PROJECT MANUAL

MANILA MUNICIPAL AIRPORT (MXA)
CONSTRUCT HELIPAD

APRIL, 2025

MCE PROJECT NO. 24-5838

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

PROJECT MANUAL

MANILA MUNICIPAL AIRPORT (MXA)
CONSTRUCT HELIPAD

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Prepared By:
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MANILA MUNICIPAL AIRPORT (MXA)
CONSTRUCT HELIPAD
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DOCUMENT 00030
ADVERTISEMENT FOR BIDS

Bids: May 14, 2025

PROJECT: MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD

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McClelland Consulting Engineers, Inc.
7302 Kanis Road
Little Rock, Arkansas 72204
Phone: (501) 371-0272

The City of Manila will receive bids on a General Contract for constructing a concrete helipad with lighting and concrete access road.

Bids shall be on a unit price basis.

The City of Manila, Arkansas will receive Bids until 11:00 a.m. Local Time on May 14, 2025 at City Hall, 315 N. Baltimore Avenue, Manila, Arkansas 72442. Bids received after this time will not be accepted. Bids will be opened and publicly read aloud immediately after specified closing time. All interested parties are invited to attend.

Pursuant to Ark. Code Ann. § 22-9-203, the Owner encourages all small, minority, and women business enterprises to submit bids for capital improvements. Encouragement is also made to all general contractors that in the event they subcontract portions of their work, consideration is given to the identified groups.

Digital copies of the bid documents are available at http://www.mce.us.com for a fee of $22. These documents may be downloaded by selecting this project from the "Current Bids" link, and be entering Quest Project Number 9652835 on the "Browse Projects" page. For assistance and free membership registration, contact QuestCDN at (952) 233-1632 or info@questcdn.com. Addendums to the bid package will be issued through the online MCE Plan Holders List; therefore, all prime bidders shall be responsible for downloading the bid documents from the MCE online plan room in order to be included in the Plan Holders List and submit a bid. Bidders must enter the addenda numbers in the Proposal to verify receipt.

Each Bid must be submitted on the prescribed form and accompanied by a certified check or bid bond executed on the prescribed form, payable to the City of Manila, Arkansas in an amount not less than 5 percent of the amount bid. The bid proposal and work of the proposed contract shall be in accordance with all applicable federal, state, county, and local laws, ordinances and regulations.

For information concerning the proposed Work, contact Jarrett Elliott at the Engineer's office.

The attention of the Bidder is directed to the applicable federal and state requirements and conditions of employment to be observed and minimum wage rates to be paid under this contract.

Any Bid may be rejected which contains material omissions, or irregularities, or in which any of the unit prices are obviously unbalanced in the opinion of the Owner. Also, a bid may be rejected if it, in any manner, shall fail to conform to the conditions of the Bidding Requirements and Contract Documents.

The Owner reserves the right to waive irregularities, reject bids, choose the most qualified bidder for the Project, and to postpone award of the Contract for a period of time which shall not exceed beyond 90 days from the bid opening date.

The publication was paid for by the City of Manila, Arkansas in the amount of $433.32, per Arkansas Code 14-55-208 and related statutes.

CITY OF MANILA, ARKANSAS

DOCUMENT 00100

INSTRUCTIONS TO BIDDERS

PARAGRAPH NO./TITLE

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DOCUMENT 00100

INSTRUCTIONS TO BIDDERS

1. FORMAT

The Contract Documents are divided into Parts, Divisions, and Sections in keeping with accepted industry practice in order to separate categories of subject matter for convenient reference thereto. Generally, there has been no attempt to divide the Specification Sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the Project.

2. SPECIFICATION LANGUAGE

"Command" type sentences are used in Contract Documents. These refer to and are directed to the Contractor.

3. GENERAL DESCRIPTION OF THE PROJECT

A general description of the Work to be done is contained in the ADVERTISEMENT FOR BIDS. The scope is indicated on the accompanying Drawings and specified in applicable parts of these Contract Documents.

4. QUALIFICATION OF CONTRACTORS

The prospective bidders must meet the statutorily prescribed requirements before Award of Contract by the Owner.

Owner and Engineer shall review each Bidder's qualifications before a Contract will be awarded for the work contemplated herein. The Owner will conduct investigations, as necessary, to determine the performance record and ability of the apparent low Bidder to perform the size and type of work specified under this Contract. Upon request, the Bidder shall submit information as deemed necessary by the Owner to evaluate the Bidder's qualifications.

In general, when bidding on a project that **DOES NOT** include Federal Funding, the Bidder must be a Licensed Contractor in the State of Arkansas before a bid is submitted. If a project **DOES** include Federal Funding, the Bidder must have an application on file with the State of Arkansas Contractor's Licensing Board and be in the process of obtaining a Contractor's License in the State of Arkansas. Before the Owner and Contractor enter into a Contract Agreement, the Contractor must have their License in hand. For any questions concerning Contractor's Licensing Requirements contact the State Licensing Board at (501) 372-4661.

5. MINORITY PARTICIPATION

Pursuant to Ark. Code Ann. § 22-9-203, the Owner encourages all small, minority, and women business enterprises to submit bids for capital improvements. Encouragement is also made to all general contractors that in the event they subcontract portions of their work, consideration is given to the identified groups.

6. DOCUMENT INTERPRETATION

The Contract Documents governing the Work proposed herein consist of the Drawings and all material bound herewith. These Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed Work. Any person contemplating the submission of a Bid shall have thoroughly examined all of the various parts of these Documents and, should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder should request of the Engineer, in writing (received by the Engineer at least 5 working days prior to bid opening), an interpretation thereof.

Any interpretation or change in said Contract Documents will be made only in writing, in the form of Addenda to the Documents, which will be furnished to all Bidders receiving a set of the Documents. Bidders shall submit with their Bids, or indicate receipt, of all Addenda. The Owner or Engineer will not be responsible for any other explanation or interpretations of said Documents not issued in writing by Addendum.

7. BIDDER'S UNDERSTANDING

Each Bidder must inform himself of the conditions relating to the execution of the Work, and it is assumed that he will inspect the site and make himself thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of his obligation to enter into a Contract and complete the contemplated Work in strict accordance with the Contract Documents. It shall be the Bidder's obligation to verify for himself and to his complete satisfaction all information concerning site and subsurface conditions.

Information derived from topographic maps, or from Drawings showing location of utilities and structures will not in any way relieve the Contractor from any risk, or from proper examination of the site and additional investigations as he may elect, or from proper fulfillment of all the terms of the Contract Documents.

Each Bidder shall inform himself of, and the Bidder awarded a Contract shall comply with, federal, state, and local laws, statutes, and ordinances relative to the execution of the Work. This requirement includes, but is not limited to, applicable regulations concerning minimum wage rates; nondiscrimination in the employment of labor; protection of public and employee safety and of health environment protection, the protection of natural resources, fire protection, burning and nonburning requirements, permits, fees, contractor's license, nonresident contractors' notice and bond requirements, and similar subjects.

8. PROJECT MANUAL AND DRAWINGS

No return of Drawings is required and no refund will be made.

