SPECIFICATIONS

FOR

MAINTENANCE BUILDING

FOR

JACKSON COUNTY SHERIFF'S DEPARTMENT

JACKSON COUNTY, ARKANSAS

January 2024

Miller-Newell

MILLER-NEWELL ENGINEERS, INC.
P.O. Box 705
510 Third Street
Newport, AR 72112
Phone (870) 523-6531
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M-N 23-085

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# ADVERTISEMENT FOR BIDS

Separate sealed bids for MAINTENANCE BUILDING CONSTRUCTION FOR THE JACKSON COUNTY SHERIFF DEPARTMENT will be received by Jackson County, Arkansas, at Jackson County Courthouse at the Judge's Office, 208 Main Street, Newport, AR 72112 until 10:00 A.M., on February 29, 2024, and then at said location publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, Forms of Bid Bond, Performance and Payment Bond, and other Contract Documents may be examined at the following locations:

Miller-Newell Engineers, Inc., 510 Third Street, Newport, AR
Dodge Plan Room, (www.dodgeplans.construction.com)
Construction Market Data (www.cmdgroup.com)
Southern Reprographics, 901 West Seventh, Little Rock, AR

Copies of the Contract Documents must be obtained at the office of MILLER-NEWELL ENGINEERS, INC., 510 Third Street, Newport, Arkansas 72112, upon the payment of $25 for each set. Bidders will be refunded $25 upon return of the Bidding Documents/Plans in usable condition within 14 days after receipt of bids.

The Owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid security in the amount, form and subject to the conditions provided in the Information for Bidders.

In accordance with Act 150 of 1965, as amended, all bidders shall conform to the requirements of the Arkansas State Licensing Law for Contractors.

No bidder may withdraw his bid within 60 days after the actual date of the opening thereof.

This Advertisement for Bids is being published by and paid for by the following:

Jackson County
208 Main Street
Newport, AR 72112

The amount of this publication is $_____.

County Judge Jeff Phillips
Date: February 11, 2024

## INFORMATION FOR BIDDERS

Bids will be received by Jackson County at Jackson County Courthouse at the Judge's Office, 208 Main Street, Newport, AR 72112 until 10:00 A.M., on February 29, 2024, and then at said office publicly opened and read aloud. Each bid must be submitted in a sealed envelope, addressed to Jackson County, AR. Each sealed envelope containing a bid must be plainly marked on the outside as BID FOR MAINTENANCE BUILDING CONSTRUCTION, and the envelope should bear on the outside the name of the bidder, his address, his license number, if applicable, and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner, 208 Main Street, Newport, AR 72112.

Bids must be made on the required bid form. All blank spaces for bid prices must be filled in, in ink or typewritten, and the bid form must be fully completed and executed when submitted. Only one copy of the bid form is required.

The Owner may waive any informalities or minor defects or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the bidder.

Bidders must satisfy themselves of the accuracy of the estimated quantities in the bid schedule by examination of the site and a review of the drawings and specifications, including all addenda. After bids have been submitted, the bidder shall not assert that there was a misunderstanding concerning the quantities of work or of the nature of the work to be done.

The Owner shall provide to bidders, prior to bidding, all information which is pertinent to and delineates and describes the land owned and rights-of-way acquired or to be acquired.

The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

Each bid must be accompanied by a Bid Bond payable to the Owner for five percent of the total amount of the bid. As soon as the bid prices have been compared, the Owner will return the bonds of all except the three lowest responsible bidders. When the Agreement is executed, the bonds of the two remaining unsuccessful bidders will be returned. The Bid Bond of the successful bidder will be retained until the Payment Bond and Performance Bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a Bid Bond.

A Performance Bond and Payment Bond, each in the amount of 100 percent of the contract price, with a corporate surety approved by the Owner, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign Bid Bonds or Payment Bonds or Performance Bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when the Notice of Award is delivered to the bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the bidder to execute the Agreement, the Owner may at his option consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

The Owner, within ten (10) days of receipt of acceptable Performance Bond, Payment Bond and Agreement signed by the party to whom the Agreement 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 by 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 shall be issued within ten (10) 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 (10) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Owner shall make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid on the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein. A conditional or qualified bid will not be accepted. Award will be made to the lowest responsible bidder.

All applicable laws, ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout.

Each bidder is responsible for inspecting the site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any bidder to do any of the foregoing shall in no way relieve any bidder from any obligation in respect to his bid.

The low bidder shall supply the names and addresses of major material suppliers and subcontractors when requested to do so by the Owner.

The Engineer is MILLER-NEWELL ENGINEERS, INC., 510 THIRD STREET, NEWPORT, ARKANSAS 72112.

# NOTICE TO BIDDERS

The following is made a part of these Contract Documents:

1. SAFETY STANDARDS AND ACCIDENT PREVENTION

With respect to all work performed under this Contract, in accordance with Act 291 of the Arkansas 79th General Assembly, the Contractor shall:

A. Comply with the safety standards provisions of applicable laws, building and construction codes, and the Manual of Accident Prevention in Construction: published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596 and the requirement of Title 29 of the Code of Federal Regulations, Section 1518 as published in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971), and specifically OSHA's Standard for Excavation and Trenches Safety Systems, 29 CFR Part 1926, Subpart P, which is made a part hereof by reference.

B. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.

C. Maintain at his office or other well-known place at the job site, all articles necessary for giving first aid to the injured and shall make standing arrangements for the immediate removal to a hospital or doctor's care of persons (including employees) who may be injured on the job site.

2. BID FORM - SEPARATE PAY ITEM

A. A separate lump sum bid item has been included for "Excavation/Trench Safety System (for excavation in excess of 5')". Bidder is required to complete this pay item in accordance with Act 291 of the Arkansas 79th General Assembly.

B. In the event a bidder fails to complete this pay item, the Owner shall declare that the bid fails to comply fully with the provisions of the specifications and bid documents and will be considered invalid as a non-responsive bid.

C. **NOTE: Payment for the lump sum bid item for "Excavation/ Trench Safety Systems" will be paid at the completion of the Contract. No partial payments will be allowed thereunder.**

PROPOSAL FORM

DATE: _____

Proposal of _____

(hereinafter called "Bidder"), a corporation, organized and existing under the laws of the State of _____; a partnership; an individual doing business as _____

_____.* (*STRIKE INAPPLICABLE PHRASE)

TO: Jackson County, Arkansas (Hereinafter called "Owner")

GENTLEMEN:

The Bidder, in compliance with your invitation for bids for the furnishing of materials and/or labor for CONSTRUCTION OF MAINTENANCE BUILDING FOR THE JACKSON COUNTY SHERIFF OFFICE, having examined the plans and specifications with the related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials, hereby proposes to furnish all materials and supplies in accordance with the Contract Documents, within the time set forth therein, and at the price stated below. These prices are to cover all expenses incurred in furnishing the equipment/materials required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this contract on or before a date to be specified in written "Notice to Proceed" of the Owner and to fully complete the project within **ninety (90) consecutive calendar days** thereafter as stipulated in the specifications. Bidder further agrees to pay as liquidated damages, the sum of $300.00 for each calendar day thereafter as hereinafter provided in Section 34 of the General Conditions.

Bidder acknowledges receipt of the following addendum:

_____

_____

_____

_____

Bidder agrees to perform all the work required and to furnish all material required to be furnished to cover the finished work as described in the Specifications and as shown on the Plans for the following prices:

## BID SCHEDULE

**BASE BID - CONTRACT I:**

**Construction of Maintenance Building as Shown on the Plans and in the Specifications for a Total Lump Sum Bid of** _____

_____

_____ **($_____).**

(Note: Bids shall include sales tax and other applicable taxes and fees.)

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids. No bid shall be withdrawn for a period of sixty (60) days subsequent to the opening of bids without the consent of the Owner.

Upon receipt of written notice of the acceptance of this bid, bidder will execute the formal contract attached within 10 days.

The bid security attached in the sum of _____ _____Dollars ($_____) is to become the property of the Owner in the event the contract is not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

RESPECTFULLY SUBMITTED,

_____

By:_____
Signature

_____ (SEAL if bid is by corporation)
Title

BUSINESS ADDRESS:

_____

_____ _____
CONTRACTOR'S ARKANSAS LICENSE NUMBER

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ _____, as Principal, and _____ , as Surety, are held and firmly bound unto _____ _____, as Owner, in the penal sum of _____ _____Dollars ($_____ _____), for payment of which sum well and truly to be made, we hereby jointly and severally bind ourselves, our successors and assigns.

SIGNED this _____ day of _____, 2024.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal has submitted to _____ a certain BID, attached hereto and made a part hereof, to enter into a contract in writing for:

CONSTRUCTION OF MAINTENANCE BUILDING

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their

hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the date and year first set forth above.

_____
Principal

_____
Surety

By:_____

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

CONTRACT

THIS AGREEMENT, made and entered into this ____ day of _____, 2024, by and between **JACKSON COUNTY, ARKANSAS,** hereinafter called "Owner," and _____, of _____, Arkansas, hereinafter called "Contractor."

WITNESSETH: That for an in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Owner, the Contractor hereby agrees with the Owner to commence and complete the construction described as follows:

CONSTRUCTION OF MAINTENANCE BUILDING FOR JACKSON COUNTY SHERIFF DEPT.

for JACKSON COUNTY, Arkansas, hereinafter called the project, for the sum of_____**Dollars($_____)** and all extra work in connection therewith, under the terms as stated in the General and Special Conditions of the Contract; and at his (its or their) own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, Supplemental General Conditions and Special Conditions of the Contract, the plans, which includes all maps, plats, blueprints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by MILLER-NEWELL ENGINEERS, INC., NEWPORT, ARKANSAS, herein entitled the Engineer, all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within **ninety (90)consecutive calendar days** thereafter. The Contractor further agrees to pay, as liquidated damages, the sum of $300.00 for each day thereafter as hereinafter provided in the General Conditions.

The Owner agrees to pay the Contractor in current funds for the performance of the contract, subject to additions and/or deductions, as provided in the General Conditions, and to make payments on account thereof as provided in Paragraph 33, "Payments to Contractor," of the General Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed this Contract in six (6) counterparts, each of which shall be deemed an original, on the day and year first above mentioned.

JACKSON COUNTY, ARKANSAS
Owner

(SEAL)
ATTEST:

By:_____

_____ JUDGE
County Clerk Title

_____
Contractor

(SEAL)
ATTEST:

By:_____

_____ _____
Print Name

_____ _____
Title Title

_____

_____
Business Address

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.

ARKANSAS PERFORMANCE AND PAYMENT BOND
(14-604 Arkansas Statutes)

KNOW ALL MEN BY THESE PRESENTS, that we _____, a _____, hereinafter called "Principal" and _____, of _____, hereinafter called the "Surety," are held and firmly bound unto _____, hereinafter called "Owner," in the penal sum of _____ _____Dollars ($___ _____) in lawful money of the United States, for payment of which sum well and truly to be made, said principals and surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 2024, a copy of which is attached and made a part hereof, for:

CONSTRUCTION OF MAINTENANCE BUILDING

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms and conditions, and agreement of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, and shall promptly make payment to all persons, firms, subcontractors and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, all amounts due for but not limited to, materials lubricants, oil, gasoline, coal and coke, repair on machinery, equipment and tolls, consumed or used in connection with the construction of said work, fuel oil, camp equipment, food for men, feed for animals, premium for bonds and liability and worker's compensation insurance, rentals on machinery, equipment and draft animals; also for taxes or payments due the State of Arkansas or any political subdivisions thereof which shall have arisen on account of or in connection with the wages earned by workmen covered by the bond; and for all labor, performing in such work whether by subcontractor or otherwise, then this obligation shall be void, otherwise to remain in full force and effect.

The Surety agrees the terms of this bond shall cover the payment by the Principal of not less than the prevailing hourly rate of wages as found by the Arkansas Department of Labor or as determined by the court on appeal to all workmen performing work under the contract.

PROVIDED, FURTHER, THAT THE SAID surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder of the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract as to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is execution in six (6) counterparts, each of which shall be deemed an original, this ___ day of _____, 2024.

_____
Principal

ATTEST: By:_____

_____ _____
Secretary Address

_____ _____
Witness as to Principal

_____
Address

_____
Surety

ATTEST: By:_____
Attorney-In-Fact

_____ _____
Secretary Address
(SEAL)

_____

_____ _____
Witness

_____
Address

NOTE: (1) Date of Bond must not be prior to date of Contract.
(2) This bond must be filed with the Circuit Clerk of

the County where the work is to be performed prior to the start of construction.

# GENERAL CONDITIONS

1. DEFINITIONS

A. The "Contract Documents" consist of the Advertisement for Bids, the Information for Bidders, the Proposal Form, the General Conditions, the Agreement of Contract, the Contract Bond, the Specifications and the Approved Plans, including all modifications to any of the above documents incorporated therein before their execution. All of these form the Contract.

B. The "Owner" is understood to mean the individual for whom the work is being done.

C. The "Engineer" is understood to mean the Registered Professional Engineer, registered in Arkansas, employed by the Owner to carry out the conditions of this contract. The Engineer is the duly authorized representative of the Owner. Where the term "Architect/Engineer" is used it is intended to mean "Engineer" and does not mean to imply the Engineer is an Architect.

D. The "Work Order" or "Notice to Proceed" is the Contractor's authority to begin the work. It shall designate the day on which working time shall commence. The work order shall be deemed to have been delivered when mail to the Contractor at the address given in the Proposal. When a Contractor begins work before a work order is issued, his time begins on the day he commences.

E. The term "Subcontractor," as employed herein, includes only those having direct contact with the Contractor and it includes one who furnished material worked to a special design according to the plans or specifications, but does not include one who merely furnishes material so worked.

F. The term "Work," includes labor or material or both, equipment, or other facilities necessary to complete the work.

2. CONTRACTOR'S UNDERSTANDING OF CONDITIONS OF WORK

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, quality and quantity of materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent or employee of the Owner, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

3. MATERIALS, APPLIANCES, EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay

for all materials, labor, water, tools, equipment, light, power and transportation and other facilities necessary for the execution and completion of the work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence, such as test reports, as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him.

4. ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible when a particular process or product of a particular manufacturer is specified, but if the Contractor has information that the process or article specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Engineer in writing.

5. SURVEYS, PERMITS AND REGULATIONS

The Engineer will provide the Contractor with the bench mark and alignment as may be necessary for the Contractor to layout the work correctly. The finished work must conform to the bench marks furnished by the Engineer.

The Owner shall furnish all right-of-way, easements and sites for the construction.

The Contractor shall furnish all permits and licenses required by law.

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 plans and specifications are at variance therewith, he shall promptly notify the Engineer in writing and proper changes or adjustments shall be made in accordance with the contract provisions for changes in the work.

6. PROTECTION OF WORK AND PROPERTY

The Contractor shall continuously maintain adequate protection of all his work from damages and shall protect the Owner's property from injury of loss arising in connection with the work. He shall make good any such damage, injury or loss, except such as may be due directly to errors in the Contract Documents or caused by agents or employees of the Owner. He shall protect all private property adjacent to the work. He shall provide and maintain all

passage ways, guard fences, lights and other facilities for protection required by law or local conditions.

The Contractor is hereby authorized to act in an emergency affecting loss of life or property without special authorization from the Engineer. Any compensation claimed by the Contractor on account of emergency work shall be determined by agreement or arbitration.

7. INSPECTION OF WORK AND TESTING OF MATERIALS

Inspection shall be provided by a representative of Miller-Newell Engineers, Inc., the Engineer, and his representatives, shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and inspection.

The Contractor shall furnish to the Engineer certified laboratory testing on all material to be used on the project.

No work or preparation for work shall be covered up without consent of the Engineer. If such work is covered up, without consent of the Engineer, the Contractor, if required by the Engineer, shall uncover such work for examination and replace it at his own expense.

Reexamination of approved work may be ordered by the Engineer and if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost of the reexamination and replacement. If such work is found not to be in accordance with the Contract Documents, the Contractor shall pay cost, unless he shall show that the defect in the work was caused by another Contractor and, in that event, the Owner shall pay such costs.

8. SUPERINTENDENCE AND SUPERVISION

The Contractor shall keep on his work during its progress a competent superintendent and any necessary assistants, all satisfactory to the Engineer. The Superintendent shall not be changed without the consent of the Engineer, unless he proves to be unsatisfactory to the Contractor and ceases to be in his employ. The Superintendent shall represent the Contractor in his absence and instructions and directions given to him shall be binding on the Contractor. Important decisions shall be confirmed to the Contractor in writing.

If the Contractor, in the course of the work, finds any discrepancy between the plans and the physical conditions of the locality, or any errors of omissions in the drawings or in the layout as given by prints and instructions, it shall be his duty to immediately inform the Engineer, in writing, and the Engineer shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

9. CHANGES IN THE WORK

The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract, except that any claim for extension in time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have the authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purpose of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the Contract sum shall be valid unless so ordered.

The value of any such extra work or changes shall be determined in one or more of the following ways:

A. By estimate and acceptance in a lump sum;

B. By unit prices named in the Contract or subsequently agreed upon;

C. By cost and percentage or by cost and a fixed fee.

If none of the above methods is agreed upon, the Contractor, provided he receives an order as above, shall proceed with the work. He shall keep an accurate account of the cost of labor and materials, pending final determination of the value of the work.

10. CLAIMS FOR EXTRA COST

If the Contractor claims that any instructions in the plans or otherwise involves any extra cost under this contract, he shall give the Engineer written notice thereof within a reasonable time after the receipt of such instructions and, in any event, before proceeding to execute the work, except in an emergency endangering life or property. No such claims shall be valid unless so made.

11. DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer deems it inexpedient to correct work injured or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore.

12. DELAYS AND EXTENSION OF TIME

If the Contractor be delayed at any time in the progress of the work by an act or neglect of the Owner or of his employees or by any other contractor employed by the Owner or by changes ordered in the work or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any causes by the Engineer pending arbitration, or by any cause which the Engineer shall decide justifies the delay, then the time of completion

shall be extended for such reasonable time as the Engineer may decide.

No such extension shall be made for delay occurring more than seven days before claim therefor is made in writing to the Engineer. In the case of the continuing cause of delay, only one claim is necessary.

This article does not exclude recovery of damages for delay by either party under provisions of the Contract Documents.

13. CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor shall promptly remove from the premises all materials condemned by the Engineer as failing to conform to the Contract, whether incorporated in the work, or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear all the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

If the Contractor does not remove such condemned work and materials within a reasonable time, fixed by written notice, the Owner may remove them and may store the materials at the expense of the Contractor.

14. SUSPENSION OF WORK

The Owner may at any time suspend work, or any part thereof, by giving five days written notice to the Contractor. The work shall be resumed by the Contractor within ten days after the date fixed by the written notice from the Owner to the Contractor to do so. The Owner shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this contract as a result of such suspension.

But, if the work or any part thereof shall be stopped by the notice in writing aforesaid, and if the Owner does not give in writing notice to the Contractor to resume the work at a date within thirty days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payment for all work done on the portions so abandoned.

15. THE OWNER'S RIGHT TO DO WORK

If the Contractor should neglect to prosecute the work or fail to perform any of the provisions of this Contract, the Owner, after three days written notice to the Contractor, may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

16. THE OWNER RIGHT TO TERMINATE THE CONTRACT

If the Contractor should be adjudged a bankrupt, or he should make

a general assigned for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or fail to make prompt payment to his subcontractors or for material or labor, or if he should persistently or repeatedly refuse or should fail, except in cases for which time is provided, to supply enough skilled workmen or proper materials, or if he should persistently disregard laws, ordinances or the instructions of the Engineer, or otherwise be guilty of a substantial violation of any provision of the contract, then the Owner, upon the certification of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy and after giving the Contractor seven (7) days notice in writing, terminate the employment of the Contractor and take possession of the premises and all materials, tools and appliances thereon and finish the work by whatever method he may deem expedient. In such cases, the Contractor will not be entitled to any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Engineer.

17. THE CONTRACTOR'S RIGHT TO TERMINATE THE CONTRACT

If the work should be stopped under the order of any court, or other public authority, for a period of three months, through no act or fault of the Contractor or of anyone employed by him, or if the Engineer should fail to issue any estimate for payment seven days after it is due, or if the Owner should fail to pay the Contractor within seven (7) days of its maturity and presentation, any sum certified by the Engineer or awarded by arbitrators, then the Contractor may, upon seven (7) days written notice to the Owner and the Engineer, stop the work or terminate this contract and recover from the Owner payments for all work executed and any loss sustained upon any plant or materials and reasonable profit and damages.

18. PAYMENTS WITHHELD

The Owner may withhold or, on account of subsequently discovered evidence, nullify whole or part of any certificate to such extent as may be necessary to protect himself from loss on account of:

A. Defective work not remedied;
B. Claims or reasonable evidence that claims will be filed;
C. Failure of the Contractor to pay all bills properly;
D. A reasonable doubt that the Contractor can finish work on time; or
E. Damage to another contractor.

When the above grounds are removed, payment shall be made for the amounts withheld because of them.

19. CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall maintain such insurance as will protect him for claims under the Worker's Compensation Act and from other claims for damages for personal injury, including death, which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them. Certificates of insurance for liability and property damage shall be filed with the Engineer before the work is started and shall be subject to his approval for adequacy of protection.

As required above, the Contractor's Public Liability Insurance and Vehicle Liability Insurance shall be in an amount not less than $500,000.00 for injuries, including accidental death, to any one person, and subject to the same limit for each person, and in an amount not less than $500,000.00 on account of one accident, and Contractor's property damage insurance in an amount not less than $500,000.00.

The insurance certificate must contain the following verbiage: **"The insurance covered by this certificate will not be canceled or materially altered except after ten (10) days prior written notice has been received by the Owner."**

The Contractor shall either (1) require each of his subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage of the type and in the same amounts as specified in the preceding paragraphs, or (2) insure the activities of his subcontractors in his own policy.

20. INDEMNITY

The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, suits, actions, recoveries and judgments of every nature and description brought or recovered against him by reason of any act or omission of the said Contractor, his agents or employees, in the execution of the work or in the guarding of it.

The Contractor shall, and is hereby authorized to, maintain and pay for such insurance, issued in the name of the Owner, as will protect the Owner from his contingent liability under this Contract, and the Owner's right to enforce against the Contractor any provisions of this article shall be contingent upon the full compliance by the Owner with terms of such insurance or policies, a copy of which shall be deposited with the Owner.

21. FIRE INSURANCE AND BUILDERS RISK INSURANCE

The Contractor shall secure in the name of the Owner, policies for fire insurance and builders risk insurance in the amount, form and from companies satisfactory to the Engineer, upon such structures and materials as shall be specified by the latter, payable to the Owner for the benefit of the Contractor or the Owner as the

Engineer shall find their interest to appear.

22. GUARANTY BONDS

The Contractor shall furnish the Owner, where stipulated in the advertisement for bids, with a performance bond covering the faithful performance on the contract and payment of all obligations arising thereunder, in such form as the Owner may prescribe and with surety company or companies as the Owner may approve.

23. DAMAGES

Any claims for damages arising under this Contract shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except as expressly stipulated by agreement or arbitration.

24. LIENS

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he had knowledge or information, the releases and receipts include all the labor and material for which the lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the Owner against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and a reasonable attorney's fee.

25. ASSIGNMENT

Neither party to the contract shall assign the contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder without the previous written consent of the Engineer.

26. SEPARATE CONTRACTS

The Owner reserves the right to let other contracts in connection with this work. 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 his work with theirs.

27. SUBCONTRACTS

The Contractor shall, as soon as practicable after the signature of the contract, notify the Engineer in writing the names of the subcontractors proposed for the work and shall not employ any of the subcontractors that the Engineer may object to as incompetent or unfit.

The Contractor agrees that he is fully responsible to the Owner for all work or omissions of his subcontractors, either directly or indirectly employed by him. Nothing in this contract shall create any contractual relations between the subcontractor or the Owner.

28. POINTS AND INSTRUCTIONS

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

29. ENGINEER'S STATUS

The Engineer shall observe the execution of the work. He has the authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the Contract. He shall also have the authority to reject all work and materials which do not conform to the contract, to direct application of the forces to any part of the work, as in his judgment is required, and to order the force increased or diminished, and to decide questions which arise in the execution of the work.

30. ENGINEER'S DECISIONS

The Engineer shall, within a reasonable time after their presentation to him, make decisions in writing on all claims of the Owner or Contractor and on other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

All such decisions of the Engineer shall be final except in cases where time and/or financial considerations are involved, which, if no agreement in regard thereto is reached, shall be subject to arbitration.

31. LANDS FOR WORK

The Owner shall provide the lands upon which the work under this Contract is to be done, except that the Contractor shall provide land required for the erection of temporary construction facilities and storage of his materials, together with right of access to same.

32. CLEANING UP

The Contractor, as directed by the Engineer, shall remove from the Owner's property and from all public and private property, at his own expense, all temporary structures and construction facilities, rubbish and waste materials resulting from his operations.

33. PAYMENTS TO CONTRACTOR

At least ten (10) days before each progress payment falls due (but

not more often than once a month), the Contractor will submit to the Engineer 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 Engineer 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 Owner, as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his 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 ten (10) days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain five (5) percent of the amount of each payment until final completion and acceptance of all work covered by the Contract Documents. When the work is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent 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.

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.

34. TIME OF COMPLETION - LIQUIDATED DAMAGES

The work shall be commenced at the time stipulated in the Notice to Proceed to the Contractor and shall be fully completed within ninety (90) consecutive calendar days thereafter.

As actual damages for any delay in completion are impossible to determine, the Contractor and his sureties shall be liable for and shall pay to the Owner the sum of $300.00 per day as fixed and agreed liquidated damages for each calendar day of delay until the work is completed and accepted.

35. SAFETY STANDARDS AND ACCIDENT PREVENTION

With respect to all work performed under this Contract, the Contractor shall:

A. Comply with the safety standards provisions of applicable laws, building and construction codes, and the Manual of Accident Prevention in Construction: published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-

596 and the requirement of Title 29 of the Code of Federal Regulations, Section 1518 as published in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971), and specifically OSHA's Standard for Excavation and Trenches Safety Systems, 29 CFR Part 1926, Subpart P.

B. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.

C. Maintain at his office or other well-known place at the job site, all articles necessary for giving first aid to the injured and shall make standing arrangements for the immediate removal to a hospital or doctor's care of persons (including employees) who may be injured on the job site.

# SUPPLEMENTAL GENERAL CONDITIONS

REFERENCE DOCUMENT: These Supplemental General Conditions are included as a part of the Contract Documents for this project to supplement and/or amend the standard provisions of the General Conditions.

1. EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

Section 2 of the General Conditions is hereby supplemented as follows: The Drawings and Specifications are intended to agree and to be mutually explanatory. Should any discrepancy exist and not be clarified by addendum prior to bid opening, it will be presumed that the Contractor has based his proposal on the more expensive of the conflicting requirements. Before proceeding with any part of the work, Contractor shall report any such discrepancy to the Engineer, who shall rule on which of the conflicting requirements is to be followed. If the least expensive is directed, the Contractor shall refund to the Owner the difference in net cost.

Explanatory notes on Drawings shall be preferred to conflicting drawn out indications, if any. Large scale details will be preferred to small scale drawings, and figured dimensions to scale measurements. Where figures are lacking, scale measurements may be followed, but in all cases the measurements are to be checked from work in place, and should variations be found, such must be referred to the Engineer for instructions. Where on any of the Drawings a portion of work is drawn out and remainder is indicated in outline, the parts drawn out shall apply also to all other like portions of the work. Where the word "similar" occurs on Drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relationship to their location and their connection with other parts of the work.

2. PROTECTION AGAINST THEFT

Contractor shall take such precautions as he deems necessary to protect himself and the Owner from loss by theft. Contractor shall be responsible for the recovery or replacement of all materials or equipment lost by reason of theft during the entire course of the work, even though payment for same may have been received.

3. TOILET FACILITIES

General Contractor shall furnish, install and maintain ample sanitary facilities for workmen, including those of other contractors. Toilets shall be placed where indicated on the site as soon as work begins. They shall be housed in temporary enclosures and shall be maintained in a sanitary condition. They shall be removed from the premises upon completion of the work. They shall comply with all regulations of governmental agencies having jurisdiction.

4. GUARANTY

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 that the completed system is 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 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 force and effect through the guarantee period.

# SECTION I

# SCOPE OF WORK

## PART 1. WORK INCLUDED

### 1.1 DESCRIPTION

It is intended that the contracts shall include all materials, labor, equipment, services, etc., for the work included in the Construction of a Maintenance Building as shown in the drawings and described in the Specifications prepared by Miller-Newell Engineers, Inc., 510 Third Street, Newport, AR.

The Contractor will not be required to perform work that is not within the general character and scope of the Drawings and Specifications or not reasonably inferrable therefrom; however, he must recognize and accept the fact that these documents are not intended to illustrate or describe each and every possible detail of construction or finish that will be encountered in the execution of the work, nor can they show the exact location of each mechanical line, wiring device, fixture, etc. Where conditions are encountered that have not been specifically shown or detailed, they shall be worked out and finished similar to other details of like nature, or in accordance with supplementary Drawings furnished by the Engineer.

It shall be the responsibility of the General Contractor to coordinate all of the various phases of the construction and finish materials, including mechanical and electrical lines and equipment, so that all of the many components will fit together and function properly without interference one to the other to the end that the entire job when completed will present a neat and finished appearance with all movable parts and mechanical and electrical equipment operating properly, ready for the Owner's occupancy and use.

## PART 2. SCOPE OF SUBCONTRACTORS WORK

2.1 This shall be established by agreement between the General Contractor and his subcontractors. For convenience of reference, the Specifications are separated into titled sections; however, such separation shall not operate to make the Engineer and arbiter to establish limits of the contracts between the General Contractor and subcontractors.

## PART 3. GRADES, LINES, LEVELS AND SURVEYS

3.1 All grades, lines, levels and bench marks shall be established and maintained by the General Contractor who shall be responsible for same.

Contractor shall verify all grades, lines, levels and dimensions as shown on the Drawings, and he shall report any errors or inconsistencies in the above to the Engineer before commencing work.

Contractor shall provide and maintain well built batterboards at all corners, he shall establish bench marks in not less than two widely separated places. As the work progresses he shall establish bench marks at each floor, giving exact levels of the various floors, and shall layout on the forms (or rough flooring) the locations of all partitions, etc., as a guide to all trades and subcontractors.

PART 4. DATA FOR "AS-BUILT" DRAWINGS

4.1 Contractor shall make a clearly legible record on one set of drawings of all conditions where the actual construction differs from the Contract Drawings. This includes the exact location of all mechanical lines and principal electrical conduits, referenced to convenient points with dimensions. Upon completion of the job, this set of drawings shall be delivered to the Engineer for his use.

PART 5. PROTECTION OF EXISTING UTILITIES

5.1 Contractor shall exercise extreme caution during excavation and/or earthwork of all kinds to prevent damage to existing mechanical lines and/or cables which may be located in the vicinity of work under this Contract. Approximate locations of such lines, insofar as the Engineer has been able to determine, are indicated on the plot plan; however, the engineer does not certify to the correctness of such information and does not assume any responsibility for same. In the event that such lines or cables should be disturbed by operations under this Contract, the Contractor shall immediately and at his own expense, make repairs necessary to restore them to their present condition.

PART 6. OWNER AND LOCATION

6.1 The work is to be done for the Jackson County Sheriff's Office or its duly authorized representative, referred to throughout the Contract Documents as the "Owner".

The project is to be located in Newport, Arkansas, at the point indicated on the plans.

## SECTION II

## EARTHWORK

### PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the Conditions of the Contract apply to all work under this Section. This includes all labor, materials, equipment and services necessary to complete all work indicated on the drawings and herein specified, or both.

B. Carefully read the General Conditions of the Specifications, which shall be considered as and made a part of this section.

1.2 SCOPE

A. The work required under this section consists of all excavating, filling, grading, dewatering, and related items necessary to complete the work indicated on the Drawings and described in these Specifications, including but not necessarily limited to the following:

1. Strip all roots and grass to 8" below the surface. Fill as described herein to 6" above existing grade. Construct building floor then place site stripping around building to within 6" of floor surface.

2. Excavating and disposal of all building rubble and excess soil materials required for completion of the work.

3. Providing and installing fill materials.

4. Rough grading and subgrade preparation.

5. Providing and installing controlled fill materials, footings and slabs.

1.3 EXAMINATION OF SITE AND DOCUMENTS

A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation at the site.

B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period as no allowance will be made for any errors or inaccuracies that may be found herein.

1.4 SUBSURFACE CONDITIONS

A. Subsurface conditions are to be assumed substantially as shown on the Drawings.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.

B. Comply with rules, regulations, laws and ordinances of all authorities having jurisdiction.

C. The Contractor shall procure and pay for all permits and licenses required for the complete work specified herein and shown on the Drawings.

D. The Contractor shall not close or obstruct any street, sidewalk, alley or passageway without permission from authorities having jurisdiction. The Contractor shall so conduct his operations as to interfere as little as possible with the use ordinarily made of roads, driveways, alleys, sidewalks, or other facilities near enough to the work to be affected thereby.

## PART 2.00 - MATERIALS AND EQUIPMENT

2.1 FILL MATERIALS

A. Gravel Fill. Well graded natural sand and gravel free from ice, organic or other deleterious materials, conforming to the following gradations:

| U.S. Sieve No. | Percent Passing by Weight | |
|---|---|---|
| | Maximum | Minimum |
| 4 Inch | --- | 100 |
| 1 Inch | 100 | 60 |
| No. 4 | 85 | 25 |
| No. 40 | 35 | 5 |
| No. 200 | 5 | 0 |

B. Ordinary Fill. Well-graded, natural, inorganic soil shall consist of sand or gravel clays approved by the Engineer and meeting the following requirements:

1. It shall be free of organic and other weak or compressive materials, of frozen materials, and of stones larger than 6 inches maximum dimension.

2. It shall be of such nature and character that it can be compacted to the specified densities in a reasonable length of time.

3. It shall be free of highly plastic clays, of all materials

subject to decay, decomposition, or dissolution, and of cinders or other materials which will corrode piping or other materials.

4. It shall have a liquid limit less than 45.

C. Controlled Fill Under Footings and Slabs.

1. The controlled fill under the floor slabs and footings shall consist of clayey sand or clayey gravel with a liquid limit less than 35. Samples of materials proposed shall be submitted for approval.

2.2 SOURCE QUALITY CONTROL

A. All fill materials shall be subject to quality control testing. A qualified laboratory will be selected and paid by the Contractor to perform tests on materials. Test results and laboratory recommendations will be available to the Owner.

2.3 COMPACTION EQUIPMENT

A. Provide sufficient equipment units of suitable types to spread, level and compact fills promptly upon delivery of materials.

B. Contractor may use any compaction equipment or device which he finds convenient and economical, but the Engineer retains the right to disapprove equipment which, in his opinion, is of inadequate capacity or unsuited to the character of materials being compacted.

PART 3.00 - EXECUTION

3.1 GENERAL

A. Site Preparation

To prepare for construction, all topsoil, vegetation, roots, and any soft soils in the building or pavement areas shall be stripped from the ground surface and either wasted or stockpiled for later use in landscaping. Some old foundation slabs may be encountered.

Site grading should include removal of the surficial organic soil zone in the building and pavement areas. Depth of stripping is estimated to be on the order of 24 inches, although potentially greater in localized soft and/or moist areas during wetter seasons.

Following stripping, and prior to placing fill, the site should be proof-rolled with a minimum 20,000 pound pneumatic tired roller, loaded tandem-wheeled dump truck, or similar equipment. Soft or loose zones should be undercut and be processed and re-compacted or undercut and replaced with approved select fill.

Additional undercutting in excess of the 24 inches will be paid for at the unit prices in the bid form.

Undercutting to depths of 2 to 3 feet are possible under extremely wet conditions, or if excessive disturbance occurs due to heavy construction equipment. To reduce undercut potential, the use of light dozers is recommended for stripping. In addition, operation of heavy rubber-tired equipment should be limited.

Fill required for backfill or to raise existing grade should consist of select clayey sand (SC), sandy clay (CL), or clayey gravel (GC) having a liquid limit less than 40, or an approved alternate. Since the footings will be supported in fill, a compaction criteria of at least 95 percent of Modified Proctor dry density (ASTM D-1557) with a moisture content range of -2 to +3 percent of optimum is recommended. In pavement areas, a compaction criteria of at least 95 percent of maximum Standard Proctor dry density (ASTM D-698), at a moisture content near optimum is recommended. Fill should be placed in maximum 8 inch lifts. Each lift or fill should be properly compacted, tested, and approved prior to placing subsequent lifts.

