shall govern.

2. ALTERNATES:

#1**: Deductive Alternate #1- Delete Visitor Shade Structures**
The cost to fabricate and install four Visitor Shade Structures will define Deduction Alternate #1. The concrete footings, the SUD poles & beams, the lattice shading and the ceiling fans will all be eliminated in Deductive Alternate #1.

($_____)

_____(Dollars)

#2**: Deductive Alternate #2 – Delete Exhibit #6 in it's entirety.**
The entire work included in these documents to complete exhibit #6 including viewing area panels, demolition, door from Keeper Building 6 & 7 simulated rockwork, plumbing, fabric shade, structural and pool renovation will be deleted on Deductive Alternate #2.

($_____)

_____Dollars)

Amount shall be shown in both written form and figures. In case of discrepancy between the written amount and the figures, the written amount shall govern

3. UNIT PRICES:

Not used

4. LIST OF SUBCONTRACTORS:

In compliance with Acts of the General Assembly of the State of Arkansas, the undersigned General Contractor hereby certifies that proposals from the following subcontractors where used in the preparation of my proposal. I agree that if I am the successful bidder, and if the following subcontractors are approved, I will not enter into contracts with others for these divisions of the work without written approval from the Architect and Owner.

Name Address

Simulated Rockwork: _____

Electrical: _____

5. ACCEPTANCE OR REJECTION OR PROPOSAL

In submitting this BID, it is understood that the OWNER reserves the right to reject any and all BIDS. If written notice of acceptance of this bid is mailed, telegraphed or delivered to the Undersigned within 60 (sixty) calendar days after opening of the BID, the Undersigned agrees to execute and deliver a contract in prescribed form and furnish required Bond within 10 (ten) days after contract is presented for signature.

6. ADDENDA RECEIPT

BIDDER acknowledges receipt of the following ADDENDA:

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

7. FIRM NAME

Business Name: _____

Business Address: _____

_____

Business Phone/Fax: _____

Authorized Signature: _____
(Title)

Seal (if Corporation):

Corporate Secretary: _____

License Number: _____

END OF SECTION

SECTION 00500

AGREEMENT

Agreement between Owner and Contractor
On the Basis of Stipulated Price

(Based on EJCDC 1910-8-A-1, 1990 edition)

THIS AGREEMENT is dated as of the _____ day of _____, in the year 2015, by and between the City of Little Rock, (hereinafter called "Owner") and _____ (hereinafter called "Contractor").

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK

Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Renovation of the Otters & Bush Dogs Exhibit** at the Little Rock Zoo, #1 Zoo Drive, Little Rock, Arkansas.

Article 2. ARCHITECT/OWNERS REPRESENTATIVES

The Project has been designed by:
Heiple + Wiedower Architects
319 President Clinton Ave., Suite 201
Little Rock, Arkansas 72201

Owner's Project Manager:
Tony Dawson, Facilities Operations Manager
1 Zoo Drive
Little Rock, AR 72205
501-247-5968
tdawson@littlerock.org

Owner's Project Coordinator:
Jj Muehlhausen
1 Zoo Drive
Little Rock, AR 72205
501-661-7230
jmuehlhausen@littlerock.org

Article 3. CONTRACT TIME

3.1 The Work included in this contract shall be completed within one hundred fifty **(150) calendar days** of the date specified on the Notice to Proceed. The calculation of this stipulated time has taken into consideration normal weather days typically encountered in this location during this time of the year.

3.2 Liquidated Damages. Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 of this Agreement, plus

any extensions thereof allowed in accordance with Article 15 of the General Conditions. The Owner and Contractor also recognize the delays, expense and difficulties involved in proving in a legal preceding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay, but not as penalty, Contractor shall pay Owner Two hundred fifty dollars ($250.00) per day for each day that expires after the time specified in paragraph 3.1 of this Agreement for completion of Work until the Work is complete and ready for final payment. There shall be no exemptions because of weather conditions if the Owner certifies that work within the structure could have proceeded despite the weather. **The Owner has the right to withhold any such sums as liquidated damages from the final payment to the Contractor.**

Article 4. CONTRACT PRICE

4.1 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents in current funds as follows:

A lump sum Contract Price of _____.

Article 5. PAYMENT PROCEDURES

Contractor shall submit Applications for Payment in accordance with Article 19 of the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

5.1 Progress Payments: Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 20th day of each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the schedule of values established in Article 3 of the General Conditions, and in the case of Unit Price Work based on the number of units completed, or, in the event there is no schedule of values, as provided in the General Conditions.

5.1.1 The Owner shall retain five percent (5%) of the amount of each progress payment. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts the Owner may withhold, in accordance with Article 19 of the General Conditions.

5.1.2 Subject to the provisions of Section 3.2, upon Substantial Completion, payments will be made in an amount sufficient to increase total payments to Contractor to ninety five percent (95%) of the Contract Price, less such amounts that the Owner may withhold, in accordance with Article 19 of the General Conditions.

5.1.3 In accordance with Ark. Code Ann. § 22-9-604, if the Contractor is required by the Contract Documents to purchase and furnish materials or equipment that will be stored on the job site or in a bonded warehouse and used in the Work, no retainage will be withheld on that amount of the submitted progress payment pertaining to the cost of these stored materials or equipment.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with Article 19 of the General Conditions, and after the Owner receives ALL lien waivers and ALL other proper documentation from the Contractor, Owner shall pay the remainder of the Contract Price as provided in said Article 19.

Article 6. CONTRACTOR'S REPRESENTATIONS

In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

6.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the Work. Contractor covenants and agrees to comply with all applicable laws, statutes, regulations, ordinances and permits relating to the performance of this contract.

6.2 Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions, and accepts the determination of the extent of the technical data contained in such reports and drawings upon which Contractor is entitled to rely.

6.3 Contractor has obtained and carefully studied, or assumes responsibility for obtaining and carefully studying, all such examinations, investigations, explorations, tests, reports and studies, in addition to or to supplement those referred to in paragraph 6.2 above, which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise that may affect the cost, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Documents. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

6.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data with respect to said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.

6.5 Contractor has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

6.6 Contractor has given Owner written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by Owner is acceptable to Contractor.

Article 7. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between Owner and Contractor concerning the Work consist of the following:

7.1 This Agreement.

7.2 Performance and Payment Bonds. (If contract amount is over $20,000)

7.3 Notice of Award.

7.4 General Conditions.

7.5 Supplementary Conditions, if any.

7.6 Specifications.

7.7 Drawings.

7.8 Addenda number _____, if any.

7.9 Invitation to Bid, Instructions to Bidders, Bid Form, and Contractor's Bid.

7.10 Notice to Proceed

7.12 Certificates of Insurance as required.

7.13 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All written amendments and other documents amending, modifying or supplementing the Contract Documents and the provisions of this Agreement.

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified or supplemented as provided in Subsections 13.1 and 13.2 of the General Conditions, of the Project Manual, and the provisions of this Agreement.

Article 8. MISCELLANEOUS

8.1 Terms used in this Agreement that are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

8.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent, except to the extent that the effect of this restriction may be limited by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.3 Owner and Contractor each binds itself, its partners, successors and legal representatives to the other party hereto, its partners, successors, assigns and

legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

8.4 Nondiscrimination. The Contractor agrees to comply with all applicable federal and state laws and regulations regarding nondiscrimination, including but not limited to the Americans with Disabilities Act, the Equal Employment Opportunity Act, and the Rehabilitation Act of 1973, as such laws are amended and supplemented, and specifically agrees not to unlawfully discriminate against any individual because of race, religion, sex, age, color, national origin or disability, and to require such compliance in contractual agreements with subcontractors and sub-subcontractors.

8.5 Modification. Any modification to this contract shall be in writing, signed by all parties to the contract. If the contract price shall be increased above the amount authorized by the Owner's Board of Directors, any further increase in the contract price shall receive prior approval by both the Owner and, if applicable, the Owner's Board of Directors. All change and field orders shall be executed by the Owner. Individuals authorized to execute such change or field orders are the City Manager, Assistant City Manager, or Zoo Director.

8.6 This contract is governed by the laws of the State of Arkansas.

8.7 Nothing contained in the contract documents shall create a contractual relationship with, or cause of action in favor of, a third party against the Owner or Contractor.

8.8 Independent Contractor. The Contractor is not acting herein as an employee of the Owner, but shall, at times, and in all respects, have the rights and liabilities of an independent contractor.

8.9 If any provision of the Contract Documents shall be declared illegal, void or unenforceable by a court of competent jurisdiction, the other provisions shall not be affected.

8.10 The statute of limitation period shall be tolled for any fraudulent act committed by the Contractor that the Owner cannot discover upon due diligence.

8.11 The officials who have executed this contract hereby represent and warrant that they have full and complete authority to act on behalf of the Owner and Contractor, respectively, and that their signatures below, the terms and provisions hereof, constitute valid and enforceable obligations of each.

8.12 This contract shall be executed in duplicate originals, and any number of copies. Any copy of this contract so executed shall be deemed an original, and shall be deemed authentic for any other use.

8.13 Nothing stated within the Contract Documents shall be construed as limiting the Owner's immunity from liability in tort.

8.14 The Owner does not agree with or consent to arbitration or mediation of disputes relating to this contract or project.

8.15 The Contractor agrees that it shall indemnify and save harmless the Owner, its officers, agents, and employees from any claims or losses for services rendered by

any subcontractor, person or firm performing or supplying services, materials or supplies in connection with the performance of this contract.

8.16 The Contractor shall ensure that the Owner receives lien waivers from all subcontractors and sub-subcontractors before final payment on the Project. The Contractor shall give written notice to the subcontractors and sub-subcontractors providing Work on the project that states the following: *"According to Arkansas law, it is understood that no liens can be filed against public property if a valid and enforceable payment and performance bond is in place. Regarding this Project and Agreement, the valid and enforceable bonds are with _____."* The Contractor shall have each subcontractor and sub-subcontractor execute a written receipt evidencing acknowledgment of this statement.

8.17 No Waiver of Enforcement of Contract Provisions. Failure of the Owner to enforce at any time any of the provisions of the Contract Documents, or to require at any time performance by the Contractor of any of the provisions hereof, shall in no way be construed to be a waiver of such provisions, nor in any way to affect the validity of this Agreement, or any part thereof, or the right of the Owner to thereafter enforce each and every such provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate.

OWNER:

CITY OF LITTLE ROCK

By: _____
Bruce T. Moore, City Manager

Date: _____

CONTRACTOR:

By: _____
(Print Name Below)

Date: _____

ATTEST:

_____
Susan Langley, City Clerk

Date: _____

APPROVED AS TO LEGAL FORM:

_____
Kim Chavis
Deputy City Attorney

Date: _____

Address for giving notices to City:

City Manager
500 West Markham
Little Rock, AR 72201

With an additional copy to:
Project Manager
1 Zoo Drive
Little Rock, AR 72205

Address for giving notices to Contractor:

_____

_____

_____

Email: _____

Contractor's Employer Identification Number:_____

GENERAL CONDITIONS

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 AGREEMENT - Contract between the OWNER and CONTRACTOR regarding the PROJECT.

1.3 ADDENDA - Written or graphic instruments issued prior to the time of opening the bids which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarification or corrections.

1.4 BID - the offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.5 BIDDER - any person, firm or corporation submitting a BID for the WORK.

1.6 BONDS - Bid, Performance, and Payment Bonds, and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.7 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion or revision of the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.8 CONTRACT DOCUMENTS - The contract, including BID, AGREEMENT, Payment Bond, Performance Bond, General Conditions, SUPPLEMENTARY CONDITIONS; NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE and FIELD ORDERS, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.9 CONTRACT PRICE - the total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.10 CONTRACT TIME - the number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.11 CONTRACTOR - the person, firm or corporation with whom the OWNER has executed the Agreement.

1.12 DRAWINGS - The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ARCHITECT.

1.13 ARCHITECT- The person, firm or corporation named as such in the CONTRACT DOCUMENTS.

1.14 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE, or an extension of the CONTRACT TIME, issued by the ARCHITECT and OWNER to the CONTRACTOR during construction.

1.15 NOTICE OF AWARD - the written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.16 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.17 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the WORK is to be performed.

1.18 PROJECT - the undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.19 PROJECT COORDINATOR or RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site, or any part thereof.

1.20 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, MANUFACTURER, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.21 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards, and workmanship.

1.22 SUBCONTRACTOR - an individual, firm or corporation having a direct contract with the CONTRACTOR, or with any other SUBCONTRACTOR, for the performance of a part of the WORK at the site.

1.23 SUBSTANTIAL COMPLETION - That date, when the construction of the PROJECT, or a specified part thereof, is sufficiently completed in accordance with the CONTRACT DOCUMENTS, so that the PROJECT, or specified part, can be utilized for the purposes for which it is intended.

1.24 SUPPLEMENTARY CONDITIONS - Modifications to adapt the General Conditions to the specific requirements of the Project and that may be imposed by applicable federal, state, and local laws.

1.25 SUPPLIER - any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.26 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of a good quality. The CONTRACTOR shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

1.27 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement shall be in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party or his authorized representative.

2. ADDITIONAL INSTRUCTION AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instruction and detail drawings, by the ARCHITECT, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER, upon request, such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, and other such records pertaining to the PROJECT.

3.2 Prior to the first partial payment estimate, the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS, and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 It is understood and agreed that the CONTRACTOR has, by careful examination, satisfied himself as to the nature and location of the WORK, the conformation of the ground, the character of equipment and facilities needed preliminary to and during the execution of the WORK, the character, quality and quantity of the materials to be encountered, the general and local conditions, and all other matters which can, in any way, affect the WORK under this CONTRACT.

4.3 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.4 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions, or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS, shall be immediately reported to the ARCHITECT, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

4.5 CONTRACTOR acknowledges that, based upon the CONTRACTOR'S examination of the Drawings and Specifications which comprise a part of the Contract Documents, the CONTRACTOR has not observed anything in the Contract Documents indicating that same are incomplete or inconsistent or otherwise contain any error or omission that would cause the CONTRACTOR to be entitled to make any claim for increases in the CONTRACT PRICE or the CONTRACT TIME.

4.6 The intent of the CONTRACT DOCUMENTS is to include all items necessary for the proper execution and completion of the WORK by the CONTRACTOR. The CONTRACT DOCUMENTS are complimentary, and what is required by one shall be as binding as if required by all; performance by the CONTRACTOR shall be required to the extent inferable from the CONTRACT DOCUMENTS as being necessary to produce the intended results given the CONTRACTOR'S experience in general construction. The SPECIFICATIONS are written in the imperative and abbreviated form. The imperative language is directed to the CONTRACTOR, unless specifically noted otherwise. Any incomplete sentences shall be completed by inserting "shall," "the CONTRACTOR shall," "shall be," and similar mandatory phrases by inference in the same manner as they are applied to notes on the DRAWINGS. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, all indicated requirements shall be performed whether stated imperatively or otherwise. Further, whenever the term "WORK Includes" or "Section Includes" is used as an article or paragraph heading in a SPECIFICATIONS section, it is merely a listing of the significant items described within the section and is not intended to limit the scope of the section or to imply a trade responsibility.

4.7 Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:

1. The AGREEMENT;
2. AMENDMENTS and revisions of later date take precedence over those of earlier date;
3. SUPPLEMENTARY CONDITIONS;
4. The GENERAL CONDITIONS;
5. The Project Manual;
6. DRAWINGS and SPECIFICATIONS: DRAWINGS GOVERN SPECIFICATIONS for quantity and location, and SPECIFICATIONS govern for quality and performance. In the event of an ambiguity in quantity or quality, the greater quantity and the better quality shall govern;
7. Figure dimensions govern scale dimensions and large scale DRAWINGS govern small scale DRAWINGS; and,
8. SUBMITTALS; if and only if OWNER concludes, in its sole discretion, that a conflict or discrepancy cannot be otherwise resolved.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prompt prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ARCHITECT shall promptly review all SHOP DRAWINGS.

5.2 When submitted for the ARCHITECT'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked, and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been reviewed by the ARCHITECT. A copy of each processed SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ARCHITECT AND OWNER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, sewer, light, utilities, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to ensure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ARCHITECT.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR(S) subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide, at the CONTRACTOR'S expense, the testing and inspection services required by the CONTRACT DOCUMENTS, unless otherwise noted.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR shall give the ARCHITECT AND OWNER timely notice of readiness. The CONTRACTOR will then furnish the ARCHITECT AND OWNER the required certificates of inspection, testing or approval.

7.5 Inspections, tests, or approvals by the ARCHITECT, OWNER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ARCHITECT, OWNER and their **representatives** will, at all times, have access to the WORK. In addition, authorized representatives and agents of any participating federal or state agency shall be permitted to inspect all work, materials, and payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR

shall provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ARCHITECT OR OWNER, it shall, if requested by the ARCHITECT OR OWNER, be uncovered for their observation and replaced by the CONTRACTOR at no increase in Contract Price.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the OWNER, such material, article, or piece of equipment is of equal substance and function to that specified, the OWNER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deducted from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute shall be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees. The CONTRACTOR shall defend all law suits or claims for infringement of any patent rights and save the OWNER AND ARCHITECT harmless from loss on account thereof; however, if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the OWNER AND ARCHITECT.

10. SURVEYS, PERMITS, AND REGULATIONS

10.1 The OWNER will furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK, together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, the CONTRACTOR shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTARY CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ARCHITECT AND OWNER, in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR shall comply with all applicable laws, ordinances, rules regulations and orders of any public body having jurisdiction. The CONTRACTOR shall erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the ARCHITECT or OWNER or anyone employed by them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ARCHITECT or OWNER, shall act to prevent threatened damage, injury or loss. The

CONTRACTOR shall give the ARCHITECT and OWNER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall there upon be issued covering the changes and deviations involved.

11.4 The CONTRACTOR shall confine operations at the PROJECT site to areas permitted by law, ordinances, permits and this AGREEMENT and shall not unreasonably encumber the PROJECT site with materials or equipment.

11.5 The CONTRACTOR shall at all times keep the premises free from accumulation of waste materials or rubbish.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR shall supervise and direct the WORK. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR shall employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR, and all communications given to the supervisor shall be as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The ARCHITECT, UPON the OWNER's approval, may, at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by a CHANGE ORDER.

13.2 The **ARCHITECT,** UPON the OWNER's approval, may, at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ARCHITECT and **OWNER** unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE or CONTRACT TIME, or both, in which event the CONTRACTOR shall give the ARCHITECT and OWNER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter, the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or CONTRACT TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the ARCHITECT and OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

(A) Unit prices previously approved.
(B) An agreed lump sum.
(C) The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the WORK.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.l The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the written NOTICE TO PROCEED.

15.2 The CONTRACTOR shall proceed with the WORK at such rate of progress to ensure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR shall pay, to the OWNER, the amount for liquidated damages as specified in Section 3.2 of the AGREEMENT for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the ARCHITECT and OWNER:

15.4.1 to any preference, priority or allocation order duly issued by the ARCHITECT or OWNER;

1 5.4.2 To unforeseeable causes beyond the control, and without the fault or negligence of, the CONTRACTOR, restricted to acts of God or of the public enemy, acts of the ARCHITECT or OWNER, acts of another CONTRACTOR in the performance of a

contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes and freight embargoes; and

1 5.4.3 to any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ARCHITECT or OWNER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the ARCHITECT and OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The ARCHITECT and OWNER will promptly investigate the conditions, and if ARCHITECT and OWNER jointly find that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment will be made and the CONTRACT DOCUMENTS will be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder will not be allowed unless the CONTRACTOR has given the required WRITTEN NOTICE, provided that the ARCHITECT and OWNER may, if ARCHITECT and OWNER jointly determine the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK, or any portion thereof, for a period of not more than ninety (90) days, or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR, which notice will fix the date on which WORK shall be resumed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any such suspension.

18.2 If the CONTRACTOR is adjudged as bankrupt or insolvent, or if the CONTRACTOR makes a general assignment for the benefit of the CONTRACTOR'S creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if the CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if the CONTRACTOR repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if the CONTRACTOR repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK, or if the CONTRACTOR otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and the CONTRACTOR'S surety a minimum of twenty (20) days' WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method the OWNER may deem expedient. In such case, the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess WILL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR SHALL PAY THE DIFFERENCE TO THE OWNER. Such costs incurred by the OWNER will be incorporated in a CHANGE ORDER. **The OWNER has the right to withhold any such costs incurred by the OWNER from any payments due the CONTRACTOR.**

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR, the OWNER may, without cause and without prejudice to any other right or remedy, elect to

abandon the PROJECT and terminate the contract. In such case, the CONTRACTOR will be paid for all WORK executed up to the date of termination.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER, or the WORK is suspended under an order of a court of competent jurisdiction for more than ninety (90) days, or the OWNER fails to pay the CONTRACTOR substantially the sum requested within sixty (60) days of approval and receipt of a request for payment by the OWNER, then the CONTRACTOR may, after thirty (30) days from delivery of a WRITTEN NOTICE to the OWNER, such thirty (30) day WRITTEN NOTICE also giving the OWNER an opportunity to cure any default, terminate the CONTRACT and recover from the OWNER payment for all WORK executed up to the date of termination. In addition and in lieu of terminating the CONTRACT, if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may, upon twenty (20) days WRITTEN NOTICE to the OWNER, stop the WORK until the CONTRACTOR has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME, or both, to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If, through no act or fault of the CONTRACTOR, the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER to act within the time specified in the CONTRACT DOCUMENTS, including default cure time periods, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, will be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays directly caused by the failure of the OWNER.

19. PAYMENTS TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due, but not more often than once a month, the CONTRACTOR shall submit to the ARCHITECT a Partial Payment Estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the Partial Payment Estimate and supported by such data as the ARCHITECT or OWNER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the ARCHITECT and OWNER, as will establish the OWNER'S title to the material and equipment and protect the OWNER'S interest therein, including applicable insurance. The ARCHITECT will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing the ARCHITECT'S approval of payment, or return the partial payment estimate to the CONTRACTOR indicating, in writing, the reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within thirty (30)

days of presentation to the OWNER of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. In accordance with Ark. Code Ann. § 22-9-604, the ARCHITECT will retain five percent (5%) of the earned amount of the WORK progress shown on the partial payment estimate, excluding materials and equipment on hand but not installed, and upon certification by the ARCHITECT that the WORK progress is fifty percent (50%) complete, based on the adjusted contract price, there will be no additional retainage on account of WORK completed, in which case the remaining progress payments prior to SUBSTANTIAL COMPLETION will be in an amount equal to one hundred percent (100%) of the WORK completed. Further, upon certification of SUBSTANTIAL COMPLETION of the WORK, the retained amount may be reduced to only that amount necessary to assure completion. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER will have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK, except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, and after the receipt of all lien waivers and other proper documentation from the CONTRACTOR, the OWNER will sign the final payment request as its certification that the WORK has been accepted by the OWNER under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, will be paid to the CONTRACTOR within thirty (30) days of completion and final acceptance of the WORK by the OWNER.

19.6 The CONTRACTOR shall indemnify and save the ARCHITECT and OWNER, or the ARCHITECT'S and OWNER'S agents, harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall furnish the OWNER and ARCHITECT satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so, the

OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, where upon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the ARCHITECT or OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment, so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER will not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 The CONTRACTOR warrants that upon submittal of a request for payment, all work for which payment has been received by the CONTRACTOR shall be free and clear of liens, claims, security interests or encumbrances in favor of the CONTRACTOR, subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials or equipment relating to the work or project.

19.8 Any payment to the CONTRACTOR by the OWNER, final or otherwise, shall not constitute an acceptance of any WORK not in accordance with the CONTRACT DOCUMENTS.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR, other than claims in stated amounts as may be specifically excepted by the CONTRACTOR, for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to, or arising out of, this WORK. Any payment, however, final or otherwise, will not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BOND.

21. INSURANCE

21.1 Contractor's Liability Insurance: CONTRACTOR shall purchase and maintain, in a company or companies licensed to do business in the State of Arkansas, such commercial general liability and other insurance as is appropriate for the WORK being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR'S performance and furnishing of the WORK and CONTRACTOR'S other obligations under the CONTRACT DOCUMENTS, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the WORK, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workers or workmen's compensation, disability benefits, and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR'S employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR'S employees;

21.1.4 Claims for damages insured by personal injury liability coverage which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

21.1.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

21.1.6 Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property;

21.1.7 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle; and

21.1.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Article 24.

21.2 The insurance required by paragraph 21.1 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the SUPPLEMENTARY CONDITIONS, or required by law, whichever is greater. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective WORK in accordance with paragraph 28.1. In addition, CONTRACTOR shall maintain completed operations insurance for at least one (1) year after date of final completion and furnish OWNER with evidence of continuation of such insurance at final completion.

21.3 The CONTRACTOR shall purchase and maintain in the name of the ARCHITECT and OWNER an Owner's and Contractor's Protective Liability Policy as will protect the ARCHITECT and OWNER against claims which may arise from operations under the contract. Coverage shall not exceed coverage of CONTRACTOR'S Commercial General Liability policy.

21.4 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the

OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.5 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the WORK is performed, Workers' Compensation Insurance, including occupational disease provisions, for all of CONTRACTOR'S employees at the site of the PROJECT and in case any work is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this AGREEMENT at the site of the PROJECT is not protected under Workers' Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected.

21.6 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by Paragraph 21.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall, within ten (10) days after the receipt of the NOTICE OF AWARD, furnish the OWNER with a Performance BOND and a Payment BOND, each in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If, at any time, a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of "Surety Companies Acceptable on Federal Bonds," CONTRACTOR shall, within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments

shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign or otherwise dispose of this AGREEMENT, the CONTRACT DOCUMENTS, or any portion thereof, or of the right, title or interest therein, or any obligation thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR shall indemnify and hold harmless the OWNER, and their agents and employees, from and against all claims, damages, losses and expenses, including attorney's fees, arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable.

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

24.3 CONTRACTOR hereby releases, indemnifies and holds harmless the OWNER, its officers, agents and employees from and against any and all loss, damage and expense including, but not limited to; any claim, demand or action for injury, liability or damage to persons or property or, for loss of life; and any and all claims or actions brought by any person, firm, government body or other entity, resulting from, arising from or in connection with contamination of, or threatened contamination of, or adverse effects on, the environment, or violation of any environmental or other statue, ordinance, rule, regulation, order, permit or judgment of any government or judicial entity; and from and against any damages, liabilities, costs, fees, fines, charges, causes of action, law suits, judgments and penalties assessed, including, but not limited to, reasonable investigation and legal expenses in connection with defending any such action, arising from any matter or circumstance on the property regarding the performance of the Work and services under the Agreement between the CONTRACTOR, its officers, agents, employees and assigns, and the OWNER for Work and services provided to the OWNER pursuant to such Agreement.

To evidence proper disposal of all solid waste associated with the Work performed under said Agreement in a legally permitted solid waste disposal facility, CONTRACTOR will provide the OWNER with a receipt for each dump load of solid waste so disposed.

24.4 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ARCHITECT, its agents or employees, arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACTS

25.1 The OWNER reserves the right to let separate contracts for this PROJECT. The CONTRACTOR shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate its WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other contractor, the CONTRACTOR shall inspect and promptly report to the ARCHITECT and OWNER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT itself, or the OWNER may let other contracts containing provisions similar to these CONTRACT DOCUMENTS. The CONTRACTOR will afford the other contractors who are parties to such contracts, or the OWNER if the OWNER is performing the additional WORK, reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3 If the performance of additional WORK by other contractors or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, WRITTEN NOTICE thereof shall be given by the OWNER to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves additional expense to the CONTRACTOR, or entitles the CONTRACTOR to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim therefor as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 All SUBCONTRACTORS and material suppliers utilized on this Project shall be experienced in the type of work required by the Project, reputable, qualified and shall be acceptable to the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of the CONTRACTOR'S SUBCONTRACTORS and material suppliers on this PROJECT, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by the CONTRACTOR.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS, and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in the CONTRACT DOCUMENTS will create any contractual relationship between any SUBCONTRACTOR or material supplier and the OWNER.

27. LAND AND RIGHTS-OF-WAY

27.1 Prior to issuance of NOTICE TO PROCEED, the OWNER will obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

27.2 The OWNER will provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

27.3 The CONTRACTOR shall provide at the CONTRACTOR'S own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

28. GUARANTY

28.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees, for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system and PROJECT, that the completed system and PROJECT are free from all defects due to faulty materials or workmanship, and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects, including the repairs of any damage to other parts of the system or PROJECT resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full effect throughout the guarantee period.