9. TYPE OF BID

Unit prices shall be submitted in the appropriate places on the Bid form. The total amount to be paid to the Contractor shall be the total amount of the unit price items as adjusted based on quantities installed and/or any adjustment for additions or deletions resulting from change orders during construction.

10. TRENCH AND EXCAVATION SAFETY SYSTEM

IN ACCORDANCE WITH **ARK. CODE ANN.§ 22-9-212**, BIDDERS MUST PROVIDE A SEPARATE PRICE FOR TRENCH AND EXCAVATION SAFETY PROGRAMS IN THE SPACE PROVIDED ON THE BID FORM. FAILURE TO DO SO WILL SUBJECT THE BIDDER TO DISQUALIFICATION.

11. PREPARATION OF BIDS

All blank spaces on the Bid Form must be filled in, preferably in BLACK ink. No changes shall be made in the phraseology of the forms. In case of discrepancy between unit prices and totals, unit prices will prevail.

Any Bid which contains material omissions, or irregularities, or in which any of the prices are obviously unbalanced in the opinion of the Owner may be rejected. Also, a bid may be rejected if, in any manner, it shall fail to conform to the conditions of the published ADVERTISEMENT FOR BIDS, Bidding Requirements, and Contract Documents.

Only one bid from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the Owner that any Bidder is interested in more than one bid for Work contemplated, all bids in which such Bidder is interested will be rejected. The Bidder shall sign his Bid Form on the blank space provided therefor. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a partnership or sole proprietorship, the true name of the firm shall be set forth above, together with the signature of the sole proprietor, partner, or partners authorized to sign Contracts in behalf of the firm. If signature is by an agent, other than an officer of a corporation or a member of a partnership or sole proprietor, a notarized power-of-attorney must be on file with the Owner prior to opening of bids or submitted with the Bid.

12. STATE AND LOCAL SALES AND USE TAXES

Unless the Supplementary Conditions contains a statement that the Owner is exempt from state sales tax on materials incorporated into the Work, due to the qualification of the Work under this Contract, all state and local sales and use taxes, as required by the laws and statutes of the state and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Bid shall include all nonexempt sales and use taxes, unless provision is made in the Bid Form to separately itemize the tax.

13. SUBMISSION OF BIDS

All Bids must be submitted not later than the time prescribed, at the place, and in the manner set forth in the ADVERTISEMENT FOR BIDS. Bids must be made on the Bid Form provided herein. Each Bid must be submitted in a sealed envelope, so marked as to indicate its contents without being opened, and addressed in conformance with the instructions in the ADVERTISEMENT FOR BIDS.

14. TIE BIDS

If two or more sealed bids are equal in amount, meet specifications, and are the lowest received at the bid opening, then the apparent low bidder will be determined by lot (placing the name of the tie bidders into a container and drawing one name). The drawing will be done by Owner personnel,

or another person designated by the Owner in the presence of a witness and tie bidders. The witness shall be an employee of the Owner or Engineer. Documentation of the drawing must be included on the bid tabulation and be signed by those present. Nothing in the above and foregoing will diminish the Owner's reserved right to reject any and all bids and/or to waive formalities.

15. TELEGRAPHIC OR WRITTEN MODIFICATION OF BID

Any Bidder may modify his bid by telegraphic or written communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time. The telegraphic or written communication should not reveal the bid price; it shall, however, state the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

16. WITHDRAWAL OF BID

Any Bid may be withdrawn prior to the scheduled time for the opening of bids either by telegraphic or written request, or in person. No Bid may be withdrawn after the time scheduled for opening of Bids, unless the time specified in Item, AWARD OF CONTRACT, of these INSTRUCTIONS TO BIDDERS shall have elapsed.

17. BID SECURITY

Each bid shall include a bid security in the amount of five percent of the total bid offered. The bidder shall be required to submit a bidder's deposit, which includes enclosing a cashier's check payable to the order of the OWNER drawn upon a bank or trust company doing business in Arkansas or by a corporate bid bond in an amount equal to five (5) percent of the bid.

The Attorney-in-Fact who executes this bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.

If the Bidder elects to furnish a Bid Bond, he shall use the Bid Bond form bound herewith or one conforming substantially thereto in form and content.

The bid bond shall indemnify the Owner against failure of the Contractor to execute and deliver the contract and necessary Performance and Payment Bonds for faithful performance of the contract. The bid bond shall provide that the Contractor or surety must pay the damage, loss, cost, and expense subject to the amount of the bid security directly arising out the Contractor's default in failing to execute and deliver the contract and bonds.

Owner will have the right to retain the bid security of bidders to whom an award is being considered until the Contract has been executed and bonds have been furnished, or until specified time has elapsed so that bids may be withdrawn, or until all bids have been rejected.

18. RETURN OF BID SECURITY

Within fifteen (15) days after the award of the Contract, the Owner will return the bid securities to all Bidders whose Bids are not to be further considered in awarding the Contract. Retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and any guarantees which have been forfeited, will be returned to the respective Bidders whose Bids they accompanied.

19. AWARD OF CONTRACT

Within ninety (90) calendar days after the opening of Bids, unless otherwise stated in the ADVERTISEMENT FOR BIDS or SUPPLEMENTARY CONDITIONS of these Documents, the Owner will accept one of the Bids or will act in accordance with BASIS OF AWARD, below. The acceptance of the Bid will be by written notice of award, mailed or delivered to the office designated on the Bid Form. In the event of failure of the lowest responsible and responsive qualified Bidder to sign and return the Contract with acceptable Performance and Payment Bonds, as prescribed herein, the Owner may award the Contract to the next lowest responsible and responsive qualified Bidder. Such award, if made, will be made within ninety (90) days after the opening of Bids.

20. BASIS OF AWARD

If, at the time this Contract is to be awarded, the Total Base Bid of the lowest acceptable Bid exceeds the funds then estimated by the Owner as available, the Owner may reject all bids or take other action as best serves the Owner's interests. The basis of the award will be as stated in the bid.

21. EXECUTION OF CONTRACT

The successful Bidder shall, within fifteen (15) consecutive days after receiving notice of award, sign and deliver to the Owner the Contract hereto attached, together with the acceptable bonds as required in these Documents. Within fifteen (15) consecutive days after receiving the signed Contract with acceptable bonds from the successful Bidder, the Owner's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

The successful bidder shall conform to the Rules and Regulations of Arkansas Department of Finance and Administration concerning nonresident contractor's notice and bond requirements.

22. PERFORMANCE AND PAYMENT BONDS

The successful Bidder shall furnish a Performance and Payment Bond in the amount equal to one hundred percent (100%) of the contract price on the forms provided in the Contract Documents as security for faithful performance of the Contract and payment of all obligations arising thereunder within ten days after receipt of the Notice of Award. The bond shall be written by a surety company qualified and authorized to do business in the State of Arkansas and shall be listed on the current U. S. Department of Treasury, Circular Number 570, or amendments thereto, in the Federal Register of acceptable Sureties for Federal projects. The bond shall be executed by a resident agent licensed by the State Insurance Commissioner to represent the surety company in Arkansas. The bond shall be written in favor of the Owner. Bond company rating by "AM Best Rating Company" to be "A-" or above and have a Positive or Stable Rating Outlooks.