B. Layout and Grades

1. All lines and grade work not presently established at the site shall be laid out by the Contractor in accordance with the Contract Drawings and Specifications. The Contractor shall establish permanent bench marks determined by a Registered Land Surveyor Professional Civil Engineer. Maintain all established bounds and bench marks and replace as directed any which are destroyed or disturbed.

2. The words "finished grades" as used herein shall mean the required final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the buildings shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.

3. The word "subgrade" as used herein means the required surface of subsoil, ordinary fill or compacted fill. The surface is immediately beneath the site improvements, specially dimensioned fill, paving, loaming, or other surfacing materials.

C. Disposition of Existing Utilities

1. Active utilities existing on the site shall be carefully protected from damage and relocated or removed as required by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record drawings and both the Engineer and the utility owner notified in writing.

2. Inactive or abandoned utilities encountered during construction operations shall be removed, plugged or capped. The location of such utilities shall be noted on the record drawings and reported in writing to the Engineer.

D. Frost Protection

1. Make no excavations to the full depth indicated when freezing temperatures may be expected, unless the footings or slabs can be placed immediately after the excavation has been completed. Protect the bottom so excavated from frost if placing of concrete is delayed. Should protection fail, remove frozen materials and replace with gravel fill as directed, at no cost to the Owner.

2. The underside of in-place beams and slabs shall be protected from freezing temperatures.

E. Disposal

1. All excavated materials which are not used for fill or backfill, and all surplus excavated materials shall be removed from the site and disposed of at no cost to the Owner.

3.2 EXCAVATION

A. Excavate all materials as required to allow construction of the foundations for the structure as shown on the Drawings. Attention is called to "General Notes" on Structural Drawings and to the requirements contained therein which may affect the work under this section.

B. If rock is encountered, trenches shall be excavated to 6 inches below bottom of pipe. Trenches for storm and sanitary sewers shall have a continuous slope in the direction of flow.

C. When the depth of backfill over the pipes exceeds ten (10) feet, keep the trench below the level of the top of the pipe as narrow as practicable.

3.3 DEWATERING

A. Provide, maintain and operate pumps and related equipment, including standby equipment, of sufficient capacity to keep excavation free of all water at all times and under any and all contingencies that may arise until the structures attain their full strength.

3.4 PLACING FILLS

A. General

1. Areas to be filled or backfilled shall be free of construc-

tion debris, refuse, compressible or decayable materials and standing water. Do not place when fill materials or layers below it are frozen.

2. Notify the Engineer when excavations are ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Engineer.

3. Furnish approved materials. Place fill in layers not exceeding 6 inches compacted thickness and compact as specified below for various fill conditions.

4. Before backfilling against walls, the permanent structures (including basement floor slabs) shall be cast and sufficiently aged to attain strength required to resist backfill pressures without damage. Temporary bracing will not be permitted except by written permission from the Engineer. When filling on both sides of a wall or pier, place fill simultaneously on each side. Correct any damage to the structure caused by backfilling operations at no cost to Owner. Place no stones closer than eighteen (18) inches to wall surfaces.

5. Backfill trenches only after pipe has been inspected, tested, and location of pipes and appurtenances have been recorded.

6. Pipe bed shall be shaped by means of hand shovels to give full and continuous support to lower third of pipe. Backfill by hand around pipe and for a depth of twelve (12) inches above the pipe; use sand and tamp firmly in layers not exceeding six (6) inches in thickness, taking care not to disturb the pipe. Compact the remainder of the backfill thoroughly with a rammer of suitable weight or with an approved mechanical tamper to achieve the compaction specified below for various fill conditions.

7. Where soft materials of poor bearing qualities are found in trenching, a concrete foundation may be required to insure a firm foundation for the pipe. Such concrete foundation shall be bedded with six (6) inches of sand tamped in place so as to provide a uniform bearing for the pipe between joints.

8. All exposed subgrade shall be proof-rolled prior to fill placement to aid in identifying areas of loose or soft subgrade soils.

B. Placing Ordinary Fill

1. Ordinary fill as specified in Paragraph 2.1.B. hereinabove shall be provided behind all walls and for all backfill and fill where gravel fill has not been specified hereinabove or on Drawings.

2. Place ordinary fill in lifts not exceeding eight (8) inches,

uncompacted thickness, and compact to 90% modified proctor density (ASTM D-1557).

C. Placing Controlled Fill

1. The controlled fill should be scarified and then processed to a moisture content between three percentage points below and two percentage points above the Standard Proctor optimum. The subgrade soils should be recompacted to a dry density of at least 95% of the standard Proctor maximum dry density for depths of at least 6 inches below the surface.

2. After subgrade preparation and inspection have been completed, fill placement may begin. Fill materials should be free of organic or other deleterious materials, have a maximum particle size of 3 inches, and have a liquid limit less than 45 and plasticity index of less than 25. If a fine-grained (silt or clay) soil is used for fill, very close moisture content control will be required to achieve the recommended degree of compaction.

3. Fine-grained structural fill should be compacted to at least 95% of the maximum modified Proctor dry density as determined by ASTM Designation D-1557. Granular soils should be compacted to at least 100% of the modified Proctor density. The fills under the concrete pavements shall have some plasticity. Select clayey sand or clayey gravel with a plasticity index between 4 and 16 shall be used.

4. Fill should be placed in maximum lifts of eight inches of loose material and should be compacted within the range of two percentage points above to three percentage points below the optimum moisture content as determined by the standard Proctor test. If water must be added, it should be uniformly applied and mixed into the soil by disking or scarifying.

5. Each lift of compacted soil should be tested and approved by the soils Engineer or his representative prior to placement of subsequent lifts. As a guideline, it is recommended that field density tests be taken at a frequency of not less than one test per 2500 square feet of surface area per lift of fill in the building areas. This testing frequency may be reduced to one test per 5000 square feet of surface area per lift of fill in the pavement areas.

D. Field Quality Control

1. See overlapping procedures in Source of Quality Control.

2. Cooperate with laboratory in obtaining field samples of in-place materials after compaction. Furnish identical field labor in connection with these tests.

E. Construction Procedures

1. It is anticipated that the surficial silty clay soils

encountered over portions of the site may be subject to significant loss in shear strength upon exposure and saturation. Therefore, adequate drainage of surface runoff should be established during the early phases of site grading and continued throughout construction to prevent ponding and subsequent saturation of subgrade soils.

2. It is anticipated that if construction is initiated during wetter seasons limited perched ground water may be encountered above excavation depths. Further, if the silty clay surficial soils within the building area are near saturation, pumping of these soils may occur during fill placement, requiring additional undercutting or the use of a "bridge" lift procedure. The potential for these problems to occur is considered to be significantly reduced if the site is dry.

3. Foundation excavations should be free of all loose or soft soils and water prior to placing concrete. Concrete should be placed as soon as possible after excavation, cleaning and inspection are complete to minimize possible changes in soil conditions due to the effects of wetting and drying. The Contractor shall notify the Engineer so he can be present during foundation excavation to monitor soil conditions at foundation depths.

4. Care should be taken to adequately slope or brace the sides of foundation excavations to prevent sloughing or caving. All applicable safety requirements (OSHA) regarding trench excavations should be adhered to.

3.5 CLEAN UP

A. Remove all excess earth, debris, topsoil or other materials associated with this work from the job site.

B. Keep driveways and city streets free from mud or trash deposited by equipment used in performing work under this section.

## SECTION III

## CAST-IN-PLACE CONCRETE

### PART 1. GENERAL

1.1 CONDITIONS

Requirements of the conditions of contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes, but is not necessarily limited to the following:

1. Excavation
2. Sleeves for piping and built-in boxes, conduits, etc., by various sections involved
3. Granular fill under slabs and around walls

1.3 REQUIREMENTS OF REGULATORY AGENCIES

A. Keep available for reference the following literature, including latest revisions, which are hereby included by reference and made a part of these specifications.

1. Southern Standard Building Code
2. ACI 306 Recommended Practice for Cold Weather Concreting
3. ACI 318 Building Code Requirements for Reinforced Concrete
4. ACI 347 Recommended Practice for Concrete Formwork
5. ACI 305 Recommended Practice for Hot Weather Concreting
6. ACI 309 Consolidation of Concrete
7. ACI 211 Recommended Practice for Selecting Properties for Concrete
8. ACI 304 Recommended Practice for Measuring, Mixing and Placing Concrete
9. ASTM Standard in Building Codes
10. CRSI Recommended Practice for Placing Reinforcing Bars
11. CRSI Recommended Practice for Placing Bar Supports
12. AWS D12.1 Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connection in Reinforced Concrete Construction
13. NRMCA Concrete Plant Standards and Truck Mixer and Agitator Standards.

B. Any material or operation specified by reference to the published specification of a manufacturer, or the above-mentioned standards, shall comply with the standard listed. In case of conflict between the referenced specifications, the one having the most stringent requirements shall govern.

In the event of conflict between the referenced specifications and the project specifications, the project specifications shall govern.

1.4 INSPECTION, TESTING AND QUALITY CONTROL

A. A testing agency will be selected by the Contractor and will be paid by the Contractor.

B. Allow clear and safe access to the work for sampling, inspection and storage of specimens and equipment. Construct a storage box on the site of sufficient size to store 24 cylinders which will afford the protection required by ASTM C31, latest revision.

C. All samples and tests required by the Engineer to determine if materials to be used in the project comply with specification requirements shall be made by the testing agency prior to their actual use in the project. If the materials submitted do not conform to all contract requirements, the cost of subsequent sampling and testing shall be paid for by the Contractor.

D. Whenever the source, quality or characteristics of the approved material changes or indicates lack of compliance with contract requirements, (1) resubmit additional materials for sampling, and (2) test these materials until they meet specification requirements. Cost of additional sampling, testing and inspection of materials and workmanship not conforming to contract requirements shall be paid for by the Contractor.

E. Notify the Engineer and testing agency not less than 24 hours in advance of commencement of any project concrete operations.

F. When tests of control specimens fall below the required strength, or when freshly poured concrete is suspected of being frozen or damaged by frost, the Engineer may require core specimens taken from the concrete in question and tested in accordance with C42. If these specimens do not meet the strength requirements, the Engineer will have the right to require additional curing, load tests, strengthening and removal and replacement of those parts of the structure which are unacceptable and, in addition, removal of such sound portions of the structure as necessary to insure the safety and durability of the structure. Control specimens shall not be used for evaluating compressive strength of concrete suspected of being frozen. All additional testing, strengthening or removal and replacement of parts of the structure shall be at the Contractor's expense.

G. Those portions of the structure that do not meet the contract requirements shall be corrected and removed and replaced as directed by the Engineer and all costs of operations, removal and replacement shall be at the Contractor's expense.

H. Testing and approvals are required to aid the Contractor in

adhering to the specification requirements and in no way are meant to be construed as relieving the Contractor of his responsibility to fulfill all the requirements of the Contract Documents.

I. Any items referred to above relative to payments by the Contractor to the Owner will be determined by the Engineer. In addition, the Contractor shall reimburse the Owner for inspection, sampling or testing services ordered but not used due to the Contractor's improper coordination.

1.5 SUBMITTALS

A. Shop Drawings.

1. Submit reinforcement shop drawings showing detailed layouts including materials, dimensions, spacing, bend details, accessories, if any, and similar items required for the proper construction of the work.

2. Submit formwork drawings for all exposed concrete work showing location of form face materials, location of strap anchors, ties and other items in contact with or embedded in the concrete. Indicate material to be used, methods of sealing joints and surfaces and leveling joints.

3. Submit mill reports for all reinforcement.

4. Submit proposed mix for concrete.

5. Submit the methods proposed for cold weather or hot weather curing and protection of concrete prior to commencement of concrete work.

6. Unless otherwise noted, when compliance with the referenced specifications or this specification is required, furnish an affidavit from the manufacturer or fabricator certifying that the material or product delivered to the project meets all the requirements of the Contract Documents.

B. Samples. Submit the following in duplicate for approval prior to the actual use in the project:

1. Concrete constituents, including admixtures.
2. Form ties and spreaders.
3. Accessories for reinforcement.
4. Reglets.
5. Form release agent.
6. Control joint filler material.
7. Vapor barrier.

C. Schedules. Submit to Engineer a schedule of concrete placement indicating areas to be poured and showing in detail the methods to be used at construction joints not indicated on the Contract Drawings.

1.6 PRODUCT HANDLING

A. Delivery of Materials.

1. All central plant and rolling stock equipment and methods shall conform with Truck Mixer and Agitator Standard of the Truck Mixer Manufacturer's Bureau of the National Ready-Mixed Concrete Association, as well as ACI 614, "Recommended Practice for Measuring, Mixing and Placing Concrete" and ASTM C94, "Specifications for Ready Mixed Concrete," latest edition.

2. Transit mixed concrete shall be mixed at mixing speed for at least ten (10) minutes immediately after charging the truck followed by agitation without interruption until discharged.

3. Ready-mixed concrete shall be transported to the site in water-tight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at the site shall be within 1.5 hours after water was first introduced into the mix and within 1 hour when ambient air temperature exceeds 80 degrees F.

4. Schedule and dispatch trucks from the batching point so that they shall arrive at the site just before the concrete is required. Avoid excessive mixing of concrete while waiting or delays in placing successive layers of concrete in the forms.

5. All light weight concrete shall be delivered to the site in trucks loaded to 50% of their rated capacity unless the Control Engineer approves loading to a higher percentage. This requirement is to prevent segregation of constituents.

B. Storage of Materials. No materials frozen or containing ice shall be used. All improper and rejected materials shall be immediately removed from the point of use. Materials, including steel reinforcement and accessories, shall be covered during the construction period. Concrete constituents shall be handled and stored separately in such a manner as to prevent intrusion of foreign matter, segregation or deterioration, and shall be properly stockpiled as necessary to assure uniformity throughout the project.

PART 2.00 - MATERIALS

2.1 MATERIALS

A. Concrete.

1. Cement shall be American made Portland Cement, free from water soluble salts or alkalies which will cause efflorescence on exposed surfaces. Portland cement hall conform to all chemical and physical requirements of ASTM C150, latest edition, for Types I or II.

2. Fine aggregate (normal weight) shall consist of washed, inert, natural sand conforming to ASTM C33, latest edition, and the following additional requirements:

| Sieve | Retained (5) |
|---|---|
| #4 | 0 - 5 |
| #16 | 25 - 40 |
| #50 | 70 - 87 |
| #100 | 93 - 97 |

| | |
|---|---|
| F.M. . . . . | 2.80 (+0.20) |
| Organic . . . . . | Plate 2 maximum |
| Silt . . . . . | 2.0% maximum |
| Mortar Strength. . . . . | 100% minimum compression ratio |

3. Coarse aggregate (normal weight) shall consist of well graded crushed stone or washed gravel conforming to ASTM C33, latest edition, and the following additional requirements:

| Designated Size | 2" | 1 1/2" | 1" | 3/4" | 1/2" | 3/8" |
|---|---|---|---|---|---|---|
| F.M.(+/-0.20) | 7.45 | 7.20 | 6.95 | 6.70 | 6.90 | |
| Organic | | Plate 1 maximum | | | | |
| Silt | | 1% maximum | | | | |

4. Pea gravel shall be washed, clean, hard, rounded gravel conforming to ASTM C33, except that it shall be graded to 90% passing the 3/8" screen and 90% retained on the 1/4" screen.

5. Light weight fine and coarse aggregates shall conform to ASTM C330, latest edition, and as specified herein. Aggregate sizes shall include fine aggregate designated as "sand size," and coarse aggregate designated as graded 3/4" size. The splitting ratio (Fsp) shall not be less than 5.5.

6. Maximum designated sizes of natural aggregate shall be used as follows:

| Dimension of section inches | Maximum size aggregate inches |
|---|---|
| 10 and over | 2 |
| 8 -10 | 1 |
| 3 - 8 | 3/4 |
| 1 1/2 - 3 | 1/2 |
| less than 1/2 | 3/8 (pea gravel) |

7. Water shall be potable and from a domestic supply.

8. Admixtures:

a. Water reducing agent conforming to ASTM C494, latest edition, shall be used in all concrete as determined by the Engineer.

b. Air Entraining Agent shall conform to ASTM C-260, latest edition, and be fully compatible with the water reducing agent to be used. Air entraining agent shall be used in all concrete exposed to the weather or subject to freezing and thawing, as a supplement to the water reducing agent to produce air entrainment of 4.5 to 5.5% total air (entrapped plus entrained) in normal weight concrete. It shall also be used in controlling density of light weight concrete, but in no case in such quantity as to produce air entrainment greater than 6.0% total air.

c. Admixtures retarding setting of cement in concrete shall be used if ordered by the Engineer.

d. Calcium chloride may be used only with express permission of the Engineer in writing.

a. Admixtures shall be pre-mixed in solution form and dispensed as recommended by the manufacturer. The water in the solution shall be included in computation of water-cement ratio.

f. "Fly-ash" is an allowable admixture provided it is not used in such proportions and quantities that will alter the strength, performance and durability of the concrete. As specified elsewhere in these specifications, the Contractor shall obtain written permission from the Engineer before the use of fly-ash is allowed.

B. Form Materials.

1. Concrete surfaces not exposed to view shall be made of wood, metal or other material as approved by the Engineer.

2. Forms for exposed concrete surfaces shall be Class I B-B High Density Overlay Plyform, exterior grade not less than 5 ply nor less than 5/8 inch thick and conforming to U.S. Product Standard PSI-66.

3. Form ties and spreaders shall be commercial brands such as Richmond Tyscrus - Richmond Screw Anchor Co., 500 East 132nd Street, Bronx, New York 10454; or Superior Ties - Superior Concrete Accessories, Inc., 9301 King Street, Franklin Park, Illinois 60131; or Sure-Grip Ties - Dayton Sure-Grip and Shor Co., 721 Richard Street, Miamisburg, Ohio, or equal. Ties shall have a removable tapered plastic or wood cone 1/2 inch outside diameter and set back 1 inch deep. Wire ties shall not be used.

4. Ties for walls below grade and at unexposed areas shall be snap-on ties or the type specified above with removable cones and shall incorporate water-seal washer.

C. Reinforcing.

1. Reinforcing steel bars shall be newly rolled billet steel conforming to ASTM A615, latest edition. All reinforcement is to be Grade 60 except column ties, beam stirrups, and temperature reinforcement, which shall be Grade 40.