29. TAXES

29.1 The CONTRACTOR shall pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

30. ARCHITECT'S RESPONSIBILITIES

30.1 The ARCHITECT will act as the OWNER'S representative during the construction period. The ARCHITECT will jointly decide with the OWNER questions which may arise as to quality and acceptability of materials furnished and WORK performed. The ARCHITECT and the OWNER will jointly interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ARCHITECT or OWNER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

30.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship, and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

30.3 The ARCHITECT will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

30.4 The ARCHITECT and OWNER will jointly make prompt decisions relative to interpretation of the CONTRACT DOCUMENTS.

END OF DOCUMENT

SECTION 01300
SUBMITTALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 SCOPE: Provide all submittals, including shop drawings, product data, samples, schedules and requests for substitutions as required by the bidding and contract documents in strict accordance with the provisions of this section.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS:

A. Contractual Requirements for Submittals: General Conditions and Supplementary Conditions.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS:

A. Prior to bidding approval is required only on those items so specified in each section. Other materials do not require prior to bidding approval.

B. After Award of Contract substitution Requests:

1. Substitution requests will be considered only under one of the following conditions:

a. Unavailability of specified product due to a strike, lockout, bankruptcy, discontinuance of the manufacture of a product or natural disasters. Submit proof that orders were placed within ten days after review by the Architect for the item listed in the specifications. Failure to order materials in time for proper delivery is not an acceptable condition.

b. When guarantee of performance is required and, in the judgment of the contractor, the specified product or process will not produce the desired result.

2. Submit request for such substitutions in writing to the Architect within ten days of the date of ascertaining unavailability of material or equipment specified, or that the performance cannot be guaranteed.

3. If any substitution will affect a correlated function, adjacent construction or the work of other trades or contractors, the necessary changes and modifications to the affected work will be considered as part of the substitution, to be accomplished without additional cost to the Owner, if and when accepted.

4. Approved substitutions will be affected by a change order. Under no circumstances shall the Architect's acceptance of any such substitution relieve the contractor from timely, full and proper performance of the work.

C. No substitutes allowed: Some materials specified are the only acceptable products allowed. No substitutions will be allowed. These products are identified by a no-substitution clause in that section of this specification.

2.02 SHOP DRAWINGS:

A. Submit required shop drawings drawn to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work. Submit related shop drawings together, partial submittals will not be accepted. Provide manufacturer's name and model number of prefabricated items and indicated methods of attachment and clearances required relative to other trades affecting all elements of the work. Identify deviations from the contract documents (if any). Check dimensions, check that trades have been coordinated and that no conflict will develop in this installation. After reviewing the shop drawings, indicate contractor's approval by signing and dating on contractor's stamp. Failure to follow these procedures will result in rejection of the submission and no additional contract time will be allowed for the delay from this cause.

B. Submit one transparency and one print of contractor's stamped and approved shop drawings for Architect's review. The Architect will review the transparency and stamp it with indication of action as appropriate. The Architect will retain the print for his record, and will return the transparency to the Contractor. For transparencies returned "Return for Correction - Re-Submit" correct the original drawings, make a new transparency reproduction and print, and re-submit. For transparencies returned "Approved Subject to Contract Requirements" or "Approved as Noted", provide each number of prints of the transparency as may be needed for field distribution.

2.03 PRODUCT DATA AND SAMPLES: Submit 3 copies of product date for Architect's review for items specified in the various specification sections (five copies required for mechanical and electrical data). Make all submissions affecting color selection within thirty days after singing the contract. Mark data clearly to indicate exact items submitted, and note deviations from contract documents (if any). After reviewing the submittals, indicate approval by signing and dating on contractor's stamp, and submit to the Architect for review.

2.04 PROJECT SCHEDULE:

A. Within 7 days after Notice to Proceed, submit to the Architect a CPM progress schedule indicating a time bar for each trade or operation of work to be performed at the site. Time bar shall demonstrate planned work, properly sequenced and intermeshed for expeditious completion of work. Identify phases, if required.

B. Submit with bar chart a tabulation (by date) of all submittals required, either by date period relation in contract documents or as necessitated by lead time related to individual time bar shown on progress schedule for the associated work. At contractor's option, submittal dates may be shown on bar chart schedule, in lieu of being tabulated.

C. Submit monthly updates of bar chart accurately depicting actual progress to the first day of the month. Indicate percentage of completion on time bars at 10% increase.

D. Submit progress schedule on transparency or other reproducible stock.

E. Distribute progress schedule including all updates to Architect, Owner, subcontractors, suppliers, fabricators, and others with a need to know schedule compliance requirements. Post copy in field office.

2.05 SCHEDULE OF VALUES: Submit schedule of values on AIA Document G703 (Continuation Sheet for G702). Itemize separate line cost for each major item of work and each subcontracted item of work (use Sections under Division 2 through 16 in Table of Contents as a basis for listed).

2.06 APPLICATION AND CERTIFICATE FOR PAYMENT: Submit Application and Certificate for Payment on AIA Document G702 and G703 (4/78 edition).

2.07 CHANGE ORDERS: Submit standard form provided by Architect for submitting proposals for Change Orders with a maximum overhead and profit of 12%.

2.08 MANUAL: Upon completion of work, and prior to the final payment, submit to the Architect a loose leaf hard cover binder with the project name printed on it, containing five indexed sections as follows:

A. Subcontractors; A listing of all subcontractors for the project, including portions of work done, address and telephone number of the firm familiar with the project.

B. Guarantee and Warranty: One fully executed copy of each guarantee and warranty period.

C. Certificates: One fully executed copy of each certificate specified.

D. Instructions: One operating service and maintenance manual or instruction sheet for each item specified.

E. List of As-Built Drawings, Record Drawings, Shop Drawings, Product Data and Samples.

2.09 DRAWINGS AND SUBMITTALS PACKAGE: Upon completion of the work and prior to the final payment, submit to the Architect a package labeled with the project name and containing one copy of all final record drawings, specifications, shop drawings, product data and samples (see AIA A201, Paragraph 4.111). This package and the manual will be presented by the Architect to the Owner upon completion of the project. In addition, submit one set of record drawings to be retained by the Architect.

PART 3 - EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS: Completely identify each submittal and re-submittal by showing at least the following information.

A. Name and address of submitter, plus name and telephone number of the individual who may be contracted for further information.

B. Name of project as it appears on each page of these specifications.

C. Drawing number and specifications section number to which the submittal applies.

D. Whether this is an original submittal or re-submittal.

3.02 TIMING OF SUBMITTALS:

A. General: Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and re-submittal and for placing orders and securing delivery.

B. Delays: Costs of delays due to late submittals may be back charged as necessary and shall not be borne by the Owner.

END OF SECTION 01300

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDE:

A. Closeout procedures

B. Final cleaning of rooftop, building and grounds

C. Manufacturer's and Contractor's warranties

1.02 RELATED REQUIREMENTS:

A. Section 01500-Construction Facilities and Temporary Controls.

B. Section 01740-Warranties

1.03 CLOSEOUT PROCEDURES

A. When the contractor considers the work has reached final completion, submit written certification that Contract Documents have been reviewed, the work has been inspected and that work is complete in accordance with Contract Documents.

B. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting, giving total adjusted Contract Sum, previous payments and sum remaining due. Submit required documentation the Architect (Release of Lien, Consent of Surety for Final Payment- if contract amount is over $20,000).

1.04 FINAL CLEANING OF ROOFTOP, BUILDING AND GROUNDS

A. Execute prior to final inspection.

1.05 MANUFACTURER'S AND CONTRACTOR'S WARRANTIES:

A. Submit all written (original) to the Architect, for approval and distribution, as specified in Section 01740, prior to final application for payment.

END OF SECTION

SECTION 01740
WARRANTIES

PART 1- GENERAL

1.01 REQUIRED WARRANTIES

A. Manufacturer's Full Value Warranty covering all materials and products installed in the project shall be provided by the contractor. The contractor shall furnish the manufacturer's printed warranty registration, upon issuance by the manufacturer.

B. Installer's regular one year guarantee for all products and materials and extended guarantees on other products specified in the Mechanical and Electrical section of the specification shall be issued by the contractor , and shall be printed and signed on contractors letter head shall include the following:

1. Expiration dated for specified time after the date of Owner's final acceptance of the roof work.

2. Signed by the company's owner or corporation president.

3. Guarantor shall agree to repair or replace defective materials and/or workmanship to keep building and it's systems free of defects and in good working order for a specified period from the date of final acceptance.

1.02 CONTRACTOR'S PROJECT WARRANTY CLOSE-OUT RESPONSIBILITIES

A. Contractors are required to do all work necessary to secure reviews, approvals, inspections, etc., as required by the roofing materials manufacturer, to execute roof warranties.

B. Deliver warranties to the Architect.

C. Project cannot be close-out or final payment released until all warranties have been received, reviewed, and approved by the Architect.

D. Warranties are considered part of the work. Contractors unable to provide manufacturer's warranties, as specified, will be rejected.

PART 2- PRODUCTS- Not Used

PART 3- EXECUTION- Not Used

END OF SECTION

SECTION 02060
SELECTIVE DEMOLITION

PART 1- GENERAL

1.01 SUMMARY: Provide building demolition work, complete. Work includes:

A. Demolition and removal of sections of existing cmu and simulated rockwork walls and concrete floors and paving as shown on the drawings. Demolition work for Phase 1 should be done just preceding Phase 1 and likewise for Phase 2. No demolition work can span Phases.

B. Removal of doors and frames, railings, etc. from existing locations as shown on the drawing.

C. Fill voids, holes and depressions with concrete material to provide smooth flooring surface.

D. Removal of plants, planter beds and sidewalks for adequate drainage and for new exhibit installation as shown on the drawings.

E. Removal of concrete slabs, sidewalks, curbs and foundation wall for installation of new trenches, structures and paving elevations.

1.02 WORK BY OWNER: Disconnecting of utilities.

1.03 SUBMITTALS: Comply with Section 01300.

A. Schedule of Demolition Activities: Provide schedule which Indicates the following:

1. The demolition work in this project will be completed so that work can proceed according to schedule. Demolition work will follow Phasing schedule of other work.

2. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.

3. Interruption of utility services.

4. Coordination for shutoff and continuation of utility services.

1.04 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.05 PROJECT CONDITIONS:

A. Animals will be housed immediately adjacent to demolition area. Conduct building demolition so animals will be minimally effected.

1. Provide not less than 72 hours' notice to Keepers of activities that will affect Owner's operations.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the work.

1. Asbestos and lead based paint will be removed by the owner before the start of work.

C. Damages: Promptly repair damages caused to adjacent utilities and facilities by demolition operations at no cost to the owner.

PART 2- PRODUCT (NOT APPLICABLE)

PART 3- EXECUTION

3.01 EXAMINATION: Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.

3.02 PREPARATION:

A. Existing Utilities:

1. Arrange for shut off of indicated utilities with owner.

2. If utility services are required to be removed, related or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

3.03 PROTECTION:

A. Existing Items to Remain: Protect items indicated to remain against damage and soiling during demolition.

B. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.

1. Do not interrupt existing utilities serving adjacent occupied and operating facilities unless authorized in writing by Owner.

2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner.

a. Provide at least 72 hours notice to Owner if shutdown of service is required.

3.04 DEMOLITION, GENERAL:

A. General: Demolish indicated items completely. Use methods required to complete the work within limitations of governing regulations.

B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interferences with roads, streets, walks and other adjacent occupied and used facilities.

3.05 DISPOSAL OF DEMOLISHED MATERIALS:

A. Disposal: Transport demolished materials off property and legally dispose of them.

END OF SECTION

SECTION 02110
SITE CLEARING

PART 1- GENERAL

1.01 SCOPE:

A. Clearing and grubbing site.

B. Disposing of removed material.

1.02 RELATED WORK:

A. Section 02210- Site Grading

PART 2- PRODUCTS

No Products Included

PART 3- EXECUTION

3.01 SITE PREPARATION AND PROTECTION

A. Protection of Existing Improvements:

1. Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

2. Protect improvements on adjoining properties.

3. Restore damaged improvements to their original condition, as acceptable to Architect/ Engineer.

B. Protection of Existing Trees and Vegetation:

1. Protect existing trees and other vegetation, indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Permanent fences should be erected to the drip line as practical to protect trees and vegetation to be left standing.

2. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the Architect/ Engineer. Employ qualified tree surgeon to repair damage to trees and shrubs.

3.02 SITE CLEARING:

A. General: Clear construction areas of vegetation, improvements, debris or other obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

B. Removal of Improvements: Remove above-grade and below-grade improvements necessary to permit construction, and other work as indicated.

C. Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings, and is included under work of those sections. Removal of all other abandoned underground piping or conduit interfering with construction is included under this section.

3.03 DISPOSAL OF WASTE MATERIALS:

A. Burning is not permitted on Owner's property.

B. Remove cleared waste materials from Owner's property and dispose of at an off site located secured by the contractor.

END OF SECTION

SECTION 02200
EARTHWORK

PART 1 - GENERAL

1.01 SCOPE: Provide earthwork, complete, including excavation, placement, stabilization and compassion of earth.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS:

A. Site Preparation: Section 02100

B. Concrete Paving: Section 02513

1.03 TESTING AND INSPECTION: Employ, at Contractor's expense, a testing laboratory acceptable to the Architect to perform soil testing and inspection service.

1.04 SUBMITTALS AND SAMPLES:

A. SUBMITTALS: In compliance with Section 01300, submit field density test reports.

B. SAMPLES:

1. Notify architect/engineer four (4) days minimum in advance of intention to import material.

2. Designate the proposed borrow area and permit architect/engineer to sample as necessary for acceptance test.

1.05 JOB CONDITIONS:

A. SITE INFORMATION:

1. Results of the soils investigation is available at the office of the Architect and Contractor.

2. Data on indicated subsurface condition are not intended as representations or warranties of accuracy or continuity between soil borings.

B. EXISTING UTILITIES:

1. Locate existing underground utilities in the area of work. Provide adequate means of protections during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt existing utilities servicing facilities occupied and used by Owner and others, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.

C. PROTECTION: Protect structure, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.06 REFERENCES

A. ARKANSAS HIGHWAY AND TRANSPORTATION DEPARTMENT (AHTD).

1. Standard specifications for highway construction latest edition.

PART 2 - PRODUCTS:

2.01 SOIL MATERIALS:

A. SUB-BASE MATERIAL: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand, as acceptable to the Architect. Class 7 crushed stone conforming to grading requirements of the standard specifications for highway construction of the Arkansas State Highway Department table 303-I.

B. DRAINAGE FILL: Washed, uniformly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1 1/2 sieve and not more than 5% passing a No. 4 sieve.

C. BACKFILL AND FILL MATERIALS: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter, except fill in total depths of 12" or greater may contain rock or gravel of maximum 6" dimension.

D. TOPSOIL: Reusable excavation or imported friable loam: free of roots, grass, excessive amounts of weed, large stones, and foreign matter.

PART 3 – EXECUTION:

3.01 EXCAVATION:

A. CLASSIFICATION: Remove and dispose of any material encountered to obtain required sub-grade elevations, including pavement, obstructions visible on ground surface, underground structures and utilities indicated to be removed, boulders, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits. Correct unauthorized excavations (removal of materials beyond indicated sub-grade elevations) by extending the indicated bottom elevation of the footing to the lower elevation.

B. SHORING AND BRACING: Provide materials for shoring and bracing such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

C. DEWATERING: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundations bottoms, undercutting footings, and soil changes detrimental to stability of subgrade and foundations. Provide and maintain pumps, well pints, sumps, suction and discharge lines, and other dewatering system component necessary to convey water away from excavations. Convey water removed from excavations and rain water to

collecting or runoff areas. Establish and maintain temporary drainage ditches and other diversions outside excavations limits for each structure. Do not use trench excavations as temporary drainage ditches.

D. MATERIAL STORAGE: Stockpile excavated material where directed until required for backfill and fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Dispose of excess soil and material as specified.

E. EXCAVATION FOR STRUCTURE: Excavate for structure to elevations and dimensions shown, following recommendations in soils report. Extend the excavation a sufficient distance to permit placing and removal of concrete form work, installation of services, other work and for inspection. Remove any material beneath structures not capable of supporting 7000 PSF. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottom to required lines and grades to provide solid base to receive concrete. Where rock is encountered, excavation to elevations and dimensions shown. Footing may be placed directly on solid rock.

F. EXCAVATION FOR PAVEMENTS: Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

G. EXCAVATION FOR TRENCHES: Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room, and the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevation. Beyond the building perimeter, keep bottoms of trenchers sufficiently below finished grade to avoid freeze-ups. Where rock is encountered, carry the excavation 6" below the required elevation and backfill with a 6" layer of crushed stone or gravel prior to installing pipe. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of the pipe. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place backfill to the level of the bottom of adjacent footing. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Architect. Use care in backfilling to avoid damages or displacement of pipe systems. Comply it all applicable local, state and federal regulations regarding trenching.

3.02 BACKFILL AND FILL: Place and compact acceptable soil material in layers to required elevations. Backfill excavation as promptly as work permits. Place backfill and fill materials in layers not more than 8" in loose depth, compacting each layer to required maximum density. Do not place materials on surface that are muddy, frozen or contain ice or frost. A geo-fabric such as Mirafi 500X or approved equal is required at base of the compacted select fill to reduce the potential for migration of the compacted fill into the underlying old fill and aid in bridging over the uncontrolled fill. Care shall be taken to prevent displacement of pipe during backfilling. Where double pipe are required, lifts between pipes shall be compacted using hand operated compaction equipment. backfill between and along the outside of pipes shall not vary in depth enough to allow displacement of alignment of pipes.

3.03 COMPACTION: Compact soils to not less than the following percentages of maximum Standard Proctor density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D 698 or ASTM D-1557.

A. Compact each layer of backfill and fill soil materials and the top 12" of sub-grade for structures, slabs and pavements to 95% Modified Proctor maximum density (ASTM D-1557). Dynamic compaction is used on the building area, including an area extending at least 100 feet beyond, and mechanical, electrical equipment area. At lawns or unpaved areas, compact the top 6" to 90% Standard Proctor maximum density (ASTM D-698). Control moisture content of sub-grade and soil material within limits, near optimum moisture content, permitting compaction to required density. Add water uniformly to soil material where soil is too dry to permit compaction. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction.

B. In each compacted fill layer, make one field density test for every 2500 sq. ft. of paved and building slab area, but in no case less than 3 tests. Maximum distance between tests shall be 50'.

3.04 PAVEMENT SUB-BASE COURSE: Place specified Sub-base material in layers of indicated thickness, over sub-grade surface to support walks and pavement. Place single layer for course 6" thick or less and equal layers for courses more than 6" thick.

3.05 GRADING: Grade areas indicated with uniform levels or slopes between finish elevations, slope surface of areas to 0.10 ft above or below required sub-grade elevation, compacted as required. Allow for the required thickness of topsoil where required. Grade all areas to prevent ponding of water.

3.06 MAINTENANCE: Repair and re-establish grades in settled, eroded, rutted, or otherwise damaged areas. In damaged compacted areas, scarify the surface, re- shape, and compact to required density prior to further construction.

3.07 DISPOSAL: Remove trash, debris and waste material from site and dispose of in legal off-site dump site. Excess excavated material must be disposed of off-site, unless otherwise directed by the Owner.

END OF SECTION 02200

SECTION 02445
FENCING, CAGING & GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental conditions and Division -1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. Extent and type of mesh doors shown on drawings.

B. Work to include, but not be limited to, mesh doors from Keeper Buildings.

1.03 QUALITY ASSURANCE

A. Provide mesh doors as complete units controlled by a single source including necessary erection accessories, fittings and fastenings.

B. Manufacturer experience: Provide products of this section by a qualified manufacture. Equally qualified manufactures that are acceptable include the following:

1. A thru Z Consulting and Distributing, Inc., Tucson, AZ. Phone 520-434-8281 or email info@ athruz.net.
2. LGL Animal Care Products, Inc, College Station, TX. Phone 979-690-3434 or email info@lglcp.com.
3. Thermeq, 1070 Disher Drive, Waterville, Ohio 43566, 419-878-4400 ext. 450

C. Welding: American Welding Society Structural welding code is referenced and will be followed. Welder must be qualified according to AWS. **Galvanizing of WWF must be done after welding.**

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, and installation instructions for metal fencing and gates. Submit data on hinges, door operating and locking hardware and other pertinent items for review by Owner's Representative. Unless otherwise approved, all fencing materials shall be galvanized steel.

B. Submit shop drawings for gates and fencing indicating all dimensions, spans, components and connectors. Submit one 12" square sample of welded woven wire mesh.

1.05 GENERAL

A. Provide mesh doors identified on the drawings.

PART 2 – PRODUCTS

2.01 PERSONNEL DOORS

A. Galvanized keeper doors are to be 1" x 1" x 3/16" mesh welded woven wire fabric mounted in 1 ½" x 1 ½" x 3/16" galvanized steel frame. Sized and operation shown on door schedule. **Galvanizing of WWF must be done after welding.**

PART 3 - EXECUTION

3.01 GENERAL:

A. Inspection: All materials installed under this specification shall be subject to testing by the Owner at his expense. Any material so inspected and found to be not in strict conformity with this specification shall be promptly removed and replaced by the Contractor at his expense.

3.02 GENERAL INSTALLATION:

A. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Gates: Install gates plumb, level and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION 02445

SECTION 02513
CONCRETE PAVING

PART 1 - GENERAL

1.01 SCOPE: Provide concrete paving, complete. Concrete paving at viewing areas is shown as Decorative, Patterns and stained concrete. This concrete will be colored and will have a decorative patterned finish of animal prints and other natural imprints such as leaves, stones, etc.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS:

A. Sealants: Section 07900

1.03 SUBMITTALS: Submit mix designs and reports as required for concrete.

PART 2 - PRODUCTS

2.01 MATERIALS: Provide concrete materials, forms, reinforcing, and expansion joint fillers as required for concrete.

2.02 CONCRETE MIX, DESIGN TESTING:

A. Comply with requirements of Section 03300 for concrete mix design, sampling testing, and quality control, and as specified below.

B. Design the mix to produce standard-weight concrete consisting of Portland cement, aggregate, air-entraining admixture and water to produce the following properties.

1. Compressive Strength: 3000 psi min. @ 28 days.
2. Slump Range: 4" +/-1". Air Content: 5% to 7%
3. Flexural Strength: ASTM C 78, 550 psi min. @ 28 days

C. Decorative, patterned and colored concrete to have imprints of animals and elements of nature found in native habitat of animals in these exhibits. Contractor to work with architect to select items for imprinting. Concrete color stain to be equal to Komiko Stone Tone Stain and is to be installed as per manufacturer's recommendations. The color of the stain is as selected from standard colors by the architect. A clear sealer equal to Komiko Stone Tone Sealer to be applied over finished product. Stamp for decorative will be provided by the Zoo.

PART 3 - EXECUTION

3.01 INSPECTION: Examine the areas and conditions under which concrete paving is to be installed. Do not proceed with the work until satisfactory conditions have been corrected.

3.02 SUBSURFACE PREPARATION: Remove loose material from the compacted sub-base surface immediately before placing concrete.

3.03 FORM CONSTRUCTION:

A. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of the work, and so that forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.04 REINFORCEMENT: Locate, place and support reinforcement as specified in Section 03300 unless otherwise shown on the drawings or herein specified.

3.05 CONCRETE PLACEMENT: Comply with the requirements of Section 03300 for mixing and placing concrete, and as specified below.

A. Do not place concrete until sub-base and forms have been checked for line and grade. Moisten sub-base if required to provide a uniform dampened condition at the time concrete is placed.

B. Spread concrete as soon as it is deposited on the sub-base if, using methods which prevent segregation of the mix. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels, for hand-spreading and consolidation. Consolidate with care to prevent dislocation or reinforcing, dowels, and joint devices. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3.06 JOINTS: Construct expansion and construction joints true to line with face perpendicular to surface of the pavement, unless otherwise indicated. Construct transverse joints at right angles to the pavement centerline, unless otherwise indicated. When the pavement is laid in partial-width slabs, of if joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

A. Construction Joints: Provide type construction joint as indicated. Locate joints as indicated, at the end of pours, and at locations where placement operations are stopped for more than 1/2 hour (except where such pours terminate at expansion joints).

B. Expansion Joints: Provide type of expansion joint as indicated. Locate joints as indicated. Extend joint fillers full width and depth of the joint, and not less than 1/2" or more than 1" below the finished pavement surface where joint sealer is indicated. Furnish joint fillers in one-piece lengths for the full width.

3.07 CONCRETE FINISHING:

A. Perform concrete finishing using machine or hand methods as required.

B. After striking off and consolidating concrete, smooth the surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.

C. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous, smooth finish.

D. Work edges of slabs, transverse joints, and construction joints with an edging tool, and round to 1/4" radius, unless otherwise indicated. Eliminate any tool marks on concrete surface.

E. Installation of patterns and decorations to be done when concrete is workable and accepts various imprints selected. Time should be left in the finishing process to accommodate the installation of the imprints.

F. After completion of floating and when excess moisture or surface sheen has been disappeared, broom finish by drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the Architect.

G. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections of major honeycombing, as directed by the architect.

3.08 STAIN APPLICATION: Install the stain over the patterned concrete as recommended by the stain manufacturer.

3.09 CURING: Protect and cure finished concrete paving, complying with applicable requirements of Section 03300.

A. Repair or replace broken defective paving, as directed by the architect.

B. Protect the pavement from damage until acceptance of the work. Exclude traffic from pavement for at least 14 days after placement.

C. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION 02513

SECTION 02811
LANDSCAPE IRRIGATION SYSTEM

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Piping and sprinkler heads for irrigation of Exhibit plantings with associated benefit of cooling animals.

B. Connection to utilities.

C. Manual control system.

1.02 RELATED SECTIONS

A. Section 02950 – Trees, Shrubs and Ground Cover.

1.03 REFERENCES

A. ASTM D 2241 – Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR).

B. ANSI/ASTM D 2564 – Solvent Cement for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.

C. Little Rock Municipal Water Works Standard Specifications.

1.04 SYSTEM DESCRIPTION

A. Provide manual controlled, irrigation system for landscape plantings and sodding areas. System shall include the following components.

1. PVC pipe and fittings.
2. Flow control valves.
3. Outlets (sprinkler heads).

1.05 SUBMITALS

A. Submit outlets type as required in Section 01300.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. TORO by TORO Co., Irrigation Division, Rain Bird, Hunter, or equal.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Connect to existing adjacent water service, which is protected by RPZ.

B. Set heads for proper operations and maximum coverage.

C. Set manual valve for easy access.

3.03 ADJUSTING

A. After inspection by Owner, make final adjustments as requested.

END OF SECTION 02811

SECTION 02950
TREES, SHRUBS AND GROUND COVER
(By Owner)

PART 1- GENERAL

1.01 SECTION INCLUDES:

A. Trees, plants and ground cover

B. Topsoil bedding.

C. Temporary support.

D. Maintenance service.

1.02 RELATED SERVICES

A. Section 02210- Site Grading

B. Section 02811- Landscape Irrigation System

1.03 QUALITY ASSURANCE

A. Perform work with personnel experienced in the work required of this Section under direction of a skilled foreman.

B. Plant material: American Association of Nurserymen, Inc. Standards.

1. Grading tolerances allowed: as specified in the American Standard for Nursery Stock, latest revised edition.

2. Material shall be free from disease and insect infestation.

1.04 SUBMITTALS

A. Submit samples of plant materials to Architect/Engineer for approval prior to installation.

B. Submit a five pound sample of prepared topsoil mixture. If an alternate pre-mixed type is proposed then submit sample and mix contents by proportion.

C. Submit a five pound sample of mulch material.

D. Submit results of soils analysis for existing and/or imported topsoils used in topsoil mixture, and, existing subgrade soils.

1.05 REFERENCES

A. Federal Specifications (FS): FS O-F-241 – Fertilizer, Mixed, Commercial

1.06 DELIVERY, STORAGE AND HANDLING

A. Move balled and burlapped stock only when root balls are solid and well hardened.

B. Deliver plant materials immediately prior to placement. Keep root balls of plant material moist.

C. Reject plants when root ball has been cracked or broken prior to or during process of planting.

D. Reject plants when burlap, staves and ropes required in connection with transplanting have been displaced prior to acceptance.

1.07 WARRANTY

A. Provide one year warranty from date of final acceptance of the work.

B. Immediately replace plant materials found dead, or not in healthy growing condition during warranty coverage.

C. Replacements: Plant materials of same size and species, with a new warranty commencing on date of replacement.

PART 2- PRODUCTS

2.01 MATERIALS

A. Planting soil shall consist of 2/3 soil and 1/3 organic material by volume.

1. The soil shall meet the following requirements:
Soil shall be sandy loam or loamy sand consisting largely of sand, but with enough silt and clay to give it a small amount of stability. Individual sand grains can be seen and felt readily. On squeezing in the hand when dry, it shall fall apart when the pressure is released; on squeezing when moist, it shall form a cast that will not only hold its shape when moist, but will hold its shape when the pressure is released, and shall withstand careful handling without breaking.