The Attorney-in-Fact who executes this Performance Bond and Payment Bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond. All Contracts, Performance and Payment Bonds, and respective powers-of-attorney will have the same date.

If the Surety on any Bond furnished by Contractor is declared bankrupt, or becomes insolvent, or its right to do business is terminated in any location where any part of the project is located, or ceases to meet the requirements of the preceding paragraph, the Contractor shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to Owner.

Before execution of the Contract Documents, the Contractor shall submit the Bonds (in triplicate) to the Owner. The Bonds shall be submitted **WITHOUT DATES**, as they will be dated by the Owner at the same time as the Contracts are executed.

23. FAILURE TO EXECUTE CONTRACT AND FURNISH BOND

Failure to deliver bonds as specified above shall be considered as having abandoned the Contract, and the bid security will be retained by the Owner as liquidated damages.

24. PERFORMANCE OF WORK BY CONTRACTOR

The Contractor shall perform on the site, and with his own organization, work equivalent to at least forty percent (***70 percent for water and sewer projects)*** of the total amount of the Work to be performed under this Contract. Contractors submitting bids where forty percent of Work is not with their own forces shall be deemed a "Brokerage Contractor" and the bid may be rejected by Owner. If determined during the "Award of Contract" phase that the Contractor is not going to be performing forty percent of Work as bid, the Contractor's bid may be subject to rejection and forfeiture of Bid Bond.

If, during the progress of the Work hereunder, the Contractor requests a reduction of the percentage and the Engineer determines that it would be to the Owner's advantage, the percentage of the work required to be performed by the Contractor's own organization may be reduced, PROVIDED prior written approval of such reduction is obtained by the Contractor from the Engineer.

Each bidder must furnish with his bid a list of the items that he will perform with his own forces and the estimated total cost of these items.

25. TIME OF COMPLETION

The time of completion of the Work to be performed under this Contract is of the essence of the Contract. Delays and extensions of time may be allowed in accordance with the provisions stated in Document 00700 - GENERAL CONDITIONS. The time allowed for the completion of the Work is stated in Document 00500 - Contract.

26. PROVISION OF REQUIRED INSURANCE

The Bidder's attention is directed to the insurance requirements set forth in the General Conditions (amended in the Supplementary Conditions, if appropriate). Submittal of a bid indicates full understanding and intent to comply with the insurance requirements which are a condition of the contract.

END OF SECTION

DOCUMENT 00200

INFORMATION AVAILABLE TO BIDDERS

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Construction Safety and Phasing Plan.

B. Geotechnical Report.

C. Arkansas Prevailing Wage is Exempt.

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

Not Used.

END OF SECTION

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

7302 Kanis Road
Little Rock, AR 72204
(501) 371.0272
mce.us.com

CONSTRUCTION SAFETY AND PHASING PLAN

Construct Helipad

Manila Municipal Airport (MXA)

MCE Project No. 24-5838

April, 2025

Sponsor:

City of Manila, AR

Tracey Reinhart, Mayor

P.O. Box 895 | Manila, AR 72442

mayor@cityofmanila.org

MANILA MUNICIPAL AIRPORT
CONSTRUCTION SAFETY AND PHASING PLAN
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INTRODUCTION

This Construction Safety and Phasing Plan (CSPP) has been developed in accordance with FAA Advisory Circular 150/5370-2G (Operational Safety on Airports During Construction) and will be included in the construction bid documents for the Construct Helipad project at the Manila Municipal Airport (MXA). The project consists of constructing a concrete helipad. Safety is the primary consideration for any airport, especially during construction. The CSPP developed for this project is intended to minimize the impact the project will have on airport operations while providing a logical sequence of construction activities. The CSPP shall be reviewed with the Contractor at the pre-construction meeting and at progress meetings during construction.

1. COORDINATION

a. Project Contacts. Below is a list of parties involved during design of the helipad project.

Table 1 – Design Contacts

Organization	Role	Point of Contact	Contact Information
McClelland Consulting Engineers	Consultant (Airfield Design)	Jarrett Elliott, P.E.	(479) 443-2377
Manila Municipal Airport	Airport Manager	John Gearhart	(479) 757-0722
Federal Aviation Administration	Airport ADO Manager	Adam Marsh	(817) 222-5672

b. Pre-Design/Pre-Bid Meeting. Pre-Design/Pre-Bid meetings will not be necessary for this project. The Sponsor has coordinated with airport users and the project will be designed with them in mind. Any questions about the project during the design or bidding phases shall be directed to the Engineer.

c. Pre-Construction Meeting (TBD). Prior to the start of any construction operations on the airfield, a pre-construction conference will be scheduled in order to discuss operational safety, phasing, quality control/quality acceptance, labor requirements, and potential issues that could arise during construction. The Contractor will be apprised of all safety regulations, and will be required to compile and submit a Safety Plan Compliance Document (SPCD) meeting the requirements of AC 150/5370-2G. Notice to proceed for construction is contingent on the Sponsor's receipt and approval of the contractor provided SPCD. Below is a general outline of topics that will be discussed at the meeting:

1. Project Contacts
2. Project Overview and Safety Items
3. Construction Items
4. Labor Requirements

After the pre-construction meeting, a copy of this CSPP will be kept in the airport pilots lounge for viewing. The Airport Manager will be responsible for notifying any airport tenants and users of the AOA closings, as a result of this project, and their timing.

d. Contractor Progress Meetings. In addition to the pre-construction conference, operational safety will be addressed each week at the Contractor progress meeting. Airport operation safety will be a standing agenda item at all construction progress meetings. At a minimum, the Contractor will be required to update the emergency points of contact, debrief any and all safety incidents, report on safety measures implemented at that point, and safety measures to be implemented. These meetings will also address weekly construction issues, administrative issues such as change orders and/or pay estimates, and any coordination required with the FAA or the Manila Municipal Airport in relation to opening/closing sections of pavement, issuing notice to air missions (NOTAMS), any notices to airport tenants, or impacting navigational aids (NAVAIDS) during construction. Below is an incomplete list of parties that will be involved during construction. The list will be updated after the

contract is awarded to include all necessary contact information.

Table 2 – Construction, Emergency, Utility Contacts

Organization	Role	Point of Contact	Contact Information
CONSTRUCTION			
Manila Municipal Airport	Airport Manager	John Gearhart	(479) 757-0722
McClelland Consulting Engineers	Consultant	Jarrett Elliott, P.E.	(501) 371-0272 Office (318) 623-8689 Cell
Arkansas Department of Aeronautics	State Engineer	Richard Mills, P.E.	(501) 376-6781
Contractor	Contractor Project Manager	TBD	TBD
	Contractor Superintendent	TBD	TBD
	Contractor Safety Manager	TBD	TBD
Subcontractor	Subcontractor	TBD	TBD
EMERGENCY			
Great River Medical Center	Hospital	911	(870) 838-7300
Manila Volunteer Fire Department	Fire Fighting	911	(870) 561-3139
Police Department	Local Law	911	(870) 561-4777
Sheriff Department	County Law	911	(870) 762-2243
UTILITY			
One-Call System	Utility Locating	811	1-800-482-8998
Manila Water & Sewer	Local Water Utility	-	(870) 561-4437
Mississippi County Electric Cooperative, Inc.	Local Power Utility	-	(870) 763-4563

e. **Changes in Schedule or Scope.** Changes to scope and schedule will be addressed in the timeliest manner possible. The Contractor will be required to inform the Engineer of any expected changes with any follow up correspondence to further define the changes. The Engineer is responsible to promptly notify the Sponsor. The changes in scope are to be coordinated with the FAA to determine if the CSPP requires resubmittal and review.

f. **FAA ATO Coordination.** Manila Municipal Airport is a non-towered, general aviation airport. FAA ATO Coordination is not required.