2. Welded wire fabric shall conform to ASTM A185, sizes as shown on the Drawings.

3. Tie wire shall be annealed wire of sufficient strength for the intended purpose, but not less than No. 18 gauge.

4. Metal supports shall be of such a type as not to penetrate the surface of the formwork and show through the surface of the concrete. Individual and continuous slab bolsters and chairs shall be of a type to suit the various conditions encountered and must be capable of supporting a 300 pound load without crushing.

D. Other Materials.

1. Form release agent shall be an approved, non-staining, non-emulsifiable type for all concrete to be left exposed, painted or plastered, or to receive any adhesive applied finish. It shall be compatible with architectural finishes applied later.

2. Pre-molded joint filler shall be cork type, non-extruding self-expanding filler strips conforming to ASTM D1752 Type III and AASHO M153 Type III. They shall be as manufactured by Celotex Corp.; W.R. Meadows, Inc.; or W.R. Grace & Co., or equal. Use where shown on Drawings or specified, in thickness shown, but not less than 1/2 inch. Joint filler shall be compatible with any joint sealer to be used.

3. Non-shrink cement grout under steel base plates and bearing plates and required to fill in pockets left in concrete walls or slabs shall be "Embeco Pre-Mixed Grout" by Master Builders; "Vibro-Foil Ready-Mixed" by W.R. Grace; or "Ferrolith G" by Sonneborn Building Products, Inc., or equal. The material shall be a ready-to-use metallic aggregate product requiring only the addition of water at the job site, and shall have the following qualities:

a. Capable of producing a flowable grouting material having no drying shrinkage or settlement at any age.

b. Compressive strength of grout (2" x 2" cubes) shall be not less than 4000 psi at 7 days, and 6000 psi at 28 days.

4. Vapor barrier shall be 6 mil polyethylene used in the widest possible widths. Joints shall be lapped a minimum of 6 inches. Laps and all penetrations shall be sealed with a compatible trowel mastic or pressure sensitive tape. Seal along wall intersections and other penetrations.

2.2 MIXES

A. Concrete Mix Designs.

1. The concrete mix design shall be carried out in accordance with Chapter 3 - Proportioning "Suggested Specifications for Structural Concrete for Buildings," and ACI Recommended Practices for Selecting Proportions for Concrete (ACI 613 and 613A), except as otherwise specified herein.

2. It is the intent of this specification to secure, for every part of the work, concrete of homogenous structure which, when hardened, will have the required strength, appearance and resistance to weathering. The actual proportions of constituents necessary to produce concrete conforming to the specification requirements shall be determined by means of prior laboratory tests made with the constituents to be used in the work.

3. All testing and control of concrete will be carried out by an organization selected by the Engineer, except that at his option the Contractor may use a different laboratory for design of the concrete mixes. All concrete shall be subject to control, at the Engineer's discretion. The Contractor agrees to accept as final the results of tests secured by the Testing Engineer.

4. Under special circumstances, the Engineer may at his discretion allow minor deviations from the material requirements specified below, provided the resulting quality is not adversely affected thereby. If an increase in cement content is made to compensate for such deviations, such increase shall be made without cost to the Owner.

5. The Contractor shall make available to the Testing Engineer all materials and mixtures for acceptance testing of the proposed concrete mixes as well as sufficient samples of fine and coarse aggregate for qualitative acceptance test. All samples shall be available at least five (5) weeks before the Contractor proposes to use them in the work. Duplicate small samples shall be plainly and neatly labeled with the source, where proposed to be used, date and name of collector, and presented to the Engineer for permanent reference. All costs in connection with furnishing and delivery of samples shall be at the Contractor's expense.

6. The conformity of aggregates to the specifications herein before given, and the actual proportions of cement, aggregates and water necessary to produce concrete conforming to the requirements set forth in Table "A" below shall be demonstrated and determined by tests made with representative samples of the materials to be used on the work. All such tests shall be made by the approved laboratory.

7. The materials acceptance test results, trial mix data, and recommended job mixtures shall be presented to the Engineer for approval as soon as possible and at least five (5) working days prior to the proposed beginning of concreting. Materials shall not be delivered to the site or used until the samples shall have been approved and as used they shall in all respects be equal to the approved samples.

8. All concrete shall have a minimum compressive strength as indicated on the Drawings. Concrete not so designated shall have a minimum compressive strength of 3500 psi at 28 days of age.

9. The following limiting strengths, water-cement ratios, cement factors, etc. as shown in Table A below, shall apply for the specific strengths of concrete:

TABLE A

| Minimum Allowable Comp.Str. (psi@28 days) | Max. Allowable Net Water Content (gal/Sack*) | Cement Factor Est. Probable Average *** Gravel | Cr.Stone | Sacks Per C.Y. Min Permissible** |
|---|---|---|---|---|
| N.Wt. 6000 | 4.75 | 7.75 | 8.0 | 7.5 |
| N.Wt. 5000 | 5.00 | 7.0 | 7.4 | 6.7 |
| N.Wt. 4000 | 5.75 | 6.2 | 6.6 | 6.0 |
| N.Wt. 3000 (Cl.A) | 6.50 | 5.3 | 5.7 | 5.0 |
| N.Wt. 2000 (Cl.B) | 7.75 | 4.8 | 5.2 | 4.65 |
| L.Wt. 4000 | 5.75 | 7.0*) | | 7.0 |
| L.Wt. 3000 | 6.50 | 6.25*) | | 6.0 |

*Maximum: Decrease if possible; this represents total water in mix at time of mixing, including free water on aggregate.

**Minimum: Increase as necessary to meet other requirements.

***For purpose of estimating only with high quality aggregates medium consistencies, Type II cement under average conditions. Type I cement concrete will generally require approximately an additional 0.25 sacks per cubic yard. Architectural "Type II" cement will generally require 0.5 additional sacks per cubic yard depending on brand and strength. Actual cement factors to be established to meet all other stated requirements.

*)Light weight aggregate.

10. The approved water reducing agent shall be added to all concrete. Concrete exposed to the weather shall contain entrained air. Retarders in hot weather shall be used, subject to approval of brand and method of use.

11. The water content and cement content of the concrete to be used in the work shall be based on a curve showing the relation between water content, cement content, and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four (4) test specimens at each age, and shall have a range of values sufficient to yield the desired data, including all the compressive strengths called for on the plans, without extrapolation. The design mix of the concrete to be used in the structure, as determined from the curve, shall correspond to the test strengths in Table "B" obtained in the laboratory trial mixtures, but in no case shall the resulting mix conflict with the limiting values as specified in Table "A".

TABLE B
Minimum Strength of Lab Trial Mixes

| Design Strength | Working Stress | | Ult. Strength | |
|---|---|---|---|---|
| | 7-days* | 28-days** | 7-days* | 28-days** |
| 5000 | 4500 | 5800 | 5000 | 6250 |
| 4000 | 3500 | 4600 | 3800 | 5000 |
| 3000 | 2000 | 3500 | 2700 | 3750 |
| 2200 | 1500 | 2400 | | |

*May be employed for preliminary design.
**To be used for final design.

12. The set density of the concrete shall be determined in accordance with ASTM C138,latest revision.

B. Controlled Concrete.

1. All material to be used in the work shall be subject to testing to determine that it conforms to the requirements of the specifications. The methods of testing shall conform to the appropriate ASTM specification, but the place, time, frequency, and method of sampling will be determined by the Engineer in accordance with the particular conditions of this project.

2. If, during the progress of the work, the Contractor desires to use materials other than those approved originally or if the materials from the source originally approved change in characteristics, additional tests shall be made with new materials which will produce concrete meeting with the stated requirements and not cause objectionable change in the color or appearance of the

structure. These additional tests shall be made by the selected Testing Engineer, at the expense of the Contractor. No concrete made from such different materials shall be used in the work until the Engineer has given his approval.

3. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being used, the Engineer may order such changes in the proportions or materials, or both as may be necessary to secure the desired properties, subject to the limiting requirements in Table A above. Any changes so ordered shall be made at the Contractor's expense, and no extra compensation will be allowed by reason of such changes.

4. All concrete shall be ready-mixed produced by a plant acceptable to the Engineer. Hand or site mixing shall not be done. All constituents, including admixtures, shall be batched at the central batch plant.

5. Materials shall be measured by weighing. The apparatus provided for weighing the aggregates and cements shall be certified by the testing agency. Each size of aggregate and the cement shall be weighed separately. The accuracy of all weighing devices shall be such that successive quantities can be measured to within one (1) percent of the indicated amount. Cement in standard packages (sacks) need not be weighed. The mixing water shall be measured by volume or by weight. The water measuring device shall be accurate to 1/2%. All measuring devices shall be subject to approval. Admixtures shall be mixed, dispensed and used in accordance with the specific manufacturer's detailed specifications. Dispensing may be done either manually with the use of calibrated containers or measuring tanks, or by means of an approved impulse dispenser by the manufacturer of the specified admixture.

6. Use cooled or heated water in accordance with ACI 305 and 306, latest revision.

7. Central mixed concrete shall be plant mixed a minimum of five (5) minutes. Agitation shall begin immediately after the pre-mixed concrete is placed in the truck and shall continue without interruption until discharged.

8. The consistency of the concrete at time of deposit as measured by the ASTM Standard Slump Test, Designation C143, latest revision shall be as follows:

| Portion of Structure | Recommended | Max. Range |
|---|---|---|
| Pavements, Slabs on Ground & Stair Fill | 2 inches | 1 inch - 3 inches |
| Footings, Massive Sections | 2 inches | 1 inch - 3 inches |
| Reinforced Slabs, Beams | 3 inches-4inches | 2 inches- 4 inches |
| Reinforced Walls & Columns | 4 inches | 3 inches- 5 inches |

9. In general, when mechanical vibration is used for compacting concrete, the above "Recommended" consistencies shall not be exceeded. The limiting consistencies may be modified subject to the approval of the Engineer, provided the requirements for placability shall be satisfied.

10. In all cases, the concrete shall be of such consistency and mix composition that it can be worked readily into the corners and angles of the forms and around the reinforcement, concrete inserts and wall castings without permitting the materials to segregate or free water to collect on the surface, due consideration being given to the methods of placing and compacting.

2.3 FABRICATION

A. Fabrication of Reinforcing Steel. Reinforcing bars shall be detailed in accordance with requirements of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315, latest revision). Bars shall be bent cold.

PART 3.00 - EXECUTION

3.1 CONDITION OF SURFACES

A. Examine all surfaces on which or against which the work of this Section is to be applied to insure that the surfaces, and the original general conditions at the site are satisfactory for the installation of the work.

B. All soil supporting slabs and footings and all reinforcing, inserts, and forms shall be inspected by the Engineer before concrete is placed.

C. Remove water and foreign matter from forms and excavations. Place no concrete on frozen soil and provide adequate protection against frost action during freezing weather. Calcium chloride shall not be sprinkled into forms to remove ice or thaw frozen soil, or on any concrete surface to remove ice.

3.2 PREPARATION

A. Slabs to receive cement waterproofing, monolithic topping or concrete fill shall be roughened and freed of all laitance and foreign material.

B. Forms shall be treated with release agent applied in accordance with the manufacturer's instructions.

C. Before concrete is placed, the surfaces of the concrete already placed, including vertical and inclined surfaces, shall be thoroughly cleaned of foreign materials and laitance, roughened with suitable tools, such as chipping hammers, wire brushes, etc., and re-cleaned by a stream of water or compressed air.

Well before the new concrete is deposited, joints shall be saturated with water. After free or glistening water disappears, joints shall be given a thorough coating of neat cement grout mixed to the consistency of very heavy paste. The surfaces shall receive a coating of at least 1/8 inch thick; wherever possible, this shall be scrubbed in by means of stiff bristle brushes. New concrete shall be deposited before the neat cement grout dries.

3.3 INSTALLATION

A. Erection of Formwork and Shoring:

1. Forms shall be constructed to withstand all dead and live loads, including construction live loads, both vertical and lateral, imposed upon them during construction, concreting and curing periods. Bracing shall be such that forms do not move out of specified tolerances for line and elevation. Conform to ACI 318 and 347, latest revision.

2. The Contractor shall provide sufficient form materials so work can proceed without delay. Forms shall be built mortar-tight and edges glued or otherwise sealed to prevent loss of concrete matrix. Edges of formed panels, in contact with previously cast concrete, shall be flush within 1/16 of an inch. Forms shall be continuously adjusted for line and elevations during concrete placement as required.

3. Forms and form accessories shall be so designed and installed so that removal will in no way damage concrete surfaces.

4. Before form materials can be re-used, surfaces that will be in contact with freshly cast concrete shall be thoroughly cleaned, damaged areas repaired, and all projecting nails withdrawn.

5. Before reinforcement is placed on or against formwork, surfaces of forms coming in contact with fresh concrete shall be cleaned and then treated with the approved form release agent.

6. Provide chamfers at all external corners of forms abutting masonry or other vertical building materials, nailed 6" o.c.

7. Provide feature and drip strips as located and shown on the drawings, nailed 6" o.c.

B. Placing Reinforcement:

1. Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured and positioned by templates, wire ties of adequate gauge and reinforcement accessories.

2. At the time concrete is placed, reinforcement shall be free of excessive rust scale, or other coatings that will destroy or reduce bond requirements. Reinforcement expected to be exposed to the weather for a considerable length of time shall be painted with a heavy coat of cement grout.

3. Splicing of reinforcement at points of maximum stress shall be avoided. Splices of bar #11 size and smaller shall be lapped as shown on the Drawings or a minimum of 30 bar diameters, placed in contact and wired securely together. Welded wire fabric shall be lapped six (6) inches and one wire space plus two (2) inches, whichever is larger and shall be securely wired together at 18" intervals.

4. Reinforcement shall be continuous through construction joints unless otherwise indicated on the Drawings. Provide additional reinforcement at construction joints in walls, except at control joints, as follows:

   a. Provide additional reinforcement 80 bar diameters long, one-half length of bar, ear side of joint in sufficient quantity so that the total area of bars through the joint is equal to .003 of the gross cross-sectional area of the wall. Bars are to be placed at each face of wall alternately spaced with the main reinforcement.

5. All splices shall be made so that the bars being joined are parallel and not offset more than 1/8 inch nor out of straight alignment more than 1/4 inch in ten (10) feet. The elevation of the top of vertical bars shall be within plus or minus 1 inch (+/-1 inch) of specified elevation as shown on the Contract Drawings.

6. Arc welded splices shall conform to all requirements of the American Welding Society D12.1.

7. Bars to be welded to structural members shall be welded to conform to A.W.S. D12.1, Section 406, with proper welding procedures to be employed for carbon and manganese contents of the reinforcing bars to be welded. The Contractor shall provide the Engineer with certified copies of the ladle analysis for each lot of reinforcing steel bars to be welded. The ladle analysis shall state the percentage of carbon, phosphorous, manganese and sulfur present in the steel. Bars that are to be welded shall be clearly identified with the heat from which they are rolled. Welding will not be permitted on reinforcing steel without such identification.

8. Bending, tack welding, cutting or substituting reinforcement in the field, other than shown on the Contract

Drawings, in any manner is prohibited, unless specific approval for each case is given by the Engineer or his designate.

9. All splices shall be made so that the bars being joined are parallel and not offset more than 1/8 inch nor out of straight alignment more than 1/4 inch in ten (10) feet. The elevation of the top of vertical bars shall be within plus or minus 1 inch (+/-1 inch) of specified elevation as shown on the Contract Drawings.

C. Embedded Items and Coordinations:

1. Insure that installation of all embedded items conform to requirements of ACI 318-71, Chapter 6, Paragraph 6-3, "Conduits and Pipes Embedded in Concrete," and as specified below.

   a. The installation of all inserts required by other trades shall be coordinated with, or shall be installed prior to, the placing of reinforcing steel.

   b. Place anchor bolts, adjustable anchor slots, etc., furnished by other Sections.

   c. Embed no pipes other than electrical conduit in any structural concrete. Apply for permission from Engineer for any variation from the following requirements unless shown on the Structural Drawings. Make request in writing, accompanied by suitable sketch.

      (1) No conduit coating, except galvanized or equivalent, shall be used.

      (2) Do not cut or displace any reinforcement.

      (3) Do not place conduit between concrete surfaces and reinforcement.

      (4) Slabs - restrict L.D. of conduit to 1/4 of slab thickness. Keep within middle half of that thickness.

      (5) Run conduit larger than 1/6 slab thickness approximately parallel and at right angles to slab reinforcing, not diagonally.

      (6) Place nearly parallel conduits apart at least 6 times L.D. of conduit being used.

      (7) Do not embed conduit over 4% of the gross concrete area lengthwise in beams or columns.

D. Joints:

1. Construction and control joints indicated on the Drawings are mandatory and shall not be omitted. If joint location is not specifically shown, Contractor shall submit a sketch to the Engineer for approval showing proposed joint location before slab is poured.

2. Construction joints shall be continuously bevel keyed, 2" x 4" minimum, except at noted.

3. Joints not indicated or specified shall be placed to least impair the strength of the structure and shall be subject to the approval of the Engineer or his designate.

E. Placing Concrete:

1. The consistency of the concrete at the time of deposit as measured by ASTM C143, "Standard Method of Test for Slump of Portland Cement-Concrete," shall be in conformance with ACI 211. Slump for light weight concrete shall be from 2" to 3". The concrete shall be of such consistency and mix composition that it can be worked readily into the corners and angles of the forms and around the reinforcement and concrete inserts, without permitting the materials to segregate or free water to collect on the surface.

2. The retempering of concrete which has partially hardened will not be permitted.

3. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of the ingredients and displacement of reinforcement, and avoid rehandling. Deposit not partially hardened concrete. When concrete is conveyed by chutes, the equipment shall be of such size and U-shaped design as to insure a continuous flow in the chute. The slope shall not be less than 25 nor more than 45 degrees from horizontal. The discharge end of the chute shall be provided with a baffle plate or spout to prevent segregation. If the discharge end of the chute is more than 5 feet above the surface of the concrete in forms, a spout shall be used, and the lower end maintained as near the surface of deposit as practicable. When the operation is intermittent, the chute shall discharge into a hopper. Concrete shall not be allowed to flow horizontally over a distance exceeding 5 feet.

4. Work shall be so executed that a section begun on any one day shall be completed in daylight on the same day.

5. If a section cannot be placed continuously between planned construction joints, a field joint and additional reinforcement shall be introduced. The Engineer shall be notified immediately in such case.