The mixed soil shall meet the following:

Size	Sieve	Percent Passing
3/8”	ASTM E-11	100
#10	ASTM E-11	85-100
#270	ASTM E-11	10-50
.002 mm	Clay	0-10

2. Shall have a ph range of 5.0-6.5 with dolomitic limestone added as necessary to attain this range.

3. Organic material shall consist of composted yard debris or organic waste material and shall consist of 100% recycled content.
In addition, the organic material shall have the following physical characteristics:

a. Shall be screened using a sieve no finer than 7/16” and no greater than ¾”.
b. Shall pass a standard cress test for seed germination (90% germination compared to standard).
c. Shall have a pH from 5.5 to 7.5.

d. Shall contain at least 25% organic matter by dry weight.
e. Shall have a maximum electrical conductivity of 3.0 mhos/cm.
f. Shall have a maximum carbon to nitrogen ration of 40:1.
g. Shall be certified by the Process to Further Reduce Pathogens (PFRP) guidelines for hot composting as established by the United States Environmental Protection Agency.

4. Submit soil analysis from a soils testing laboratory to the Engineer. Indicate source and obtain the Engineer's approval before hauling to site (analysis test with a two (2) pound bag sample is required).

B. Fertilizers

1. FS O-F-241, commercial type: Proportions as per U.S. Dept. of Agriculture Extension Service recommendation from analysis of soil samples.

2. Fertilizer: AGRIFORM planting tablets by Sierra Chemical Company, or approved equal.

a. Trees and shrubs: 21 gram planting tablet.
b. Linder size plants: 10 gram planting tablet.
c. Ground cover, each plant: 5 gram planting tablet.

C. Trees, Shrubs and Ground Cover:

1. Refer to Plant Materials List on Drawings.

2. Furnish either baled and burlapped or container grown stock.

D. Topsoil Mixture:

1. Three parts topsoil, one part composted rice hulls or peat moss and one part sand.

2. Submit any proposed alternate mixture sample and mix proportions to Engineer for approval.

E. Weed Control:

1. Anti-germination weed control agent, EPTAM, or approved equal. Place under mulch in shrub and groundcover beds at manufacturer's recommended rates.

F. Plant Growth Stimulator:

1. Water all plants at installation with a liquid form root stimulator. Saturate planting holes thoroughly.

G. Mulch Material: Shredded hardwood bark with no hardwood chips, limbs or other foreign material.

2.02 ACCESSORIES

A. Wrapping Materials: quality burlap

B. Support stakes: wood, 2 inch x 2 inch minimum nominal size.

C. Cables, Wire, Eye Bolts and Turnbuckles: Noncorrosive and of sufficient strength to withstand wind pressure.

PART 3- EXECUTION

3.01 PREPARATION

A. Verify that the site is ready to receive the work of this Section.

B. Prepare subgrades and bedding areas to receive plant materials.

C. Enclose all open plant bed edges with steel edging. Do not palce edging along backs of curbs or pavements.

3.02 PREPARATION OF SUBGRADE

A. Remove foreign materials, undesirable plants and their roots, stones and debris. Do not bury foreign material beneath areas to be backfilled and planted. Remove sub-soil which has been contaminated with petroleum or chemical products.

B. Excavate ground cover and annual beds to a minimum depth of 6 inches below finish grade.

C. Excavate plant pits for size of root ball and installation per planting details.

D. Cultivate sub-soil to a depth of 3 inches where backfill mixture is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted sub-soil.

3.03 PLACING BACKFILL

A. Backfill plant pits with topsoil mixture mounded to finish grade.

B. Backfill ground cover and annual beds with topsoil mixture to 6 inch minimum layer depth.

C. Backfill other bed areas to finish grade requiring topsoil mixture during dry weather and on dry, unfrozen subgrade.

D. Place topsoil and prepared topsoil mixture during dry weather and on dry, unfrozen subgrade.

E. Grade bed areas to eliminate rough and low areas, ensuring positive drainage. Maintain levels, profiles and contours of subgrade.

3.04 INSTALLATION OF PLANT MATERIALS

A. Place plant materials for review and final orientation by Architect/Engineer prior to installation.

B. Handle nursery stock in accordance with good nursery practice.

C. Place trees and shrubs in a pit at approximately twice as wide as the ball diameter. Allow depth for root ball plus base layer of topsoil mixture per planting details. Place ground covers in beds backfilled with prepared topsoil mixture.

D. Scarify walls and bottoms of planting pits where soil is compacted or glazed.

E. Fertilize per manufactures recommendations for material shown in the planting details.

F. Backfill plant pits with prepared topsoil mixture. Install a layer of topsoil mixture at base of root ball. Mix granular fertilizers with topsoil mixture.

G. Brace trees over 5 feet in upright position with guy wires and stakes as indicated in the planting details.

H. Provide 3 inch minimum loose layer depth of mulch in all planted beds and around the base of all newly planted trees.

I. Maintain plantings throughout construction period until date of final acceptance.

3.05 MAINTENANCE SERVICE

A. Begin maintenance of tree and shrub plantings immediately after planting and continue throughout construction period until final acceptance of the work.

B. Maintenance shall include measures necessary to establish and maintain plants in a vigorous and healthy growing condition, including the following items:

1. Cultivation and weeding plant beds and tree pits. When herbicides are used for weed control, apply in accordance with manufacturer's instructions. Remedy damage resulting from use of herbicides.

2. Water sufficient to saturate root system.

3. Pruning, including removal of dead or broken branches, shaping and treatment of prune wounds.

4. Disease and insect control.

5. Maintenance of wrappings, guys, turnbuckles and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

6. Replace mulch and topsoil after washouts.

7. Immediately replace plant materials found dead or not in healthy growing condition.

8. Fertilize trees, shrubs and ground covers every 45 days after installation.

END OF SECTION

SECTION 03310
CONCRETE WORK

PART 1 - GENERAL

1.01 SCOPE: Provide all cast in place concrete work. Provide all reinforcing steel, dowels, chairs, and accessories as specified for concrete work. Furnish reinforcing steel bars for masonry work and tile bars after they are in place.

1.02 RELATED DOCUMENTS:

A. Excavation and Filling, including base course and cushion fill; Section 02200.

B. Soil treatment for termite control; Section 02280

1.03 QUALITY ASSURANCE:

A. Reference Standards and Specifications: Comply with provisions of following codes specifications and standards, except as otherwise noted or specified, or as accepted or directed by the Architect during unusual climatic conditions.

1. ACI 301 "Specifications for Structural Concrete for Buildings."

2. ACI 318 "Building Code Requirements for Reinforced Concrete."

3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

B. Local Codes and Ordinances: Wherever provisions of the Uniform Building Code or the local current ordinances are more stringent than the above specifications and standards, the local codes and ordinances shall govern.

1.04 TESTS: Testing of concrete cylinders to determine compression strength of concrete delivered to the job site, shall be performed by an independent testing laboratory approved by the Architect. Tests shall be paid for by the Contractor. Testing requirements are specified in FIELD SAMPLING AND TESTING paragraph.

1.05 SUBMITTALS: Comply with Section 01300.

A. Shop Drawings; Reinforcement: Submit to the Architect for review prior to installation, shop drawings reinforcing steel and construction joint schedule with details.

B. Prior to the placement of concrete, submit concrete mix designs proposed by the concrete supplier, class of concrete.

C. Weekly reports of all compression, slump, and air content tests from the testing laboratory.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Form Materials:

1. Forms for Unexposed Finish Concrete: Use plywood, lumber, metal or other acceptable material. If lumber is used, it must be dressed on at least 2 edges and 2 sides for a tight fit.

B. Steel Reinforcement:

1. Reinforcing Bars: ASTM A 615 (S1), deformed billet steel bars of grades as indicated on the structural drawings, free from loose rust, scale and other coatings that may reduce bond.

2. Mesh or Fabric Reinforcement: ASTM A 185, welded wire fabric, of sizes and types as indicated the drawings.

3. Accessories: Include all spacers, chairs, ties and other devices necessary for properly spacing and fastening reinforcement in place.

4. Tie Wires: Soft annealed iron wire not smaller than 18 gage.

D. Concrete Materials:

1. Portland Cement: ASTM C 150, Type I.

2. Normal Weight Aggregates: ASTM C 33 and the following:

a. Fine Aggregate: Clean, sharp, natural or manufactured sand free from loam, clay, lumps or other deleterious substances.

b. Coarse Aggregate: Clean, uncoated, processed, locally available aggregate, containing no clay, mud, loam or foreign matter. The maximum size of coarse aggregate shall be 1 1/2".

3. Mixing Water: Clean, free from oil, acid, salt, injurious amounts of impurities; potable.

4. Admixtures:

a. Air-Entraining Admixture: ASTM C 260. 5 1/2% + 1 1/2% for all concrete.

b. Other Admixtures: Do not use other admixtures unless accepted by the Architect.

E. Related Materials:

1. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

a. Polyethylene sheet not less than 10 mils thick.

2. Non-Shrink Grout: CRD-C 588, Type D, non-metallic, factory pre-mixed grout: Master Builder "Masterflow 713", Euclid "Euco-NS", Sonneborn "Sonogrout", L & M "Duragrout".

3. Bonding Compound: Polyvinyl acetate, rewettable type; W.R. Grace "Daraweld C", Sonneborne "Sonocrete". Larsen "Weldcrete", Euclid "Eucoweld, L & M "Everbond".

4. Connectors: Provide all metal connectors required for placement in cast-in-place concrete, for the attachment of Structural and non-structural members.

5. Expansion Joint Filler: ASTM D 1751, non-extruding premoulded material, ½" thick, composed of fiberboard impregnated with asphalt, except use ASTM D 1752, Type II, resin-bound cork for walks and other exposed areas.

6. Curing Compound: ASTM C 309, minimum 30% solids content. Euclid "Super Floor Coat", Sonneborn Cure-N-Seal modified for 30%, W.R. Meadows "Sealtight" 1100.

7. Concrete Sealer: Sonneborn Son-No-Mar, Euclid Eucopoxy I, Bonsal Concrete Sealer.

8. Contraction Joint: Tongue and groove keyway, preformed metal or wood form designed to provide 1 ½" keyway.

2.02 PROPORTIONING AND DESIGN OF MIXES:

A. Strength: Concrete minimum ultimate strength at 28 days shall be:
Concrete footings and slabs 3000 psi
Concrete paving and walks 3500 psi

B. Mix Design:

1. Prepare design mixes for each type of concrete, in accordance with ACI 301 and ACI 318.

2. Proportion design mixes by weight for class of concrete required, complying with ACI 211.

C. Provide test results from the concrete supplier for proposed design mix, to establish the following:

1. Gross weight and yield per cubic yard of trial mixtures.

2. Measured slump.

3. Measured air content.

4. Compressive strength developed at 7 days and 28 days, from not less than 3 test cylinders cast for each 7 day and 28 day test, and for each design mix.

D. Submit written reports to the Architect for design mix at least 15 calendar days prior to the start of work.

E. Use air-entrained admixture in strict compliance with manufacturer's directions.

F. Slump Limits: 4".

2.03 BATCHING AND MIXING: Concrete may be ready-mixed or job-mixed at the Contractor's option, in accordance with the governing building code and with the referenced ACI 318. No hand mixing allowed.

PART 3 - EXECUTION

3.01 FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

C. Construct forms in accordance with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulk heads, anchorage's and inserts, and other required finishes. Solidly butt joints and provide back - up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

F. Provisions for Other Trades: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Re-tighten forms and bracing after concrete placement is completed to eliminate mortar leaks and maintain proper alignment.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Re-tighten forms and bracing after concrete placement is completed to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's (CRSI) recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. In all cases, provide minimum concrete protection over bar reinforcement at least equal to the bar diameter or as follows:

1. Where concrete is deposited against ground without forms, not less than 3".
2. In forms, not less than 2" for bars more than 5/8" diameter and 1 ½" for bars less than 5/8".
3. All other locations, the thickness of concrete over reinforcement shall be at least 1 ½" or ¾" in slabs.

E. Do not place bars more than 2" beyond the last leg of continuous support. Do not use supports to hold runways for conveying equipment.

F. Avoid splicing at points of maximum stress. Minimum laps to be 32 bar diameters.

G. Install mesh welded wire fabric reinforcement in as long length as practicable, lapping pieces at least one mesh plus 2" but in no case less than 8". Lace splices with wire. Offset end laps to prevent continuous laps in either direction. Lift mesh to middle third of slab by use of hooks.

H. Provide 2 #5 bars at each side of openings through walls and slabs, unless otherwise noted to extend 2'-0" past opening.

I. Provide 2 #3 bars, 3" apart at the four sides at floor drains, plumbing risers, sleeves and inserts.

3.03 JOINTS AND INSERTS:

A. Construction Joints: Locate and install construction joints as indicated or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect. Submit construction joint schedule and details to the Architect. Place construction joints perpendicular to the reinforcement, and continue all reinforcement across the joints, unless noted otherwise on the drawings. Provide joints bonded in compliance with manufacturer's instructions to forma continuous diaphragm.

B. Expansion Joints: Provide expansion joints at locations indicated on the drawings, or as approved by the Architect. Do not permit reinforcement to extend continuously through any expansion joint.

C. Inserts: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Properly locate all embedded items in cooperation with other trades, and secure in position before concrete is poured. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

3.04 CONCRETE PLACEMENT: Comply with ACI 304, and as herein specified.

A. Pre-Placement Inspection: Before placing concrete, clean and inspect formwork, reinforcing steel and items to be embedded or cast-in. Notify other crafts in ample time to permit the installation of their work and cooperate with them in setting such work, as required. Make sure the soil treatment for termite control has been applied to cushion fill before vapor barrier and concrete are installed. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

B. Vapor Barrier: Apply directly over fill. Lay dry with 6" wide dry side laps and end laps. Lay film just before reinforcement is placed and concrete is poured, and protect against punctures. Repair punctures with adhesive applied extra sheet before proceeding.

C. Notify the Architect 48 hours before placing any concrete.

D. Conveying: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. Provide equipment for cutting, pumping and pneumatically conveying concrete of proper size and design as to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials. Keep open troughs and chutes clean and free from coatings of hardened concrete. Do not allow concrete to drop freely more than 10 feet. All equipment and methods used for conveying are subject to the approval of the Architect.

E. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on hardened concrete so as to cause seams or planes of weakness. If a section can not be placed continuously, provide construction joints as specified. Deposit concrete near of in its final location to avoid segregation due to re-handling or flowing, and displacement of the reinforcement.

F. Cold Weather Placement: Comply with the requirements of ACI 306.

G. Hot Weather Placement: Comply with the requirements of ACI 305.

H. Compaction: Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corner.

3.05 FIELD SAMPLING AND TESTING:

A. Laboratory Sampling and Testing: The following samples and tests will be performed by an independent testing laboratory approved by the Architect. Refer to paragraph 1.04 TESTS, for responsibility for payment of tests.

1. Field samples shall be made and cured in accordance with ASTM C3, for each concrete strength, at the rate of 3 test cylinders and one slump test for each 50 cubic yards of concrete from each day's pour. Test cylinders as follows: one at 7 days, two at 28 days, and reserve remaining for testing after a longer period as required by the Architect, if the 28 day test do not meet the required strength. In accordance with ASTM C 173 Volumetric Method or ASTM C231 Pressure Method, make air content check for each set of test cylinders. The taking of samples from small pours of 10 cubic yards or less may be omitted at the discretion of the Architect. Additionally, test slump every 25 cu. yards, recording location for weekly report. When early form removal is requested, field cure cylinders tested at 7 or less days to determine sufficient strength.

2. In all cases where the strength of any group of 3 cylinders or of any individual falls below the minimum compressive strength specified, the Architect shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by the Architect from the location in the structure represented by the test specimen or specimens which failed. Specimens shall be secured, prepared and tested in accordance with ASTM C 42, within a period of 60 days after placing the concrete. Concrete shall be considered to meet the strength requirement of this specification if it meets the strength requirements of paragraph 4.8.4 of ACI 318. Should laboratory analysis indicate, however, that the proper concrete mix has not been used by the Contractor, all such concrete poured using the improper mix shall be subject to rejection. The cost of cutting specimens form the structure, patching the resulting holes, and making the laboratory analysis shall be borne by the Contractor. The holes from which the cored samples are taken shall be packed solid with no slump concrete proportioned in accordance with the ACI 211 "Recommended Practice for Selecting Proportions of No-Slump Concrete". The patching concrete shall have the same design strength as the specified concrete. If any of the specimens sit from the structure fails to meet the requirements outlined in paragraph 4.8.4 of ACI 318, the Architect shall have the right to require any and all defective concrete to be replaced, and all costs resulting therefrom shall be borne by the Contractor.

3.06 FINISH OF FORMED SURFACES: For formed concrete surfaces not exposed-to-view in the finish work or by other construction. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fin and other projections exceeding ¼" in height rubbed down or chipped off.

3.07 SLAB FINISHES:

A. Exposed Plain Concrete Finish and Stained Concrete Finish: Finish the concrete by forcing aggregate away from the surface and screeding at the proper level. Float the surface and lightly trowel. When concrete has set sufficiently to ring under the trowel, give a second trowelling to produce a smooth, dense surface free from trowel marks and sweeps, air bubbles or other imperfections of troweling.

B. Slabs to Receive Floor Covering: Finish as in A. above, trowel to remove trowel marks and to a smooth, even finish, except omit second troweling.

C. Non-Slip Broom Finish: At exterior walks, steps and elsewhere as indicated. Finish as in A above except that after first troweling, give the surface a light broom finish, brushing at right angles to direction of travel or in pattern where so indicated on the drawings. No exposed tool marks will be permitted. Score as indicated on the drawings. No exposed tool marks will be permitted. Score as indicated or directed with a small radius edging tool, to a minimum ½" depth.

D. Concrete Sealer: Apply two coats in accordance with manufacturer's instructions.

3.08 CONCRETE CURING AND PROTECTION: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. Begin final curing procedures immediately following initial curing before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

A. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing and sealing compound, and by combinations thereof, as herein specified.

1. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by water fog spray or by covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture cover curing by covering concrete surface with moisture retaining cover for curing concrete, placed in widest practicable width with sides and end lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing and sealing compound on interior slabs to receive resilient flooring, or left exposed; and to exterior slabs, walks and curbs as follows:

a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

B. Curing Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

C. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs and other flat surfaces by application of appropriate curing compound. Final cure concrete surfaces by moisture-retaining cover.

3.09 PROTECTION:

A. No wheeling, working or walking on finished surfaces will be allowed for 16 hours after the concrete is placed.

B. Provide plywood or other acceptable protective cover at all traffic areas throughout the job.

C. Protect all exposed concrete floors, steps and walks from paint, plaster and other materials or equipment which may mar or damage these surfaces.

3.10 REMOVAL OF FORMS: Do not remove forms until the concrete has attained 67% of 28 day strength or a minimum of 4 days. Use a method of form removal which will not cause overstressing of the concrete.

3.11 MISCELLANEOUS ITEMS:

A. Filling Holes: Fill in holes and opening left in concrete for the passage of work by other trades after their work is in place. Mix, place, and cure concrete to blend with in-place construction. Provide all other miscellaneous concrete filling required to complete work.

B. Equipment Pads: Provide 6" thick concrete pads under mechanical and electrical equipment. Use concrete specified for slabs, with a smooth integral finish. Set bolts, anchors, etc., from templates or setting diagrams furnished by the various trades. Provide #4 reinforcing bars at 12" o.c. each way in equipment pads.

C. Drainage and Plumbing System Items: Unless otherwise noted on drawings, provide 3000 psi concrete for construction of manholds, catch basins, foot baths, valve boxes, etc., required for plumbing and drainage installation.

3.12 CONCRETE SURFACE REPAIRS: Repair and patch defective areas with cement mortar of the same type and class as the original concrete, immediately after removal of forms. Repair defects that adversely affect the durability of the concrete. If defects cannot be repaired remove and replace the concrete.

3.13 CLEAN-UP: Do not allow debris to accumulate. Clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work, and upon completion of the entire cast-in-place concrete work.

END OF SECTION

SECTION 03371
SIMULATED ROCKWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:

1. Pneumatically applied concrete, referred to Gunite or Shotcrete on the documents.

2. Hand-carved: formed in place shotcrete

3. Rockwork contractor shall provide all hand-carved, full thick exterior rock shell construction complete, including Slabs on grade with sculptured surfaces, elevated shells with sculpted surfaces and water tight pool shells and water containing vessels.

4. The new simulated rockwork or existing simulated rockwork included in this project that is located in a pool, new or existing shall have admixtures as specified to make the simulated rockwork waterproof. The crystalline concrete admixture should be equal to Xypex Admixture for use with simulated rockwork and as a coating over existing simulated rockwork.

Related Sections:

1. Division 01 Section "General Requirements."
2. Division 01 Section "Special Procedures."
3. Division 03 Section 03310 "Concrete".

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

B. ACI – American Concrete Institute:

1. ACI 506R Guide to Shotcrete
2. ACI 506.2 Specifications for Shotcrete

C. ASTM International:

1. ASTM C33 Standard Specification for Concrete Aggregates
2. ASTM C150 Standard Specification for Portland Cement
3. ASTM C1140 Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels
4. ASTM C1141 Standard Specification for Admixtures for Shotcrete

1.3 SUBMITTALS

A. Submit under provisions Section 01700 "General Requirements."

B. Qualifications of shotcrete applicator and personnel performing the work to have 10 years experience in applying shotcrete both as a craftsman and as an organization.

C. Mix designs including compressive test data used to establish proportions. Material certificates for shotcrete materials, including cements, aggregates and admixtures. Submit to Testing Laboratory for record purposes.

D. Submit batch tickets to Testing Laboratory for each batch of shotcrete, indicating weight of cement, aggregate, water and admixtures.

E. Samples as requested by the Testing Laboratory.

1.4 QUALITY ASSURANCE

A. Perform shotcrete work in accordance with the requirements of ACI 506.2, "Specifications for Materials, Proportioning, and Application of Shotcrete,".

B. Shotcrete Mix Design: Testing laboratory shall, under direction of its Arkansas registered Civil Engineer, design shotcrete mixes. Each mix shall bear the signature and registration number of the responsible engineer.

C. Test Panels: Prepare preconstruction test panels at least 21 days prior to job placement, using the mix and equipment proposed for the project.
   1. Each proposed nozzle man shall prepare a panel demonstrating each shooting orientation.
   2. Fabricate test panels in accordance with ASTM C1140 and CBC 1924.5 and as approved by the Zoo.
   3. Notify Testing Laboratory to observe placement of panels. Maintain panels at point of fabrication for 7 days and until Testing Laboratory have taken cores.
   4. Samples taken from test panel shall achieve a mean core grade of 2.0, in accordance with Section 1.7 of ACI 506.2, "Shotcrete Core Grades". In the event of failure, nozzle man shall be permitted one retest. Any nozzle man failing the second test shall not be permitted on the project.

D. Certificates of Compliance: Acceptability of the following materials will be based upon documentation furnished by the manufacturer identifying each batch of material and certifying compliance with the requirements specified.
   1. Portland cement
   2. Fly Ash
   3. Admixtures

E. Certified laboratory test reports: Before delivery of materials, certified copies of the reports of all tests required in referenced publications or otherwise specified here shall be submitted. Certified test reports are required for the following:
   1. Cement
   2. Aggregates
   3. Admixtures

1.5 QUALIFIED INSTALLERS

A. At least five years experience in placement of gunite/shotcrete to simulate natural rock formations, outcroppings and natural streams and streambeds.

B. Employ experienced foreman with at least 5 years of construction in this field.

C. Employ personnel with the ability and skill to sculp fresh gunite into natural forms and rock formations and to reproduce forms in large scale from small scale replicas.

D. The following installers are pre-approved. Other installers wishing to be approved must submit qualifications to architect to be allowed to bid:

1. Dodson Studios, 44050 Ashburn Plaza; Suite 195 No. 661, Ashburn, Virginia 20147, Phone: (703) 935-0094, Email: dodsonstudios@aol.com, Webpage: www.dodsonstudios.com.

2. Cost of Wisconsin, Inc., 4201 Hwy P, Jackson, Wisconsin 53037, (800) 221-7625, Webpage: www.costofwinconsin.com

3. Cemrock, 4907 S. Julian Avenue, Tuscon, AZ 85714, Phone: (520) 571-1999, Webpage: www.cemrock.com.

4. Weber Group Inc. 5233 Progress Way Sellersburg, IN 47172, Phone: (812) 246-2100 Fax: (812) 246-2109, Webpage: www.webergroupinc.com

1.6 ENVIRONMENTAL REQUIREMENTS

A. Ensure materials and surrounding air temperature are a minimum 40 deg F (4.4 deg C) prior to, during, and seven days after completion of work.

B. During freezing or near freezing weather, provide equipment and cover to maintain minimum 40 deg F (4.4 deg C) and to protect work completed or work in progress.

C. Suspend shotcrete operations during high winds, rainy weather, hot weather, or near freezing temperatures when work cannot be protected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete materials shall conform to the appropriate requirements of Section [Division 03 Section "Concrete Reinforcing"] Division 03 Section "Cast-in-Place Concrete"], ACI 506R and ACI 506.2 except as specified herein for adjustment of aggregate and mix for placing.

B. Addmixtures: ASTM C1141.

C. Aggregate: ASTM C33, combined Gradation No. 2 as specified in ACI 506.R.

2.2 SHOTCRETE MIX

A. Proportion shotcrete mixes in accordance with ACI 506.2.to achieve 4,000 psi (27.6 MPA) compressive strength at 28 days.

B. Provide a mix that is plastic enough to give good compaction and low percentage of rebound, but stiff enough not to sag.

C. Measure and mix shotcrete in accordance with requirements of [Division 03 Section "Concrete Reinforcing"] Division 03 Section "Cast-in-Place Concrete"].

D. ADD 2.3, 2.4 AND 2.5 STRUCTURAL SUBSTRATE

2.3 Aggregates shall be manufactured from natural rock or atone, washed gravel either natural or crushed, clean, and free of deleterious substances. Structural Substrate: Gradation limit for combined aggregates.

a. Aggregates conforming to the following:

US Standard Square Mesh	Passing Individual Sieves
¾ in.	100

½ in.	80-95
3/8 in.	70-90
No. 4	50-70
No. 8	35-55
No. 16	20-40
No. 30	10-30
No. 50	5-17
No. 100	2-10

2.4 Batch fine coarse aggregates separately to avoid segregation.

a. Coloring Agent:

1. Colored concrete to be achieved by the use of Chromix Admixtures for color conditioned concrete by L.M. Scofield Co.

2. The dosage rate of Chromix Admixture used must be at the rate specified by the manufacturer for the particular color used.

3. Concrete color to be selected by the Owner from manufacturer's full range of available colors.

4. Concrete mix, batching, placement and finish to be in accordance with the printed specifications of L.M. Scofield Co.

5. Shall be harmless to concrete set and strength.

6. Shall be stable at high temperature and strength.

7. Shall be sunlight fast and alkali-resistant.

2.5 EQUIPMENT

A. Equipment: Equipment of design and size which has given good results in similar work; pneumatic feed type; capable of maintaining continuous placement.

B. Air Supply: Clean, dry air adequate for maintaining sufficient nozzle velocity, uniformly steady for work while simultaneously operating blow pipe for cleaning away rebound.

C. Delivery Equipment: Capable of discharging aggregate-cement-water mixture accurately, uniformly, and continuously through the delivery hose.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify fabricated forms are true to line and dimension, adequately braced against deflection and vibration, and constructed to permit escape of air and rebound during gunning operations.

C. Ensure correct placement of reinforcement. Ensure sufficient clearance around reinforcement to permit complete encasement.

D. Ensure easy access to shotcrete surfaces for screening and finishing, to permit uninterrupted application.

E. Beginning of installation means the Subcontractor accepts that the existing conditions meet the above criteria.

3.2 PREPARATION

A. Prepare smooth, even surfaces. Minimize abrupt changes in thickness of repair. Remove square external corners from substrate by radiating the edge.

B. Ensure that forms are true to line and dimension, adequately braced against deflection and vibration, and constructed to permit escape of air and rebound during gunning operations.

C. Do not place shotcrete on any surface which is frozen, spongy or where there is standing water.

D. Shotcrete placed against existing concrete or masonry - Remove unsound material before applying shotcrete. Chip or scarify any area to be repaired to remove off-sets which would cause an abrupt change in thickness without suitable reinforcement. Taper edges to leave no square shoulders at the perimeter of a cavity. Remove loose material from areas receiving shotcrete. Wet the surface until it is damp, but without visible free water. [Remove paint, oil, grease and other contaminants and apply bonding agent to provide a surface for proper bonding of the shotcrete.]

3.3 ALIGNMENT CONTROL

A. Provide alignment wires to establish thickness and plane of required surfaces.

B. Install alignment wires at corners and offsets not established by forms.

C. Tighten alignment wires true to line. Position adjustment devices to permit additional tightening.

3.4 APPLICATION

A. Ensure sufficient clearance around reinforcement to permit complete encasement.

B. Allow easy access to shotcrete surfaces for screening and finishing to permit uninterrupted application.

C. Establish, and adhere to, operating procedures for placement in close quarters, at extended distances or around unusual obstructions where placement velocities and mix consistency must be adjusted.