2. PHASING

The phasing developed for the Construct Helipad project is intended to minimize the impact the project will have on the airport by providing proper separation of construction and airfield operations as required by FAA Advisory Circular 150/5370-2G. The project will be constructed in one phase, with all work being located outside of the Air Operations Area (AOA).

Phase I consists of all work necessary to complete this project. All work will take place outside the AOA; therefore, no closures are anticipated as a result of this project. Phase I contract time is 90 calendar days. Liquidated damages of $350 per day will be assessed for each day Phase I exceeds contract time.

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY.

a. Affected Areas / Operations. No impacts to areas/operations are anticipated.

b. Mitigation of Affects. The Contractor will be required to coordinate the construction schedule in advance to allow the airport ample time to notify tenants of construction. The Contractor shall not enter the Obstacle Free Zone at any time with Runway 18-36 open.

4. PROTECTION OF NAVIGATION AIDS (NAVAIDS)

The Contractor shall protect and preserve existing NAVAIDs to remain during construction. The Contractor will be required to repair/replace any NAVAIDs damaged as a result of the Contractor's operations.

5. CONTRACTOR ACCESS

a. Access Point. The Contractor shall access the airport construction off of Airport Road and enter the access road as shown in Appendix A. The Contractor shall coordinate gated access with the Sponsor and be responsible for maintaining any existing fences or gates in order to properly secure the work area during construction.

b. Haul Routes. The Contractor will be able to enter the project directly from the access point identified above. The Contractor will follow the routes identified in Appendix A. Any damage to the entrance road or haul route shall be repaired at the Contractor's expense.

c. Location of Stockpiled Construction Materials. The staging area will be located on the south side of the airport property as shown in Appendix A, which includes employee parking and material storage. Vehicles, equipment, and stockpiles shall be no closer than 10 feet away from any temporary security fence. Stockpiled materials shall not exceed 20 feet in height and will only be permitted within the boundaries of the staging area. The stockpiles shall be stabilized in a way so they are not an attraction to wildlife.

d. Vehicle and Pedestrian Operations. Access to the AOA will be granted from the Contractor's staging area through the access road as shown in Appendix A. Any modification of the access points or haul routes shown on the plans shall have written approval of the Sponsor. All Contractor employees shall park personal vehicles at the designated contractor staging area as shown in Appendix A. Personal vehicles will not be allowed anywhere inside the AOA. It is the responsibility of the Contractor to provide vehicles that are authorized to operate on the site. These vehicles will be identified in accordance with AC 150/5210-5D. At a minimum, a 3' x 3' orange and white checker flag or flashing amber, yellow or red light shall be mounted to the uppermost part of the vehicle. In addition, the Contractor shall identify employees and subcontractor employees which require unescorted access. If a vehicle or piece of equipment is not furnished with a beacon and company information it must be escorted within the AOA by a vehicle with the proper identification. All personnel must maintain situational awareness at all times while on the airfield.

e. Work Zone Lighting for Nighttime Construction. Nighttime construction is not allowed on this project.

6. WILDLIFE MANAGEMENT

a. Trash. Various Contractor operations during construction can directly or indirectly create wildlife hazards at airports. One direct wildlife hazard that can be created by Contractor personnel activity is the generation of trash. Food debris and packaging must be collected from construction personnel and disposed of appropriately. It is the responsibility of the Contractor to make arrangements for trash removal from the project site as well as the Contractor's staging area. Trash will be kept is containment that animals cannot penetrate and will be hauled off site regularly. Other construction debris will be hauled off site at the earliest feasible time and by the end of the project. Should this practice prove to be inadequate, the Contractor will be asked to increase the frequency of trash removal.

b. **Standing Water**. Standing water is a potential wildlife hazard that can be created from construction activity or rainfall events. For this project, standing water will not be allowed to stand after a rain event for more than 48 hours. The Contractor will take precautions and have ready, at no additional cost to the Project, a pump to remove standing water from the project area by pumping to the nearest storm water inlet.

c. **Tall grass**. Seed and tall grass represent another wildlife attractant on airfields. Seeding on this project, if used, will be specified accounting deterrence of wildlife, including birds. The Contractor is responsible for maintaining the staging, parking, and construction areas free from tall stands of grass.

d. **Maintaining Fence Line and Gates.** All existing fence lines and gates will be required to remain standing during construction in order to prevent wildlife from entering the airport operations areas. The Contractor will be responsible for keeping the gate secured day and night throughout the duration of the project.

e. **Disruption of Existing Wildlife Habitat.** The airport property is enclosed by fencing. There is a small amount of grading associated with the project; therefore, little or no disruption of existing wildlife is expected to occur.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

It is the responsibility of the Contractor to maintain a clean project site free from the threat of FOD. The Contractor and its employees will be held responsible for maintaining the project area and keeping it free from FOD whether it is generated from the project site or other airfield areas. Everyone inside the AOA is responsible for the removal of FOD regardless of its origin. In project areas that require the temporary closure of airfield pavement, Airport Personnel will have the final word on the acceptance of cleaned construction areas for aircraft operations. The Contractor shall use a street sweeper or vacuum truck to clean airfield pavement prior to opening closed areas to air traffic.

8. HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT

The Contractor shall take all precautions and management procedures for fuel deliveries and spill recovery. The Contractor shall immediately notify the Airport of any spills of fuels or other hazardous material. Contractor shall submit material safety data sheets on all hazardous materials brought on site. The Contractor shall submit a Storm Water Pollution Prevention Plan (SWPPP) that addresses the management of hazardous and non-hazardous waste in accordance with FAA AC 150/5320-15A, Management of Airport Industrial Waste and include it in the SPCD.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Federal Aviation Regulation Part 77, must notify the FAA. The Sponsor has provided FAA notice of what is believed to be the Contractor's construction equipment heights and locations when the equipment will be closest to the runway during the various phases of the project. **NOTE: The Contractor will be required to provide additional notice to FAA if the equipment will be taller than anticipated.**

The notices of proposed temporary construction equipment already initiated by the Sponsor and determined by FAA are summarized in Table 3. FAA's determinations resulting from studies in response to these notices are listed in Appendix C. As shown in the determination letters, the contractor must:

- Ensure construction meets the requirements set forth in AC 150/5370-2G.
- Ensure construction equipment used during all project phases is marked and lighted in accordance with AC 70/7460-1L, Chapters 3, 4, 5 and 12.
- Ensure equipment used during the project is removed from the Runway and Runway Object Free Area (ROFA) at night and when not in use.