6. In order to secure full bond at construction joints, the surfaces of the concrete already placed shall be thoroughly cleaned of foreign materials and laitance, roughened with suitable tools and recleaned by a stream of water or compressed air. Well before the new concrete is deposited, the joints shall be saturated with water. After free or glistening water disappears, the joints shall be given a thorough coating of neat cement grout mixed to the consistency of very heavy paste. The surfaces shall receive a coating of at least 1/8 inch thick; whenever possible, this shall be scrubbed by means of stiff bristle brushes. New concrete shall be deposited before the neat cement grout dries.

7. Concrete shall be thoroughly compacted by means of internal type mechanical vibrators. Vibration shall be done by experienced operators and shall be thorough enough to produce homogeneity and optimum consolidation without permitting segregation of the constituents or "pumping of air." All vibrators used for light weight concrete shall operate at a speed of not more than 5000 rpm, with large amplitude motion. All vibration shall be supplemented by proper wooden spade puddling to remove included bubbles and honeycombs. At least one vibrator shall be on hand for every 10 cubic yards of concrete placed per hour, plus one spare. All vibrators shall be operable and on the site prior to starting placement.

8. Cold joints are to be avoided, but if any occur, the Engineer may require removal of all or part of the concrete at which cold joint occurs, using any method he deems necessary. Minimum requirement will be that a cold joint shall be treated as a bonded construction joint.

9. When placing exposed concrete on vertical surfaces, strike corners of forms rapidly and repeatedly from the outside along the full height while depositing concrete and vibrating.

10. After depositing concrete in columns or walls, at least 2 hours must elapse before depositing in beams, girders or slabs supported thereon.

11. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each run and the water and debris shall be discharged outside the form.

12. After concrete has been placed, provide protection against rapid drying, from direct sun or wind, or cold temperature, during and after finishing operations.

F. Finishing:

1. Float Finish.

a. Provide floated finish on the following surfaces:

(1) Slabs to receive metallic waterproofing.

(2) Slabs to receive built-up roofing.

(3) Slabs to receive terrazzo.

(4) Top surfaces of walls, curbs, and parapets to receive metal flashing,or other finish material not requiring a steel troweled surface.

b. Surfaces to receive floated finish shall be finished in conformance with ACI 301, Section 1104(b, latest revision.

2. Steel Troweled Finish.

a. Provide steel troweled finish on the following surfaces:

(1) Slabs to receive carpeting.
(2) Slabs to receive resilient tile.
(3) Slabs to be left exposed
(4) Top surfaces of equipment pads.

b. Surfaces to receive steel troweled finish shall be finished in conformance with ACI 301, Section 1104 (b) and (c), and additional requirements as follow:

(1)Floated Finish - After the concrete has been placed, struck off, consolidated, and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared, and/or when mix has stiffened sufficiently to permit the proper operation of a power-driven float. The surface shall then be consolidated with power-driven floats. Hand floating with wood or cork-faced floats shall be used in locations inaccessible to the power-driven machine. Trueness of surface shall be re-checked at this stage with a 10 foot straightedge applied at not less than two different angles. All high spots shall be cut down and all low spots filled during the procedure to a Class B tolerance. The slab shall then be re-floated immediately to a uniform, smooth, granular texture.

(2)Troweled Finish - Where a troweled finish is specified, the surface shall be finished first with power floats, as specified above, where applicable, then with power trowels, and finally with hand trowels. The first troweling after power floating shall be done by a power trowel and shall produce a smooth surface which is relatively free of defects but which may still contain some trowel marks. Additional

trowelings shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be thoroughly consolidated by the hand troweling operations. The finished surface shall be free of any trowel marks, uniform in texture and appearance, and shall be planed to Class A tolerance. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

(3)Apply 2 coats of floor hardener to all concrete floor slabs not receiving another finish material as called for on the drawings. Apply hardener over broom clean dry concrete (minimum of 28 days after concrete placement). Rate of application for each coat shall not exceed 100 square feet per gallon.

(4)Level and grind depressed and high spots in concrete surfaces in excess of the tolerances. In areas where leveling materials are required to provide the proper surface, such materials shall be of a type approved by the Engineer.

G. Curing, Protection, Form Removal and Reshoring:

1. Curing shall conform to ACI 301, Chapter 12, except as herein amended.

2. Sand and sawdust shall not be used for the curing of floor slabs. The slabs shall, in all cases, be kept continuously wet for at least six (6) days.

3. Sufficient and adequate equipment for protecting the concrete from any damage by the elements, including equipment for enclosing and heating the work, shall be kept on the site.

4. A permanent temperature record shall be kept by the Contractor showing the date and outside temperature for all concreting operations. Thermometer readings shall be taken at the start of work in the morning, at noon and again late in the afternoon, and the locations of all concrete placed during such periods shall likewise be recorded, all in such a manner as to show any effect the temperature may have had on the construction. Concrete temperatures shall be taken one inch below the surface using mercury-filled thermometers. Locations of temperature readings shall be such as to give a true indication of the concrete temperature of the entire unit being monitored.

5. Forms shall be removed only after concrete has attained sufficient strength to support its own weight, construction live loads placed thereon, and lateral loads, all

without excessive deflection or damage to the structure. See ACI 347.

a. The Contractor shall be fully responsible for the proper removal of forms, installing all shoring and re-shoring, and removal of shores and re-shores. Replace any work damaged due to improper or too early removal of forms, shores or re-shores.

b. Do not place construction or building materials on concreted members for a period of at least 24 hours after pouring, at which time adequate shores shall be employed to prevent damage to "green" concrete. Workmen shall not walk on freshly poured concrete members for a minimum of 12 hours after finishing.

3.4 FIELD QUALITY CONTROL

A. Slump tests, air tests, fabrication of cylinders and all other recognized tests which are deemed applicable shall be carried out in the field by the Testing Agency as required by the Engineer.

3.5 REPAIRING AND FINISHING OF FORMED SURFACES

A. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed plane with parent concrete surfaces. Recesses left by the removal of form ties shall be filled and minor surface defects repaired.

B. Immediately after removal of forms, remove cones or cut off metal ties at least 1 1/2 inches back from surfaces exposed to view or which are to be finished. Fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16 inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug hole with a 1:1 1/2 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense and an excess of paste appears on the surface. Trowel smooth with heavy pressure. Employ same source of cement and sand as used in the parent concrete. Rub lightly with a 60 grit carborundrum stone at an age of two to five days if necessary to bring the surface plane with the parent concrete. Exercise care to avoid damaging the virgin skin of the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

C. Defective concrete and honeycombed areas shall not be patched unless examined and approval is given by the Engineer. If such approval is received by the Contractor, areas involved shall be chipped from square and at least 1 inch deep to sound concrete by means of cold chisels or pneumatic chipping hammers. If honeycomb exists around reinforcement, chip to provide a clear space at least 3/4 inch wide all around the steel to afford proper ultimate bond thereto. For areas less than 1 1/2 inch

deep, the patch may be made in the same manner as described above for filling form tie holes, care being exercised to use adequately dry (nontrowelable) mixtures and to avoid sagging. Thicker repairs shall require build-up in successive days, each layer being applied (with slurry, etc.) as described above. The air strength and bonding of the multiple layer repairs, a non-shrink metallic aggregate shall be used as an additive as follows:

| Materials | Volumes | Weights |
|---|---|---|
| Cement | 1.0 | 1.0 |
| Metallic Aggregate | 0.15 | 0.25 |
| Sand | 1.5 | 1.5 |

For very heavy (generally, formed) patches, pea gravel may be added to the mixture and the proportions modified as follows:

| Materials | Volumes | Weights |
|---|---|---|
| Cement | 1.0 | 1.0 |
| Metallic Aggregate | 0.2 | 0.33 |
| Sand | 1.0 | 1.0 |
| Pea Gravel | 1.5 | 1.55 |

In cases where the metallic aggregate is employed in multiple patches and a rusty finish is not desired on the surface, the final layer (of at least the fine 1/2 inch) shall be composed of the 1:1.5 mix (see above) without metallic aggregate. After hardening, rub lightly as described above, for form tie holes. Patches which become grazed, cracked or sound hollow upon tapping shall be removed and replaced with new material at no expense to the Owner.

## 3.6 REPAIR AND FINISH OF UNFORMED SURFACES

A. Tops of slabs, walls, stairs, etc., shall be repaired by using either the same material as originally cast or by use of a dry-pack material. Areas affected shall be chipped back square and to a depth of one inch minimum. Hole shall then be moistened with water for a minimum of two hours, followed by a brush coat of 1/16 inch thick cement slurry. Immediately plug the hole with concrete, or with a dry pack material consisting of 1:1 1/2 mixture of cement and concrete sand mixed slightly damp to the touch. Hammer the dry-pack into the hole, until dense, and excess of paste appears on the surface. Finish the patch level and to the same extent as surrounding concrete.

## 3.7 GROUTING OF COLUMN BASE PLATES AND BEAM BEARING PLATES

A. Mixtures.

1. Where clearances are less than 2 inches or where placement is difficult, grout shall consist of only grouting material and water.

2. Where clearances are over 2 inches and free passage will not be obstructed by coarse aggregate, 50 lbs. of pea gravel shall be added for each 100 lbs. of the grouted material.

3. Use minimum amount of water required to produce flowable grout.

B. Mixing.

1. Mix materials in accordance with manufacturer's requirements, using paddle type mortar mixer.

2. Mixing shall be done close to the area to be grouted. Provide adequate means for transporting the mixed grout as quickly as possible in order to prevent segregation.

3. No more grout shall be mixed at one time than can be placed in a period of 15 minutes. After the grout has been mixed, it shall not be retempered by additional water.

C. Preparation.

1. All defective concrete, laitance, dirt, oil, grease and loose material shall be removed from the concrete foundation leaving a reasonably rough surface. Surface of concrete shall be treated with two brush coats of cement waterproofing consisting of 1 part metallic aggregate to 1 part Portland cement mixed with sufficient water to produce a grout of brushable consistency. Not less than 24 hours shall elapse between coats, and after second coat prior to grouting. Cover the area with waterproof paper to prevent contamination prior to grouting.

2. The bottom of the plate shall be cleaned of all dirt, oil, grease and loose material. The plate shall be aligned and levelled in its final position and maintained in that position during grouting.

3. Special care shall be taken in hot or cold weather to insure proper setting and gain the strength, in accordance with instructions of the manufacturer of the ready-to-use grouting material.

4. Prior to grouting, all loose dirt and matter shall be cleaned away by compressed air and other means. The surface of the concrete shall be thoroughly saturated with clean water. Free water shall be removed from the surface just prior to placing the grout.

5. Take care that nearby equipment or machinery does not transmit vibrations to the plate being grouted whereby settlement, the normal set, strength and bond of the grouting may be affected.

D. Grouting.

1. The grout shall be placed quickly and continuously to avoid undesirable effects of overworking which might result in segregation, bleeding, or breaking down of initial set.

2. The grout shall be placed by the most practical means. The grout may be poured in place, pressure-grouted by gravity, or pumped. The use of pneumatic pressure or dry-packed grouting required approval of the Engineer.

3. Grout shall completely occupy the space to be filled and be thoroughly compacted and free of air pockets. Pour grout from one side only to avoid air entrapment. Chain, if necessary.

E. Finishing Unconfined Grout. After the grout has acquired its initial set, all exposed edges shall be cut off, leaving sloping "shoulders." The entire exposed area shall then be painted within 24 hours with a vapor-proof paint or plastered with a Portland cement-sand mortar.

3.8 CONCRETE FOUNDATIONS FOR EQUIPMENT

A. The concrete pads required under items of mechanical, electrical and other equipment shall be included under this Section of the Specifications. See mechanical and electrical drawings for size and design of pads and location of equipment requiring concrete pads and foundations. Concrete shall be normal weight concrete of same strength as specified for floor slabs and shall have a smooth integral finish. Set bolts, anchors, piping, etc., in concrete as required by manufacturer of equipment used. Templates or setting diagrams as necessary shall be furnished by the various trades. Provide steel reinforcing in equipment foundations as indicated, but in no case less than required for slabs of the same thickness.

3.9 WATERSTOPS

A. All waterstops set forth in these specifications and/or as shown on the drawings shall be Sonneborn-Contech Vinylstops, by Sonneborn-Contech, Inc., or equal. The manufacturer must certify in writing that all waterstops supplied to the jobsite meet or exceed the physical property requirements as outlined in the current U.S. Corps of Engineers specification CRD-C572-74.

All waterstop splices shall be heat sealed with Sonneborn-Contech Thermal Blade, or equal, to insure permanent, watertight junctions.

3.10 CLEANING

A. Concrete surfaces shall be cleaned of objectionable stains as

determined by the Engineer. Materials containing acid in any form, or methods which will damage the "skin" of concrete surfaces shall not be employed.

SECTION IV

PEST CONTROL

PART 1. GENERAL

1.1 DESCRIPTION

A. Work Included:

To inhibit the infestation of termites in wood construction, adequately poison the soil as indicated on the Drawings and/or as described herein.

1.2 QUALITY ASSURANCE

A. Qualifications of applicator:

The applicator shall have been successfully engaged in the business of soil poisoning in Arkansas for a period of not less than one year immediately prior to performing this portion of the work, and must be approved by the Arkansas State Plant Board.

B. Codes and standards:

In addition to complying with all pertinent codes and regulations, comply with all pertinent provisions of FHA Document M715-3 "Termite Protection," and requirements of the Arkansas State Plant Board.

1.3 SUBMITTALS

A. Proofs of compliance:

1. Prior to start of this portion of the work, submit to the Engineer all evidence required by him to prove the qualifications of the applicator and to prove compliance with the requirements for materials as specified.

2. Upon completion of this portion of the work, and as a condition of its acceptance, deliver three copies of the required guarantee to the Engineer.

1.4 JOB CONDITIONS

A. Environmental conditions:

Do not apply exterior treatment when the soil is excessively wet or there is an immediate likelihood of rain.

B. Product handling:

1. Use all means necessary to protect poisoning materials before, during and after installation to protect the installed work and materials of all other trades.

2. In the event of damage, immediately make repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

1.5 GUARANTEE

A. Form of guarantee:

The guarantee shall be in form acceptable to the Engineer and shall be drawn in favor of the Owner, his successors and assigns.

B. Provisions required:

1. All termite treatment has been performed in accordance with all requirements of this Section of the Specifications.

2. The effectiveness of the treatment against termite infestation will continue for not less than five years after the date of treatment.

3. All evidence of reinfestation within the guarantee period will be treated in accordance with the referenced standards and without additional cost to the Owner.

4. Complete performance of the guarantee is assured by Surety acceptable to the Owner.

C. Performance of guarantee:

Treat, in accordance with all terms of the guarantee, all evidence of termite infestation which is discovered within the guarantee period.

PART 2.00 - PRODUCTS

2.1 CHEMICALS AND CONCENTRATIONS

To the areas to be treated, apply one of the following chemicals at not less than the designated concentrations.

| | |
|---|---|
| Aldrin: | 0.5% applied in water emulsion |
| Chlordane: | 1.0% applied in water emulsion |
| Dieldrin: | 0.5% applied in water emulsion |

Other materials may be used provided they are acceptable to the Engineer and provided they have met a five year test conducted by the U.S. Forest Service; in all cases of proposed substitution, provide conclusive evidence to the Engineer that material proposed to be used will have no toxic effect to humans or to beneficial plants and animal life.

## PART 3.00 - EXECUTION

### 3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that poisoning may be performed in strict accordance with all pertinent rules and regulations, the referenced standards, and the requirements of this Section.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Engineer.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

### 3.2 APPLICATION

A. Under Concrete Slabs on Grade:

Apply poison uniformly to all areas where concrete slab on grade is indicated on the Drawings:

1. On top of base under slabs, apply at a rate of not less than 1 1/2 gallons per ten square feet.

2. Along both sides of foundation walls, along interior foundations, and around plumbing, apply at a rate of not less than four gallons per ten linear feet.

B. Elsewhere:

Apply poison uniformly under sidewalks and other paved areas within five feet of the building, at a rate of not less than one gallon per ten square feet.

## 3.3 PROTECTION OF TREATED SURFACES

Unless the treated surfaces are to be immediately covered, take all means necessary to prevent disturbance of the treated areas by human or animal contact with the treated surfaces.

SECTION V

INSULATION

PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes:

1. Finish Carpentry

PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Roof, where shown on plans, shall have noncombustible 1-1/2" spray on urethane insulation.

B. Walls shall have 1-1/2" spray on urethane insulation as shown on plans.

PART 3.00 - EXECUTION

3.1 GENERAL

A. The insulating Contractor shall inspect all areas to be insulated and satisfy himself that the areas are properly prepared to receive this insulation. If these areas are not properly prepared to receive this insulation, no work will be done and the Contractor is to call the inspector's attention to this fact.

B. Insulation shall be installed according to manufacturer's recommendations.

2.4 PANEL MATERIAL

A. Panel material as specified shall be:

1. 29 gauge aluminum-zinc alloy coated steel, coated both sides with a layer of aluminum-zinc alloy (approximately 55% aluminum, 45% zinc) applied by the continuous hot-dip method. Nominal aim is 0.5 ounce of aluminum-zinc alloy per square foot of coated sheet (total both sides). Triple-spot minimum - 0.36 ounce per square foot as determined by the triple spot test per ASTM Specification A-428.

2.5 PANEL FINISH

A. The panel finish as specified shall be the following:

1. Aluminum-zinc alloy coated steel - hot-dipped aluminum-zinc alloy.

B. Roof color to be galvalume.

C. Wall color to be selected by Owner from manufacturer's color chart.

2.6 PANEL APPLICATION

A. All panels to be positioned and aligned to hold the 3' module throughout the building length.

B. Panel laps shall be at least 6", sealed with building manufacturer's sealants and fastened together with standard fasteners.

2.8 FASTENERS

A. Fasteners shall be ZXL Wood Binder #10 x 1-1/2" as manufactured for Fasteners Plus or Equal.

2.9 ROOF WARRANTY

A. The metal building manufacturer shall guarantee the builders performance, that builder will repair or stop any leaks in the roof panels of the building arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions within twenty (20) years from the shipment date. The metal shall be warrantied against fade, chalking, or rusting for the 20-year period.