D. When shotcreting walls, begin the application at the bottom and work upwards. Ensure that the work does not sag.

E. Direct nozzle perpendicular to surface to ensure maximum compaction with minimum rebound.

F. Build up thickness by layers, in multiple passes of the nozzle over the work area. Follow a routing that will fill and completely encase reinforcement, using maximum layer thickness.

G. Allow each layer to take initial set before applying succeeding layers.

H. After initial set, remove excess material outside of forms and alignment lines.

I. Remove laitance that has taken final set by sandblasting. Clean with air-water jet.

J. Sound work with hammer for voids. Cut out voids and replace with new shotcrete layers.

K. Remove trapped rebound at construction and expansion joints.

L. Remove rebound material which does not fall clear of the work. Discard salvaged rebound.

M. Keep rebound and other loose or porous material out of new construction.

N. Provide troweled finish of final layer. Avoid troweling of thin sections of shotcrete unless both troweling and commencement of moisture curing take place, within a relatively short period after placement of shotcrete. Do not scrape or cut to remove high spots until the shotcrete has become stiff enough to withstand pull of the cutting device.

O. Remove and replace all shotcrete which exhibits sags or sloughs, segregation, honeycombing, sand pockets or other obvious defects. Repair defective areas in accordance with the provisions of paragraph 3.02.E of this Section.

P. Keep completed surfaces wet for a minimum of seven days. Immediately after placement, protect shotcrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

Q. Protect shotcrete repair work from frost action or heavy water flow.

3.5 FIELD QUALITY CONTROL

A. Inspection and Testing will be performed under provisions of Division 01.

B. Testing Laboratory will:
1. Test and inspect materials as required to ensure compliance with specifications.
2. Collect and review tickets for each batch of shotcrete delivered. Annotate water added subsequent to batching.
3. Observe placement of preconstruction test panels. Take six cores from each panel; three with reinforcement and three non-reinforced. Visually inspect and grade in accordance with "Quality Assurance" article. Test non-reinforced cores for compressive strength at 7 days.
4. Special Inspect shotcrete placement, as required by **[CBC Section 1910, IBC]**, for conformance with the Contract Documents.
5. Take 3-inch (75 mm) core specimens from field test panels and test for compressive strength in accordance with CBC 1924.10.
6. Take 3-inch (75 mm) core specimens from in place work to examine for structural soundness in accordance with **[CBC Section 1910, IBC]**.

C. The Subcontractor shall:
1. Gun field test panels for strength testing in accordance with **[CBC Section 1910, IBC]**. Panels shall be a minimum of 18 inches square.
2. Patch areas cored for testing.
3. Pay Testing Laboratory for investigating of low-strength compressive test results in accordance with **[CBC Section 1910, IBC]**.

END OF SECTION 03371

SECTION 04200
UNIT MASONRY

PART I - GENERAL

1.01 SCOPE:

A. Provide all concrete masonry work and face brick work complete.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS:

A. Furnishing of anchors attached or anchored to masonry; Section 03310.

B. Furnishing of materials for bar reinforcement; Section 03310.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Provide material and work complying with referenced codes, regulations and standards.

B. Construction Tolerances:

1. Variation from Plumb: For vertical lines and surfaces of columns walls and arise do not exceed 1/4" in 10' or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines do not exceed 1/4" in any story of 20' maximum, nor 1/2" in 40' or more.

2. Variation form Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 3/4" in 40' or more.

3. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20' maxim, nor 3/4" in 40' or more.

4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

1.04 SUBMITTALS: Comply with Section 01300.

A. Certification: Submit certification that each type of unit complies with specified requirements. Submit design mix of all grouts and mortals.

B. Samples: Submit samples of each color and texture of masonry including CMU and face brick.

1.05 JOB CONDITIONS:

A. Protect masonry materials during storage and construction from wetting by rain, snow or ground water, and from soilage or intermixture with earth or other materials. Do not use metal reinforcing or ties having loose rust or other coatings, including ice, which will reduce or destroy bond. Do not lay masonry units which are wet or frozen.

B. During erection, cover top of wall with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

D. Prevent grout or mortar form staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with masonry. Protect sills, ledges and projections from droppings of mortar.

E. Do not lay masonry when the temperature of outside air is below 40 degrees F, unless means are provided to heat and maintain the temperature of the masonry materials and protect the completed work from freezing. Protection shall consist of heating and maintaining the temperature of the masonry materials to at least 40 degrees F, and maintaining an air temperature above 40 degrees F on both sides of the masonry for at least 48 hours.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS: Provide units meeting the following requirements.

A. Provide lightweight units, using aggregate complying with ASTM C331, producing dry net unit weight of not more than 105 lbs. per cu. ft.

B. Hollow Load - Bearing Units: ASTM C90, Grade N, Type I, sizes as indicated.

C. Face Finishes:

1. Standard light weight units.

D. Curing: Cure units in a moisture - controlled atmosphere or in an autoclave at normal pressure and temperature to comply with ASTM C90 Type I requirements.

2.01 BRICK:

A. Size: Unless otherwise indicated, provide bricks manufactured to the following actual dimensions:

1. Standard Modular: 2-1/4" X 3-3/8" X 7-5/8".

B. For sills, caps and similar application resulting in exposure of brick surfaces which otherwise would be concealed from view, provide unscored or unfrogged units with all exposed surfaces finished. No cut surfaces exposed to view allowed.

C. Facing Brick: ASTM C 216 and as follows:

1. Grade SW.

2. Type FBS (Normal size and color variations).

3. Application: Use where brick is exposed, unless otherwise indicated.

2.02 MORTAR AND GROUT MATERIALS:

A. Portland Cement: ASTM C150 Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

B. Hydrated Lime: ASTM C207, Type S. An acceptable alternate to Hydrated lime is "Easy Spread" mortar plasticizer manufactured by American Colloid Company.

C. Aggregate for Mortar: Sand, conforming to ASTM C144 or ASTM C404, Size No. 2.

D. Aggregate for Grout: ASTM C404, Size No. 8 or Size No. 89.

E. Water: Clean, potable.

F. Integral waterproofing (mortar at exterior veneer): Aqua Stop Plus, Acme Shield, Sonneborn "Hydrocide Powder" or approved equal.

2.05 MASONRY ACCESSORIES: Hohmann and Barnard, Dur-O-Wal ,AA Wire Products and National or approved equal.

A. Continuous Masonry Wire Reinforcing:

1. Provide welded wire units prefabricated in straight lengths of not less than 10' with matching corner and tee units. Fabricated from cold-drawn steel wire complying with ASTM A82, with deformed continuous side rods and plain cross rods, and a unit width of 1 -1/2" to 2" less than thickness of wall or partition. Provide manufacturer's standard mill galvanized finish.

2. Use truss type fabricated with single pair of 9 gage side rods, and 9 gage continuous diagonal cross rods spaced not more than 16" o.c.

B. Wall Ties and Anchors:

1. At Concrete Foundations: 1" wide x 1" deep x ¾" throat, 24 gage mill galvanized dovetail anchor slot, and dovetail triangle with ¼" wire tie and 12 gage mill galvanized dovetail.
2. At Metal Framing" Hohmann and Bernard DW-10X (except DW-10 at interior walls), mill galvanized, 12 gage, with vee tie, mill galvanized, ¼" diameter. Attach anchors to metal framing with #10 self-tapping corrosion-resistant screws.
3. At Steel: 9" long x ¾" wide, 12gage, flat continuous adjustable weld-on anchor, mill galvanized, and 3/16" gage square nosed beam tie, mill galvanized.

4. At Intersecting Walls: ½" x ½" mesh, 16 gage hot-dipped galvanized wire mesh tie.

2.06 MORTAR AND GROUT MIXTURES:

A. Mortar Mix: ASTM C270, Type S.

B. Grout Mix: ASTM C476.

C. Measure and batch materials either by volume or weight, such that required proportions can be accurately controlled and maintained. Measurements of sand exclusively by shovel will not be permitted. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of mortar. Mix ingredients for a minimum of 5 minutes in mechanical mixer. Do not use mortar or grout which has begun to dry, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2 - 1/2 hour period as required to restore workability. Do not add air-entraining agents or other admixtures to mortar or grout materials.

2.07 CONCEALED THRU - WALL FLASHING: Provide Nervastral HD, 20 mil thick elastic sheet or equal.

2.08 CONTROL JOINT MATERIAL: Specified and furnished in Section 7900, installed under this section.

2.09 WATER REPELLENT COATINGS: All exposed exterior masonry work to have water repelling sealer applied. See appropriate section is this project manual damp proofing.

2.10 WEEPHOLES: 3/8" diameter cotton sash cord or fibrous glass rope, length to produce 2"exposure on exterior and 12" in cavity; medium density polyethylene tubing 3/8" x 4" long may also be used.

PART 3 - EXECUTION

3.01 INSPECTION: Examine the areas and conditions under which masonry is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION: CMU - Do not wet concrete masonry units.

3.03 INSTALLATION:

A. Thickness: Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.

B. Build chases and recesses as indicated or required for the work of other trades. Provide not less than 8" of masonry between chases or recess and jamb openings, and between adjacent chases and recesses.

C. Leave opening for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

D. Cut masonry units using motor - driven saws to provide clean, sharp, unchipped edges. Cut units as required to fit adjoining work neatly. Use full - size units without cutting wherever possible.

3.04 LAYING MASONRY WALLS:

A. Lay walls plumb and true to comply with specified tolerances, with courses level, accurately spaced and coordinated with other work.

B. Weep holes: Open head joints. Weep holes to be located at 48" o.c. maximum.

C. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers. Columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with grout. Lay CMU in running bond with vertical joint in each course centered on units above and below. Provide weep holes in exterior walls immediately above ledges and flashing spaced 2' o.c., unless otherwise indicated.

D. Do not tooth corners.

E. Build - in items specified under this and other sections of this specification. Fill in solidly with masonry around built - in items. Fill space between hollow metal frames and masonry solidly with mortar.

F Locate vertical bar reinforcement of the size and in location indicated. Solidly fill all cells containing reinforcement with grout in one lift not exceeding 8 feet. When grouting is stopped for one hour or more, form horizontal construction joints by stopping placement of grouting 1 - 1/2" below top of uppermost units.

G. Joints: Lay walls with 3/8" joints. Use as dry a mortar mix as practical and compress points as much as possible to produce a dense tight joint.

1. Concealed Joints: Strike flush

2. Exposed CMU Joints: Typical joints in standard block to be tooled concrete. Joints in center scored block to have raked joint to match appearance of scoring in CMU. Joints in brick work to be tooled concave joint.

H. Control Joints: Provide 3/8" wide (to match typed joint size) joints in CMU walls for movement as shown on the drawings or if not shown at 20' o.c.

3.05 HORIZONTAL JOINT REINFORCING:

A. Reinforce walls with continuous horizontal reinforcing. Fully embed longitudinal side rods in mortar for their entire length. Lap reinforcement a minimum of 6" at end of units. Do not bridge control joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcing as directed by the manufacturer for special conditions. Space reinforcing 16" o.c. vertically, unless otherwise indicated.

B. Reinforce masonry openings greater than 12" wide with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above the lintel and below the sill. Extend reinforcing a minimum of 2' beyond jambs of the opening bridging control joints where provided.

3.06 REINFORCED MASONRY LINTEL

A. Lentel constructed of standard 8" wide CMU bond beams units.

1. 0'-0" span to be 8" deep with #4 rebars.

2. 4'-0" span to be 8" deep with #5 rebars.

3. 6'-8" span to be 10" deep with #5 rebars top and bottom.

3.07 REPAIR, POINTING AND CLEANING:

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout pointed to eliminate evidence of placement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point - up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

C. Clean exposed CMU masonry by dry brushing at end of each day's work and after final pointing to remove mortar spots and drippings.

END OF SECTION

SECTION 04852
NATURAL THIN VENEER STONE & FACE BRICK

PART I - GENERAL

1.01 SCOPE:

A. Section includes: Thin cut veneer masonry construction of natural stone & simulated brick set in cement mortar with a CMU substrate.

B. Refer to Section 1300 for Submittals and Substitutions.

1.02 REFERENCES:

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM C97 Standard Test Methods Sampling and Testing Brick and Structural Clay Tile.

2. ASTM C91 Standard Specification for Masonry Cement.

3. ASTM C150 Standard Specification for Portland Cement.

4. ASTM C170 Standard specification for compressive strength of dimension stone.

5. ASTM C192 Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.

6. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes.

7. ASTM C270 Standard Specification for Mortar and Unit Masonry.

8. ASTM C568 Standard Specification for Lime Stone dimension stone.

9. ASTM C530 Building code for masonry structures.

C. Underwriters Laboratories, Inc. (UL):

1. UL 723 Standard for Safety for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

A. General: Submit listed submittals with Conditions of the Contract and Division 1 Submittals Procedures Section.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.

D. Samples: Submit selection and verification samples for finishes, colors, and textures.

E. Quality Assurance Submittals: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificated: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

3. Manufacturer's Instructions: Manufacturer's installation instructions.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finished and performance.

2. Warranty: Warranty documents specified herein.

1.04 QUALITY ASSURANCE:

A. Qualifications

1. Installer Qualifications: Installer experienced for a minimum of 5 years in performing work of this section that has specialized in installation of work similar to that required for this project.

2. Stone to be single source that specializes in quarrying and processing stone with five years of experience.

B. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

1.05 DELIVERY, STORAGE AND HANDLING:

A. General: Comply with Division 1 Product Requirements Sections.

B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store mortar and other moisture-sensitive materials in protected enclosures; handle by methods that avoid exposure to moisture.

1.06 PROJECT CONDITIONS

A. Environmental Requirements/ Conditions: Ambient air temperature shall be in accordance with manufacturer's requirements.

1. Maintain materials and surrounding air temperature to minimum 40 degrees F (4 degrees C) prior to, during and for 48 hours after completion of work.

2. Protect materials from rain, moisture, and freezing temperatures prior to, during and 48 hours after completion of work.

3. Allow no construction activity on opposite side of wall during installation and for 48 hours after completion of work.

1.07 WARRANTY:

A. Project Warranty: Refer to Condition of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.01 THIN STONE VENEER

A. Manufacturer: Specified stone by Cooperstone of Jarrell, Texas , or equal. Brick to be standard nominal size face brick that will be painted.

B. Proprietary Product/System: Cooperstone Ledgestone in Brazos material, or equal. Final material and color to be chosen by architect.

1. Sizes and Shapes of stone: Provide random sizes, shapes and textures of finished product of 1" – 4" in lengths of 10" – 18" in thickness of .75" – 1.25" in heights. Brick to be standard nominal sized face brick.

2.02 RELATED MATERIALS:

A. Mortar:

1. Portland Cement, ASTM C150, Type I or masonry cement (Type N), ASTM C91.

2. Masonry cement, ASTM c91, Type 5.

3. Lime: ASTM C207.

4. Water: clean & potable

B. Masonry Sealer

C. Metal Lath: Minimum 18 gauge galvanized woven wire mesh.

2.03 MORTAR MIXES

A. Mixes: Mix propriety materials in accordance with manufacturer's instructions, including product data and product technical bulletins. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270, Type N. Do not use antifreeze compounds to lower the freezing point of mortar.

2.04 SOURCE QUALITY:

A. Source Quality: Obtain materials form a single manufacturer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Surface Preparation:

1. Concrete sheathing with moisture proof barrier with 4" laps.

2. Install lath in accordance with ASTM C1063. Attach with galvanized nails at 6" o.c. vertically 16" o.c. horizontal.

3.04 STONE VENEER INSTALLATION:

A. Install thin stone veneer in accordance with AC1530.

B. Maintain masonry covering to uniform dimension with uniform vertical and horizontal joints.

C. Pattern: lay stone with split face exposed taking care to avoid some mortar out around the stone's edges. Apply pressure to the stone to ensure a good bond. Ensure complete coverage between the mortar bed and back surface of the stone.

3.05 BRICK VENEER INSTALLATION:

A. Lay brick walls in straight and PLUMB veneer following guidelines of accepted standards. Utilize standard and even joints standard reinforcing and tool joints to acceptable appearance.

3.06 CLEANING:

A. Cleaning: remove temporary coverings and protection of adjacent work areas. Remove construction debris from project site and legally dispose of debris.

1. Keep the face of the stone as free of mortar as possible. Remove any mortar on the face of stone with brush and sponge.

2. Do not use metal brushes or acids in cleaning.

END OF SECTION

SECTION 05500
MISCELLANEOUS METAL WORK

PART 1 GENERAL

1.01 SCOPE: Provide miscellaneous metal work, complete, including:

A. Steel supports for work of other trades.

B. Furnish miscellaneous metal steel attachments, anchors, plates, angles.

C. Include all anchors, angles, bolts, expansion shields for items in this section, and other accessories shown in details and or required for the complete installation of all work.

PART 2 PRODUCTS

2.01 MATERIALS:

A. Miscellaneous Steel Bars, Rods and Shapes: ASTM A 36, A283, A 108,A 663, A 501, and A 575 as applicable.

B. Bolts and Nuts: ASTM A 307, grade A. High strength bolts; ASTM A 325. Hot-dip galvanized all items in accordance with ASTM A 153.

C. Expansion Bolts; Hilti "Kwik bolt".

D. Expansion Shields: F.S. FF-S-325.

E. Anchor Bolts: Furnish and deliver to site, anchor bolts and other items to be embedded in concrete. Provide necessary shop details and diagrams for concrete forms and, accurate locations and setting of anchor bolts.

F. Toggle Bolts: tumble-wing type F.S. FF-b-588 type, class and style as required.

G. Lock Washers: F.S. FF-W-84, helical spring type carbon steel.

H. Miscellaneous Items: Furnish bent or otherwise custom fabricated bolts, plates, Z-clip at studs, anchors, hangers, dowels and other miscellaneous steel shapes as required for framing and supporting wood work and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Section 06100.

2.02 STEEL PIPE RAILINGS AND HANDRAILS:

A. Fabricate steel pipe supports handrails and cable rails to design, dimensions, and details indicated. Provide railing handrail members formed of pipe of sizes and wall thickness indicated.

B. Interconnect railing and handrail members by butt-welding or welding with Internal connectors, at fabricator's option, unless otherwise indicated.

C. At tee and cross intersections provide coped joints.

D. Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's expense.

E. All cabling, connections, turnbuckles and take-ups to be as manufactured by Cablerail.

F. Brackets, Flanges, Fittings and Anchors: provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and hand rails to the work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

G. For railing posts set in concrete, provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less than 1/2" greater than the outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve and width and length not less than 1" greater than outside diameter of sleeve.

H. Galvanize exterior steel railings, including pipe, fittings, brackets, fasteners and other ferrous components.

2.03 SHOP PAINT FOR FERROUS METAL: Fast curing, lead free, abrasion resistant, rust inhibitive primer selected for compatibility with substrates and with types of alkyd-type finish paint systems specified, complying with performance requirements of F.S. TT-P-86, types I, II and III.

2.04 FABRICATION:

A. Workmanship: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product, Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

B. Form exposed work true to line and level with accurate angles and surface and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed weld smooth and flush to match and blend with adjoining surfaces.

D. From exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Philips flat-head (countersunk) screws or bolts. Provide for anchorage of type shown, Coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use. Cut reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

2.05 SHOP PAINTING:

A. Shop paint miscellaneous metal work, except concealed metal work, members or portion of members to be embedded in concrete, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.

B. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 or SSPC SP-3.

C. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.

D. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joint, corners, edges, and exposed surfaces.

PART 3 EXECUTION

3.01 PREPARATION: Furnish setting drawings, diagrams, templates, instructions and directions for installation of anchorage. Coordinate delivery of such items to site.

3.02 INSTALLATION: Perform cutting, drilling and fitting required for installation; set work accurately in location, alignment and elevation, measured from established lines and levels. Provided anchorage devices and fasteners where necessary for installation to other work.

3.03 TOUCH-UP SHOP PAINTING: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Use galvanizing repair paint on damaged galvanized surfaces.

END OF SECTION 05500

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 Scope: Provide all rough carpentry, and installation of items specified in other sections which are installed by the carpenters. In general, this work includes the following:

A. Concealed framing studs, etc.

B. All braces, stripping, cants, grounds, and nailers indicated or necessary to install all work, including architectural woodwork, toilet room accessories, medical equipment, fire extinguisher wall bracket, and to receive or back of other trades.

1.02 Quality Assurance:

A. Grading Marks: Factory-mark each piece of lumber and plywood with type grade, mill and grading agency identification; and submit mil certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.

B. Wood Preservative Treatment: Label each piece of pressure treated lumber and plywood with the Quality Control mark of the American Wood Preserver Bureau showing compliance with the appropriate.

1.03 Product Handling: Keep carpentry materials dry during delivery, storage and handling. Store lumber and plywood in stacks for air circulation within stacks. Protect bottom of stacks against contact with damp surface. Protect bottom of stacks against contact with damp surface. Protect exposed materials against weather. Do not store dressed or treated lumber or plywood outdoors.

PART 2 - PRODUCTS

2.01 Softwood: Comply with the standards of WCLIB, "Standard Grading Rules for West Coast Lumber", for Douglas fir, and SPIB "Standard Grading, Rules for Southern Pine Lumber", for Southern Pine. For light framing and studs 2" - 4" wide, use SAS Douglas fir or Southern pine; construction grade or stud grade. For wood deck comply with the standards of WWPA "Standard Grading Rules". All blocking, etc. to be fire treated.

2.02 Rough Hardware: Nails, metal connectors, bolts, screws, and other fasteners (except as specified or noted otherwise); hot-dip galvanized steel.

2.03 Wood Preservative Treatments: Pressure treat with water-borne preservatives complying with AWPB -LP-2 all concealed wood (including lumber, grounds, nailers, blocking, backing, rough framing) in a closed cylinder using the vacuum-pressure process to a net dry retention of .35 lbs. per cu. ft. Dry to maximum moisture content of 19% after treatment. Brush two coats of same preservative used in treatment, to end cuts, holes, notches, splits, etc. Dry all lumber.

2.04 Fire Retardant Treatment: All concealed lumber, and other material to be fire treated to have Fire Retardant Treatment, pressure impregnated, and complying with AWPA C20 and C27. Identify all fire treated lumber with appropriate classification marking of Underwriter's Laboratories, Inc. or inspecting agency acceptable to authorities having jurisdiction.

2.05 Gypsum Sheathing: sheathing board complying with FS-1-30, Class 2, Grade "W" (Water-resistant treated core). Provide 1/2" x 4' x 8' panels with square edges.

PART 3 - EXECUTION

3.01 Workmanship: Erect all work accurately to required lines, level, plumb, to true planes, and rigidly secured.

3.02 Rough Carpentry: provide wood grounds, strips, backing and blocking of thickness and shape required to secure work and equipment in place, as indicated on the drawings or required by conditions. Fasten wood grounds, furring and other engaging woodwork to various types of walls with approved types and sizes of nails, ties, and inserts spaced to provide rigid secure supports.

3.03 Rough Hardware: Provide all rough hardware necessary or required for installation of the work specified. Use sufficient size and number of spikes, nails, screws, bolts, etc. to insure rigidity, security, and permanence.

3.04 Installation of Items Specified in Other Sections:

A. Specialties: Install all metal and specialty items (including those specified in Division 10) as indicated on the drawings and/or as recommended by the manufacturer's printed instruction, subject to modification on the job at the Architect's direction.

3.06 Clean-Up: Remove from the premises all rubbish, debris, and unused materials which may be accumulated during the progress of the work.

END OF SECTION 06100

SECTION 06192
SOLID UNIFORM DIAMETER POLES

PART 1- GENERAL

1.01 SCOPE: Provide prefabricated wood trusses, complete.

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS: Roof Decking, Section 06100 and LEED Requirements section 01354 for certified wood.

1.03 QUALITY ASSURANCE:

A. AWPA Standards: Comply with uses for CCA and ACQ treated wood.

1.04 SUBMITTALS:

A. Product Data: Submit fabricator's technical data covering lumber, metal plates, hardware, fabrication process, treatment, handling and erection.

B. Certification: Submit certificate, signed by an engineer licensed in Arkansas, indicating that poles to be supplied for project comply with indicated requirements.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Handle and store trusses with care, and in accordance with manufacturer's instructions and recommendations to avoid damage from bending, overturning or other cause for which poles are not designed to resist or endure.

B. Time delivery and erection of poles to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of poles.

PART 2- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Solid form diameter poles to be as manufactured by America pole and Timber or equal:

2.02 MATERIALS:

A. Poles:

1. Factory mark each piece of lumber with type, grade, mill and grading agency.

2. Nominal sizes to be 6" diameter (non-tapered).

3. Lumber Species: Douglas Fir, Hem-Fir, Western Larch graded by WWPA or WCLIB; or Southern Pine, graded by SPIB at fabricator's option.

2.03 WOOD TREATMENT:

A. Treated wood to be pressure treated to .60 ACQ or .60 CCA for freshwater, ground contact and extreme conditions.

PART 3 – EXECUTION

3.01 Poles to be cut, set, connected as recommended by the manufacturer.
3.02 All members to be set plum and level (except as noted) and connections to be as recommended by manufacturer w/ aesthetic connection after installation.

END OF SECTION

SECTION 07600
FLASHING AND SHEET METAL

PART 1- GENERAL

1.01 SCOPE: Provide all sheet metal work, complete, including flashing and counter-flashing (except metal drip edge in conjunction with roofing).

1.02 RELATED WORK SPECIFIED IN OTHER SECTIONS: Sealants: Section 07900.

1.03 SUBMITTALS: Comply with Section 01300.

A. Shop Drawings: Prior to fabrications, submit shop drawings for each typical sheet metal item indicating materials, gages, jointing and fastening.

1.04 JOB CONDITIONS: Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

PART 2- PRODUCTS

2.01 MATERIALS:

A. Steel Sheets: ASTM A 526, 24 gage steel sheets, hot-dip galvanized in compliance with ASTM A 525, mill phosphatized.

B. Nails, Screws and Rivets: Same metal as flashing/ sheet metal or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with materials being fastened.

C. Solder: ASTM B32, 50% tin and 50% lead, used with rosin flux.

D. Roofing Cement: F.S. SS-C-153, Type I, Class A (summer grade) or Class B (winter grade) as applicable.

E. Bitumastic Coating: F.S. TT-C-494, MIL-C-18480, or SSPC- Paint 12, cold applied solvent type bitumastic coating for application in dry film thickness of 15 mils per coat.

F. Metal Accessories: Sheet metal clips, cleats, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

G. Sealants: As specified in Section 07900.

H. Thru-Wall Flashing over lintels, beams, at sills, window head weeps, bed joints with weeps, and elsewhere as shown on drawings shall be 20 mil PVC, “Wascoseal Type 20” as manufactured by York Flashing, or Nervastral “Seal-Pruf 300”.

2.02 FABRICATION:

A. Fabricate metal flashings, counter flashings, trim and similar items to comply with the profiles and sizes indicated.

B. Fabricate to comply with SMACNA “Architectural Sheet Metal Manual”, metal manufacturer’s recommendations and recognized industry practices.

C. Fabricate waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams and solder.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant (concealed within joints).

F. Separate dissimilar metals from each other by painting each metal surface in are of contact with a heavy application of bitumastic coating, or by other permanent separation as recommended by manufacturers of dissimilar metals.

PART 3- EXECUTION

3.01 INSPECTION: Examine substrates and conditions under which metal flashing and trim will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

A. SMACNA Details: Except otherwise indicated or specified, comply with applicable recommendations and details of "Architectural Sheet Metal Manual" by SMACNA.

B. Manufacturer's Recommendations: Except as otherwise indicated or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.

C. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

D. Retainers: Where shown, provide saw cuts for securing edges of flashings to other work. Insert flashings into saw cuts and seal. Where required, provide wedges of lead or other compatible metal, spaced 2' o.c., and drive well into saw cut so as to be completely covered by sealant.

E. Roofing Cement Edges: Where indicated or required, bed flanges and seal edges of metal flashings to substrates with roofing cement; install bed or bead cement in manner which will maintain a watertight seal.

3.03 CLEAN UP: After completion of work, clean roofing cement, sealant and bituminous paint from flashing, floors and all surfaces so defaced. Removal all excess materials and scraps from the job and leave all surfaces neat and clean.

END OF SECTION 07600

SECTION 07900
JOINTS SEALANTS

PART 1 - GENERAL

1.01 Scope: Completely close with calking compound or sealant at all joints, including joints around frames of doors, windows, or other openings in exterior walls, flooring joints, joints at penetrations of walls, decks, and floors by piping and other services and equipment, joints between items of equipment and other construction. Re-calk all control joints between concrete wall panels and other joints indicated or specified to be calked or sealed.