If the Contractor anticipates using construction equipment that is a) higher than 20-feet or b) closer to

an active runway than that which has already been studied, the Contractor will be responsible for filing notice with FAA for these new temporary construction equipment heights and/or locations. The Contractor is advised FAA may take as long as 45 days to provide determinations in response to notices.

Table 3 – Coordinates for "Points of Interest"

Study Number	Point of Interest Location	Latitude (NAD83)	Longitude (NAD83)	Height of Equipment	MSL Ground Elevation
Phase I – RW 18-36 Open					
2025-ASW-4023-NRA	Point 1	35° 53' 17.52" N	90° 09' 21.98" W	20'	242'
2025-ASW-4024-NRA	Point 2	35° 53' 14.61" N	90° 09' 21.97" W	20'	242'
2025-ASW-4025-NRA	Point 3	35° 53' 14.63" N	90° 09' 23.37" W	20'	242'
2025-ASW-4026-NRA	Point 4	35° 53' 17.52" N	90° 09' 23.37" W	20'	242'
Airport Reference Point					
2025-ASW-4027-NRA	ARP	35° 53' 40.01" N	90° 09' 16.45" W	1'	243'

a. **Notice to Responsible Representatives / Points of Contact.** An incomplete list of construction and emergency contacts for the Project can be found in Table 3. Upon award of the project, the Contractor shall provide all appropriate contact information for its staff and subcontractors in its SPCD such as project managers, project superintendents, and safety managers. Once the list is obtained, Table 3 in this document will be updated to provide a comprehensive list of construction and emergency contact information. Should any personnel change occur during the project, it is the responsibility of that organization to provide revised contact information.

b. **Notice to Air Missions (NOTAMs).** The Notice to Air Missions (NOTAM) system provides essential information to personnel concerns with flight and airport operations. NOTAMS provide timely information on unanticipated or temporary changes to components or hazards in the National Airspace System (NAS) which include the closure of runways, taxiways, and aprons. The construction of this project will require NOTAMs to be issued. A minimum of 72 hours written notice (weekends excluded) or requested closing shall be directed to the Sponsor who will then coordinate the request with the Department of Operations. A sample NOTAM form can be found in Appendix C. Only the FAA may issue or cancel NOTAMS on shutdown or irregular operation of FAA owned facilities.

c. **Emergency Notification Procedures.** Channels of emergency notification will be agreed upon by the Contractor, Engineer, Sponsor, and FAA at the preconstruction meeting before work begins on site. Table 3 in this document will be updated to include a comprehensive list of emergency contact information.

d. **Coordination with ARFF.** No Aircraft Rescue Fire Fighting (ARFF) services are located on the airport. Coordination between the Contractor and Fire Department (FD) will be required to mitigate the impact construction operations will have on emergency access routes on the airfield. Weekly construction progress meeting will be held throughout the project. Contact information for FD personnel and other emergency contact information can be found in Table 3.

e. **Notification to FAA.** FAA notification for emergencies will be the responsibility of the Sponsor. The primary FAA point of contact for this project is Adam Marsh, Arkansas / Oklahoma Airport District Office, (817) 222-5672. Please also refer to Table 2.

10. INSPECTION REQUIREMENTS

The Contractor shall identify a single point of contact for each subcontractor involved on the project. These contacts will be incorporated into Table 3 Construction, Emergency, and Utility contacts in order to provide a comprehensive list of project contacts. The Contractor shall also outline its safety policy and internal inspection requirements to ensure airfield safety compliance.

a. **Daily Inspections.** The Contractor will log daily inspections for FOD and house-keeping practices, report any safety incidents, near incursions into restricted area, etc. The Sponsor's representative

will provide daily inspections of the project as well. The daily inspection reports will provide, at a minimum, the following information: construction progress, safety concerns, weather conditions, number of men and equipment working, and on-site location of construction activity. Apparent safety deficiencies will be passed to the Contractor on site for immediate correction.

b. Final Inspection. At the time of the final inspection for the project, the project area will be inspected for any safety issues. The Contractor's Construction Safety Officer will be present at the final inspection. Operational safety will be a primary focus, as well as, quality of workmanship, compliance with plans and specifications according FAA Advisory Circulars, and overall satisfaction of the Airport Sponsor. Before pavement can be re-opened after a closure, the safety inspection should check for compliance with this CSPP. Also, it should be verified that: all areas are clean and swept free of any foreign object debris (FOD), all construction equipment is removed from the site, all NAVAIDs and airport lighting (including the beacon) are operational, and all barricades and closure markings have been removed. At this time, any airport pavement closure NOTAMs should be canceled by the Owner. Once all safety issues have been addressed, the airport pavement can be re-opened.

11. UNDERGROUND UTILITIES

The Contractor is responsible for contacting the local utility stakeout service for site utility stakeout within the project limits prior to beginning work. The location of these utilities should also be reviewed with the Airport Sponsor. Arkansas One-Call is a local utility stakeout provider and its contact information can be found in Table 3. The Sponsor may assist as necessary for coordination with the FAA. The Contractor will assist the utility companies and the FAA in their efforts to field verify underground utilities.

12. PENALTIES

Penalties are an important tool used to enforce controls established for the mitigation of safety risks. Table 4 describes the various violations and subsequent consequences established for the Project. Any Contractor personnel found in violation of a safety rule identified in the Contract and/or CSPP, a rule set by the any public entity having jurisdiction while on airport property, can be subject to the penalties for noncompliance.

Table 4 – Penalties for Noncompliance

Violation	Consequence
1st Occurrence	Verbal Warning
2nd Occurrence	Written Warning and Construction Halted During Review of CSPP and SPCD with Engineer
3rd Occurrence	Written Warning and $1,000 Fine
4th Occurrence	Person removed from Project

13. SPECIAL CONDITIONS

Airport operations take precedence over all work, especially if a question of safety is involved. Special conditions such as low visibility, snow removal, aircraft in distress, aircraft accident, security breach, or work being completed by others may require the rescheduling and moving from one work area to another, including work stoppage caused by airport operations shall be considered as included in the contract prices paid for contract items of work involved and not additional compensation.

14. RUNWAY AND TAXIWAY VISUAL AIDS

a. Construction. No runway or taxiway visual aids will be needed for this project.

b. Markings. No markings will be needed for this project.

15. MARKINGS AND SIGNS FOR ACCESS ROUTES

No pavement marking or sign installation on airport access routes is anticipated as part of the Project. Should such work be added to the contract, all pavement markings and signs for construction personnel shall conform to AC 150/5340-18F and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or state highway specifications.

16. HAZARD MARKINGS AND LIGHTING

Low profile barricades will be used as a method of traffic control in the Project. Barricades will be used during construction to prevent aircraft from entering the closed taxiways/taxilanes and apron. The flashers on the low-profile barricades should be spaced no more than 10' apart and must be operated between sunset and sunrise and during periods of low visibility. The barricades should be spaced no further apart than 12' on center. Refer to note 8 in Appendix A for instruction on marking construction equipment. The Contractor shall describe additional methods of traffic control, if any, in the SPCD.