SECTION VII

ROUGH CARPENTRY

PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes:

1. Finish carpentry.
2. Formwork.

PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Materials shall meet the following Federal Specifications, Commercial Standards, and these specifications, unless more restrictive requirements are indicated on the Drawings.

1. Hardware, nails, screws, bolts, etc., for securing lumber in place shall be commercial quality; any suitable type and finish for interior dry locations; galvanized or nonferrous hardware for interior work in toilets.

3. Lumber for exterior furring and blocking shall be No. 2 grade SPIB or SCLB. All lumber shall be grade marked.

3. Lumber for interior furring, nailing and blocking shall be 1400 F (min.) SPIB or SCLB.

4. Plywood shall conform to PS 1-66 for softwood plywood, Standard Grade, group 1 face and bark veneers, C-D plugged, and fire retardant treated.

5. Square Post - S4S 6" x 6" No. 2 and better Southern Yellow Pine. Posts shall be treated with Pentachlorophenol to a net retention of 8 lbs. Per cubic foot of wood. Posts shall be treated at 140 lbs. Pressure per Federal Specifications TTW570 and American Wood Pressure Association Standards.

6. Splashboards - Splashboards shall be No. 2 and better Southern Yellow Pine 2" x 8" S4S or Centermatched.

7. Roof Trusses - Factory assembled in jig fixtures steel truss plates, 16 and 18 gauge. Trusses shall be designed by

a professional engineer to adequately carry any snow load conditions found in our area. Trusses are spaced 9' on centers unless otherwise specified. Truss members shall be No. 2 Dense Yellow Pine - 1550 F and better. Trusses shall be nailed and bolted to posts.

8. Framing Lumber - Roof purlins shall be 1400 F or Better, kiln dried. 2" x 4" spaced 24" on center. Side nailers or 2" x 4" 24" approx. O.C. standard and better.

9. Siding panels - 29 GA, 1 1/4 ounce zinc-coated steel with an additional baked-on colored finish. Color is 1 mil thick on exterior, ½ mil thick on interior. Color shall be selected by Owner.

10. Trim - Steel or aluminum with color finish on corners, gables, ridge and doors.

## PART 3.00 - EXECUTION

### 3.1 WORKMANSHIP

A. Work shall be performed in accordance with good trade practice, recommendations of manufacturers, building codes and these specifications unless specifically indicated otherwise on the Drawings and shall be well fitted and securely fastened in its proper location with nails, screws or other approved fastening devices.

B. Install wood blocking in stud partitions for anchoring where required for toilet accessories, shelving, etc.

### 3.2 SHOP DRAWINGS

1. Submit shop drawings for laminated timber work.

## SECTION VIII

## FINISH CARPENTRY

### PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes:

1. Furnishing metal doors and frames
2. Furnishing finish hardware
3. Rough Carpentry

1.3 ABBREVIATIONS

A.S.T.M. - American Society for Testing and Materials
A.W.I. - Architectural Woodwork Institute
P.S. - Product Standards
F.S. - Federal Specifications
D.F.P.A. - Douglas Fir Plywood Association

1.4 SUBMITTALS

A. Submit complete shop drawings for all items to be furnished by this Section.

B. Submit affidavits verifying conformance with flame spread rating indicated herein.

1.5 ENVIRONMENTAL CONDITIONS

A. Millwork items shall not be placed on the job site until building has dried out and 60 degrees F. minimum temperature is maintained.

### PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Softwood plywood shall conform to PS 1-66, Interior Type, Group 1, grade A-A veneers.

B. Particle board shall be Duraflake, Novaply or Flakeboard, medium density.

C. Plastic laminate shall be 1/16" solid color, Formica, Wilson

Art or Nevamar, solid color and finish as selected by the Engineer.

D. Plastic laminate adhesive shall be as required for AWI premium grade work.

E. Rough hardware and fasteners shall be good commercial quality as required for secure anchorage.

## PART 3.00 EXECUTION

### 3.1 INSTALLATION

A. Doors and frames shall be set square, plumb, true to line and so that doors will operate without binding according to manufacturer's recommendations.

E. Finish hardware shall be installed without injuring other work and so that hardware works exactly as intended.

F. Millwork and counters shall be set level, plumb, square and secure. Replace surfaces damaged during installation.

## SECTION IX

## CAULKING AND SEALANTS

### PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes the following:

1. Painting.

1.3 QUALIFICATIONS

A. Applicator shall be franchised or otherwise formally approved by manufacturer of caulking and sealant materials.

1.4 SUBMITTALS

A. Submit manufacturer's complete descriptive literature for approval and color selection.

1.5 PROTECTION

A. Mask surrounding surfaces.

### PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Sealants for joints in concrete and precast concrete panels, except expansion joints, shall be Dow Silicone, Mono made by Tremco, DAP acrylic terpolymer, or G.E. Silicone Construction Sealant, standard color as selected by Engineer.

A. Backing shall be polyethylene foam rods, shaped as recommended by sealant manufacturer for type of joint involved.

B. Sealant for vertical expansion joints shall be Tremco Dymeric, color as selected by Engineer.

D. Interior caulking shall be non-staining butyl latex.

PART 3.00 - EXECUTION

3.1 PREPARATION

A. Remove all contaminant materials and clean joints in order to provide sound, clean surfaces to receive materials.

B. Apply masking tape where required to protect adjoining surfaces. Align tape with joint edges. Do not allow tape to touch surfaces to which caulking or sealant is to be applied.

C. Apply solvents, if required by sealant manufacturer, as directed by sealant manufacturer.

3.2 MIXING

A. Mix two-part sealants according to manufacturer's instructions.

3.3 APPLICATION

A. Install back up material. Material shall be sized to require 20% to 50% compression in width. Insert back up to depth recommended by sealant manufacturer for type and width of joint involved. In joints too shallow for rod, install polyethylene.

B. Apply caulking and sealant according to manufacturer's printed instructions. Fill joints carefully and completely, compressing material into joint. Smooth and tool joints slightly concave or smooth as indicated to leave a neat, tightly sealed joint.

C. Remove masking tape immediately after tooling of sealant is accomplished and before surface skin has started to form.

SECTION X

FINISH HARDWARE

PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.3 QUALIFICATIONS

A. Only those approved by the Engineer as having proven technical knowledge and experience will be acceptable suppliers.

1.4 SUBMITTALS

A. This Contractor shall be responsible for checking the detailed drawings to insure the proper operation and fit of all items of hardware. After award of a formal contract by the General Contractor as instructed by the Engineer, and prior to the issuance of any templates or the placing of orders for materials, submit to the Engineer, through the General Contractor, complete typewritten schedules of all items for checking, together with any illustrations or samples of materials proposed to be furnished as may be requested by the Engineer. Such items or illustrations shall remain in the Engineer's possession until the project has been accepted by the Owner. After approval of the schedules of materials, provide five (5) copies to the Engineer for file and distribution purposes.

B. Before final inspection, the supplier shall make a detailed written report to the Engineer covering application and condition of the finish hardware.

1.5 COORDINATION

A. Templates and/or physical hardware shall be furnished by this supplier to any an all affected contractors or suppliers for preparation of their material to fit the hardware. Physical hardware required by any contractor or supplier shall be shipped by this supplier via prepaid freight included in his estimate, in sufficient time to prevent any delay in the execution of this work.

1.6 DELIVERY AND STORAGE

A. Deliver hardware in manufacturer's labeled containers, packed so as to avoid any damage and labeled to conform to approved schedule.

B. The General Contractor shall provide a locked room in which the finish hardware is to be stored. The room is to be of sufficient size to receive, check and store the hardware on temporary shelves to be provided by the General Contractor.

## PART 2.00 - PRODUCTS

### 2.1 HARDWARE SCHEDULE

A. All locks shall be master keyed and keyed in groups as directed by the Engineer. Furnish six (6) master keys and two (2) keys per lock.

B. The finish in general shall be dull chrome (US26D) unless noted otherwise.

Manufacturers

| | |
|---|---|
| Butts | Hager |
| Locksets | Sargent |
| Closers | Sargent |
| Push, Pull, Kickplates | Trimco |
| Stops, Flush Bolts | Trimco |
| Thresholds | Southern Metal |
| Weatherstripping | National Guard |
| Astragals | National Guard |
| Silencers | Blynn-Johnson |

Exterior Single Doors

Single Doors
1 1/2 Pr. Butts BB4101-P-4 1/2 x 4 1/2 10A
1 Ea. Closers EB 1234-PN9
1 Ea. Lockset 8G05 ECX 10B
1 Ea. Floor Bumper
1 Ea. Threshold S258A x opening width
1 Ea. Set Weatherstrip 160A
3 Ea. Silencers

SECTION XI

METAL DOORS AND FRAMES

PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes the following:

1. Erection and installation
2. Finish hardware
3. Finish painting

1.3 SHOP DRAWINGS

A. Shop drawings shall be submitted to the Engineer for approval. These drawings shall fully describe and locate all items being furnished and shall include large scale details on principal construction features. Approved shop drawings shall constitute final contract requirements, and no work shall be fabricated until shop drawings for that work have been approved by the Engineer.

1.4 SAMPLES

A. Submit:

1. A sample door construction, showing edge, top and/or bottom construction, hinge reinforcement and face stiffening.

2. A sample of a typical frame, showing welded corner joint, welded hinge reinforcements, dust cover boxes and floor anchors.

1.5 SITE STORAGE AND PROTECTION OF MATERIALS

A. It shall be the responsibility of the General Contractor to see that any scratches or disfigurement caused in shipping or handling are promptly cleaned and touched up with a rust-inhibitive primer, and that materials are properly stored on planks or dunnage, out of water, and covered to protect them from damage due to any cause. Doors shall have their wrapings or coverings removed upon arrival at the building site and shall be stored in a vertical position, spaced by blocking to permit air circulation between them.

PART 2.00 - PRODUCTS

2.1 HOLLOW METAL DOORS - Door Between Bays

A. Materials. Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM Designation A366-66T and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than 16 gauge. Face sheets for exterior doors shall be not less than 16 gauge.

B. Design and Construction.

1. All doors shall be custom made, of the types and sizes shown on approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1 3/4".

2. All doors shall be strong, rigid, and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radium for the gauge of metal used.

3. Face sheets shall be stiffened by continuous vertical formed steel sections occupying the full thickness of the interior space between door faces. These stiffeners shall be not less than 22 gauge, spaced not more than 6" apart and securely attached to both face sheets by spot welds not more than 4" on center. Spaces between stiffeners shall be sound-deadened and insulated to full height of the door with an inorganic noncombustible batt type material.

4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than 16 gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top eges, and where required for attachment of weather stripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.

6. Edge profiles shall be provided on both vertical edges of doors as follows:

Single-acting swing doors - beveled 1/8" in 2"
Double-acting swing doors - rounded on 2 1/8" radius

7. Hardware reinforcements:

(a) Doors shall be mortised, reinforced, drilled and tapped at the factory for full templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware contractor. Where surface-mounted hardware is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by others.

(b) Minimum gauges for hardware reinforcing plates shall be as follows:

| | |
|---|---|
| Hinge and pivot reinforcement | - 7 gauge |
| Reinforcements for lock face, flush bolts, concealed holders, concealed or surface-mounted closers | - 12 gauge |
| Reinforcement for all other surface mounted hardware | - 16 gauge |

8. Astragals shall be full height, full welded to face active leaf.

C. Finish. After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Door shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with a rust-inhibitive primer which is fully cured before shipment.

2.2 FIRE RATED DOORS (Not in Contract)

A. Doors rated for 1-hr and 2-hr fire resistance shall be provided with Underwriters' Laboratories, Inc. labels with appropriate fire resistance and temperature use ratings.

2.3 HOLLOW METAL FRAMES

A. General. All metal frames shall be accurately fabricated to match the doors to be installed in them.

B. Design and Construction.

1. Frames for exterior openings shall be made of commercial grade cold rolled steel conforming to ASTM Designation A-366-66T, not less than 16 gauge.

2. Frames for interior openings shall be either commercial grade cold rolled steel conforming to ASTM A-366-66T or commercial grade hot rolled and pickled steel conforming to

ASTM A-569-66T. Metal thickness for frames shall be not less than 16 gauge.

3. All frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Knocked-down frames will not be accepted.

4. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Mounted members shall be clean cut, straight and of uniform profile throughout their length.

5. Jamb depth, trim, profile, and backbends shall be as scheduled by the Engineer and shown on approved shop drawings.

6. Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded and stops mitered.

7. Minimum depth of stops shall be 5/8". Cutoff (sanitary and hospital type) stops, where scheduled, shall be capped at heights shown on approved shop drawings, and all jamb joints below cut-off stops shall be ground and filled smooth, making them imperceptible.

8. Hardware reinforcements:

   (a) Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware contractor. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping shall be done by others.

   (b) Minimum thickness of hardware reinforcing plates shall be as follows:

   Hinge and pivot reinforcements - 3/16" x full width of frame x 10" min.
   Strike reinforcements - 1/8"
   Reinforcements for surface-mounted hardware - 1/8"

9. Floor Anchors:

   (a) Floor anchors shall be securely welded inside each jamb, with two holes provided at each jamb for floor anchorage.

   (b) Minimum thickness of floor anchors shall be 16 gauge.

10. Jamb Anchors:

(a) Frames for installation in walls shall be provided with adjustable jamb anchors. Anchors shall be not less than 16 gauge steel. The number of anchors provided on each jamb shall be as follows:

Frames up to 7'6" height - 3 anchors

SECTION XII

OVERHEAD DOORS

PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes the following:

A. Rough Carpentry

1.3 SUBMITTALS

B. Submit duplicate submittals.

PART 2.00 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Overhead Door Corp. or equal.

2.2 INSULATED SECTIONAL OVERHEAD DOORS

A. Insulated Steel Sectional Overhead Doors: 432 Series Insulated Steel Doors by Overhead Door Corporation. Units shall have the following characteristics:

1. Door Assembly: Insulated steel door assembly with rabbeted meeting rails to form weather tight joints and provide full-width interlocking structural rigidity.
   a. Panel Thickness: 2 inches
   b. Exterior Surface: Ribbed
   c. Exterior Steel: Nominal 24 gauge, hot-dip galvanized
   d. Back Cover:
      1) Poly-Backed
   e. Center and Eng Stiles: 16 gauge
   f. Springs:
      1) 10,000 cycles
   g. Insulation: Polystyrene
   h. Thermal Values:
      1) Polystyrene - R-value of 7.35; U-value of 0.136

2. Finish and Color: Two coat baked-on polyester with white exterior and white interior color.

3. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.

4. Lock:
   a. Interior mounted slide lock with interlock switch for automatic operator

5. Weatherstripping:
   a. Flexible bulb-type strip at bottom section
   b. Flexible Jamb seals
   c. Flexible Header seal

6. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.

7. Manual Operation: Chain hoist operator.

PART 3.00 - EXECUTION

3.01 PREPARATION

A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Strictly comply with manufacturer's installation instructions and recommendations. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

B. Instruct Owner's personnel in proper operating procedures and maintenance.

C. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion.

D. Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.

## SECTION XIII

## SHEET METAL WORK

### PART 1. GENERAL

1.1 CONDITIONS

A. Requirements of the conditions of the Contract apply to all work under this Section.

1.2 SCOPE

A. Related work specified elsewhere includes:

1. Flashing of ventilators and piping.
2. Grilles and louvers.
3. Caulking and sealants.
4. Flashing to walls

1.3 SUBMITTALS

1. Shop drawings shall be submitted for approval.

### PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Sheet metal shall be 26 gauge galvanized iron.

B. Solder shall meet QQ-S-571d. Flux shall be approved brand.

C. Nails shall be galvanized.

2.2 FABRICATION

A. Conform to best commercial practice and to approved shop drawings.

### PART 3.00 - EXECUTION

3.1 CONDITION OF SURFACES

A. Inspect all surfaces to which sheet metal or sheet metal accessories are to be installed and do not install sheet metal work unless such surfaces are sound, dry, clean and free of defects which might be deleterious to the sheet metal work. Drive projecting nails flush with deck.

3.2 INSTALLATION

A. Confine direct nailing to sheet metal less than 12 inches wide. Use cleats on sheet metal wider than 12 inches.

B. Lock one end of cleats into seams and folded edges; nail other end with two nails and fold back over nail heads. Space cleats not over 12 inches on center.

C. Pretin edges of sheet metal before soldering. Sweat width of soldering. Remove exposed flux after work is soldered. Lap seams in direction of flow. Make seams not smaller than the following: standing 1 inch; flack lock 3/4 inch; soldered lap 1 inch; unsoldered filled flat 3 inches. All sheet metal work shall be functionally weathertight and watertight.

D. Finished installation shall be true to line with shop formed shapes undistorted, not damaged; and with properly shaped angles, and with plane surfaces free from waves and buckles.

E. Provide expansion joints and other means for relieving stresses from expansion and contraction of the material. Base computations on lowest recorded or known winter temperature plus 50 degrees. Provide additional expansion joints and other means which will permit twice the movement calculated, whether specially indicated otherwise or not on the drawings.

SECTION XIV

MECHANICAL - GENERAL

PART 1. GENERAL

1.1 GENERAL CONDITIONS

A. The General Conditions and other pertinent documents issued by the Engineer are a part of these Specifications and shall be complied with in every respect. In addition, the accompanying Architectural, Structural, Mechanical, Electrical and other Drawings shall be complied with in every respect. It shall be the responsibility of the Mechanical and Electrical Contractors to avail themselves of a complete set of Drawings and Specifications and be familiar with all parts thereof. Failure to do so shall not relieve any responsibility in the fulfillment of the Contract in any respect.

1.2 INTENT

A. The intent of the Mechanical and Electrical Drawings and Specifications is that the Contractor shall furnish all labor and materials, equipment and transportation necessary for the proper execution of the work. The work required as related to other trades is shown in it majority in the drawings, but thoroughly examine the Drawings and Specifications relating to other trades in order to include all necessary work. No additional compensation shall be considered for failure to properly interpret the responsibilities to other trades. The Contractor shall do all the work shown on the Drawings and described in the Specifications and all incidental work considered necessary to complete the project. The Engineer reserves the right to make any reasonable change in the locations indicated without additional compensation to the Contractor.

1.3 CONFLICT

A. If there is a conflicting variance between the Drawings and Specifications, the provisions of the most stringent shall control. In case of conflict between the General Provisions of the Contract or any modifications thereof, the Mechanical and Electrical Specifications shall control. The Drawings and Specifications are complementary and any work required by one, but not by the other, shall be performed as though required by both.