1.02 Related Work specified in Other Sections:

A. N/A

1.03 QUALITY ASSURANCE: Obtain elastomeric materials only from manufacturer who will, if required, send a qualified technical representative to project site, for the purpose of advising the Installer or proper procedures and precautions for the use of the material.

1.04 SUBMITTALS: Comply with Section 01300

A. Manufacture's Data: Submit manufacturer's specifications, recommendations, and installation instructions for each type of sealant, calking compound and miscellaneous materials. Include letter of certification, or certified test laboratory reports indicating that each material complies with the requirements and is intended for the applications indicated. Transmit a copy of recommendations and instructions to the Installer.

B. Samples: Submit 1/2" long sample of each color required (except black) for each type of sealant of calking compound exposed to view. Install sample between 2 strips of material similar to or representative of typical surfaces where sealant or calking compound will be used, held apart to represent typical joint widths. Samples will be viewed for color and texture only.

1.05 Job Conditions:

A. Examine joint surfaces, backing, and anchorage of units forming sealant rabbet. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Do not proceed with installations of sealant under adverse weather conditions, or when temperatures are above or below manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength

PART 2 - PRODUCTS

2.01 Materials:

A. Acrylic Latex Calk: Tremco "Acrylic Latex Caulk" Sonneborn "Sonolac", Pecora Corp. "Ac-20", or acceptable equal.

B. Sealant: One component silicone sealant conforming to F.S. TT-S-1543, S Class A.

C. Concrete Slab Joint Sealant: Concrete slab Control Joint Sealant to be self-leveling, Sonolastic SL-1 by Sonoborn, or equal. Preparation as recommended by manufacturer for service intended.

D. The simulated rockwork shall be sealed using a crystalline concrete admixture equal to "Xypex" concrete waterproofing by Crystallization products. This simulated rockwork admixture to be used with simulated rockwork and as a coating over existing simulated rockwork for sealing.

E. Miscellaneous Materials:

1. Joint Cleaner: Type of joint cleaning compound recommended by the sealant or calking compound manufacturer for the joint surfaces to be cleaned.

2. Joint Prime/Sealer: Type recommended by the sealant manufacture for the joint surfaces to be primed or sealed.

3. Bond Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.

4. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility either sealant by the sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bond on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

PART 3 - EXECUTION

3.01 Joint Types and Usages: Caulking and sealant usage is specified below.

A. Caulking: All interior joints.

B. Sealants: At exterior vertical joints use polyurethane sealant and at horizontal pavement joints use self leveling polyurethane sealants as specified.

3.02 Joint Surface Preparation:

A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture, and other substances which would interfere with bond of sealant or caulking compound.

B. For sealants, do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating. Remove coating or treatment from joint surfaces before installing sealant.

C. Etch concrete and masonry joint surfaces to remove excess alkalinity. Etch with 5% solution, rinse thoroughly with water and allow to dry before sealant installation.

D. Roughen joint surfaces on vitreous coated and similar non-porous materials, wherever sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or wool to produce a dull sheen.

E. See manufacturer's information for preparation and application of epoxy joint sealant.

3.03 INSTALLATION:

A. Comply with sealant manufacturer's printed instructions and except where more stringent requirements are indicated or specified and except where manufacture's technical representative directs otherwise.

B. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

C. Install sealant backer rod for liquid sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

D. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

END OF SECTION

SECTION 08220
(FRP) DOORS AND
FIBERGLASS RESIN TRANSFER MOLDED DOOR FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section Includes The Following:
   1. Fiberglass Reinforced Plastic (FRP) Doors
   2. Fiberglass Resin Transfer Molded Door Frames

1.2 RELATED SECTIONS

A. Related Sections Include The Following:
   1. Division 0 – Bidding and Contract Requirements
   2. Division 1 – General Requirements
   3. Division 8 – Finish Hardware
   4. Division 8 – Glazing

1.3 QUALITY ASSURANCE

A. Reference Standards
   1. Door Properties
      a) Standard test method for steady state thermal transmission properties by means of the heat flow meter apparatus.
      b) Successfully completed 1,000,000 cycles test in accordance with:
      AAMA 920-03 – Specification for Operating Cycle Performance of Side-Hinged Exterior Door Systems. ANSI A250.4-2001 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings. NWWDA TM-7 Test Method to Determine the Physical Endurance of Wood Doors and Associated Hardware Under Accelerated Operating Conditions.
   2. Laminate Properties

      Door face plate is a minimum of 0.125 inch thick fiberglass reinforced plastic molded into one continuous sheet starting with a 25 mil resin-rich gel coat layer resin integrally molded with multiple layers of 1.5 oz. sq ft fiberglass mat and one layer of 18 oz per square yard fiberglass woven roving saturated with special resin. Door plate weight shall not be less than 0.97 lbs per square foot at a ratio of 30/70 glass resin. Laminated plate by itself evaluated in accordance with Florida Building Code TAS 201 Large Missile Impact Test as per ASTM-1996-05b, Standard Specification for Performance of Exterior Windows, Curtain Wall, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes. The missile (a 2 x 4 with a weight of 9 lbs shot from a cannon at a velocity of 50 ft/sec) did not penetrate the door face plate.
      a) ASTM D 638 Tensile Strength Properties of Plastic
      b) ASTM D 790 Flexural Strength Properties of Plastic
      c) ASTM D 2583 Indention Hardness of Plastics
      d) ASTM D 256 Izod Pendulum Impact Resistance
      e) ASTM D 792 Density/Specific Gravity of Plastics
      f) ASTM D 1761 Mechanical Properties of Fasteners
      g) ASTM E 84 Surface Burning Characteristics of Materials
      h) ASTM G 155 Xenon Light Exposure of Non Metallic Materials
      i) ASTM D 635 Method for Rate of Burning
      j) ASTM D 2843 Smoke Density
      K) ASTM D 1929 SELF IGNITION TEMPERATURE PROPERTIES
      L) SFBC PA 201 IMPACT PROCEDURES FOR LARGE MISSILE I

3. Core Properties
    a) ASTM C 177 Thermal Properties of Materials
    b) ASTM D 1622 Density and Specific Gravity
    c) ASTM E 84 Surface Burning Characteristics of Materials
    d) WDMA TM-10 and TM-5 Firestop ASTM E 152 U.L 10(b)
    e) ASTM E90-04- Sound Transmission Loss
    f) ASTM E413-04- Classification for Rating Sound Insulation ASTM E1332-90- Standard Classification for Determination of Outdoor-Indoor Transmission Class
    g) ASTM E2235-04- STANDARD TEST FOR DETERMINATION OF DECAY RATES FOR USE IN SOUND INSULATION METHODS

B. Qualifications
    1. Manufacturer Qualifications: A company specialized in the manufacture of fiberglass reinforced plastic (FRP) doors and frames as specified herein with a minimum of 30 years documented experience and with a record of successful in-service performance for the applications as required for this project.
    2. Installer Qualifications: An experienced installer who has completed fiberglass door and frame installations similar in material, design, and extent to those indicated and whose work has resulted in construction with a record of successful in-service performance.
    3. Source limitations: Obtain fiberglass reinforced plastic doors and resin transfer molded fiberglass frames through one source fabricated from a single manufacturer, including fire rated fiberglass frames. This ensures complete uniformity of physical properties and consistency in the resin chemistry tailored for this application.
    4. Source limitations: Hardware and accessories for all FRP doors as specified in Section 08710 shall be provided and installed by the fiberglass door and frame manufacturer.
    5. Source Limitations: Glass for windows in doors shall be furnished and installed by door and frame manufacturer in accordance with related section, Division 8, Glazing.

D. Operation and Maintenance Manual
    1. Include recommended methods and frequency for maintaining optimum condition of fiberglass doors and frames under anticipated traffic and use condition.
    2. Include one set of final as built drawings with the same requirements as mentioned in Section B above.
    3. Include certificate of warranty for door and frame listing specific door registration numbers.
    4. Include hardware data sheets and hardware manufacturer's warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Each door and frame shall be delivered individually crated for protection from damage in cardboard containers, clearly marked with project information, door location, specific reference number as shown on drawings, and shipping information. Each crate shall contain all fasteners necessary for installation as well as complete installation instructions.
    1. Doors shall be stored in the original container on edge, out of inclement weather for protection against the elements.
    2. Handle doors pursuant to the manufacturer's recommendations as posted on outside of crate.

1.6 WARRANTY

A. All fiberglass doors and frames have a lifetime guarantee against failure due to corrosion. Additionally, fiberglass doors and fiberglass frames are guaranteed for ten years against failure due to materials and workmanship, including warp, separation or delamination, and expansion of the core.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the FRP doors for this project are to be equal to Chem-Pruf Door Co., Ltd., P.O. Box 4560 Brownsville, Texas 78523 Phone: 1-800-444-6924-7943, Fax: 956-544-7943, Website: www.chem-pruf.com

B. Substitutions may be considered provided manufacturer can comply with the specifications as written herein and said products are manufactured in the United States of America. Requests for substitution must be submitted in writing no less then 10 days prior to bid date. Substitution request to include a physical sample and written documentation that product will meet the specific manufacturing methods as highlighted below.

2.2 FRP DOORS

A. Doors shall be made of fiberglass reinforced plastic (FRP) using Class 1 premium resin with no fillers that is specifically tailored to resist chemicals and contaminants typically found in environment for which these specifications are written. Doors shall be 1 ¾ inch thick and of flush construction, having no seams or cracks. For consistency in the resin chemistry tailored for this application and to maintain the same physical properties throughout the structure, all fiberglass components including face plates, stiles and rails and frames must be fabricated by the same manufacturer. Components obtained through various outside sources for plant assembly will not be accepted.

B. Door Plates shall be 0.125 inch thick minimum, molded in one continuous piece, starting with 25 mil gel coat of the color specified, integrally molded with multiple layers of 1.5 ounces per square foot fiberglass mat and one layer of 18 ounce per square yard fiberglass woven roving. Each layer shall be individually laminated with resin as mentioned above. Door plate weight shall not be less than 0.97 lbs per square foot at a ratio of 30/70 glass to resin. Plate alone to withstand Large Missile Impact per FBC TAS 201. Face plates manufactured using the pultrusion process does not allow for a smooth molded gelcoat finish, the use of woven roving for adequate plate thickness, strength and weight, or the appropriate glass to resin ratio and will not meet the quality standards of this project.

C. Stiles and Rails shall be constructed starting from the outside toward the inside, with a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat. The stile and rail shall be molded in one continuous piece to a U-shaped configuration and to the exact dimensions of the door. In this manner there will be no miter joints and disparate materials used to form the one-piece stile and rail.

D. Core material shall be Polypropylene plastic honeycomb core with a non woven polyester veil for unparalleled plate bonding, 180 PSI typical compression range unless otherwise requested.

E. Internal Reinforcement shall be #2 SPF of sufficient amount to adequately support required hardware and function of same.

F. Finish of door frame shall be identical with 25 mil resin-rich gelcoat of the specified color integrally molded in at time of manufacture resulting in a smooth gloss surface that is dense and non-porous. To achieve optimum surface characteristics, the gelcoat shall be cured within a temperature range of 120F to 170F creating an impermeable outer surface, uniform color throughout, and a permanent homogeneous bond with the resin/fiberglass substrate beneath. Only the highest quality gelcoat will be used to ensure enduring color and physical properties. Paint and/or post application of gelcoat results in poor mechanical fusion and will be deemed unacceptable for this application. The finish of the door and frame must be field repairable without compromising the integrity of the original uniform composite structure, function or physical strength.

G. Window openings shall be provided for at time of manufacture and shall be completely sealed so that the interior of the door is not exposed to the environment. Fiberglass retainers, which hold the glazing in place, shall be resin transfer molded with a profile that drains away from glazing. The window retainer must match the color and finish of the door plates with 25 mil of resin-rich gelcoat integrally molded in at time of manufacture. Mechanical fasteners shall not be used to attach retainers. Glass, as specified herein, shall be furnished and installed by door and frame manufacturer. In order to maintain uniform appearance, product longevity and the corrosion resistance this application requires, window retainers fabricated from Metal, PVC or Vinyl will not be accepted.

2.3 FRP FRAMES

A. Frames (rated and non-rated) shall be fiberglass and manufactured using the resin transfer method creating one solid piece (no voids) with complete uniformity in color and size. Beginning with a minimum 25 mil gelcoat layer molded in and a minimum of two layers of continuous strand fiberglass mat saturated with resin, the frame will be of one-piece construction with molded stop. All frame profiles shall have a core material of 2 psf polyurethane foam. Metal frames or pultruded fiberglass frames will not be accepted.
B. Finish of frame shall be identical to the door with 25 mil resin-rich gelcoat of the specified color integrally molded in at time of manufacture. To achieve optimum surface characteristics, the gelcoat shall be cured within a temperature range of 120F to 170F creating an impermeable outer surface, uniform color throughout, and a permanent homogeneous bond with the resin/fiberglass substrate beneath. Only the highest quality gelcoat will be used to ensure enduring color and physical properties. Paint and/or post application of gelcoat result in poor mechanical fusion and will be deemed unacceptable for this application. The finish of the door and frame must be field repairable without compromising the integrity of the original uniform composite structure, function or physical strength.
C. Jamb/Header connection shall be mitered for tight fit.
D. Internal Reinforcement shall be continuous within the structure to allow for mounting of specified hardware. Reinforcing material shall be a dense matrix of cloth glass fibers and premium resin with a minimum hinge screw holding value of 1000 lbs per screw. All reinforcing materials shall be completely encapsulated. Documented strength of frame screw holding value after third insert must be submitted. Dissimilar materials, such as steel, will be deemed unacceptable as reinforcement for hardware attachment.
E. Mortises for hardware shall be accurately machined by CNC to hold dimensions to +/- 0.010 inch in all three axis.
F. Hinge pockets shall be accurately machined by CNC to facilitate heavy duty hinges at all hinge locations, using shims when standard weight hinges are used.

2.4 HARDWARE

A. See Section 08710
B. The special nature of this material requires that all related hardware as specified must be furnished and installed by the door frame manufacturer to maintain product quality and function as well as to ensure sufficient support/reinforcement, precision tooling and proper sealing methods are provided.

PART 3 – EXECUTION

3.1 INSTALLATION CONDITIONS

A. Verification of Conditions
    1. Verify openings are correctly prepared to receive doors and frames.
    2. Verify openings are correct size and depth in accordance with submittal drawings.
B. Installer's Examination
    1. Door installer shall examine conditions under which construction activities of this section are to be performed and submit a written report to general contractor if conditions are unacceptable.
    2. General Contractor shall submit two copies of the installer's report to the architect within 24 hours of receipt.
    3. Installer shall not proceed with installation until all unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Doors shall be delivered at job site individually crated. Each crate to be clearly marked with the specific opening information for quick and easy identification.
B. All single doors to be shipped completely assembled in the frame with hardware installed. Double doors to be prehung at the factory to ensure a proper fit and that hardware functions properly, then disassembled for shipping purposes.

C. Install door opening assemblies in accordance with shop drawings and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.
D. Field alteration of doors or frames to accommodate field conditions is strictly prohibited.
E. Site tolerances: Maintain plumb and level tolerance specified in manufacturer's printed installation instructions.
F. Fire labeled doors, frames and any associated hardware must be installed by qualified professional installers in strict accordance with manufacturer's instructions and the latest revision of NFPA 80.

3.3 ADJUSTING

A. Adjust doors in accordance with the door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.
B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instruction.

3.4 CLEANING

A. Clean surfaces of door opening assemblies and exposed door hardware in accordance with respective manufacturer's maintenance instructions.

3.5 PROTECTION OF INSTALLED PRODUCTS

A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

End of Section

SECTION 08710
FINISH HARDWARE

PART 1 GENERAL

1.01 CONDITIONS:

A. The General Conditions, Supplementary General Conditions, and all other Contract Documents are a part of this division of the Specifications and all provisions contained in them are as binding as though incorporated Submission of proposal implies that the Bidder is fully familiar with all requirements of said documents.

1.02 SCOPE:

A. The finish hardware supplier shall furnish all necessary items for completion of this project, as specified in Paragraph 3.05, Hardware Sets, or as necessary to complete this building excepting the items specifically excluded.

B. New hardware required to match existing and to be keyed and function properly with reused hardware and locks.

1.03 WORK NOT INCLUDED:

A. Window Hardware

B. Cabinet and Millwork Hardware

1.04 QUALITY ASSURANCE:

A. The hardware supplier shall submit six (6) typewritten hardware schedules to the Architect through the General Contractor for approval on any set requiring new hardware. Each schedule shall contain the door index listing or opening on the project and the hardware for said opening. Each item of hardware listed is to be clearly identified by number and finish.

B. The Architect retains his authority to approve or reject any schedule based upon his knowledge of the supplier's experience and capabilities, the general quality of the products submitted and compliance with the specifications.

C. If requested, the supplier shall provide working samples of any items he proposes to substitute. Samples will be returned to the jobsite for installation.

D. The hardware supplier shall forward template information to all related traces within ten (10) days after receipt of approved hardware schedules. Template submission shall be made in accordance with the latest standards as published by the Door and Hardware Institute.

E. The supplier shall forward wiring diagrams to all affected trades within ten (10) days after receipt of approved hardware schedule.

F. All hardware shall be installed to meet the requirements of the Americans with Disabilities Act including mounting heights and operation limitations.

1.05 DELIVERY, STORAGE AND HANDLING:

A. All items of hardware shall be clearly marked with door number, key symbol and heading number to correspond with the approved hardware schedule.

B. The General Contractor will be responsible for providing a dry, clean locked room of adequate size for storage of hardware.

1.06 GUARANTEE:

A. The hardware supplier shall guarantee that all materials furnished under this division will be free from defects and blemishes for a period of one (1) year from date of acceptance. The supplier shall repair or replace at his expense, including labor, when instructed to do so by the Architect and/or Owner any item of finish hardware which may prove to be defective within said period.

PART 2- PRODUCTS

2.01 MANUFACTURERS:

A. Product's numbers listed in the following specifications are taken from the catalogs of manufacturers listed as follows:

(TB)Triangle Bass/ Mfg. Co.
(Mc) McKinney Hinge Co.
(C) Corbin Russwin
(NG) National Guard Products.
(M) Monarch Hardware & Mfg. Co.
(P) PDQ Industries
(N) Norton Door Controls

If manufacturer is not noted, product numbers are taken from the following manufacturer's catalogs: Schlage, The Stanley Works, L.C.N. Closers, Burns Mfg. Co., Sealeze Mfg. Co., American Device Mfg. Co., H. B. Ives, Glen Johnson, Bradley Corporation.

2.02. FINISH:

A. Stainless Steel (US32B) will be provided unless otherwise noted.

B. Door closers shall be painted aluminum (BHMA689).

C. Thresholds and weather-strip shall be mill finish aluminum.

2.03 FASTENERS:

A. Where hex nut bolts are specified in Paragraph 3.05, furnished hex bolts sized to the thickness of the door.

B. Wood screws are to be threaded to the head.

C. Material of fasteners shall be ferrous or non-ferrous matching the product being applied.

D. Length of fasteners shall be sufficient to afford adequate thread engagement.

2.04 KEYING: Keys, construction and permanent cylinders are to match master keying system of the Owner.

A. All locks are to be master keyed in groups as directed the Architect. Locks are to be keyed alike in groups or keyed different as required.

B. Furnish four (4) keys per keyed alike set and two (2) keys each for all new locks.

2.05 CLOSERS: All closers and door operators to be adjustable to allow for closing speed and timing as well as opening force requirements of ADA.

PART 3-EXECUTION

3.01 INSPECTION:

A. Conditions of opening size shall be verified as to door frames being plumb and of correct tolerances to receive doors and hardware.

3.02 INSTALLATION:

A. The installer shall be competent and have knowledge of hardware.

B. Mounting heights for all hardware shall be as recommended by the Door and Hardware Institute.

C. All hardware shall be installed for easiest use for disabled persons.

3.03 HARDWARE SETS:

A. The following is a general listing of the minimum hardware requirements. Any item of hardware normally required by good practice, to meet fire rated partition requirements or as to meet state or local codes, shall be furnished even though it may not be specifically mentioned. Standard lockset and trim to match style and finish of existing hardware.

SET #1
This FRP Door and Frame will come as a single unit so hardware listed, with the exception of lock cylinders are from the door and frame manufacturer.

1 1/2 Pr. Spring Hinges	4" x 4"
1 Entry Lockset with Lever Handle	Corbin Russwin

SET #2
New hardware set in US 32B with trim to match existing.

3 Spring Hinges	4” x 4”
1 Padlock for Padlock Tab	By Owner

END OF SECTION 08710

SECTION 08800
GLAZING

PART 1 - GENERAL

1.01 Scope: Provide glass, glazing, all accessories including setting blocks, glazing tape, and glazing sealant, and labor necessary to complete glazing in this Contract.

1.02 Quality Assurance:

A. Provide glass manufactured by Dupont, PPG Industries, Libbey-Owens-Ford Co., C-E Glass division, ASG Industries, Hordis Brothers, Inc., Ford Glass Division, Falconer Glass Industries, or acceptable equal. Each piece of glazing shall bear manufacturer's label designation thickness and type.

B. Provide safety glass (tempered) complying with requirements of ANSE Z97.1 and CPSC 26 CFR 1201. Label each piece of glass indication compliance with requirements. Do not remove label prior to installation.

C. Qualification of Installers: Provide as least one person who is thoroughly trained and experienced in the skills required, who is familiar with referenced standards and the requirements of this work, who shall personally direct all glass installation specified in this section.

D. Applicable Standards: Glazing work shall conform to recommendations of the "Manual of Glazing" of the Flat Glass Marketing Association, Fed. Spec, DD-G-451c and to Safety Standard 16 CFR 1201 of the U.S. Consumer Products Safety Commission.

1.03 Submittals: Comply with Section 01300. Submit test data or certification substantiation that glass complies with specified requirements.

1.04 Protection: Protect glass surfaces and edges at all times during the construction period. Keep glass free from contamination by materials capable of staining glass.

PART 2- PRODUCTS

2.01 Glass: Conforming to Fed. Spec. DD-G-451 of the various types, classes, and forms specified. See Frame Schedule for locations.

A. Laminated Glass: Assembly to include 2 outside tempered glass layers type 1, class 1, clear quality Q3, ¼" thick heat strengthened and one Sentry Glass (By Dupont) interlayer in .060 in thickness.

2.02 Glazing Materials:

A. Glazing Sealants: Dow Corning 795 Silicone Building sealant or equal by the glass manufacturer.

B. Glazing Tape: Dap "Butyl Rubber Tape", Woodmont "Chem Tape 40" Tremco "440".

C. Setting Blocks: Neoprene or other resilient blocks of 70 to 90 Shore A durometer hardness, adhesively backed on one face only, tested for compatibility with specified glazing sealants.

D. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, tested for compatibility with specified glazing sealant.

E. Labels: Labels showing manufacture's identity, type of glass, thickness and quality are required on each piece of glass.

F. Channels holding glass to be equal to CR Lawrence CRL brushed stainless 7/8" wide X 1 ½" high u channel "GRUC5B510" or equal to 5/8" glass on 3 sides. Top to be matching channel in 7/8" width & 1/2" height.

PART 3-EXECUTION

3.01 Performance Requirements: Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

3.02 Installation: Comply with recommendations of glass manufacturers and manufacturers of sealants and other glazing materials, unless otherwise indicated or specified, including preparation of surfaces.

A. Clean channel surfaces and prime as recommended by sealant manuf.

B. Cut glass to size as required for measured opening, provide adequate edge clearance and glass bit all around. Cut prior to tempering.

C. Do not install sheets which have edge damage or face imperfections.

D. Miter-cut and bond (weld) ends of channel gaskets at corners to provide a continuous gasket.

E. Seal face gaskets at corners with liquid elastomeric sealant to close openings and prevent withdrawal of gaskets from corners.

F. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during the construction period.

3.03 Curing: Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

3.04 Cleaning: Glass surfaces shall be clean of all paint spots, putty and other defacement.

END OF SECTION

SECTION 09900
PAINTING

PART 1 - GENERAL

1.01 Scope:

A. Provide painting and finishing of all interior and exterior items and surfaces throughout the project, except as otherwise indicated. Provide field painting of hangers, exposed steel and iron work, of primed metal surfaces and exposed-to-view prefinished metal surfaces of items required to match adjacent surfaces, and equipment installed under mechanical and electrical work. Provide touch-up of damaged pre-finished items as required to match original finish. Provide painted identification of piping as required by application codes.

B. Do not paint acoustical ceilings, anodized aluminum, toilet partitions (except as noted), laminated plastic, pre-finished items except as noted above, or surfaces to receive wall covering, or other decorative coating.

1.02 Submittals: Comply with Section 01300.

A. Paint Schedule: Submit paint schedule listing each material cross-referenced to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.

B. Samples: Before any work is done, submit samples of finishes available in type and color on specified materials. Two samples of each color on proper material will be submitted after Architect's color selection.

1.03 Delivery and Storage: Deliver materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers: Provide all paints, enamels, stains, varnishes, admixtures and coatings of first line quality as manufactured by Sherwin Williams, Pratt and Lambert, Glidden, Benjamin Moore, Pittsburgh, Devoe, or acceptable equal.

2.02 Materials: See paragraph 3.05, SCHEDULE OF PAINT TREATMENT for materials. All finish coats shall contain midewcides. Grind in the factory all exterior colors and interior deep tone colors. Shop mixing is not permitted. Colors as selected by the Architect, and subject to modification on the job at the Architect's discretion.

PART 3 - EXECUTION

3.01 Inspection: Examine the areas and conditions under which painting work is to be performed. Do not proceed with the work or it will be construed as acceptance of the surfaces within any particular areas.

3.02 Surface Preparation: Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified. Remove all hardware, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide protection prior to surface preparation and painting operations. Remove, if necessary, for the

complete painting of the items and adjacent surfaces. Reinstall the removed items by workmen skilled in the trades involved, after painting is completed.

A. Cementitious and Masonry Materials: Prepare cementitious and masonry surfaces of brick, concrete block and cement plaster to be painted by removing all chalk, dust, dirt, grease, oils and roughening as required to remove glaze. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint.

B Wood: Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scraper, mineral spirits, and sandpaper, as required. Sandpaper smooth those surfaces exposed to view, and dust off. Prime, stain, or seal wood required to be job painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, etc. Scrape and clean small, dry seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before application of the priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

C. Ferrous Metals: Touch-up shop-applied prime coats which have damaged or bare areas. Wire-brush, solvent clean, and touch up with the same primer as the shop coat.

E. Galvanized Surfaces: Clean free of oil and surface contaminates with an acceptable non-petroleum based solvent.

3.03 Application:

A. Apply paint to brush, roller, spray, or other acceptable practice in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the manufacturer for material and texture required.

B. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completed dried. Sand between each enamel or varnish coat application with fine sand paper, or but surfaces with pumice stone where required to produce an even smooth surface in accordance with the coating manufacturer's directions.

C. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film, is of uniform finish, color and appearance.

D. Give special attention to insure that all surfaces, including edges, corners, crevices welds, and exposed fasteners receive a film thickness equivalent of that of flat surfaces.

3.04 Clean-Up Thoroughly clean all spots, smears, spills, etc., remove from the site all discarded paint materials, rubbish cans and rags at the end of each work day.

3.05 Schedule of Paint Treatments:

TREATMENT NO.	LOCATION	COATS	MATERIALS
1	Ext. & Int. Ferrous	2	Shop Priming specified under the respective metal section 1st Coat: Rustprimer 2nd/3rd Alkyd semi-gloss paint.
2	Ext. & Int. Galvanized Metal	2	Shop priming is under the respective metal section. Pretreatment: Chemical wash. 1st Coat:Galvanized iron primer. 2nd Coat:Ext. Alkyd semi-gloss paint.
3	Other metal surfaces	2	Clean and prime abraded spots as, specified in metal sections
4	Ext. plywood & wood (ptd)	3	1st Coat: Wall and wood primer. 2nd/3rd Coats: Semi-Gloss alkyd enamel.
5	Clear Concrete/CMU Sealer	2	1st/2nd Coats: Concrete and Masonry Sealer by Thoro

END OF SECTION 09900

SECTION 13312
TENSION SHADE STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental conditions and Division -1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK

A. Extent type and shape of tensioned fabric shade structure is shown on the drawings. The shade structure is to be provided complete with fabric and all clips, hooks, and eye bolts installed for easy deployment and removal of fabric shade when required.

1.03 QUALITY ASSURANCE

A. Provide fabric shade fabric and connectors as complete units controlled by a single source including all necessary erection accessories, pulleys, winches, fittings, clips and fastenings. Primary side cable supporting fabric shade is by Owner, while any cable attached to the shade fabric for attachment or operation is part of this contract.

B. Shade Structure fabricator must have a minimum of 5 years experience in working with these type projects and be prepared to submit references, if requested.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, and installation instructions for shade structures. Submit manufacturer's standard color samples for review and selection of type by Owner's Representative.

B. Submit shop drawings for shade structure indicating all dimensions, spans, components and connectors, including design tension forces.