17. PROTECTION OF RSA/TSA, OFA, OFZ AND APPROACH/DEPARTURE SURFACES

The Contractor will not be allowed to work inside the OFZ or TSA during construction while the corresponding runway or taxiway is open. The areas described below are shown on the Construction Safety and Phasing Plan in Appendix A, where applicable. Low profile barricades will separate construction from ground operations. All personnel and equipment within the limits of the construction shall be accompanied by Contractor personnel who are authorized by the airport, equipped with a two-way Unicom radio, and who is familiar with proper communication procedures. In order to protect the approach and departure surfaces, the Contractor shall stay out of the OFZ while the runway is open. Table 5 shows the safety and object free area dimensions.

Table 5 – Safety and Object Free Dimensions

Area	Distance from CL	End of RWY
Runway Safety Area (RSA)	75'	300'
Runway Object Free Area (ROFA)	180'	300'
Taxiway Object Free Area (TOFA)	65.5'	-
Taxiway Safety Area (TSA)	39.5'	-
Runway Obstacle Free Zone (OFZ)	155'	200'

a. **Runway Safety Area.** No construction activity inside the RSA is permitted while the runway is open and operational. Before opening the runway after any construction activity, the contractor is responsible for maintaining the RSA. Stockpile materials shall be removed prior to the runway opening. Open trenches shall be backfilled or covered appropriately and should be designed to allow safe operation of the heaviest aircraft operating on the taxiway or runway without damaging the aircraft. The RSA must be cleared and graded and have no ruts, bumps, depressions, or other surface variations that are potentially hazardous to aircraft. Reference Tables 5 for RSA dimensions.

b. **Runway Object Free Area (ROFA).** Construction activities may be performed inside the ROFA only if it is accordance with the requirements on the phasing plan. Equipment must be moved outside the ROFA when not in use and stockpile materials are not allowed to be stored inside the ROFA. The dimensions for the ROFA can be found in Table 5.

c. **Taxiway Safety Area (TSA).** No construction is permitted inside the TSA while the taxiway is operational. Before opening the Taxiway after any construction activity, the contractor is responsible for maintaining the TSA. Stockpile materials shall be removed prior to the taxiway opening. Open trenches shall be backfilled or covered appropriately and should be designed to allow safe operation of the heaviest aircraft operating on the taxiway or runway without damaging the aircraft. The TSA must be cleared and graded and have no ruts, bumps, depressions, or other surface variations that are potentially hazardous to aircraft.

d. **Taxiway Object Free Area (TOFA).** Construction activities may be performed inside the TOFA only if it is accordance with the requirements on the phasing plan. Equipment must be moved outside the TOFA when not in use and stockpile materials are not allowed to be stored inside the TOFA.

e. **Obstacle Free Zone (OFZ).** The Runway Obstacle Free Zone is the volume of airspace centered above the runway centerline. The elevation of the OFZ is equal to the elevation of the nearest point on the runway centerline. Equipment may not penetrate the OFZ of an active runway. Equipment should be used in accordance with the phasing plan and stored in the staging area when not in use.

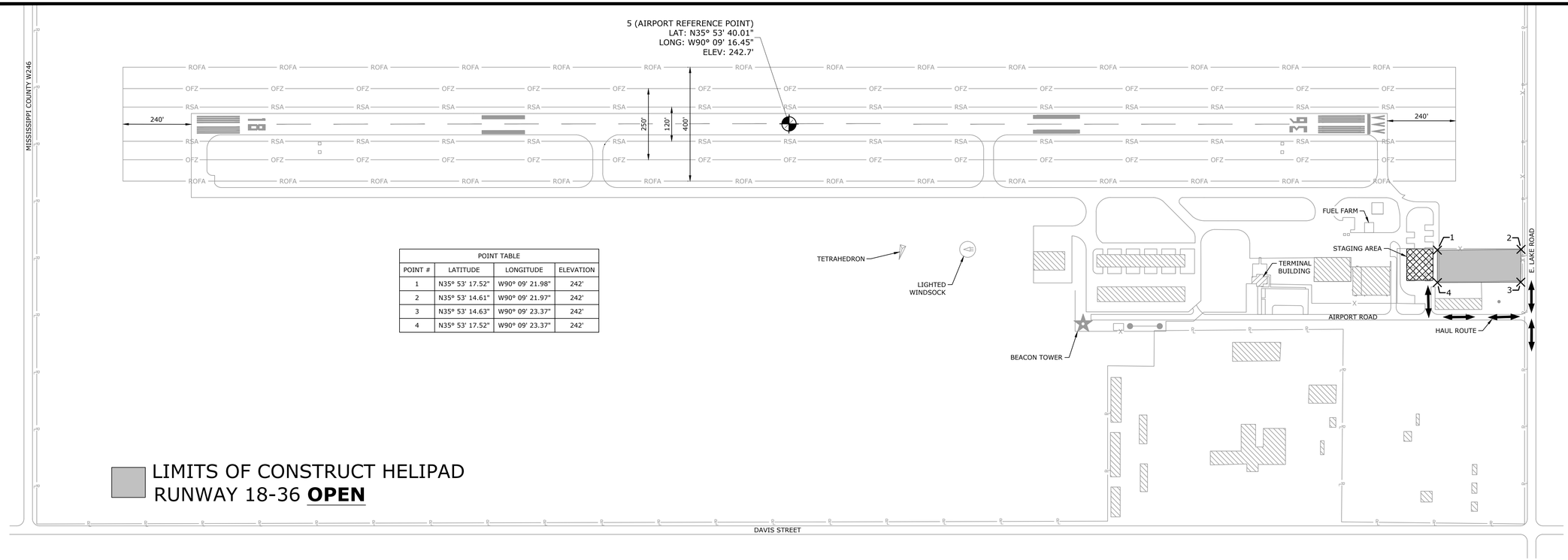
f. **Runway Approach/Departure Surfaces and Clearways.** The Federal Aviation Regulation Part 77 Approach Surfaces are 20:1 on each end of the Runway. All personnel, material, and equipment must remain outside the protected approaches and surfaces while the runway is operational. Objects that do not penetrate the surfaces may still be considered obstructions and can affect the instrument approach procedures. FAA Form 7460-1 must be provided to the FAA district office before any objects such as cranes, excavators, or other tall equipment can be placed in these areas.

18. OTHER LIMITATIONS ON CONSTRUCTION

No nighttime work will be permitted for this project. If the Contractor anticipates using any equipment taller than 20-feet or working any closer to the runway than indicated in the FAA study, the Contractor will file a notice with the FAA in accordance with Section 9 – Notification of Construction Activities. Permission must be granted by the Sponsor for the Contractor to access any other areas, not shown in the CSPP, controlled by the airport either inside or outside the fence.