1.4 SCOPE

A. The work contemplated and included under this Section of the Specifications consists of the furnishing of all labor, materials and supervision necessary for the installation of

complete mechanical and electrical systems as specified herein or shown on the Drawings, together with all necessary auxiliaries and appurtenances for same.

B. Furnish and install all systems complete in every respect and ready to operate. Furnish all miscellaneous items and accessories required for such installation, whether or not each such item or accessory is shown on the Drawings or mentioned in these Specifications.

1.5 INSPECTION OF SITE

A. The Contractor, before submitting his proposal, shall inspect the site of the proposed construction and become fully informed as to the facilities, difficulties and restrictions attending the execution of the work. No additional compensation will be granted for work or items omitted from his proposal due to his failure to inform himself of the conditions affecting the performance of the work included in the Contract, or necessary to carry on and satisfactorily complete the work included herein.

B. Locations and elevations of the various utilities included within the scope of this work are offered separate from the Contract Documents as a general safety guide only without guarantee as to accuracy.

1.6 CODES, STANDARDS AND REGULATIONS

A. All workmanship and materials herein specified shall meet in every respect the codes, standards and regulations having jurisdiction of the work. In case of difference between the various standards and other regulations, the matter will be brought to the attention of the Engineer and either the most stringent shall govern or the regulation or standard selected by the Engineer shall govern.

B. Should the Contractor perform any work that does not comply with the requirements of the applicable codes, standards and regulations, he shall bear all costs arising from the deficiencies.

C. The following codes, standards and regulations in effect on the date of bid invitation shall be considered a part of this Specification:

a. State Public Health Department Regulations
b. State Plumbing Code
c. National Fire Protection Association
d. American Society of Mechanical Engineers
e. American Society for Testing Materials
f. Air Conditioning and Refrigeration Institute
g. National Electrical Code
h. National Electrical Safety Code
i. Local, City, State and Federal Codes and Standards

j. Underwriters' Laboratories
k. Local Utilities Requirements
l. National Electrical Manufacturers Association
m. OSHA - Occupational Safety and Health Standards

1.7 PERMITS AND FEES

A. Provide all necessary notices, obtain all permits, pay all taxes, file all necessary plans and obtain all necessary approvals in connection with the mechanical and electrical work required for the project.

1.8 CONTRACTOR DEFINITION

A. Where the word "Contractor" issued in connection with the work included under the Mechanical and Electrical Sections of these Specifications, reference is thereby made to the Contractor who is engaged to execute the work included under that Section of the Specifications only, notwithstanding the fact that this Contractor may be either the prime contractor, general contractor or his subcontractor.

1.9 DRAWINGS

A. The accompanying Mechanical and Electrical Drawings in general indicate approximately the locations of equipment and devices, except in those cases where specified notes appear. Exact locations of outlets and apparatus shall be determined by reference to the general plans and to detailed shop drawings, by measurements at the building and in cooperation with other contractors and the Engineer.

B. Exact locations are subject to approval by the Engineer and may differ a reasonable amount from the approximate locations shown on the Drawings without additional compensation to the Contractor.

C. Major changes resulting in a savings in labor or material shall be made only in accordance with a Contract Change Order. Major deviations shall be made only where necessary to avoid interference and only after drawings showing the proposed deviations have been submitted to and approved by the Engineer.

PART 2.00 - PRODUCTS

2.1 MATERIALS

A. Provide materials and equipment which are new and in perfect condition. Where the Underwriters' Laboratories have established standards and issued labels for a particular group, class or type of equipment, the Underwriters' label shall be required on all equipment in that category. Each component shall have a nameplate giving the name and address of the manufacturer, catalog number and designation.

B. Where the words "or equal" are used in the Specifications or on the Drawings, it shall be understood that the Engineer will be the sole judge in the matter. In all cases where more than one manufacturer or material is specified, the Contractor shall be permitted to furnish any of those specified, however, power equipment, panels, transformers and safety switches should be of the same manufacturer. It is not the intention to discriminate against any "equal" product of other manufacturers, but rather to definitely set a standard of quality and shall not be construed to limiting competition. Any proposed substitution will be assumed to be acceptable without specific authorization from the Engineer. Should a substitution be accepted and should the substitution prove defective or otherwise unsatisfactory for the intended service within the warranty period, the Contractor shall replace the substitution with the equipment or material originally specified, and on which the Specification required him to base his proposal, at no additional compensation.

2.2 TEMPORARY CONSTRUCTION POWER

A. Furnish and install temporary power, water, heating, gas and lighting as the needs require for construction and safety purposes. It shall be the responsibility of the General or Prime Contractor to obtain and be responsible for all utility charges.

PART 3.00 - EXECUTION

3.1 WORKMANSHIP - GENERAL

A. All work shall be installed in a neat, careful, safe and workmanlike manner by craftsmen skilled in the trade.

3.2 STANDARDS

A. Perform all work in such a manner that the many components will function as a complete workable system, including any accessories required to accomplish such installations. Perform all work in accordance with acceptable industry standards except where other standards or procedures are herein specified.

3.3 COORDINATION AND COOPERATION

A. Coordinate all mechanical and electrical work with general, structural and other grades to insure proper execution of the work and general progress for the entire project and to avoid delaying any other Contractor. Cooperate with all other trades so that the entire project will not be handicapped, hindered or delayed. Assist other trades in working out space conditions to permit all work to be installed satisfactorily. No extra compensation will be allowed the Contractor for any remedial work required to eliminate interferences due to lack of

coordination and cooperation.

3.4 STORAGE OF MATERIALS

A. Protect all mechanical and electrical materials and apparatus to prevent any damage to them. Unless approved, no material or apparatus shall be stored outside or exposed to the elements. Cover apparatus with tarpaulins or other protective coverings, provide pallets or other methods to raise materials above the floor, and where directed, provide barriers or guard rails to protect the materials. Failure on the part of the Contractor to comply with the above to the complete satisfaction of the Engineer or his representative will be sufficient cause for rejection of the piece of apparatus in question.

3.5 DAMAGED AND DEFECTIVE WORK

A. Remove and replace damaged and defective work or materials as directed by the Engineer with no extra compensation. All repairs to the work shall be made with new materials or a complete new piece of equipment shall be provided as directed by the Engineer.

3.6 ACCESSIBILITY

A. Install all equipment and devices in an accessible location or in a location where they can be made accessible with removable panels. Provide Milcor or approved equal access panels as required for access to concealed equipment which requires servicing and testing. Equipment and devices shall be "readily accessible" where required by the National Electrical Code. In non-removable ceilings, the removal of a lighting fixture or air device is not an approved access panel.

3.7 SAFETY

A. Provide necessary precautions for the safety of life or property. All construction work shall conform to the standards of the Occupational Safety and Health Act. Provide approved ground fault interrupter devices on all electrical construction devices consuming power and including temporary lighting systems.

3.8 CLEAN-UP

A. The Contractor shall keep his work area clean at all times. Upon completion of work in any area, remove all equipment, excess materials and debris from the area and leave area broom clean. Protect all equipment during operations of painting, plastering, cutting or drilling and any like operation which might damage the equipment. Upon completion of the project, remove all equipment, excess material, scrap and debris from the job site. The job site shall be left clean and finished.

## 3.9 CONTRACTOR FURNISHED DATA

A. Submit to the Engineer shop drawings for all equipment and materials to be installed on the project. No equipment or materials shall be installed until the shop drawings have been approved, even if the material submitted is identical to that originally specified. Consideration for substitution of materials will not be allowed if shop drawings are not received within 30 days after award of Construction Contract.

B. Rough-in materials including pipe, wire, conduits, connectors and boxes may be submitted in a list form including the names of manufacturers and catalog type or number. All other equipment and materials shall be submitted with detailed prints or drawings. Prints or drawings shall be permanent reproductions and not Thermofax copies. The total number of shop drawings and lists shall be not less than six.

C. Should the Contractor propose to submit items other than those specified, he shall include cuts of both the specified item and the proposed "equal item" in the brochures. The "originally specified product" and the "proposed substitution" shall be clearly marked.

D. Where the Specifications or Drawings call for the work to be installed in accordance with the manufacturer's specifications, recommendations or directions, copies of the same shall be submitted to the Engineer for review and surveillance.

E. Provide the Engineer four (4) copies of hard bound manuals for the project ten (10) days prior to final acceptance of the completion of the project. The manuals shall include copies of all corrected and approved shop drawings, schedules, catalog data, illustrations, performance curves and rating data, wiring and control diagrams, manufacturer's recommendations, operating and maintenance instructions, including safe operating procedures and requirements, spare parts lists and other pertinent information for the specified equipment and systems. The manual shall include a typewritten schedule of each motor, giving nameplate data, switch and fuse or breaker sizes and voltage and phase at motor terminals.

## 3.10 TESTS

A. Test and demonstrate each and every system in the presence of and to the complete satisfaction of a representative of the Engineer. Prior to demonstration, start all equipment and make necessary tests and adjustments to place the system in first class operating conditions.

B. Furnish all services, instruments, equipment and personnel required for the tests; in addition, submit a typewritten test report, where applicable and recorded data is taken or required for approval prior to final acceptance.

C. Test all electrical conductors after installation but prior to termination with a 500 volt meggar. Conductors shall test free of grounds and shorts, and their insulation resistance shall be recorded for all feeders and circuits where the conductor size is size 8 and larger.

D. No piping work, fixtures or equipment shall be concealed or covered until they have been inspected and approved. Engineer's representative shall be notified one week prior to when the work is ready for inspection. All work shall be completely installed, tested as required by the Section and the State Ordinances and State Safety Orders, and shall be leak-tight before inspection if requested. All tests shall be repeated upon request to the complete satisfaction of those making the inspection.

E. All domestic water piping shall be flushed out, tested and shall be left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

3.11 AS-BUILT DRAWINGS

A. Before the project will be finally accepted, a set of permanent as-built drawings must be submitted to the Engineer. The Contractor must certify accuracy by endorsement. The as-built drawings must be correct in every detail so that the Owner can properly operate, maintain and repair exposed and concealed work.

B. All underground work shall be dimensioned. All change orders, field changes, equipment, circuit numbers, motors, feeders, breakers and starters shall be clearly indicated on the drawings. As-built drawings shall be submitted on tracings or other reproducible forms.

3.12 GUARANTEE

A. Furnish to the Engineer a typewritten guarantee, countersigned by the General Contractor, to the effect that all work or equipment installed by him under this Contract shall be free from any or all mechanical and electrical defects for a period of one (1) year from the date of final acceptance. Should any mechanical or electrical defect develop in any of the systems or equipment within the period, due to faulty equipment, poor installation or workmanship, this Contractor shall agree to repair or replace same with new and like material without additional compensation. Lamps in all fixtures shall be guaranteed for 100 percent of manufacturer's published life data.

3.13 GENERAL CONSTRUCTION WORK FOR MECHANICAL AND ELECTRICAL FACILITIES - SLEEVES

A. Provide 22 gauge galvanized sheet iron sleeves where pipes and conduits pass through interior masonry walls. Sleeves shall be trimmed flush with each finished surface. Sleeves shall be

sufficient size to allow insertion of pipe or conduit passing through concrete beams and walls, masonry exterior walls and all floors. Sleeves shall be sized at least 1/2 inch greater than the outside diameters of the pipes or conduits. Floor sleeves shall extend 1 inch above floors. After conduits/pipes are installed, seal the space between the conduits/pipes and sleeves with a filler to provide a non-runable watertight joint.

3.14 ROOF FLASHING

A. Provide complete watertight flashing and counterflashing for all roof penetrations. All flashings shall be made to the complete satisfaction of the Engineer.

3.15 PAINTING

A. All exposed mechanical and electrical equipment in finished areas shall be painted.

B. Provide a prime coat to all unfinished equipment or material and all ferrous metal subject to rusting and corrosion during construction.

C. All duct work visible through registers, grilles and diffuser openings shall be given two coats of dull black paint.

3.16 FASTENING DEVICES AND METHODS

A. Provide fastening devices which are permanent, non-corroding, high strength type using threads or tightening. Minimum size bolt shall be 3/16 inch, and medium size screw shall be No. 10. Cement or glue type fasteners shall not be used. Driven studs may be used for fastening only in steel.

B. In concrete and solid masonry, use threaded inserts secured in drilled holes or cast into the concrete. Conduits 1 inch and larger, junction boxes 12 inches and larger, and all equipment subject to motion, operation or vibration shall be fastened with lead tamped or wedge type expanding shield secured threaded inserts.

C. In hollow masonry, plaster or plaster board, toggle bolts or expanding lag anchors shall be used with excess hole area covered with washers. Whenever possible, fastening in plaster or plaster board shall be into studs or structural supports.

D. In wood construction, wood screws and lag bolts may be used. Screws shall not be hammered into wood.

E. In steel construction, driven threaded studs, welded threaded studs, drilled threaded or through holes, or threaded clamps shall be used.

F. In light weight applications on sheet metal, self-threading screws or bolts may be used.

## 3.17 PIPING

A. Cut pipe accurately to measurements established at the site, work into place, without springing or facing and clear all windows, doors and other openings. Ream all piping to remove burrs and install so as to permit free expansion and contraction without causing damage. Make all changes in direction with fittings.

B. Provide, whether shown or not, sufficient awing joints, expansion loops and devices necessary for a flexible piping system. Provide union shut off valves suitable located to facilitate maintenance and removal of all equipment or apparatus. Install drain valves at all low points of each system to enable complete drainage, and air vents at all high points in the piping system to enable complete air venting.

C. Pipe all drains from condensate pans, and relief valves, to spill over an open sight drain, floor drain or other acceptable discharge points, and terminate with a plain end (unthreaded pipe) 6 inches above the drain. Rigidly support all drains.

D. Weld-O-Let type fittings may be used for branch take offs where size of take off does not exceed 3 inch IFS and the take off is at least two standard pipe sizes smaller than the main size. Standard welding steel shall be used in all other locations. Copper piping shall have soldered joints with 95-5 solder. Galvanized piping shall have screwed joints.

E. Joints in copper tubing shall be made using sweat fittings and tin-antimony solder and non-corrosive flux. For soldered joints, the outside surface at end of pipe and inside surface of fitting shall be thoroughly cleaned with steel wool or emery cloth and all burrs shall be removed. After cleaning, surfaces to be joined shall be evenly and completely covered with flux. Solder joints shall be well supported during the heating process and shall not be strained during the cooling period. Excess solder shall be removed while in a plastic state, leaving a fillet around the cup of the fitting as it cools.

F. All pipe and fittings with screwed ends shall have its threads cut clean and true and in conformance with the AA Specification B-1 for taper threads. Screwed pipe and fitting of brass shall be made up without marring or damaging pipe and fitting surfaces. All screwed pipe joints, except where specified otherwise, shall be made up with non-soluble, non-toxic, approved thread compound, applied to male threads only.

G. Connections between pipe fittings, hangers and equipment of dissimilar metals shall be avoided wherever practical. Wherever such connections are unavoidable, they shall be insulated against direct contact, using a high grade dielectric insulating material of Teflon, Micarta, asbestos fiber, neoprene, or equal.

H. Hangers: Furnish and install suitable hangers and supports for all horizontal lines. Hangers and supports shall be Grinnel, Fee and Mason, or equal. Heavy pipes shall be carried by pipe hangers supported by rods secured to slab or by approved design. No piping shall be hung from other piping. In no case shall hangers be supported by means of vertical expansion bolts.

I. Horizontal steel piping shall be supported in accordance with the following schedule:

| PIPE SIZE | MAX. HANGER SPACING | ROD SIZE |
|---|---|---|
| 1" & smaller | 6 ft. 0 inches | 3/8 inch |
| 1 1/2" to 2" | 9 ft. 0 inches | 3/8 inch |
| 2 1/2" to 4" | 10 ft. 0 inches | 1/2 inch |
| Larger than 4" | 12 ft. 0 inches | 1/2 inch |

J. All lines of copper tubing shall be supported by approved type hangers. Hangers for uncovered lines shall be especially designed for copper tubing. Hangers for covered tubing shall have broad scraps fitting outside of covering with insulation protection. Horizontal copper tubing shall be installed in accordance with the following schedule.

| PIPE SIZE | HANGER HORIZONTAL SPACING | ROD SIZE |
|---|---|---|
| 1/2" | 6' | 3/8 inch |
| 3/4" & 1" | 8' | 3/8 inch |
| 1 1/4" & Larger | 10' | 3/8 inch |

3.18 ESCUTCHEONS

A. Escutcheons shall be installed on pipes and conduits wherever they pass through floors, ceilings, walls or partitions in finished areas.

B. Escutcheons shall be chrome plated brass.

3.19 RELOCATION OF GAS LINE (Not in Contract)

A. Trenches for gas line shall be excavated to the required depth.

B. The bottom of the trenches shall be tamped hard and graded to secure all available fill. Bell holes shall be excavated to ensure pipe resting for its entire length on solid ground. If rock is encountered, it shall be excavated to a depth of 6 inches below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe and the rock surface shall be filled with gravel and shall be well tamped. No extra compensation will be made for rock excavation.

C. After the gas line has been tested, inspected and approved by the Engineer and utility company representative, the trenches shall be backfilled with approved fill material, in 12 inch layers, firmly compacted, flooded if necessary, and thoroughly tamped.

## 3.20 NAMEPLATES AND IDENTIFICATION

A. Provide nameplates and identification on all major mechanical and electrical equipment.

B. Exposed or surface mounted panelboards, cabinets, starters, contactors, time clocks, fans, motors, air handling units, shall be coded and painted with one inch high stenciled black letters across the front.

C. The above equipment where flush mounted, shall be coded on the inside of the cover.

D. Stencils shall be made from heavy waxed cardboard with all letters in capitals and of the same size. At the completion of the project, the stencils shall be turned over to the Owner.

E. In lieu of stencils, engraved bakelite nameplates may be used; nameplates shall be minimum one inch high with 1/4 inch high capital letters permanently fastened to equipment.

## 3.21 PIPE VIBRATION AND NOISE ISOLATION

A. Insert 1 inch strip of hair felt to isolate all piping, conveying fluids, from direct contact with building walls, framing and sleeves. Pipe isolation shall be installed at all ring hangers consisting of 1 inch felt. Separate cold and hot water piping by 6 inches.

B. All rotating equipment, piping, hangers, supports and tank connections to rotating equipment shall be vibration isolated from beams, columns, floors, ceilings, joists and walls using isolation equipment as specified in other sections of this specification or as shown on the Drawings.