PART 2 - PRODUCTS

2.01 General:

A. Shade structure fabric to be fire rated knit HDPE shade fabric designed for large tension membrane structures, with weight of 10 oz. per square yard, equal to Contex by Poly Fab USA.

B. Shade structure fabric to comply with ASTM E-84 Class A and NFPA 701-2004.

C. Color of fabric to be as selected by the architect from standard colors, by Poly Fab USA or equal.

D. Provide Edge Webbing for the Shades equal to Poly Fab Shade Sail Edge Webbing, 2" wide with breaking strength of 4,720 lbf, in color matching shade fabric.

2.02 Shade Structure Hardware:

A. Provide all required grommets, clips, hooks, as required to install shade structure to perform the task for which it was intended. All hardware to be chromium nickel austenitic stainless steel. All connections and operators are to be designed to support and deploy the specified fabric structure.

PART 3 - EXECUTION

3.01 GENERAL:

A. Support connector locations and spacing: Connectors of fabric to owner provided cable to be sized and located according to design tensions on the fabric. Provide connectors and clips that allow fabric to slide so that deployment is as shown on the drawings.

B. Inspection: All materials installed under this specification shall be subject to testing by the Owner at his expense. Any material so inspected and found to be not in strict conformity with this specification shall be promptly removed and replaced by the Contractor at his expense.

3.02 INSTALLATION:

A. Do not begin installation and erection before supporting cable is completed, unless otherwise permitted.

B. Provide fabric with connectors that allow corners to be clipped to Gunite mounted eye bolts and clips that allow fabric to be deployed in shape and size shown on the drawing.

END OF SECTION 13312

SECTION 15010 – BASIC MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1. General Conditions

   The General conditions, Supplementary General Conditions, Information to Bidders, Division A and all other pertinent documents issued by the Architect, are a part of these specifications and shall be complied with in every respect.

2. Scope and Conditions of Work

   The mechanical work consists of furnishing all labor and materials, and performing all operations necessary in the installation of the mechanical systems in accordance with the Drawings and Specifications. In case of conflict between the Mechanical Drawings and Specifications the most stringent shall govern. In case of conflict between this section and other sections of Division 15 the most stringent shall govern.

3. Special Inspection

   The Architect will inspect the piping systems, duct systems and equipment systems when they are ready for testing. The Mechanical Contractor shall notify the Architect 24 hours prior to this time so that the Architect can make inspection and give approval of or indicate corrective action before systems are concealed.

4. Painting

   Unless otherwise specified, job finish painting will be done by the General Contractor, and mechanical equipment shall be baked enamel finish. The Mechanical Contractor shall restore damaged painted surfaces of mechanical equipment to its original condition.

5. Codes and Standards

   Materials and workmanship shall comply with the Contract Documents and applicable codes and standards. If applicable

codes and standards and the Contract Documents differ, the Contractor shall promptly notify the Architect in writing of such difference. If the Contractor performs any work that does not comply with the requirements of applicable codes and standards, he shall bear all costs in correcting such defect. Applicable codes and standards shall include all state laws, local ordinances, utility company regulations and applicable requirements of nationally accepted codes and standards. All pressure vessels, including hot water storage containers, shall be constructed in compliance with the rules and regulations of the Boiler Inspection Division of the State of Arkansas and installation of such equipment shall be made by firms licensed by the Boiler Inspection Division.

6. Coordination of Work

A. The Mechanical Drawings show the general arrangement of piping, equipment and appurtenances, and shall be followed as closely as practicable. The Mechanical work shall conform to the requirements shown on all of the drawings. General and Structural Drawings shall take precedence over Mechanical Drawings. It is not practical to indicate all offsets, fittings, and accessories required. The Contractor shall study the structural and finish conditions affecting the work, and arrange his work accordingly, providing fittings, valves, and accessories required. The Contractor shall study the structural and finish conditions affecting the work, and arrange his work accordingly, providing fittings, valves, and accessories required to meet such conditions.

B. The Contractor shall compare the Mechanical Drawings and Specifications with the Drawings and Specifications for other trades and report any discrepancies between them to the Architect and obtain from him written instructions for changes necessary in the Mechanical work. The Mechanical work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provisions to avoid interferences. Changes required in the work of the contractor caused by his neglect to do so shall be made by him at his own expense.

C. Anchor bolts, sleeves, insert, and supports for the Mechanical work shall be furnished and installed by the Mechanical Contractor.

D. Slots, chases, openings and recesses through floors, walls, ceilings and roofs in new construction will be provided by the various trades in their respective materials, but the trade requiring them shall see that they are properly located and shall do any cutting and pay for any patching caused by the neglect to do so.

E. Locations of pipes, ducts, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The contractor shall determine the exact route and location of each pipe and duct prior to fabrication.

F. Lines that pitch shall have the right of way over those which do not pitch. For example, plumbing drains shall normally have right of way. Lines whose elevations cannot be changed shall have the right of way over lines whose elevations can be changed.

G. Transitions and changes in direction in pipe and ducts shall be made as required to maintain proper head room and pitch of sloping lines. The contractor shall furnish and install traps, air vents, sanitary vents, etc., required to effect these offsets and changed in directions.

H. The contractor shall provide access panels in walls, ceilings, equipment, ducts, etc., as required for inspection of interiors and for proper maintenance.

7. Fees, Permits, and Inspection

Fees, permits, and inspections shall be obtained and paid for by the Contractor under the section of the Specifications for which they are required. The Contractor shall furnish a certificate of final inspection to the Architect from the inspection department having jurisdiction.

8. Equipment and Materials

A. Materials shall be new and bear the manufacturer's name, trademark, and the UL label in every case where a standard has been established for the particular material. Equipment shall e the standard product of a manufacturer regularly engaged in the production of that type of equipment, and shall be the manufacturer's latest approved design.

B. Equipment shall be protected against moisture, dirt, damage and theft. Fixtures, equipment and materials shall be cleaned and polished and turned over to the owner in a condition satisfactory to the Architect. Rusted surfaces shall be refinished.

C. The contractor shall make field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the intent of the Drawings and Specifications.

D. Manufacturer's directions shall be followed in the delivery, storage, protection and installation of equipment and materials. The contractor shall promptly notify the Architect in writing of any conflict between any requirement of the Contract Documents and the manufacturer's directions, and shall obtain the Architect's written instruction before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Architect, he shall bear all cost arising in correcting deficiencies.

9. Equipment Accessories

A. The Contractor shall furnish and install equipment, accessories, connections, and incidental items necessary to complete the work, ready for use, occupancy and operation by the Owner.

B. Where equipment requiring different arrangement or connections from those shown is approved, it shall be the responsibility of the Contractor to install the equipment to

operate properly. He shall provide additional motors, controllers, supports, bases, valves, fittings, and other equipment, including required changes in affected trades. The contractor shall be responsible for the proper location of rough-ins and connections by other trades. All changes shall be made at no increase in the Contract amount or additional costs to other trades.

C. The contractor shall support work and equipment plumb, rigid, and true to line. The Contractor shall study the General, Structural, Mechanical and Electrical Drawings, shop drawings, and catalog data to determine how equipment, fixtures, piping, ductwork, etc., are to be installed. The Contractor shall provide bolts, inserts, pipe stands, brackets, and accessories for proper support. When directed, the Contractor shall submit drawings showing supports for approval.

10. Cutting and Patching

A. The contractor shall be responsible for digging, cutting, etc., incident to his work, and shall make repairs thereafter to the satisfaction of the Architect, but no structural element, beam or column shall be cut without the written approval of the Architect.

B. Pavements, sidewalks, roads, and curbs shall be cut, patched, repaired and/or replaced as required to permit the installation of underground work of the various trades and such cutting, patching, repairing and replacing shall be the responsibility of, and paid for by, the Contractor under the section of the Specifications of the trade requiring the work.

C. Each trade shall bear the expense of cutting, patching, repairing or replacing of the work of other trades required because of his fault, error, or tardiness.

11. Excavation and Backfilling

A. Separate trenches shall be provided for each utility or service to the building unless otherwise noted or approved. All excavations shall be made by open cut. Banks of trenches

shall be kept as nearly vertical as practicable, and trenches over 5 feet deep (and where required) shall be properly sheeted and braced.

B. Water shall be removed as necessary to fully protect workmen and adjacent structures, and to permit proper installation of work. Under no circumstances shall pipe be laid or appurtenances installed in water; trenches shall be kept free from water until pipe joint material has hardened. Presence of ground water in soil or necessity of sheeting or bracing trenches shall not constitute a condition for which any increase may be made in contract price. Sheeting left in place shall be cut off not less than two feet below finished grade.

C. Material to be excavated shall be unclassified, and shall include all earth or other material encountered. Contract shall include removal of all such materials to depth and extent as required.

D. Trenches shall be graded evenly on bottom to insure uniform bearing for full length of pipe. Bell holes shall be cut for joint making. Where bottom of trench is rock, cement, gravel or other similar hard materials, trench shall be excavated to an overdepth of at least three inches below trench depth otherwise required. Overdepth in the excavation shall be filled with firmly compacted sand or fine gravel, or with concrete.

E. Trenches shall not be backfilled until all required tests have been performed and section tested meets requirements as specified herein. Trenches shall be carefully backfilled with excavated materials consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials free from large clods of earth or stone, deposited in thoroughly compacted six-inch layers, loose thickness, until pipe has a cover of not less than one foot. Remainder of pipe shall be backfilled and compacted thoroughly with a runner of suitable weight, or with an approved mechanical tamper or if backfill material is granular, settling with water will be permissible. Areas which are subsequently to receive pavements, walks, or other surfacing shall be tamped solidly

in layers not to exceed six inches loose thickness. Along all portions of trenches, except areas to receive pavements, walks, or other surfacing, ground shall be graded to a reasonable uniformity and mounding over the trenches left in a uniform and neat condition. Trenches under floor slabs shall be backfilled and compacted as directed by the Architect.

12. General Piping Installation

A. The Contractor shall furnish and install a complete system of piping, valved as indicated and necessary to control the entire apparatus and appurtenances. The piping drawings are diagrammatic and indicate the general location and connections.

B. Piping shall be properly supported, and adequate provisions made for expansion, contraction, slope and anchorage. Piping shall be cut accurately for fabrication to the measurements taken at the site, and shall be worked into place without springing or farcing, clearing windows, doors, and other openings and equipment. Pipes shall have burr and cutting slag removed by reaming or other cleaning methods.

C. Piping shall be arranged to permit removal of equipment, access to openings, removal of coils, filters, etc., so that there will be no interference with the installation of equipment, ducts, etc., and to insure noiseless circulation. Valves and specialties shall be placed to permit easy operation and access, and valves shall be regulated, packed and glands adjusted so as to avoid liquid or air pockets. Eccentric reducers shall be used where changes in pipe sizes occur, and the reducers shall be located approximately 18" beyond the nearest upstream branch. Expansion and contraction of piping shall be provided by expansion loops, bends, and/or expansion joints top prevent injury to connections, piping, equipment or the building.

D. Minimum slope of piping shall be in accordance with the following, unless otherwise required:

1. Waste and vent piping ¼" per foot.

2. Main building sewer and storm sewer, 4" and larger. 1/8" per foot (Minimum).
3. Water piping (where practical). 1" in 40 ft. to drain points.

E. Unions or flanges shall be installed on bypasses, ahead of traps, and at all equipment connections to permit removal of equipment.

F. Sleeves shall be provided around pipes passing through walls, floors, ceilings, partitions, structural members or other building parts. Sleeves through floors or walls below grade and exterior walls shall be schedule 40 galvanized iron pipes two sizes larger that the pipe or insulation, so that pipe or insulation shall pass through freely with space for movement. Sleeves through floors shall be extended ¼' above floor finish in toilets or in rooms where domestic water is used. In other rooms, sleeves shall be flush with the floor. Sleeves through outside walls and floor shall be sealed with Non-Asbestos fireproof and watertight packing. Sleeves through inside walls and floors above grade may be 18-gauge galvanized steel.

G. Plates: Spring clamp plates (escutcheons) shall be provided where pipes are exposed through walls, floors, or ceilings, except in concealed spaces. Plates shall be chrome-plated spun brass, set tight on the pipe and to the building surface.

H. Flashing: Piping passing through new built-up roof shall be flashed with a square sheet of 4-pound soft lead or 16 oz. Copper extended to the top of pipe and turned over top and into pipe ½" or extended to flashing collar where pipe continues beyond roof.

Flashings through metal building roofs and existing roofs shall be as directed by the Architect.

I. Protection: Ends of pipes and equipment shall be capped to keep foreign matter out of the system. Plugs of rags, waste, or similar materials shall not be used.

J. Hangers and Supports: Pipe hooks, chains or perforated iron shall not be used for pipe support. Hangers shall be attached to floor inserts or expansion shields.

1. Hangers, support rods, and other support accessories for bare copper tubing shall be copper plated.

2. Vertical Piping: Riser clamps shall be placed at each floor and at each coupling or fitting. Clamps shall be supported by structural members, which are supported directly from the building structure. Clamps for bare copper tubing shall be copper plated.

K. Cleaning: Remove dirt, grease, and other foreign matter from pipe before making connections.

L. Installation of Underground Pipe: Each pipe shall be laid true to line and grade and in such manner as to form a close concentric joint with adjoining pipe and to prevent sudden offset to flow line.

M. Pipe Sizes: If pipe sizes are not clearly evident, the Contractor shall request instructions as to proper sizing. Changes resulting from the Contractor's failure to request clarification shall be at his own expense.

N. Pressure Regulators: Where water supply pressure can exceed 75 psi, the Contractor shall install two (2) pressure-reducing valves sized for 1/3 and 2/3 flow to maintain a maximum of 75 psi.

13. Electrical Wiring

A. Electrical wiring for mechanical equipment is separated into two main wiring divisions: "Power Wiring" and "Control Wiring."

1. Power Wiring – Shall be the energy source and includes circuit protective devices, motor starters or controllers, conduit, wiring and safety disconnects beginning at the Power Supply and terminating at the motor or terminals on equipment.

2. Control Wiring – Comprises conduit and wiring not included in power wiring, including automatic

temperature control wiring, interlock wiring, pilot light and signal wiring, etc., that is not included as part of prewired equipment, but necessary for the proper operation and safety of the equipment.

B. Unless otherwise noted, Power wiring shall be done by the Electrical Contractor under the supervision of the equipment supplier, and Control Wiring shall be done by the Contractor furnishing the equipment. All wiring shall be done in compliance with the Electrical Division of these Specifications.

14. Motor and Equipment Control

A. Each motor, electrical equipment or group of motors and equipment shall be provided with starters and pilot devices that will perform the functions as specified. Starters and pilot devices shall conform to NEMA Standard LCL and UL Standard for Industrial Control Equipment.

B. Manual Starter shall be provided for manually started single phase motors under ½ horsepower or as noted on the Drawings. Starters shall be single or two pole with selector switches, push button, pilot lights and interlocking attachments are required. Contactors may be used in lieu of manual starter if motor has integral overload protections.

C. Magnetic starters shall be provided for motors ½ horsepower and larger, and motors started by pilot devices. Starters shall have necessary control devices in cover, three interlocking contacts, and low-voltage protection.

D. Starters shall have overload relays in all ungrounded conductors. Overload relays shall be sized to protect the motor with consideration given to ambient temperature of the motor and controller.

E. Starters, pushbutton stations, selector switches, pilot lights, relays, automatic temperature controllers, safety devices, solenoids, and similar devices that are not a part of a motor control center or switchgear, shall be furnished and installed by the Contractor furnishing the equipment, except starters

and contactors in individual enclosures shall be furnished to the Electrical Contractor for his installation.

F. Starters, pilot lights, contactors, pushbuttons, and similar devices located in finished spaces shall be flush-mounted and surface-painted to match surrounding finish.

15. Electrical Motors

A. Motors shall be of recognized American manufacturer and shall conform to latest standards of manufacture and performance of NEMA and AIEE. Motors shall be highest efficiency and shall meet the current energy code requirements.

B. Motors shall be rated for continuous duty at 100 percent of rated capacity, and temperature rise shall be 40 degrees C open type: 50 degrees C drip and splash proof: 55 degrees C explosion proof and totally enclosed, above an ambient of 40 degrees C.

C. Unless otherwise required, integral horsepower polyphase motors shall be Class B, general purpose, squirrel cage, open type induction motors.

D. Motors ½ horsepower or less shall have integral overcurrent protection.

E. Motors 10 horsepower and above shall have positive temperature coefficient thermistors embedded in the phase windings of the motor. 120 mechanical degrees part. P.T.C. thermistors or Westinghouse Guardistor.

F. Motors inside building or suitable housing shall be open type drip-proof. Motors exposed to weather shall be totally enclosed. Fan-cooled. Motors in hazardous locations of duty shall be explosion proof of the type required for the service.

16. System Operating Tests

During these tests, the Contractor shall balance circulating or water, air and other fluids to provide proper quantities to spaces or items of equipment. He shall adjust valves, dampers, and similar items to insure that the Mechanical systems perform as intended. A report shall be provided containing a summary of all tests.

17. Instructions of Owner's Representative

The Contractor shall instruct the representative of the Owner in the operation and maintenance of the Mechanical Systems.

18. Submittals

The Contractor shall submit within thirty days after the awarding of the contract, six brochures of descriptive data of proposed material and equipment. Failure by the Contractor to comply shall make him liable to the expense of delays and changes in construction. Also, if the Contractor fails to comply, the Architect may go directly to the manufacturer and obtain any details necessary. Cost of changes in connection with this shall be borne by the Contractor. Thermofax copies are not acceptable; only permanent-type prints will be allowed. Submittals shall designate the exact item offered. Submittals shall not cover detailed installation drawings prepared for the Contractor's own use, but shall be limited to necessary departures from the Contract Drawings.

19. Substitution of Materials

Competition is requested and where a definite material or equipment is specified, it is not the intent to discriminate against any "approved equal" product. However, no substitution shall be made unless authorized in writing by the Architect.

20. Utilities Location

Location and elevations of utilities are offered as a guide only, without guarantee as to accuracy. The contractor shall verify location and elevation of utilities and their relation to the work with the Owner before starting any work.

21. Guarantee

The Contractor shall guarantee his materials, equipment, and labor to be fee of defects for one year from date of final acceptance, and should any defects appear within this period, the defect will be replaced or repaired without additional expense to the Owner. This guarantee shall include the replacement of drive belts, bearings, seals, and other similar items whose improper installation, or lack of attention could be cause for failure within the one-year period. This guarantee does not include the replacement of air filters, lamps or similar expendable items.

22. As-Built Drawings

The Mechanical Contractor shall prepare as-built drawings to be delivered to the Architect prior to final acceptance. These drawings shall show systems as installed, including location, medium conveyed, pipe size, pipe material of all underground lines. Also, shown location, size, medium conveyed, pressure, material of all existing underground lines encountered during installation of systems under this contract.

End of Section

SECTION 15120 - VALVES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Valves specified in this section are for general use. See specifications for specific system for special valves.

B. Submit brochures and other data for approval of all items differing from those specified.

PART 2 PRODUCTS

2.01 GATE VALVES

A. 1/4" through 2": NIBCO Scott T-113, 125 lb. SWP, 200 lb. WOG, bronze, screw-in bonnet, threaded ends, non-rising stem, solid wedge.

B. 2-1/2" through 12": NIBCO Scott F-619, 125 lb. SWP, 200 lb. WOG, iron body, inside screw, bronze mounted. Flanged ends, non-rising stem, solid wedged.

2.02 GLOBE VALVES

A. 1.8" through 2" NIBCO Scott T-211, 215 lb., SWP, 200 lb. WOG. Bronze, screw-in bonnet, threaded ends, Buna-N seat disc for water, oil, or gas (W). Teflon seat disc for steam (y).

2.03 SWING CHECK VALVES

A. 1/4" Through 2": NIBCO Scott T-413, 125 lb. SWP. 200 lb. WOG, bronze, threaded ends, Buna-N seat disc for water, oil or gas (@), Teflon seat disc for steam (S).

2.04 BALL VALVES

A. 1/4" Through 1-1/2": NIBCO Scott T-595. 150 lb. steam. 400 lb. WOG, bronze, full port, threaded ends, Buna-N seat for water, oil, or gas (W), Teflon seat for steam (Y).

2.05 BALANCING VALVES

A. 3/4" and Below: Sarco Sarcofow balancing fittings, 20 psi cold liquid, 175 psi at 150 degrees F, brass, screwdriver slot adjustment, screwed ends, air vent if required.

2.06 GAS COCKS

A. 2 inch and smaller: Bronze body, bronze tapered plug, non-lubricated, Teflon packing, threaded ends.

B. Gas cock Larger than 2 inch and those on medium pressure gas line shall be Nordstrom or equal lubricated plug valves.

PART 3 EXECUTION

3.01 ARRANGEMENT OR LOCATION

A. Locate valves in an accessible position, where several valves are related as to function, group in a battery.

B. No valve shall be installed with stem below horizontal position without prior approval.

C. Provide special handles or operators as might be required or as indicated on the drawings.

D. Valves specified under specific systems shall take precedence over those as specified herein.

E. Valves in copper pipe shall have threaded ends (except where size dictates flanged ends), use copper to MPT adapters.

F. The use of threaded ends of flanged ends is the Contractor's option within the size listed.

3.02 VALVE BOXES

A. All valves located below slabs or grade shall be housed in cast iron boxes with covers. Covers shall be properly identified as to the services controlled by the valve.

B. Furnish Owner with proper key and valve-operator extensions.

END OF SECTION

SECTION 15140 - MECHANICAL SUPPORTING SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide adequate pipe, equipment foundation and suspension system in accordance with recognized engineering practices. Where possible, use standard, commercially-accepted hangers and accessories.

1.02 CODES

A. All pipe hangers and supports shall conform to the latest requirements of the code for Pressure Piping, Refrigeration Society of ANSI/ASME B 31.5-74 and Manufacturers' Standardization Society of Valve and fittings industry documents MASS-SP-58-75 and MASS-SP-69-76.

B. All auxiliary steel necessary for the installation of the pipe hangers and supports shall be designed in accordance with the AISC, an as indicated on the drawings.

C. It is the intention of the drawings to show supports for major mechanical equipment and piping. Supporting steel not shown for the equipment shall be designed, supplied and erected by the Contractor. (The supporting steel is that steel which is connected to the structural members shown on the drawings and carries the weight of the mechanical items). This supporting steel design must carry the dead weight and dynamic load imposed by the equipment or piping.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products shall be equal to Fee & Mason. Devices by Grinnell or Blaw-knox will be acceptable.

2.02 PIPE HANGERS

A. All hangers for piping two (2) inch or larger shall be provided with means of vertical adjustment.

B. Where thermal movement causes the hanger rod to deviate more than five

(5) degrees from the vertical, or where longitudinal expansion causes a movement of more than 1/2" in the piping supported from below, roller hangers shall be used in conjunction with a protection saddle to suite the insulation thickness. On insulated pipe the hanger must be placed on the outside of the insulation with a shield.

2.03 BRACKETS AND RACKS

A. Multiple pipe racks or trapeze hangers shall be fabricated from B-line, FAMET, or UNISTRUT channel, clamps and accessories.

PART 3 EXECUTION

3.01 ATTACHING TO STRUCTURE

A. Where equipment or piping is supported from building steel, beam-clamps or welded beam attachments shall be used. Holes drilled in building steel for hanger support rods will not be permitted.

B. All vertical runs of piping shall be supported at the floor.

3.02 HANGER ROD AND SPACING

A. Where hanger rod sizes are catalog-listed for a specified hanger, this size shall govern. Where hanger rod sizes are not catalog-listed, the load on the hanger shall be the determining factor and the maximum recommended hanger rod load as catalog-listed, shall govern.

B. Pipe hangers shall be installed at each change in direction not more than two feet (2') from end of run. On straight runs, support at each joint and intermediately, so the spacing shall not exceed the following, whichever is closer:

Size	Steel pipe	Copper pipe
To 3/4"	7'	5'
1" to 2"	10'	8'
2-1/2" to 4"	12'	10'
5" to 8"	16'	10'
10" and larger	20'	10'

C. Provide supports at concentrated loads such as equipment, in-line pumps, valves and other piping, to prevent line sag and/or excess stress in the piping systems.

D. For cast iron pipe, provide a hanger at each joint or fitting with a maximum spacing of five (5) feet on center.

E. Where distance between riser clamp and hanger exceed ten (10) feet in height, intermediate clamps shall be installed to provide support or alignment at a maximum of every ten (10) feet.

3.03 AUXILIARY STEEL

A. Furnish all miscellaneous structural members necessary to hang or support pipe or mechanical equipment. Material of members shall be consistent with that of the main structural system.

B. All auxiliary steel shall receive one shop coat of primer paint prior to installation.

C. Notify Engineer of any adjustment in main structural system for support of major equipment or piping.

3.04 CONCRETE PADS

A. Provide concrete pads under floor-mounted equipment and apparatus as indicated on drawings and coordinate with structural drawings.

3.05 INSULATION INSERTS OR SADDLES

A. Provide insulation inserts or saddles at all points of support on insulated pipe. Insert to be same thickness as adjoining pipe insulation.

END OF SECTION

SECTION 15252 - PIPING AND EQUIPMENT INSULATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Piping Insulation

B. Adhesive, tie wires, tapes.

C. Insulate all hot and cold water piping above floor.

D. Insulate all refrigerant suction piping.

1.02 PROJECT CONDITIONS

A. Deliver material to project site in original non-broken factory packaging, labeled with manufacturer's density and thickness.

B. Perform work at ambient and equipment temperatures as recommended by the adhesive manufacturer.

PART 2 PRODUCTS

2.01 GENERAL

A. Adhesives and insulation materials: composite fire and smoke hazard ratings of maximum 25 for flame spread and 50 for smoke developed. Adhesives to be waterproof.

2.02 INSULATION MATERIALS

A. Cold and hot domestic water piping: Fine glass fiber insulation, with factory applied vapor barrier jacket, molded to conform to piping "K" value at 75°F, maximum 0.24 BTU*inch/(hr*ft^2*°F) Insulation shall be equal to Johns Manville Micro-Lok® with vapor barrier jacket, self-sealing lap and butt strips.

B. Refrigerant piping: Flexible elastomeric thermal insulation with "K" value at 75°F, maximum 0.25 BTU*inch/(hr*ft^2*°F). Insulation shall be equal to Armaflex AP closed-cell insulation.

PART 3 EXECUTION

3.01 PREPARATION

A. Do not install covering before piping and equipment has been tested and approved.

B. Ensure surface is clean and dry prior to installation and during application. Finish with systems at operating conditions.

3.02 INSTALLATION

A. Ensure insulation is continuous through inside walls. Pack around pipes with fireproof self-supporting insulation material, fully sealed.

B. Insulate fittings and valves. Do not insulate unions, flanges, strainer, flexible connections, and expansion joints. Terminate insulation neatly with plastic material troweled on bevel. Provide removable bands of flexible fiberglass insulation with vapor sealed jacket over all insulated surfaces previously described.

C. Finish insulation neatly at hangers, supports and other protrusions.

D. Locate insulation or cover seams in least visible locations and install aluminum bands on 8" centers.

E. Cold and hot water piping: Cover fittings and valves with equivalent thickness of insulation material. Cover with open mesh glass cloth sealed with vapor barrier sealant. Seal lap joints with 100 percent coverage of vapor barrier sealant and adhesive. Seal butt joints with 4-inch wide strips of vapor barrier sealed with vapor barrier adhesive. For exposed fittings and valves, apply hydraulic setting cement paste over insulation material before applying finish.

F. Insulate bowls of roof drains to prevent condensation.

G. Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

3.03 INSULATION THICKNESS SCHEDULE:

Piping or Equipment	Pipe Size Inches	Insulation Thickness
Domestic Cold Water Piping	1/4 thru 1/2"	1/2 inch
Domestic Hot Water Piping	All Sizes	1 inch
Domestic Hot & cold Water Piping	3/4" and Larger	1 inch
Cold Condensate & Hub Drains	All sizes	1/2 inch
Refrigerant Suction	All Sizes	1/2" Armaflex
Roof Drain Piping Above Slab	All Sizes	1/2 inch

END OF SECTION

SECTION 15400

SITE PLUMBING AND GAS UTILITIES

PART 1-GENERAL

1.1 RELATED DOCUEMENTS: General Conditions and Supplementary Conditions apply to this Section.

1.2 WORK INCLUDED

A. Domestic Water System to within 5 feet of building.

B. Irrigation Water System to within 5 feet of building.

C. Water Meters and Vaults.

D. Water Isolation Valves in Ground Boxes.

E. High Pressure and Medium Pressure Gas Service Line (Underground from Meter to Building with Risers).

F. Natural Gas Pressure Reducing Stations.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: See Architectural Specification Sections.

B. Plumbing: Sections 15410 and 15440.

1.4 QUALITY ASSURANCE

A. Applicable requirements of the following standards and codes apply:

1. 2012 Arkansas Pluming Code (International Plumbing Code).