APPENDIX A

CONSTRUCTION SAFETY AND PHASING PLAN



POINT TABLE			
POINT #	LATITUDE	LONGITUDE	ELEVATION
1	N35° 53' 17.52"	W90° 09' 21.98"	242'
2	N35° 53' 14.61"	W90° 09' 21.97"	242'
3	N35° 53' 14.63"	W90° 09' 23.37"	242'
4	N35° 53' 17.52"	W90° 09' 23.37"	242'

LIMITS OF CONSTRUCT HELIPAD
RUNWAY 18-36 **OPEN**

CONTRACTOR SAFETY REQUIREMENTS

1. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ADVISORY CIRCULAR 150/5370-2G, "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION. THE ADVISORY CIRCULAR CAN BE FOUND ON THE FAA'S WEBSITE. (WWW.FAA.GOV)
2. ALL CHANGES TO THIS SAFETY PLAN MUST BE APPROVED BY ENGINEER, AND FAA PROGRAM MANAGER.
3. PRIOR TO CONSTRUCTION, THE OWNER, CONTRACTOR, AND ENGINEER WILL MEET TO REVIEW CONSTRUCTION SAFETY PLAN. FAILURE TO COMPLY WITH THIS CONSTRUCTION SAFETY PLAN WILL RESULT IN IMMEDIATE CORRECTIVE ACTIONS. (SEE CONSTRUCTION SAFETY AND PHASING PLAN IN SPECIFICATIONS).
4. THE RUNWAY MUST BE CLOSED WHILE THE CONTRACTOR IS PRESENT IN THE RUNWAY OBSTACLE FREE ZONE (OFZ). THE OFZ IS 250 FEET WIDE CENTERED ON THE RUNWAY CENTERLINE AND EXTENDS 240 FEET BEYOND EACH END OF THE RUNWAY.
5. CONTRACTOR SHALL GIVE 48 HOURS NOTICE TO THE AIRPORT MANAGER PRIOR TO COMMENCING CONSTRUCTION SO THAT THE MANAGER CAN ISSUE THE APPROPRIATE NOTAMs.
6. CONTRACTOR SHALL VERIFY WITH THE OWNER THAT THE APPROPRIATE NOTAMs ARE IN PLACE PRIOR TO INSTALLING AIRFIELD MARKINGS AND LIGHTED BARRICADES. PERSONNEL AND EQUIPMENT SHALL NOT BE PERMITTED INSIDE THE WORK AREA UNTIL THE NOTAMs HAVE BEEN CONFIRMED TO BE IN PLACE.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ANY EXISTING FENCES OR GATES IN ORDER TO MAINTAIN A SECURED AREA DURING CONSTRUCTION.
8. CONSTANT MONITORING OF AIRCRAFT RADIO COMMUNICATIONS DURING CONSTRUCTION ARE REQUIRED FOR THIS CONTRACT BY THE CONTRACTOR. THE LOCAL AIRPORT COMMON TRAFFIC ADVISORY FREQUENCY IS 122.8.
9. CONTRACTOR'S GROUND VEHICLE OPERATIONS SHALL BE IN ACCORDANCE WITH AC 150/5210-20.
10. ALL CONSTRUCTION EQUIPMENT SHALL BE MARKED WITH 3'x3' ORANGE AND WHITE CHECKER FLAG (DAY ONLY) OR FLASHING LIGHTS OF AMBER, YELLOW OR RED (DAY OR NIGHT) OR ESCORTED BY A VEHICLE SO EQUIPPED.
11. ALL EQUIPMENT AND MATERIALS NOT IN USE SHALL BE STORED IN THE STAGING AREA.
12. RUNWAY, TAXIWAY, & APRON SHALL BE KEPT CLEAR OF ALL DEBRIS & EQUIPMENT. AREAS SHALL BE SWEPT AS REQUIRED.
13. CLOSED AIRFIELD MARKINGS SHALL BE INSTALLED AS THE FIRST TASK OF ANY WORK PHASE. CLOSED AIRFIELD MARKING SHALL BE REMOVED AS THE LAST TASK IN ANY WORK PHASE. PAVEMENT SHALL NOT BE REOPENED UNTIL RUNWAY, TAXIWAY, AND AOA PAVEMENT AREAS HAVE BEEN SWEPT CLEAR OF GRAVEL AND OTHER DEBRIS.
14. CONSTRUCTION TRAFFIC SHALL NOT ENTER THE RUNWAY OBSTACLE FREE ZONE DURING CONSTRUCTION.
15. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT EXISTING FACILITIES, WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE. ALL SUCH FACILITIES, STRUCTURES, OR NAVAIDS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED, SATISFACTORILY TO THE OWNER, AT THE EXPENSE OF THE CONTRACTOR.
16. ANY DAMAGE TO SURROUNDING APRONS, TAXIWAYS, RUNWAYS, OR HAUL ROUTES CAUSED BY CONSTRUCTION EQUIPMENT SHALL BE RESTORED BY THE CONTRACTOR TO ORIGINAL OR BETTER CONDITION, AT NO COST TO THE OWNER.

GENERAL SITE NOTES

1. PUBLIC CONVENIENCE AND SAFETY:
   THE CONTRACTOR SHALL CONDUCT THE WORK IN A MANNER THAT WILL INSURE, AS FAR AS PRACTICABLE, THE LEAST OBSTRUCTION TO GROUND TRAFFIC AND SHALL PROVIDE FOR THE CONVENIENCE AND SAFETY OF THE GENERAL PUBLIC AND AIRPORT USERS AT OR NEAR THE AIRPORT IN AN ADEQUATE AND SATISFACTORY MANNER IN ACCORDANCE WITH FAA ADVISORY CIRCULAR 150/5370-2G "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".
2. CONTRACTOR SHALL RETAIN A FULL SET OF LATEST APPROVED CONSTRUCTION PLANS ON SITE DURING CONSTRUCTION ACTIVITIES.
3. CONSTRUCTION METHODS AND MATERIALS NOT SPECIFIED IN THESE PLANS ARE TO MEET OR EXCEED THE SITE WORK SPECIFICATIONS PROVIDED BY McCLELLAND CONSULTING ENGINEERS, INC. OR AS SPECIFIED BY THE OWNER'S RESIDENT REPRESENTATIVE.
4. ALL OSHA REGULATIONS SHALL BE STRICTLY FOLLOWED AND SPECIAL CARE TAKEN TO PREVENT INTERACTION W/ OVERHEAD OR UNDERGROUND POWER SOURCES.
5. THE LOCATION OF KNOWN SUBSURFACE STRUCTURES, PIPE, POWER, GAS, PHONE, RUNWAY/TAXIWAY LIGHTING AND CABLES, ETC. ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING INFORMATION AND SATISFYING HIMSELF AS TO THE LOCATION OF THE AFOREMENTIONED ITEMS, SHOWN AND NOT SHOWN. ALL REPAIRS OR RELOCATIONS NECESSARY SHALL BE MADE AS REQUIRED BY THE OWNER OF THE UTILITY OR STRUCTURE. THE COST OF SUCH REPAIRS OR RELOCATIONS NECESSARY SHALL BE BORNE BY THE CONTRACTOR.
6. THE CONTRACTOR IS REQUIRED TO NOTIFY THE ONE CALL CENTER AT (800) 482-8998 AT LEAST 48 HOURS PRIOR TO EXCAVATING IN ORDER THAT UNDERGROUND UTILITIES IN THE AREA CAN BE LOCATED. THE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR COORDINATION WITH THE FAA UTILITIES / FACILITIES MANAGER TO LOCATE ANY UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. ANY REQUIRED FEES AND COSTS ASSOCIATED WITH UTILITY LOCATING SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS, LICENSES, ETC. REQUIRED BY ALL LOCAL, STATE, AND FEDERAL AGENCIES.
8. ALL PAVEMENTS, LIGHTING SYSTEMS, SIGNS, FACILITIES, DRAINAGE STRUCTURES, FENCES, ETC. THAT ARE DISTURBED SHALL BE RESTORED TO THEIR ORIGINAL OR BETTER CONDITION USING LIKE MATERIALS. COST OF SUCH REPAIRS SHALL BE BORNE BY THE CONTRACTOR UNLESS PROVISIONS FOR PAYMENT ARE MADE IN THE CONTRACT DOCUMENTS.
9. UPON NOTIFICATION OF A DECLARED AIRCRAFT EMERGENCY, THE CONTRACTOR SHALL IMMEDIATELY CLEAR THE RUNWAY AND / OR TAXIWAY OF EQUIPMENT AND PERSONNEL.
10. ALL CONCRETE SHALL DEVELOP 4,000 PSI COMPRESSIVE STRENGTH IN 28 DAYS UNLESS OTHERWISE SPECIFIED.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION LAYOUT AND STAKING.
12. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND LAYOUT COORDINATES IN THE FIELD. REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER FOR DIRECTION PRIOR TO COMMENCING CONSTRUCTION.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION LAYOUT AND STAKING.
14. THE CONTRACTOR SHALL KEEP ALL AOA SURFACES CLEAN AND SWEPT FREE OF DEBRIS. WORK AREAS WILL NOT BE OPENED FOR USE UNTIL THEY HAVE BEEN SWEPT FREE OF ALL TRASH AND DEBRIS.
15. CARE SHOULD BE TAKEN TO APPLY PAINT FOR PAVEMENT MARKINGS AT THE PROPER YIELD TO PREVENT DAMAGE TO THE PAVEMENT. APPLICATION RATES SHOULD NOT EXCEED MANUFACTURER'S RECOMMENDATIONS. IF DAMAGE TO THE PAVEMENT OCCURS, CONTRACTOR SHALL REPAIR AT THEIR OWN EXPENSE.
16. GLASS BEADS ARE TO BE APPLIED TO ALL MARKINGS IN ACCORDANCE WITH THE SPECIFICATIONS (UNLESS OTHERWISE NOTED.)