## 3.22 CONTROL WIRING

A. The Electrical Contractor shall furnish and install all control and interlock wiring for electrical equipment furnished. All wiring shall be in conduit and shall be in conformance with Section 16. Where control voltage is greater than 48 volts, wire shall be minimum 14 gauge AWG and shall have 600 volt insulation. Motors, starters, heaters, thermostats, and other control devices shall be furnished and delivered from the Mechanical Contractor to the Electrical Contractor for installation by the Electrical Contractor. The Mechanical Contractor shall furnish complete wiring diagrams to the Electrical Contractor for each and every piece of equipment to be installed and inter-connected if necessary. The Mechanical Contractor shall notify the Electrical Contractor concerning any changes in the electrical requirements due to substitution of equipment or variations in the equipment. Control raceways and boxes exposed to the elements shall be NEMA 3R or weatherproof.

SECTION XV

HEATING, VENTILATING AND AIR CONDITIONING

PART 1. GENERAL

1.1 CONDITIONS

A. Furnish all labor, materials, equipment and services to complete the work as shown on the Drawings or as specified. Refer to the General Conditions, Supplemental General Conditions, Electrical, and other Sections as they apply.

1.2 SCOPE

A. Furnish all HVAC systems complete in every respect and ready to operate. Furnish all miscellaneous items and accessories required for such installation, whether or not each such item or accessory is shown on the Drawings or mentioned in these Specifications.

B. The work shall consist of but is not limited to the following items:

1. Suspended heaters

C. Submit shop drawings for:

1. Wall exhaust fans
2. Louvers
3. Suspended heaters

PART 2.00 - PRODUCTS

2.1 EXHAUST FANS

A. Exhaust fans shall bear AMCA or PFMA certified seal and be of minimum sizes and capacities as shown on the drawings. Include disconnects, integral mounted. Furnish with variable pitch drives unless otherwise directed. Fans shall be spun type with automatic backdraft dampers.

B. Furnish with factory curbs.

C. Approved equals shall include Greenhack, Penn, Cook or Exit-Air.

2.2 SUSPENDED HEATERS

1. Suspended heaters shall be installed at locations shown on the plans. Heater capacities shall be as indicated on the Mechanical Schedule.

PART 3.00 - EXECUTION

3.1 FLUES

1. All gas flues shall be double wall type B with 6" clearance between roofing material and flue. Flues shall terminate above roof with rain cap, roof jack and counter flashing, in compliance with the gas code.

3.2 LOUVERS (Not in Contract)

A. Louvers shall be 30" W x 36" H as manufactured by Greenheck, Model ESJ-601, stationary type aluminum extrusion louvers. Screens and motorized dampers shall be provided for each louver.

SECTION XVI

ELECTRICAL

PART 1. GENERAL

1.1 CONDITIONS

Furnish all labor, materials, equipment and services to complete the electrical work as shown on the drawings or as specified. Refer to the General Conditions, Supplemental General Conditions and other sections below, as they apply.

1.2 SCOPE

A. Furnish and install all electrical systems complete in every respect and ready to operate. Furnish all miscellaneous items and accessories required for such installation, whether or not each such item or accessory is shown on the drawings or mentioned in these specifications.

B. The work shall consist of, but is not limited to the following general items:

1. Service Entrances and Grounding Facilities
2. Lighting Fixtures and Lamps
3. Raceways
4. Wiring Devices and Plates
5. Panelboards and Branch Circuits
6. Control Wiring

C. Submit shop drawings for:

1. Lighting Fixtures and Lamps
2. Wiring Devices and Plates
3. Panelboards
4. Safety Disconnect Switches
5. Control Wiring for all Mechanical Systems

PART 2.00 - PRODUCTS

2.1 MATERIALS

Submit material lists for all raceways and connectors, conductors and their connectors, boxes and grounding facilities.

PART 3.00 - EXECUTION

3.1 RACEWAYS

A. GENERAL: Provide raceways for all wiring systems, minimum 3/4

inch. Raceways shall include rigid galvanized steel, conduit, rigid aluminum conduit, (EMT) electrical metallic tubing, flexible metallic conduit, surface metal raceways, wire ways and troughs. Raceways shall be mechanically and electrically continuous from service entrance to final outlet. Raceways shall be run perpendicular and parallel to building construction. Except in Mechanical Rooms or as otherwise noted, all raceways shall be concealed. All breaks and turns with exposed raceways shall be made with malleable iron cadmium or hot dipped galvanized conduit fittings and covers. Raceways shall be rigidly supported with malleable iron conduit clamps or trapeze supports and clamps at intervals not exceeding 7 feet with 12 inches of all outlet boxes, elbows, and changes or direction. Concealed raceways shall be supported from structural members and not furring. All raceway systems shall be completely installed and secured and swabbed out, and all work in the area shall have progressed sufficiently to prevent injury to cables, before any conductors are installed. Provide caps and plugs on ends of raceways and openings in boxes to prevent foreign material from entering during construction. Provide double locknuts where 1 1/2 inch and larger conduits terminate, where No. 4 and larger conductors are installed, and where required by NEC. Do not use running threads. Leave No. 12 pull wire (identified at both ends) in all empty raceways. Provide plastic insulating busing on all conduit connections and fiber inserts on all tubing connections. Surface metal raceways, surface wiremold and surface metal troughs shall be installed only where shown on the drawings.

B. RIGID CONDUIT: Provide rigid galvanized steel conduits for service entrance, panel feeders and all motor feeders. Threadless fittings, all thread and running threads shall not be used. Rigid conduits shall be provided for all raceway systems run underground or embedded in concrete or solid masonry. Rigid conduit shall be as manufactured by Youngstown, Allied, Triangle, or equal. Conduits located on ground or underground or exposed to the elements shall have an additional coat or polyvinylchloride and shall be manufactured by Robroy, or equal.

C. ELECTRICAL METALLIC TUBING (EMT): Electrical metallic tubing (EMT) may be used for conduits concealed in furred ceilings or walls, run exposed in the building, or embedded in hollow masonry construction above grade. EMT shall be as manufactured by Triangle, Allied, Republic, or equal. EMT fittings shall be ferrous metal galvanized or plated to resist corrosion and shall be of the compression-ring type, rain-tight and concrete-tight. Set screw, indenter or friction type fittings will not be allowed. All fittings shall be wrench tight and shall have insulated throats. Fittings shall be as manufactured by Steel City, Raco, Appleton, or equal.

D. FLEXIBLE CONDUIT: Provide flexible conduit for all connections to motors and other equipment subject to vibration or motion with a maximum length of 18 inches. Flexible conduit may be used for final connection to lighting fixtures in lay-in

ceilings. Conduit shall be rigidly supported where connection to flexible conduit is made. Conduit and fittings shall be self-grounding and, in addition, copper bonding jumpers shall be used. Flexible conduit shall be as manufactured by Republic, Anaconda, Pittsburg, or equal. Connectors shall be ferrous metal, galvanized or plated to resist corrosion, of the two (2) screw clamp type, or the squeeze type, as manufactured by Raco, Appleton, Steel City, or equal. Flexible conduit and fittings used outdoors or in other areas subject to moisture shall be of the liquid-tight type with connectors having an O-ring assembly. Liquid tight connectors shall be Raco type 3500, Appleton STB, or equal.

E. CONDUIT HANGERS AND SUPPORTS: All conduits shall be rigidly supported and securely fastened to structural members. Perforated iron straps or wire shall not be used for support. Maximum support spacing shall be five (5) foot for one (1) inch and smaller conduits, and seven (7) foot for conduits larger than one (1) inch. All conduits shall be installed to permit expansion and contraction, and type hanger, method of support, location of support, etc. shall be governed in part by this consideration.

3.2 OUTLET, JUNCTION AND PULL BOXES

A. Provide outlet and junction boxes where shown on the drawings or as required by Code. Boxes shall be independently rigidly supported and accessible. All outlet boxes shall be minimum of two (2) inches deep. Provide a four (4) inch square box with plaster ring and cover at each switch and receptacle location. Wiring device boxes located in brick, block or concrete walls shall be approved for the type of installation being at mortar joints. Multi-gang boxes shall be installed for more than two (2) adjacent devices; sectional boxes will not be allowed. All exposed cover plates as manufactured by Crouse Hinds, or equal. Outlets exposed to the weather shall be type FD with weather-proof gaskets and covers. Pull boxes shall be constructed of code gauge galvanized steel and shall be sized not less than 1½ times all dimensions as recommended by the NEC. All conductors in pull boxes shall be identified with tags.

3.3 CONDUCTORS

A. All conductors shall be rated 600 volts, and shall be copper with type THHN insulation. Minimum size shall be No. 12 and No. 8, and larger shall be stranded. All conductors shall be color coded, with sizes through No. 10 being of the solid compound coating. Stripes, bands or hash marks with respective color coding may be used for conductors No. 8 and larger. Color coding shall be phase A - black, phase B - red, phase C - blue, neutral - white, and ground - green. All conductors shall be by the same manufacturer and shall be Triangle, Simplex, Anaconda, General, Okonite, or equal.

B. Mains and feeders shall be run continuous without joints or splices. Branch circuit splices shall be made with 3M "Scotchloks," or equal. In panelboards and boxes, conductors shall be neatly placed in phase groups and supported away from

all enclosure sides. Lacing shall be done at intervals not greater than six (6) inches and shall be done with linen cord or T & B self-locking "Ty-Raps," or equal.

3.4 PANELBOARDS

A. Provide panelboards in accordance with the schematic drawings and schedules indicated on the drawings. Main bus bars, connecting straps and stub projections shall be silver plated copper. Panelboards shall be mounted with top six (6) feet above floor unless indicated otherwise. At all surface mounted 120 volt panels, provide a duplex receptacle surface mounted extending six (6) inches below panel and connected to a spare breaker. Provide a typewritten directory card in each panel indicating the location and equipment served by each circuit. Panelboard shall be as manufactured by Square D, General Electric, Cutler-Hammer, Westinghouse, ITE, or equal.

B. Panelboards shall contain quick-make, quick-break circuit breakers for manual and automatic operation. Circuit breakers shall be of the combination thermal-magnetic type with bolt-on attachment and with minimum interrupting capacities of 10,000 amperes. Single pole breakers shall be of nominal one (1) inch width. All multi-pole breakers shall be of the common trip so that an overload on one phase will trip all poles simultaneously. Tie handles are not acceptable.

3.5 LIGHTING FIXTURES

A. Provide all lighting fixtures as noted on the drawings. Fixtures shall be suspended from structural members or from ceiling structural members, by standard bar hangers, or other approved means. Structural steel necessary to support fixtures shall be furnished and installed under this Section. Provide plaster frames as required. All fixtures shall be grounded. Fixtures shall be completely wired and lamped and shall be in perfect condition and operating at the time of completion. New building fixtures shall not be used for construction lighting.

B. Fixture locations shall be coordinated with ceiling patterns or other details or notes as shown on the drawings.

C. If a lighting fixture for a specific location is not clearly noted, the Contractor shall bring it to the attention of the Engineer prior to bidding, or the Contractor shall furnish and install a fixture similar and comparable in cost to that specified for other like location.

3.6 WIRING DEVICES AND PLATES

A. Furnish and install all wiring devices and plates where shown on the drawings and herein specified. All devices shall be NEMA rated specification grade, with all parts except terminals totally enclosed, and with each device separately packaged upon arrival at job site. Height of wiring device shall work with

brick joints and concrete block joints, but in general, lighting switches shall be mounted 4'-0" above floor, and receptacles and telephone outlets shall be mounted 12" above floor. Adjacent wiring devices shall be mounted as close to each other as possible. All wiring devices shall be side wired.

B. In general, wiring devices and plates located in finished unpaneled areas shall be ivory. Wiring devices and plates located in finished paneled areas shall be brown. In unfinished areas, plates shall be 302 stainless steel.

3.7 SAFETY DISCONNECT SWITCHES

A. Furnish and install safety disconnect switches where shown on the Drawings or as required by NEC. Switches shall be NEMA heavy duty, horsepower rated, with padlocking provisions and with a nameplate identifying equipment served. In wet or exterior locations, switches shall be in NEMA 3R enclosures. Switches shall be as manufactured by Square "D", General Electric, Cutler Hammer, or equal.

3.8 GROUNDING

A. The entire electrical system and the building structure shall be grounded, or as indicated on the Drawings. The electric service, equipment and enclosures, conduits and raceways, switches, breakers and panels, motors, controller, lighting fixtures and receptacles shall be grounded. Each branch or power circuit shall have an independent grounding conductor whether shown or not, with the exception of lighting switches.

B. Bonding jumpers shall be installed to maintain continuity at water meters, connections shall be made with approved clamps as manufactured by Burndy.

3.9 GROUND FAULT CIRCUIT INTERRUPTERS

A. Conformance with UL Std. 943, Class A.

B. Temperature tolerance level of -31°F to 158°F.

C. Equal to Leviton Suregard V, NEMA 5-15R,Model 6598-W with indicator light, 15A, 125 Volt.

## SECTION XVII

## PLUMBING

### PART 1.00 - GENERAL

1.1 CONDITIONS

A. Furnish all labor, materials, equipment and services to complete the plumbing work as shown on the drawings or as specified. Refer to the General Conditions, Supplemental General Conditions, Electrical, and other sections as they apply.

1.2 SCOPE

A. Furnish and install rough-in plumbing as shown on drawings. Furnish all miscellaneous items and accessories required for such installation, whether or not each item or accessory is shown on the drawings or mentioned in these specifications.

### PART 2.00 - PRODUCTS

2.1 MATERIALS

A. All materials and plumbing connections are to be in conformance to local plumbing code.

2.2 PIPE AND FITTINGS

A. Hot and cold water piping above slab shall be Type "L" copper with wrought copper fittings, or equal. Piping below slab shall be Type "K" copper tubing. Exterior piping shall be Type "K" or "L" copper.

B. Vent piping shall be service weight cast iron, no hub. Copper DWV with copper drainage fittings may be used for all size vent piping.

C. Gas piping shall be Schedule 40 black steel assembled with M.I. or welded fittings. Piping below grade coated and wrapped. Straight lengths furnished with factory coating. Fittings and damaged coatings shall be wrapped with tape-coat applied according to manufacturer's instructions.

2.3 VALVES AND STRAINERS

A. Gate and globe valves shall be bronze with a steam working pressure of 125 psi as manufactured by Jenkins, Crane, Stockham or Wellworth, or equal.

B. Valves 2" and smaller shall have screwed ends. Valves 2 1/2" and larger shall be iron body bronze mounted 125 psi ASA flanged.

2.4 OIL AND GAS SEPARATOR

A. The oil and gas separator shall be as manufactured by Peterson's Concrete Products, North Little Rock, AR.

PART 3.00 - EXECUTION

3.1 INSTALLATION

A. In areas where state and local plumbing codes differ from these specifications, the state or local codes shall apply. In no case shall lesser quality material be substituted for material in these specifications.

PART 4.00 - RESTROOM FURNISHINGS

4.1 MATERIALS

A. Provide and install Bobrick Paper Towel Dispenser.
B. Provide and install toilet paper dispenser.
C. Provide and install mirror.
D. Provide and install handrails as shown on plans.

# APPENDIX A

Arkansas Health Department

Plumbing Approval Letter

# Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000

**Governor Sarah Huckabee Sanders**

**Renee Mallory, RN, BSN, Secretary of Health**

**Jennifer Dillaha, MD, Director**


January 30, 2024

Robert W Chatman
Miller Newell Engineers, Inc.
PO Box 705
Newport, AR 72112
(870) 523-6531
milnewengr@aol.com

RE: Project # 131430 PD# 24-0090
Sheriff's Maintenance Building
3300 Theatre Drive
Newport, AR

The plans and specifications for the above referenced project have been reviewed and approved by the Plumbing and Natural Gas Section of the Arkansas Department of Health. No deviations from the accepted plans, specifications, and/or addenda will be permitted during construction except by prior written acceptance. This approval is valid for one (1) year from the date on this letter or this acceptance must be re-validated by contacting this office referring to the above referenced file numbers. **Note:** Plans & specifications will be discarded after completion of the review and in no case be retained for more than a six (6) month period.

This approval letter is for the **plumbing portion of this project only**. The architect, engineer, designer, or agent of the owner shall provide all contractors a copy of this letter. Swimming pools, public water/sewer extensions, fire protection systems, sewage disposal systems, and water wells are regulated by other sections of the Arkansas Department of Health and are subject to plan review approval before construction begins; and furthermore, this letter shall serve as a provisional approval for food service until an official review is completed, if applicable. For more information for food service requirements, please contact Environmental Health Protection at (501) 661-2171.

All plumbing and gas work shall meet minimum state plumbing code standards and be performed by a duly licensed master plumber. While every effort is made to ensure these plans and specifications meet the plumbing & gas codes, the final approval for this project rests with the onsite inspection of the plumbing & gas systems by the certified plumbing inspector. Please refer to any attached comments with this letter regarding required changes or the need for additional plumbing.

For more information regarding this approval, please contact us at (501) 661-2642.

Sincerely,

Josh Hazlewood, Plan Review Examiner
Plumbing & Natural Gas Section
Protective Health Codes

CC: Matt Myers, State Plumbing Inspector
Municipal Plumbing Inspector

## Project Comments and / or Needed Corrections

**Project ID: 131430 PD # 24-0090**

**Project Name: Sheriffs Maintenance Building**

1. **ASPC 1002.1 Fixture traps**. Each plumbing fixture shall be separately trapped by a water-seal trap.

2. **ASPC 425.2 Water closets for public or employee toilet facilities.** Water closet bowls for public or employee toilet facilities shall be of the elongated type.

3. **ASPC 1002.4.1 Trap seal protection**. Trap seals of emergency floor drain traps and trap seals subject to evaporation shall be protected by one of the methods in Sections 1002.4.1.1 through 1002.4.1.4.**(Trap Primer** or **Trap Guard Required**)

4. **ASPC 419.5 Tempered water for public hand-washing facilities**. Tempered water shall be delivered from lavatories and group wash fixtures located in public hand-washing facilities provided for customers, patrons and visitors. Tempered water between 85°(29°C) and 110°(43°C) shall be delivered through an approved water temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or CSA B125.3

5. **ASPC 1003.9 Venting of interceptors and separators.** Interceptors and separators shall be vented in accordance with one of the methods in Chapter 9.