2. Central Arkansas Water and City of Little Rock Standard Pipeline Construction Specifications.

3. 2012 Arkansas Fuel Gas Code (International Fuel Gas Code).

B. Contractor shall have a minimum of 5 years of experience in water and gas line construction in Little Rock, Arkansas.

1.5 SUBMITTALS: Product Data: Catalog cuts and specifications date for all materials.

1.6 JOB CONDITONS

A. Inspection:

1. Examine areas for conditions under which work is to be performed. Report in writing to Owners Representative all conditions contrary to those shown on the drawings or specified herein and all other conditions that will affect satisfactory execution of work such as improperly constructed substrates or adjoining work. Do not proceed with work until satisfactory conditions have been corrected.

2. Starting work constitutes acceptance of the conditions under which work is to be performed. After such acceptance this contractor shall at his expense, be responsible for correcting all unsatisfactory and defective work resulting from such unsatisfactory conditions.

B. Notify the Little Rock Zoo, City of Little Rock, Central Arkansas Water, and Centerpoint Energy before beginning construction.

PART 2-PRODUCTS

2.1 MATERIALS

A. Pipe and Valves: Central Arkansas Water and City of Little Rock Standard Pipeline Construction Specifications.

B. Backflow or Cross Connection Prevention Devices: UPC, Section 1003, Central Arkansas Water, and the City of Little Rock requirements.

C. High and Medium Pressure Gas Service Pipe below Grade: Per Arkansas Fuel Gas Code, City of Little Rock, and Centerpoint Energy Requirements (Verify).

PART 3-EXECUTION

3.1 TRENCHING, BACKFILLING AND COMPACTION: Trenching, Backfilling and Compacting: In accordance with applicable requirements of the appropriate Sections in the Architectural Specifications for the Project.

3.2 INSTALLATION

A. Minimum depth of cover shall be 36", unless otherwise noted or required by utility (City of Little Rock, Centerpoint Energy, etc.).

B. Vertical clearance between sewer and water lines: Arkansas/International Plumbing Code.

3.3 TESTING

A. Testing: All lines as per City of Little Rock and Central Arkansas Water Standards for Pipeline Construction.

END OF SECTION

SECTION 15405

SITE SEWERAGE & DRAINAGE UTILITIES

PART 1-GENERAL

1.1 RELATED DOCUMENTS

A. General Conditions and Supplementary Conditions apply to this Section.

B. All drain and sewer lines shall be constructed in accordance with the Project Specification Requirements for Sanitary Sewers and the requirements of the Little Rock Wastewater Utility.

1.2 WORKS INCLUDED

A. Storm Sewerage System.

B. Subdrainage Systems.

C. Sanitary Sewerage System.

D. LR Zoo Storm Water Retention System (to ADEQ Treatment Pond).

E. Manholes.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: SEE ARCHITECTURAL SPECS

B. Concrete: SEE ARCHITECTURAL SPECS

1.4 QUALITY ASSURANCE

A. Applicable requirements of the following standards and codes apply:
   1. Specification Requirements for Sanitary Sewers, Little Rock Wastewater Utility.

2. 2012 Arkansas Plumbing Code (International Plumbing Code).

B. Contractor shall have a minimum of 5 years of experience in sewerage and drainage line construction in Little Rock, AR.

1.5 SUBMITTLAS: Product Data: Catalog cuts and specifications data for all materials.

1.6 JOB CONDITIONS

A. Inspection:

1. Examine areas for conditions under which work is to be performed and report in writing to Owners Representative all conditions contrary to those shown on the drawings or specified herein and all other conditions that will affect satisfactory execution of work such as improperly constructed substrates or adjoining work. Do not proceed with work until unsatisfactory conditions have been corrected.

2. Starting work constitutes acceptance of the conditions under which work is to be performed. After such acceptance this contractor shall at his expense, be responsible for correcting all unsatisfactory and defective work resulting from such unsatisfactory conditions.

PART 2-PRODUCTS

2.1 MATERIALS

A. Site Sanitary Sewer and Storm Drain Piping: Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron joints: ASTM C564, neoprene gasketing system or local utility Engineer Approved Equal.

B. Force Main Sewer Pipe: SDR 11 HDPE and fittings or local utility Engineer Approved Equal.

C. Pipe and fittings for sanitary sewer mains, sewer services, and PVC or D.I.P storm drainage lines shall conform to Little Rock Wastewater Utility Standard Specifications.

D. Concrete Storm Drain Pipe shall be reinforced concrete (RCP), Class III, complying with ASTM specifications C14 C76 latest edition.

E. Corrugated metal pipe (CMP) and fittings shall be polymer coated (10 mill each surface) and conform to Standard Specifications for Highway Construction of the Arkansas Highway Commission.

F. Fittings: Provide proper fittings for installation and connection of lines.

G. Concrete: concrete for storm sewer construction shall be 3000 psi mix. Joint M \ mortar shall be 1:2 Portland cement sand mix, masonry mortar to be 1:3. At Contractors option, hydrated lime may be substituted for cement not to exceed 10% of cement used in masonry mortar.

H. Precast Structures: Precast reinforced concrete structures may be used at contractor's option. Precast structures shall meet local and state standards.

PART 3-EXECUTION

3.1 TRENCHING, BACKFILLING AND COMPACTION

A. Trenching, backfilling and compacting: In accord with applicable requirements of Section 02720, parts C, D and B. Sanitary sewers, sewer services and PVC or D.I.P storm drainage line in accordance with Bryant Wastewater Utility Standard Specifications.

B. Generally, excavate to the line and grade shown. The excavation shall not be carried closer than to within two inches of final grade until the pipe is ready to be installed. Fine graders just ahead of the pipe laying operation shall remove the remaining two inches.

C. Backfilling from bottom of trench to a point at least one foot over the top of pipe barrel shall be placed by hand in six inch layers and thoroughly tamped into place around the pipe. Extreme care shall be exercised to the level one foot above

pipe bane to insure that no damage is caused to the pipe or that its alignment or grade is not disturbed in any way. Only clean materials may be used in this operation, clean earth (no rocks) sand or rock dust.

3.2 INSTALLATION OF STORM SEWERS

A. Install sewer lines in straight line and on uniform rate of grade between points where changes in alignment or grade are shown. Bed barrel of pipe firmly at required line and grade. Keep stopper in mouth of pipe when pipe-lying is not in progress. Set bell of pipe upstream. Support barrels of pipe continuously and scoop out space for proper clearance of bell.

B. After installed piping has been tested and inspected, backfill excavations with approved material tamp and compact in place. Tamp carefully around pipe and above top of pipe in layers not over 6 inches. Observe care in backfilling not to disturb pipe.

C. Provide granular bedding and dewatering and methods required to facilitate installation.

3.3 CONSTRUCTION OF DRAINAGE STRUCTURES

A. Masonry work shall be laid up true and plumb and horizontal joints shall not be more than ½". Masonry units shall be laid in full bed of mortar and joints in each course shall be filled solid with mortar before another course is laid on top. Brick shall be wet before being laid in warm weather. Brick shall not be laid in freezing weather. Protect brick work from the weather when storming or freezing and at other times when necessary during the progress of the work. Inlet frames shall be set in a full bed of mortar and at the elevation established by the drawings.

B. Precast shall be set on properly prepared granular or concrete subbase providing full support to unit.

C. Cast in place structures shall be formed and poured in accordance with Section 03300-Cast-in-Place Concrete.

END OF SECTION

SECTION 15410 - PLUMBING PIPING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Pipe and pipe fittings.

B. Valves.

C. Sanitary Sewer & Drain (Private & Public) Piping Systems.

D. Domestic water piping System.

E. Natural Gas Piping System.

F. Storm Drain Piping System.

PART 2 PRODUCTS

2.01 SANITARY SEWER & DRAIN PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron joints: ASTM C564, neoprene gasketing system.

2.02 SANITARY SEWER & DRAIN PIPING, BURIED UNDER AND WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast Iron Joints: Hub-and-Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.03 SANITARY SEWER & DRAIN PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast Iron Joints: Hub-and-Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight, Fittings: Cast Iron, Joints: Neoprene gaskets and stainless steel clamp-and shield assemblies.

C. Copper Pipe: ASTM B306, DWV. Fittings: ANSI/ASME B16.3, cast bronze, or

ANSI/ASME B16.29 wrought copper. Joints: ANSI/ASTM B32, solder, Grade 50 B

2.04 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Copper tubing: ASTM B88, type "L" soft. Fittings: ANSI/ASME B16.29, wrought copper silver Braze.

2.05 WATER PIPING, BURIED UNDER AND WITHIN 5 FEET OF BUILDING

A. Copper tubing: ASTM B88, Type "K", hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29. wrought copper. Silver Braze.

2.06 WATER PIPING, ABOVE GROUND

A. Copper tubing: ASTM B88, type "L", hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

2.07 CONDENSATE DRAIN PIPING, ABOVE GROUND

A. Copper tubing: ASTM B88, type "M" hard drawn. Fittings: ANSI/ASME B16.23 cast brass or ANSI/ASME B16.29 wrought copper. Joints: ANSI/ASME B32. solder. Grade 95TA.

2.08 NATURAL GAS PIPING, ABOVE GRADE INSIDE BUILDING

A. Steel Pipe: ASTM A53 or A120. Schedule 40 Black. Fittings ANSI/ASME B16.3 malleable iron, or ASTM A234. forged steel welding type. Joints: Screwed for pipe two inches and under ANSI/AWS D1.1 welded, for all pipe sizes (optional)

2.09 NATURAL GAS PIPING, ABOVE GRADE OR EXPOSED OUTSIDE

A. Pipe shall be schedule 40 black steel with X-tru or equal external coating.

2.10 NATURAL GAS PIPING OUTSIDE UNDERGROUND

A. Schedule 40 black steel with X-tru or Equal external coating.

B. Polyethylene Plastic ASTM-D2513 with compatible fitting thermally welded where approved by authorities and Architect.

2.11 STORM DRAIN PIPING ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast Iron Joints: Hub-and-Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight, Fittings: Cast Iron, Joints: Neoprene gaskets and stainless steel clamp-and shield assemblies.

2.12 STORM DRAIN PIPING, BURIED UNDER AND WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight. Fittings: Cast Iron Joints: Hub-and-Spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.13 STORM DRAIN PIPING BURIED BEYOND 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74, service weight. Fittings: Cast iron joints: ASTM C564, neoprene gasketing system.

2.14 FLANGES, UNIONS, AND COUPLINGS

A. Pipe size 2 inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

B. Dielectric Connections: Union with black, galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

PART 3 EXECUTION

3.10 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.11 INSTALLATION

A. Provide non-conducting dielectric connections wherever jointing dissimilar

metals.

B. Route piping in orderly manner and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Provide clearance for installation of insulation and access to valves and fittings.

F. Provide access where valves and fittings are not exposed.

G. Slope water piping and arrange to drain at low points.

H. Establish elevations of buried piping outside the building to ensure adequate cover.

I. Establish invert elevations, slopes for drainage of 1/8" inch per foot minimum within building for Pipe 4" or larger. Slope smaller sizes 1/4" per foot minimum. Maintain gradient.

J. Install valves with stems upright or horizontal, not inverted.

K. Coat and tape all joints in underground gas piping.

L. Provide cathodic protection (package magnesium anode) with lead welded to each service riser.

3.03 APPLICATION

A. Install unions downstream of valves at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

C. Install gate or ball valves for shut-off and to isolate equipment.

3.04 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting use, verify system is complete, flushed and clean.

B. Comply with all requirements of the Local Authorities having jurisdiction and Arkansas State Health Department.

3.05 COORDINATION

A. Consult and verify with Owner and Local Authorities having jursidiction the exact location, size, depth and requirements of all utility services.

END OF SECTION

SECTION 15440 - PLUMBING EQUIPMENT

PART 1 - GENERAL

1.01 Work Included:

A. Plumbing Fixtures

B. Plumbing Specialties

C. Installation

PART 2 - PRODUCTS

2.01. General

A. Catalog numbers have been taken from current catalogs and used for descriptive purposes, but it is not intended to exclude any recognized equal products approved by the owner or Engineer.

B. Flush valves shall be equipped with vacuum breakers. All service sinks shall have vacuum breaker and hose threaded attachment.

C. Plumbing fixtures and equipment shall be furnished and installed complete with trim required to connect to rough-in piping at floor or wall, unless otherwise specified under the item. Fixtures shall be as scheduled or equal.

D. Fixtures (new and reused fixtures) shall be protected during construction and then thoroughly cleaned after all painting, plastering, and cleaning of the building has been done.

E. Floor and Wall escutcheons shall be furnished with all fixtures. All fixtures shall be white. Trim shall be chromium plated brass.

F. Approved stops, installed in accessible locations as directed by Architect shall be provided on each fixture supply pipe.

2.02. Plumbing Fixture - Schedule:

A. P-2B Custom Stainless Steel Sink Integral to Countertop (See architectural plans and specifications. T&S B-2866-05 Lavatory Faucet with 5-3/4" spread swivel gooseneck, 10-5/8" nozzle height, 6-1/4" clearance from the deck to nozzle, B0199-01 non-splach aerator, 4" wrist handles, and installation on 8" centers. K-9000 cast brass 17 gauge P-trap with clean-out, K-7606 Chrome Polished angle supplies with stops. Install for above floor waste and vent. Or Approved Equal.

B. P-4A Single Compartment Sink - ELKAY: "Lustertone" LRSR2722 single compartment 18 gage type 203 stainless steel, self-rimming bowl 16"X 24"X8" deep, undercoated, 3-1/2" crumb cup strainer. 4 hole sink with Delta model 2497LF high arc spout and spray handle accessory. Undercoated. 17 gage tube to wall two Kohler K-7606 angle stop and supplies, escutcheons chrome plated. Or Approved Equal.

C. P-4B Service Sink Williams SB 800 Mop Switch. T&S B-0665-BSTR Faucet. A20-24 Bumper guard, hook, hose and hanger. BP-2-24 splash panel. Or Approved Equal.

D. P-6 and P-6H Electric Drinking Fountain: Oasis P85BF water cooler rated 8.0 gph@115V/1phase, ¼ HP, 4.6FLA Provide Versafiller and mount @ handicapped height. Install P6-H at handicap accessible height. Or Approved Equal.

E. P-7 Floor Drain: Zurn ZN-415NH-2" with type "B" strainer (Field verify model no. components to coordinate floor construction) Or Approved Equal.

F. P-7A Floor Sink: Zurn ZN 566-AR-GT-Y -12" x 12" x 9" floor sink with ¾ grate nickel bronze top, sediment bucket, and acid resisting epoxy coated cast iron. Or Approved Equal.

G. P-8 Frost Proof Hose Bib (FPHB): Zurn Light Commercial Model Z1345 wall faucet, ½" or ¾" to suit location. anti siphon, non-freeze wall hydrant,. Length to suit location (Field Verify). Or Approved Equal.

H. P-8A Yard Hydrant. Woodford Iowa "Freezeless" Model Y34-3/4" NPT, 2ft bury Depth. Or Approved Equal.

I. P-8B Hose Bib. Zurn Z1341-BFP wall faucet with Z1399-BFP external back flow preventer, all bronze interior components, rough bronze exterior, and ¾" male hose connection. Or Approved Equal.

J. P-9 Roof Drain: Zurn No. Z-100NH-84-AC-R-4 inch, 15 inch Diameter main roof drain, no-hub angular underdeck clamp, roof sump receiver. (Field verify model no. components to coordinate roof construction.) Or Approved Equal.

K. P-10 Hub Drain: Zurn No. Z-211-S, Dura-Coated cast iron body with bottom outlet, 2, 3, or 4 inch by drain size on drawings. Or Approved Equal.

L. P-11 HW Pump – Provide HW circulator equal to Armstrong S-25 1/12 hp, 115v, 1phase with ¾" companion flange Bell and Gossett bronze booster pump series NRF-45-3SPEED 270 Watts 115,1phase AZ-1A Thermostatic Control for pump. Or Engineer Equal.

M. P-11A HW Pump- HW circulator equal to Armstrong H-41, 1/6 HP, 115V, 1 phase with 1" companion flange connections. Provide with aqua stat thermostatic control for pump. Or Approved Equal.

N. P-13 Air Gap - Wade W-2491, 2" outlet. Provide with stainless steel access panel as required (verify with architect). Or Approved Equal.

O. P-16 Thermal Expansion tank: Therm-X-Trol model, ST-8, 3.2 gallon tank. Or Approved Equal.

P. P-16A Thermal Expansion Tank: Therm-X-Trol Model, ST-12, 4.4 gallon tank. Or Approved Equal.

Q. HWH -2 Hot Water Heater--. Rheem "Commercial Electric" Model EGSP20, 4500W 240V/1P 19.9 GALLONS. Provide with Expansion Tank, T & P and overflow pan. Or Approved Equal.

2.03. Plumbing Accessories:

A. Floor cleanouts: Zurn Z-1400 cast iron adjustable nickel bronze top to suit floor material, round top.

B. Wall cleanouts: Zurn Z-1305-1, with cast iron plug, cast iron ferrule, and

polished nickel-bronze round flat access cover.

C. Shock absorbers: Josam No. 1485 Hydro-pneumatic Absorbotron sized per manufacturers sizing method for fixture units served.

D. Guy Gray Ice Maker water box with valve.

E. Guy Gray Washer box with hot and cold water valves.

F. RPZ Zurn-Wilkins Reduced Pressure Principle Assembly with Union Ball Valves. Model 975XL2U. Size noted on drawings. Or Approved Equal.

G. ZURN 500XL Pressure Reducing Valves, size to suit location. Or Approved Equal.

H. Sensus Model 243 Commercial Gas Pressure Regulator (5#, 2#, or # to oz. regulator – verify with local gas utility, Centerpoint Energy). Provide appropriate model and line size as required and noted on plans. Or Approved Equal.

PART 3 - EXECUTION

3.01 Inspection

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

B. Verify when adjacent construction is ready to receive rough-in work of this section.

3.02 Installation

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Install specialties in accordance with manufacturer's instructions to permit intended performance.

C. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

D. Provide chrome plated rigid or flexible supplies to all fixtures (with wheel handle stops, reducers, and escutcheons.)

E. Install components level and plumb.

F. Install and secure fixtures in place with supports, wall carriers and bolts.

3.03 Adjusting and Cleaning:

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

B. At completion, clean plumbing fixtures and equipment.

END OF SECTION

SECTION 15623 - MECHANICAL EQUIPMENT (HVAC)

PART 1 GENERAL

1.01 WORK INCLUDED

A. Gas Unit Heaters.

1.02 REFERENCES

A. ASHRAE Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings (most current addition)

B. ARI 210 - Standard for Unitary Air-Conditioning Equipment.

C. ASHRAE Standard 62.1 – Ventilation for Acceptable Indoor Air Quality

D. Arkansas Mechanical Code

E. National Electric Code, NFPA 70

F. International Fuel Gas Code

1.03 QUALITY ASSURANCE

A. Conform to requirements of UL, ETL, and applicable codes.

B. Cooling system tested and rated to Air-Conditioning and Refrigeration Institute Standard 210.

1.04 SUBMITTALS

A. Submit shop drawings and product data showing, dimensions, connections, arrangements, accessories, and controls.

B. Submit manufacturer's installation instructions.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's descriptive literature, operating instruction, and maintenance and repair data.

1.06 WARRANTY

A. Provide minimum five (5) year parts warranty on Air Handlers and Controls.

B. Provide minimum five (5) year warranty on compressor.

1.07 QUALITY ASSURANCE

A. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

B. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.

C. Unit Energy Efficiency Ratio (EER) shall be equal to or greater than prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.

D. Unit shall be safety UL/ETL listed or both.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Gas Unit Heaters: Modine, Sterling, or Approved Equal.

2.02 GAS UNIT HEATERS

A. Low Profile, Sealed Combustion Gas Unit Heaters as scheduled on drawings, or Approved Equal.

B. Provide with all required mounting hardware, thermostats, and disconnect.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all HVAC equipment in accordance with the manufacturer's installation instructions and recommendations.

B. Provide winter season start-up for first year of operation.

C. Support all horizontal equipment from the structure per specifications and manufacturer's requirements.

D. Install exhaust systems as indicated on plans and per manufacturer's guidelines and all applicable codes and standards.

E. Installation, Operation and Maintenance manual shall be supplied with the all units.

F. Start up and maintenance requirements shall be complied with to ensure safe and correct operation of the unit. Provide factory start-up for equipment where required or specified.

END OF SECTION

SECTION 16010 – BASIC ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

A. Work Included

1. Furnish and install all electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings. Specifications and drawings are complimentary except that, in case of conflict, the most stringent specifications will govern. Capacities, power ratings of motors, cable, panel board, motor controls and arrangement for specified items in general are shown on drawings.

2. All ampacities herein specified or indicated on the drawings are based on copper conductors with the conduit and raceway accordingly sized. Aluminum conductors are not permitted.

3. The Bidding requirements and conditions, and the General Requirements of these specifications are in integral part of this Division and of the Contract for this project. Carefully note their contents and provisions in performance of the work.

4. Examine all of the Contract drawings and specifications or otherwise determine the extent of related work in other divisions before submitting a quotation for the work in this division. Coordinate the work in this Division with work in other divisions through the General contractor. No extra payment will be made for additional work required by failure to coordinate the work.

5. Examine the premises in accordance with the general requirements of the Specifications.

6. Obtain all permits and pay all fees required by the work in this Division in accordance with the General conditions of the Specifications.

7. Should the particular equipment which any bidder proposes to install, require other space conditions than those indicated on the drawings, arrange for such space with the Engineer before submitting a bid. Should changes become necessary

because of failure to comply with this clause, install changes without additional expense.

8. Where electrical equipment is installed that causes electrical noise interference with other electrical systems installed under this contract, equip the offending equipment with isolating transformers, filters, shielding or any other means as required for the satisfactory suppression of the interference as determined by the Engineer.

B. Applicable Publications

1. The following publications of the issues as listed, but referred thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto:

   a. Federal Specifications (Fed. Spec.)
   b. American Society of testing and Materials (ASTI)
   c. National Fire Protection Association (NFPA)
   d. National Electrical Code (NEC)
   e. Miscellaneous Standards:

American National Standards Institute, Inc.	ANSI
Illuminating Engineering Society	IES
Institute of Electrical and Electronic Engineers	IEEE
Insulated Power Cable Engineers Assoc.	IPCEA
Joint Industrial Council	JIC
National Electrical Manufacturer's Assoc.	NEMA
National Electrical Safety Code	NESC

C. Related Work In Other Division

1. Related work in other divisions requiring cooperation and coordination with this Division includes, but is not limited to, the following:

   a. Perform all cutting and patching as required under Division 1.

   b. Perform all earth work required by the work in this Division. Insure that excavating, back-filling and other earthwork conforms to Division 2 except where

described in other sections of this Division or on the drawings.

c. Furnish all sleeves inserts anchors and supports required by this work to be installed in concrete or masonry and coordinate with the respective trades under for proper locations and installation.

d. Flash and seal roof penetrations in accordance with division 7. Furnish locations and sizes and coordinate the installation with the respective trades.

e. Perform painting of electrical equipment and materials as required under Division 9. Touch up or prime any surfaces required in this Division in accordance with Division 9.

f. Install branch circuits and make final connections to any equipment requiring electric power that is furnished and installed by the Contractor or by the Owner. Perform the electrical work according to approved shop drawings.

g. Install empty raceways and outlet boxes or branch circuits for equipment to be furnished by others and installed after completion of the Contract.

h. Install and connect motor starters furnished under Division 15 where starters are not integral parts of the equipment. Insure that starters generally conform to the requirements of this Division.

i. Mechanical equipment controls and control wiring are furnished and installed under Division 15 in accordance with the requirements of this Division Coordinate Mechanical.

j. Motors are furnished and installed generally as an integral part of equipment specified under Division 15 and must conform to the requirements of this Division Coordinate Mechanical.

D. Standards

1. Ensure that all materials and equipment are listed, labeled or certified by Underwriters Laboratories, Inc. where such

standards have been established. Equipment and materials which are not covered by UL standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certified, lists, labels or determines to be safe will be considered. If inspected or tested in accordance with national industrial standards, such as NEMA, IPECA or ANSI. Evidence of compliance must include certified test reports and definite shop drawings.

PART 2 – PRODUCTS

A. The following are required of products or services of proposed manufacturers suppliers and installers and will be based upon submission by Contractor of Certification:

1. Manufacturer's Qualifications: The following products have been manufactured regularly as one of the manufacturer's principal products for at least five (5) years:

   Light Fixtures
   Lighting Switches and Receptacles
   Dimmers
   Occupancy Sensors
   Low Voltage push button switches
   Molded Case Circuit Breakers
   Conduit
   Surge Protection Devices
   Low Voltage Fusible and Nonfusible Switches
   Outlet boxes
   Panelboards
   Operable Breaker Panelboards
   Fire alarm Equipment

2. Manufacturer's product submitted must have been in satisfactory operation on three installations similar to this project for approximately three (3) years.

3. Installer must have the technical qualifications, experience, trained personnel and facilities to install specified items including at least three years of successful installation of electrical work similar to that required for this project.

Approval will not be given where the experience record is one of unsatisfactory performance.

B. Manufactured Products

1. Insure that materials and equipment furnished is of current production by manufacturers regularly engaged in the manufacture of such items for which replacement parts should be available. Items not meeting this requirements but which otherwise meet technical specifications and merits of which can be established through reliable test reports or physical examination of representative samples will be considered.

2. Provide products of a single manufacturer when more than one unit of the same class of equipment or material is required.

3. Equipment assemblies and components:

    a. All components of an assembled unit need not be products of the same manufacturer.

    b. Manufacturers of equipment assemblies, which include components made by others, must assume complete responsibility for the final assembled unit.

    c. Components must be compatible with each other and with the total assembly for the intended service.

    d. Constituent parts, which are similar, must be the product of a single manufacturer.

    e. Moving parts of any element of equipment of the unit normally requiring lubrication must have means provided for such lubrication and must be adequately lubricated at factory prior to delivery.

4. Identify all factory wiring on the equipment being furnished and on all wiring diagrams.

C. Equipment Ratings and Approval of "Equal" Equipment

1. Equipment voltage ratings must be in accordance with the requirements indicated on the drawings or as specified.

2. Obtain written approval for any equipment that differs from the requirements of the drawings and specifications. Written approval requires the following:

    a. Furnish drawings showing all installation details, shop drawings, technical data, and other pertinent information as required.

    b. Approval by the Engineer of equal equipment does not relieve the Contractor of the responsibility of furnishing and installing acceptable equipment at no additional cost.

    c. Furnish and install any other items required for the satisfactory installation of the equal equipment at no additional cost. This includes, but is not limited to, changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels, and correlation with other work, subject to the jurisdiction and approval of the Engineer.

3. Where specifically called for, provide equipment of the named manufacturer with an alternate price for the acceptable "equal" equipment.

D. Equipment Protection

1. Store all materials and equipment to be installed in the work so as to insure the preservation of their quality, workability and fitness for the work intended. Provide storage provisions for protection from the elements, rust, and physical damage. Place stored materials on clean, hard surfaces above ground and keep covered at all times to insure protection from paint, plaster, dust, water and other construction debris or operations. Install heaters under the protective cover where the equipment may be damaged due to moisture and weather conditions. Keep conduit ends plugged or capped and all covers closed on boxes, panels, switches, fixtures, etc. until installation of each item. Store all plastic conduit or duct

out of direct sunlight in shaded areas. Locate stored materials and equipment to facilitate prompt inspection.

2. Protect during installation, all equipment, controls, controllers, circuit protective devices, etc., against entry of foreign matter on the inside and be vacuum clean both inside and outside before testing, operating and painting.

3. Place damaged equipment, as determined by the Engineer, in first class operating condition or return to source of supply for repair or replacement.

4. Protect painted surfaces with removable heavy kraft paper, sheet vinyl or equal, installed at the factory and removed prior to final inspection.

5. Repair damaged paint on equipment and materials. Finish with same quality of paint and workmanship as used by manufacturer so repaired areas are not obvious.

PART 3 – EXECUTION

A. General Requirements

1. Field coordinate with other trades in ample time to build all chases and openings, set all sleeves, inserts and concealed materials, and provide clearances that may be required to accommodate materials and equipment, lay out electrical work so that in case interference with other items the layout may be altered to suit conditions encountered.

2. Cutting of Holes:

    a. Cut holes through concrete and masonry in structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand, or manual hammer type drills are not allowed except where permitted by the Engineer as required by limited working space.

    b. Locate holes so as not to affect structural sections such as ribs or beams.

c. Layout holes in advance. Advise the Engineer prior to drilling through structural sections for determination of proper layout.

3. Floor, exterior wall and roof seals must be watertight. Sleeve walls and floors which are cored for installation of conduit with steel tubing, grouted, and the space between the conduit and sleeve filled as specified herein. Where conduits pierce the roof, refer to architectural specifications and drawing for details.

4. Do not use electrical hangers and other supports for other than electrical equipment and materials, provide not less than a safety factory of 5 and conform with any specific requirements as shown on the drawings or in the specifications.

5. Do not deviate from the Plans and Specifications without the full knowledge and consent of the Engineer. Should, at any time during the progress of the work, a new or existing condition be found which makes desirable a modification of the requirements of any particular item, report such item promptly to the Architect for his decision and instruction.

6. Notify all other Contractors of any deviation or special conditions. Resolve interferences between the work of the various Contractors prior to installation. Remove, if necessary, work installed, which is not in compliance with the Plans and Specifications as specified above, and properly reinstall without additional cost to Owner. Architect/Engineer or his representative is the mediating authority in all deviation and confliction disputes arising on this project.

B. Equipment Installation and Requirements

1. Installation:

a. “Provide” and “Install” as used on the drawings and in the specifications means furnish, install, connect, adjust and test except where otherwise specified.

b. Install coordinated electrical systems, equipment and materials complete with auxiliaries and accessories.

2. Equipment location: As close as practicable to locations shown on drawings.

3. Working spaces not less than specified in the National Electrical code for all voltages specified.

4. Inaccessible Equipment:

    a. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, remove and reinstall equipment as directed at no additional cost.

    b. Conveniently accessible is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and ductwork.

5. Equipment and Materials:

    a. Install new equipment and materials unless otherwise specified.

    b. Insure that equipment and materials are designed to provide satisfactory operating life for environmental conditions where being installed. NEC and other code requirements apply to the installation in areas requiring special protection such as explosion-proof, vapor-proof, watertight and weatherproof construction.

C. Equipment Identification

1. In addition to the requirements of the National Electrical Code, install an identification sign which will clearly indicate information required for use and maintenance of items such as panelboards, cabinets, motor controllers, safety switches, separately enclosed circuit breakers, individual breakers, and controllers in switchgear and motor control assemblies, control devices and other significant equipment.

D. Drawings and Specifications

1. The drawings and specifications indicate the requirements for the systems, equipment, materials, operation and quality. They are not to be construed to mean limitation of competition to the products of specific manufacturers.

E. Systems Voltages

1. High Voltage: Above 600 Volts.

2. Low Voltage: 600 Volts and Lower.

F. Submittals

1. Obtain the Engineer's approval for all equipment and material before delivery to the job site. Delivery, storage, or installation of equipment or material that has not had prior approval is not permitted at the job site.

2. Include in all submittals adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Engineer to ascertain that the proposed equipment and materials comply with specification requirements, catalog cuts submitted for approval must be legible and clearly identify equipment being submitted.

3. Make submittals for individual systems and equipment assemblies which consist of more than one item or component for the system or assembly as a whole. Partial submittals will not be considered for approval.

4. Submit within fifteen (30) days after the awarding of the Contract, six (6) complete brochures of shop drawings and descriptive data of all materials and equipment.

5. The submittals must include the following:

    a. Information which confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.

b. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring must be identified on wiring diagram.

c. Parts list which must include those replacement parts recommended by the equipment manufacturer.

d. Approval will be based on complete submission only.

6. Furnish shop drawing for the work involved in sufficient time so that no delay or changes will be caused. Thermofax copies are not acceptable; only permanent type prints are allowed.

7. Verity that shop drawings comply in all respects with the item originally specified. It is the Contractor's responsibility to procure the proper sizes, quantities, rearrangement, structural modifications or other modifications in order for the substituted item to comply with the established requirements.

8. Any shop drawings prepared to illustrate how equipment, conduit, fixtures, etc., can be fitted into available spaces will be examined under the assumption that the Contractor ahs verified all the conditions. Obtaining approval thereon does not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those drawings.

9. Shop drawings need not cover detailed installation drawings prepared for the Contractor's own use, but be limited, as in the case of raceways, to necessary departures for the plans as prepared by the Engineer.

10. Submit working scale drawings of apparatus and equipment which in any way varies from theses specifications and plans, to be reviewed by the Engineer before the work is started. Correct interferences with the structural conditions before the work proceeds.

11. Submit all shop drawings at the same time in a loose-leaf binder with double index as follows:

    a. List the products alphabetically by name.

b. List the name and manufacturers whose products have been incorporated in the work alphabetically together with their addresses and the name and addresses of the local sales representative.

G. Test and Demonstration

1. As equipment and materials are being installed and connected, test the installation for the following:

   a. Short circuits and ground faults.

   b. Insulation resistance at 500 volts DC.

   c. Grounding continuity.

2. After tests are completed and necessary corrections are made, put each system into operation and demonstrate its performance to the satisfaction of the Owner's authorized representative.

3. Provide written documentation of tests and performance as requested by the Owner's authorized representative.

4. Furnish all electricity, instruments, test equipment and personnel that are required for the particular test. Certify that equipment and instruments are in good working order. Remove equipment subject to damage during test from line before test is applied.

H. Completion and Acceptance

1. Upon completion of the work and before final acceptance, perform the duties and provide the documents in accordance with the General Conditions of the Contract.

2. Remove all rubbish, tools and surplus materials accumulated during the execution of the work in this Division.

3. Touch up any equipment or finishes damaged during delivery or installation of the work in this Division.

4. Provide a written one-year guarantee of materials and work except for items that are specified to have a longer warranty.

Items that have a published or normal life expectancy of less than one year, such as incandescent lamps are to be governed by the manufacturer's guarantee.

5. Provide systems and equipment installation, operating and maintenance instructions and catalog data for transmittal to the Owner. Place the data in a loose leaf binder which contains an index of the products listed alphabetically by name and a separate index listing the manufacturer's address of their local representative.

6. Instruct the Owner's representative in the proper operation and maintenance of the systems and their elements as required or directed to familiarize the Owner in the operation and maintenance of the system.

I. Records Drawings

1. Maintain one extra set of Blue or Black-line white print drawings for use as record drawings. Keep daily records using colored pencil. When the work is completed transfer relevant information to a reproducible set, to be given to the Engineer.

2. Show as-built information to scale, using standard symbols listed in the legend. As a minimum, shown the following:

    a. Location of stub-outs, dimensioned from permanent building lines.

    b. Location and depth of under-slap and in slab raceways.

    c. All routing of raceways.

    d. Corrected panelboard and equipment schedules.

    e. Corrected circuit numbers as they appear on panelboard directories.

    f. Corrected motor horsepower and full load amperages.

g. Number, size, type or insulation, number of wires in each conduit or multi-conductor cable whether in conduit or exposed.

h. Location of junction boxes and splices.

End of Section

SECTION 16109 - IDENTIFICATION

PART 1 - GENERAL

1.01 Work Included

A. Provide and install identification makers.

1.02 Related Work

A. Section 16111: Conduit

B. Section 16130: Outlet and Pull Boxes

C. Section 16120: Wires and Cables

D. Section 16471: Panelboards

E. Section 16475: Lighting Control and Building Automation Panel Boards

E. Section 16491: Motor and Circuit Disconnects

F. Section 16402: Low Voltage Switchboards

PART 2 - PRODUCTS

2.01 Materials

A. Provide nameplates of laminated phenolic plastic with engraved letters 3/16" high at pushbutton stations, thermal overload switches, receptacles, wall switches and similar devices where the nameplate is attached to the device plate. At all other locations make lettering 1/4" high, unless otherwise detailed on the drawings. Securely fasten nameplates to the equipment with No. 4 Phillips, roundhead, cadmium plated, steel self-tapping screws or nickel plated brass bolts. Motor nameplates may be die stamped non-ferrous metal not less than 0.03" thick.

B. Premarked, self-adhesive, wrap around type markers, manufacturers: Brady, T&B, E-Z code.

C. Underground type plastic line marker: Manufacturer's standard permanent, bright colored, continuous printed plastic type, not less than 6" wide X 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried cable.

PART 3 - EXECUTION

1.01 Installation

A. General: Equip the following items with nameplates:

1. All motors, motor starters, motor control center, pushbutton stations, control panels, and time switches.

2. Disconnect switches, fused or nonfused, switchboards and panelboards, circuit breakers, contactors or relays in separate enclosures.

3. Power receptacles where the nominal voltage between any pair of contacts is greater than 150 volts.

4. Wall switches controlling outlets for lighting fixtures or equipment where the outlets are not located within sight of the controlling switch.

5. Special electrical systems at junction and pull boxes terminal cabinets and equipment racks.

B. Adequately describe the function of or use of the particular equipment involved. Where nameplates are detailed on the drawings, use inscription and size of letters as shown. Include on nameplates for panelboards and switchboards the panel designation, voltage and phase of the supply. The name of the machine or the motor nameplates for a particular machine must be the same as the one used on all motor starter, disconnect and pushbutton station nameplates for that machine.

C. Underground Cable Identification: During back filling/top soiling of each exterior underground electrical, signal or communication cable, install continuous underground type plastic line marker, located directly over buried line at 6" to 8" below finished grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16", install a single line marker. Install line marker for every buried cable,

regardless of whether it is direct buried, protected in conduit or encased in concrete.

D. Operational Identification and Warnings: Wherever reasonably required to ensure safe and efficient operation and maintenance of electrical system, electrically connected mechanical systems, general systems and equipment and including the prevention of misuse of electrical facilities by unauthorized personnel, install self adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for intended purposes.

E. Danger Signs:

1. In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations indicated and at locations subsequently identified by the Installer of electrical work as constituting similar dangers for persons in or about the project.

2. High Voltage: Install danger signs wherever it is possible, under any circumstances, for persons to come into contact with electrical power of voltages higher than 110-120 volts.

3. Critical Switches/Controls: Install danger signs on switches and similar controls, regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

F. Furnish and install a framed, full-size (24" X 36" min.) print of the electrical riser and distribution systems (emergency and normal). Include the main service entrance equipment, distribution panels, branch circuit panels, transformers, motor control centers, transfer switches, emergency generator, emergency distribution panels, emergency branch circuit panels, etc.

1. Show each piece of electrical equipment on the print and identify with identical terminology as shown on the engraved plate on each piece of equipment installed throughout the building.

2. Submit "Record Drawing" to the Electrical Design Engineer for approval prior to installation.

3. Frame print in a suitable wooden frame under glass and install in the main service entrance equipment room at a location designated by the Owner.

END OF SECTION

SECTION 16111 - CONDUIT & RACEWAY

PART 1 GENERAL

1.01 WORK INCLUDED

A. Rigid metal conduit and fittings.

B. Intermediate metal conduit and fittings.

C. Electrical metallic tubing and Fittings.

D. Liquid tight flexible metal conduit and fittings.

E. Non-metallic conduit and fittings.

1.02 INCLUDED SPECIFICATIONS

A. Section 16010 - Basic Electric Work

1.03 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

D. FS WW-C-563 Electrical Metallic Tubing.

E. FS WW-C-566 Specification for Flexible Metal Conduit.

F. FS WW-C-581 Specification for Galvanized Rigid Conduit.

PART 2 PRODUCTS

2.01 RIGID METAL CONDUIT AND FITTINGS

A. Rigid Steel Conduit: ANSI C80.1

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type, material to

match conduit.

2.02 INTERMEDIATE METAL CONDUIT (IMC) AMF FITTINGS

A. Conduit: Galvanized Steel.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; use fittings and conduit bodies specified above for rigid steel conduit.

2.03 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

A. CMT: ANSI C80.3. Galvanized tubing

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; Steel or malleable iron, compression type.

2.04 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

A. Conduit: Flexible metal conduit with PVC jacket.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1.

2.05 PLASTIC CONDUIT AND FITTINGS

A. Conduit: NEMA TC 2 Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3

2.06 SURFACE METALLIC RACEWAY

A. Surface Metallic Raceways: One-piece system of galvanized steel, base and cover preassembled.

1. Acceptable Product: Wiremold 500 or 700 Series One Piece Metal Raceway by Legrand/Wiremold.

a. Construction: 3/4 inch (19 mm) wide by 17/32 (13.5mm) or 21/32 inch (17 mm) deep.
b. Include all matching fittings, devices, and fixture boxes.
c. Finish: Manufacturer's standard Ivory, White or custom color as selected – Verify and coordinate with Architect.

2.07 CONDUIT SUPPORTS

A. Conduit Clamps, Straps, and Supports corrosion resistant: Steel or malleable iron.

PART 3 EXECUTION

3.01 CONDUIT INSTALLATION SCHEDULE

A. Underground installation buried more than 18" deep, Schedule 40 plastic conduit.

B. Installation in or under concrete slab, or underground buried less than 18" deep, Rigid Steel Conduit.

C. Exposed outdoor locations: Rigid Steel, Liquidtight flexible steel.

D. Wet Interior Locations: Rigid Steel, Liquidtight flexible steel.

E. Concealed Dry interior locations: Rigid Steel, Intermediate metal conduit, electric metallic tubing, liquidtight flexible steel.

F. Exposed dry interior locations: Rigid Steel, Electrical metallic tubing, Liquidtight flexible steel.

3.02 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

A. Size conduit for conductor type installed or for type THW conductors, whichever is larger: 3/4 inch minimum size underground and 1/2 inch minimum size above grade.

B. Arrange conduit to maintain headroom and present a neat appearance.

C. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls.

D. Maintain minimum 6 inch clearance between conduit and piping. Maintain 12 inch clearance between conduit and heat sources such as flues, pipes, and heating appliances.

E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lav-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space of 25% percent additional conduit.

G. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

3.03 CONDUIT AND TUBING INSTALLATION

A. Cut conduit and tubing square using a saw; de-burr cut ends.

B. Bring tubing to the shoulder of fittings and couplings and fasten securely.

C. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

D. Install no more than the equivalent of three 90-degree bends between boxes.

E. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 1 inch size.

F. Avoid moisture traps.

G. Install Wiremold raceway system in all exposed locations below 8 feet from finished floor level.

END OF SECTION

SECTION 16120 - WIRE AND CABLE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Building Wire.

B. Cable.

C. Wiring connections and termination.

1.02 REFERENCES

A. NEMA WC 3 - Rubber insulated wire and cable for the transmission and distribution of electrical energy.

B. NEMA WC 5 - Thermoplastic insulated wire and cable for the transmission and distribution of electrical energy.

PART 2 PRODUCTS

2.01 BUILDING WIRE

A. Feeders and Branch Circuits larger than 6 AWG; copper stranded conductor, 600 volt insulation, THHN/THWN or THW.

B. Feeders and Branch Circuits smaller THHN 6 AWG solid copper conductor, 600 volt insulation, THHN/THWN, 6 and larger stranded copper conductor.

C. Control Circuits: Copper, stranded conductor 600 volt insulation, THW or THHN/THWN.

D. Communications System Wiring per Equipment Manufacturer.

PART 3 EXECUTION

3.01 GENERAL

A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring unless noted.

B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet.

C. Splice only in junction or outlet boxes.

D. Neatly train and lace wiring inside boxes, equipment, and panelboards.

E. Make conductor lengths for parallel circuits equal.

3.02 WIRING INSTALLATION IN RACEWAYS

A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricate for pulling 4 AWG and larger wires if required.

B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

C. Seal service entrances into building per codes and Utility Co. requirements.

3.03 WIRING CONNECTIONS AND TERMINATIONS

A. Use solderless pressure connectors with insulating covers for copper wire splices and taps, 8 AWG and smaller. For 10 AWG and smaller, use insulated spring wire connectors with plastic caps or copper sleeve stacon connectors.

B. Use pressure connectors for copper wire splices and taps, 6 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.

C. Thoroughly clean wires before installing lugs and connectors.

D. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

E. Terminate spare conductors with wire nuts and electrical tape.

H. The electrical contractor shall provide all wiring necessary to complete the electrical installation per plans and specifications.

END OF SECTION

SECTION 16130 - BOXES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.02 REFERENCES

A. ANSI/NEMA OS 1 - Sheet Steel outlet boxes, device boxes, covers and box supports.

B NEMA 250 - Enclosure for Electrical Equipment (1000 volts maximum)

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet boxes: ANIS/NEMA OS 1: Galvanized steel, with 1/2" inch male fixture studs where required.

B. Cast Boxes: Aluminum, cast feralloy, deep type, gasketed cover, threaded hubs.

2.02 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: ANSI/NEMA OS 1; Galvanized steel.

B. Cast Metal Boxes For outdoor and Wet location installation: NEMA 250: junction box, UL listed as raintight, Galvanized cast iron or cast aluminum box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

C. Wiremold boxes for V500 raceway systems in exposed areas below 8 feet from the finished floor.

PART 3 EXECUTION

3.01 COORDINATION

A. Provide electrical boxes as shown on drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.

B. Electrical box locations shown on Contract drawings are approximate unless dimensioned. Verify location of floor boxes and outlets when shown or required prior to rough-in.

C. Locate and install boxes to allow access.

D. Locate and install to maintain headroom and to present a neat appearance.

3.02 OUTLET, PULL, SPLICE OR JUNCTION BOX INSTALLATION

A. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation.

B. Locate boxes in masonry walls to required cutting of masonry unit in corner only. Coordinate masonry cutting to achieve neat openings for boxes.

C. Provide knockout closures for unused openings.

D. Support boxes independently of conduit, except for cast boxes that are connected to two rigid metal conduit, both supported within 12 inches of box.

E. Use multiple-gang boxes where more than one device is mounted together: do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.

F. Install boxes in walls without damaging wall insulation.

G. Coordinate mounting heights and locations of outlets mounted above counters, equipment and backsplashes.

H. Position outlets to locate luminaries as shown on lighting and reflected ceiling plans.

I. In inaccessible ceiling areas, position outlets and junction boxes, when required, within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening.

J. Provide recessed corrosion resistant outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

K. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.

L. Provide corrosion resistant cast outlet boxes in exterior locations exposed to the weather and in other wet locations.

END OF SECTION

SECTION 16141 - WIRING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wall Switches.

- Electrically Held Line Voltage Wall Switches (per plans)
- Low Voltage Wall Switches (per plans)

B. Receptacles.

C. Device plates and box covers.

1.02 REFERENCES

A. FS W-C-596 Electrical Power connector, plug, receptacle, and cable outlet.

B. FS W-S-896 Switch, Toggle.

C. NEMA WD 1 - General Purpose Wiring Devices.

D. NEMA WD 5 - Specific Purpose Wiring Devices.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - WALL SWITCHES

A. Sentry, Schneider, Hubbell, Slater, Arrow Hart, Leviton, G.E., P & S.

B. Substitutions: Under provisions of Section 16010.

2.02 WALL SWITCHES (SPECIFICATIONS GRADE QUIET TYPE)

A. Wall Switches for lighting circuits and motor loads under 1/2 HP:

- Sentry Switch Model SS05277 for circuits rated 5 ampere or less and 120 volts AC. Plastic plates and devices shall have color selected by the Architect.
- Sentry Switch Model SS20277 for circuits rated up to 20 ampere and 120 volts AC. Plastic plates and devices shall have color selected by the Architect.

- Sentry Three Way Switch Model SS053277 for circuits rated 5 ampere or less and 120 volts AC. Plastic plates and devices shall have color selected by the Architect.
- Sentry Three Way Switch Model SS23277 for circuits rated up to 20 amperes and 120 volts AC. Plastic plates and devices shall have color selected by the Architect.

B. Wall switches with pilot light rated 20A, 120 Volt Equal Hubbell 1221-PL

C. Wall switches double pole 20A, Equal Hubbell 1222-1

D. Wall Switches three-way 20A, Equal hubbell 1223-1

E. Wall Switches four-way 20A, Equal Hubbell 1224-1

F. Schneider C-Bus 360° PIR Low Voltage Occupancy Sensors for use with Powerlink G3500 network controller system and Schneider Powerlink Panels. (See Plans)

G. Schneider C-Bus Saturn 5 Button Dynamic Labeling Technology Low Voltage Wall Keypads for use with Powerlink G3500 network controller system and Schneider Powerlink Panels. (See Plans)

H. Hubbell Ceiling Occupancy Sensors, Model CUI5002000P120 IVORY.

I. Hubbell Wall Occupancy Sensor, Model LHIRS1 IVORY.

2.03 ACCEPTABLE MANUFACTURERS – RECEPTACLES

A. Hubbell, Slater, Arrow hart, Leviton, G.E. P & S.

B. Substitutions: Under provisions of Section 16010.

2.04 RECEPTACLES

A. Convenience and Straight-Blade duplex receptacles: NEMA 5-20R grounding type. Equal hubbell 5362-1.

B. Straight-Blade single receptacle: NEMA 5-20R grounding type. Equal Hubbell 5352-1.

C. Twist-lock receptacles: NEMA L7-20R grounding type. Equal Hubbell 2330-A.

D. Ground Fault interrupter receptacles: ANSI C73.12, NEMA 5-20R, 20A 125 Volt, Equal Hubbell GF-5362-1.

E. Other receptacles as noted and required.

2.05 WALL PLATES

A. Decorative cover plate: Smooth color as selected by the Architect Phenolic Plastic.

B. Weatherproof cover plate: Gasketed cast metal with hinged gasketed device covers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install wall switches 48 inches above floor, off position down.

B. Install convenience receptacles 16 inches above finished floor and 8 inches above counter tops unless otherwise directed or noted.

C. Install specific-use receptacles at heights shown on Contract drawings.

D. Install devices and wall plates flush and level.

E. Contractor shall provide permanent labeling of circuits to each device on the front of the wall plates (i.e) (Pnl L-3 etc.)

F. Sentry switches shall be used for wall switches in classrooms and where line voltage switching is required throughout the facility.

G. Low voltage switching shall be provided as shown on the plans. Low voltage switches shall be compatible with the Schneider C-Bus Network Devices.

H. Other Line Voltage Switches (i.e., Hubbell, etc.) may be utilized for Alternate#1 (see plans).

END OF SECTION

SECTION 16190 - SUPPORTING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Conduit and equipment supports.

B. Fastening hardware.

1.02 COORDINATION

A. Coordinate size, shape and location of support systems with other contractors.

PART 2 PRODUCTS

2.01 MATERIAL

A. Support channel: Galvanized or painted steel.

B. Hardware: Corrosion resistant.

PART 3 EXECUTION

3.01 INSTALLATION

A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure or additional steel supports.

B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs.

C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit unless specifically indicated.

D. Do not use powder-actuated anchors.

E. Do not drill structural steel members.

F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

G. In wet locations, install electrical equipment watertight.

H. Install surface-mounted cabinets and panelboards with a minimum of four anchors.

END SECTION

SECTION 16450 - GROUNDING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Electrical system grounding.

1.02 REGULATORY REQUIREMENTS

A. Install a complete grounding system in accordance with National Electrical Code Article 250.

PART 2 PRODUCTS

2.01 GROUND RODS

A. Ground rods shall be copper-clad steel 5/8 inch diameter X 10 feet minimum length.

2.02 CONDUCTORS

A. Ground Conductors shall be copper type THHN/THWN.

PART 3 EXECUTION

3.01 INSTALLATION

A. Exothermically weld or clamp cable connection to ground rod in permanently visible location. Install service entrance ground conductor in PVC conduit from main service ground to ground rod.

B. Bonding Jumpers: Provide bonding jumper. Connect ground bar neutral only at service entrance panel neutral bar.

C. Bonding Wires: Install a Green Ground bonding wire in all conduit systems with bond wire conduit connected at each end to a grounding bar solderless lug, clamp or cup washer and screw. Ground all enclosures, boxes, receptacles, light fixtures, enclosures, etc.

D. All existing panels to be reused shall have grounds & neutral bars separated. Insulate the neutral bars, & install neutrals on the neutral bars and green grounds on the green ground bars only.

END OF SECTION

SECTION 16471 - PANELBOARDS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Panelboards as scheduled on the drawings.

1.02 REGULATORY REQUIREMENTS

A. Construct panelboards to UL standards and provide UL labels.

1.03 SUBMITTALS

A. Manufacturer shall provide [6] seven copies of the following documents to the Engineer for review and evaluation in accordance with general requirements.

1. Product Data on specified product;

2. Shop Drawings on specified product;

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Square D (Schneider), Cutler-Hammer, Siemmens

B. Substitutions: Under provisions of Section 16010.

2.02 ENCLOSURES

A. Panels: Surface or flush mounted complete with panel trim having concealed hinges and trim mounting screws. Provide locking door with flush catch. NEMA 1 or NEMA 3R as required by location.

B. Tub: Galvanized, painted to match trim.

C. Keys: Provide two keys for each panel. Make keys interchangeable for panels of same voltage.

2.03 PANELBOARDS

A. Panelboards: 1 or 3 phase, 3 or 4 wire, design with sequence phase bussing and full capacity neutral, composed of an assembly of molded case automatic air circuit breakers with thermal and magnetic trip and trip free position separate from either ON or OFF positions. Provide common simultaneous trip for 2 and 3 pole breakers. Provide interrupting ratings of 10,000 AIC for 240 volts unless noted. Provide ground bar in each panelboard. Busbars shall be copper only.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide mounting brackets, busbar drillings, and filler pieces for unused spaces.

B. Prepare and affix a typewritten directory to inside cover of panelboard indicating loads controlled by each circuit.

END OF SECTION

SECTION 16491 - DISCONNECT SWITCHES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide and install motor disconnects.

B. Provide and install circuit disconnects.

C. Verify Load Rating and Requirements with other Trades and Manufacuter's

1.02 REGULATORY REQUIREMENTS

A. Conform to National Electrical Code and to applicable inspection Authority.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. General Electric, Schneider (Sq. D.), Westinghouse.

B. Substitutions: Under provisions of Section 16010.

2.02 COMPONENTS

A. Motor and circuit disconnects shall have an underwriter's laboratory label.

B. Single phase disconnect switches: Single or two pole toggle switch. A suitably rated twist lock receptacle and plug with power cord connection may be used for single phase fractional horsepower motors when approved by the Engineer and Inspector.

C. Disconnect Switches: 2 or 3 pole heavy duty fusible or non-fusible 600 volt as required in NEMA type 1 or 3R enclosure to suit location.

D. Fuses shall be equal "Fusetron" or as recommended by Equipment Manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install motor and circuit disconnect as recommended by manufacturer and as required by Code.

B. Install disconnect switches for outdoor condensing units below the top of condensing units.

END OF SECTION

SECTION 16510 - LIGHTING FIXTURES

PART 1 - GENERAL

1.01 Work Included:

A. This Section includes supply and installation of luminaries, supports, and accessories; fixture frames, trim rings, and back boxes for lay-in or other ceilings to suit finish.

1.02 Interface:

A. Confirm compatibility and interface of other materials with luminaire and ceiling system. Report discrepancies to the Engineer/Architect, and defer ordering until clarified.

B. Supply frames, trim rings and back boxes to other trades.

C. Coordinate with Division 15 to avoid conflicts between luminaries, supports, piping, ductwork, and mechanical equipment.

PART 2 - PRODUCTS

2.01 LED OR Fluorescent Luminaries:

A. Provide Luminaries as scheduled on drawings.

B. Provide gasketing, stops, and barriers to form light traps and prevent light leaks.

C. Design luminaire to dissipate heat.

D. Use formed or ribbed backplates, endplates, reinforcing channels.

E. Verify Finishes with Architect.

2.02 Recessed Luminaries:

A. Recessed LED or Fluorescent Luminaries: Pre-wired type with

junction box forming an integral part of the assembly.

B. Supply luminaire complete with trim type required for ceiling system installed. Before ordering, confirm ceiling construction details and architectural finish for each area.

C. Select reflector and lamp positions to provide high efficiency, and even brightness.

PART 3 - EXECUTION:

3.01 Supports:

A. Refer to Section 16190

B. Support luminaries directly from building structure.

3.02 Adjusting and Cleaning:

A. Align luminaries and clean diffusers prior to final acceptance.

3.03 Luminaire Schedule:

A. Lighting Fixture Schedule is shown on drawings.

B. Provide Fixtures with bulbs as specified, if required.

3.04 Lighting Control:

A. Install lighting controls as shown on the drawings.

END OF SECTION

SECTION 16770 - TELEVISION, TELEPHONE, & DATA EMPTY CONDUIT

PART 1- GENERAL

1.01 SECTION INCLUDES

A. Conduit and boxes for telecommunications, data, & television systems.

1.02 SYSTEM DESCRIPTION

A. Provide empty conduit and outlet boxes for complete telephone, data, and television systems.

PART 2- PRODUCTS

2.01 GENERAL

A. No wiring is included.

2.02 MATERIALS

A. Boxes shall be (2) gang 3 ½" deep Wiremold boxes for V500 raceway system.

B. Equal to Cablofil™ Cable Tray for low voltage wiring in corridors above accessible ceilings, exposed locations (i.e., control rooms, etc.) attic spaces, and other applicable areas.

PART 3- EXECUTION

3.01 INSTALLATION

A. General: Install system as described on Drawings or required by owner (Verify).

B. Coordinate with Owner for any A/V, Telephone, or Data Conduits that are required (Verify).

END OF SECTION