PHASING NOTES

PHASE I CONSISTS OF ALL WORK NECESSARY TO COMPLETE THIS PROJECT. ALL WORK WILL BE LOCATED OUTSIDE OF RUNWAY 18-36 OFZ; THEREFORE, RUNWAY 18-36 WILL REMAIN OPEN FOR THE DURATION OF PHASE I. PHASE I CONTRACT TIME IS 90 CALENDAR DAYS. LIQUIDATED DAMAGES OF $350 PER DAY WILL BE ASSESSED FOR EACH DAY PHASE I EXCEEDS CONTRACT TIME.

LEGEND

- CONTRACTOR'S HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- OFZ — RUNWAY OBSTACLE FREE ZONE
- ROFA — RUNWAY OBJECT FREE AREA
- ℄ — PROPERTY LINE
- X — EXISTING FENCE LINE
- BEACON
- AIRPORT REFERENCE POINT
- BUILDINGS
- STAGING AREA
- WORK AREA

PLAN SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200ft.

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE
7302 KANIS ROAD
LITTLE ROCK, ARKANSAS 72204
(501) 371-0272
HTTP://WWW.MCE.US.COM

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No.23088
JAMES ELLIOTT
4-18-25
ORIGINAL SIGNATURE ON FILE

Know what's below. Call before you dig.

MANILLA MUNICIPAL AIRPORT (MXA)
CONSTRUCT HELIPAD
MANILLA, ARKANSAS

©2025

REVISIONS

REV	DATE	DESCRIPTION

CONSTRUCTION SAFETY AND PHASING PLAN - PHASE I

DESIGNED BY:	DRAWN BY:
JME	SJM
DATE: APRIL, 2025	REVISION:
SCALE: 1" = 200'	JOB NUMBER: 24-5838

2

W:\2024\24-5838 Manila Municipal Airport Construct Helipad\Design Drawings\Civil\24-5838 Construction Safety And Phasing Plan.dwg, PRINTED ON: April 22, 2025 @ 9:29 AM

APPENDIX B

FINAL DETERMINATION FOR POINT STUDIES

(Final Determinations will be added once they are issued by the FAA)

APPENDIX C

SAMPLE NOTAM FORM

SAMPLE NOTAM

_____ **AIRPORT**

FAA NOTAM # _____ **DATE:** _____

AIRPORT I.D. # _____ **TIME:** _____

NOTAM TEXT:

NOTIFICATION:

_____ TOWER _____ _____ _____
PHONE # INITIALS TIME CALLED IN BY

_____

_____ AFSS _____ _____ _____
PHONE # INITIALS TIME CALLED IN BY

_____

AIRLINES

_____

_____

_____

CANCELLED:

NOTIFICATION:

_____ TOWER _____ _____ _____
PHONE # INITIALS TIME CALLED IN BY

_____

_____ AFSS _____ _____ _____
PHONE # INITIALS TIME CALLED IN BY

_____

AIRLINES

_____

_____

_____

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

7302 Kanis Road
Little Rock, Arkansas 72204
(501) 371.0272
mce.us.com

February 18, 2025

Manila
Est. 1901

Manila Municipal Airport (MXA)
P.O. Box 895
Manila, Arkansas 72422

CERTIFICATE OF AUTHORIZATION
McCLELLAND CONSULTING ENGINEERS, INC.
No. 24
ARKANSAS-ENGINEER

ATTN: Mr. John Gearhart
Airport Manager

RE: Geotechnical Report for
Manila Municipal Airport Construct Helipad
Manila, Arkansas
MCE Project Number: 24-5838

Dear Mr. Gearhart:

We are submitting herewith the report for the Geotechnical Report on the above-referenced project. We appreciate the opportunity to provide this service to you. If there are any questions regarding the Geotechnical Investigation, please contact us.

Sincerely yours,

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 16434
STEVEN J. HEAD

Steven J. Head, PE
Principal | Geotechnical Department Head

02/18/2025

David Hubbard

David Hubbard
Geotechnical Specialist

Michael T. Scott, PE
Associate | Geotechnical Engineer | CMT Supervisor

Enclosure: Geotechnical Report

McCLELLAND CONSULTING ENGINEERS, INC.
DESIGNED TO SERVE

7302 Kanis Road
Little Rock, Arkansas 72204
mce.us.com

GEOTECHNICAL REPORT

Manila Municipal Airport (MXA) Construct Helipad
Manila, Arkansas

Project No. 24-5838

February, 2025

Manila
Est. 1901

Prepared For:

Mr. John Gearhart
Airport Manager
P.O. Box 895
Manila, Arkansas 72442

GEOTECHNICAL REPORT

Manila Municipal Airport (MXA) Construct Helipad
MCE Project Number: 24-5838
Manila, Arkansas

FOR

Manila Municipal Airport (MXA)
P.O. Box 95
Manila, Arkansas 72442

Executive Summary

This is a report of the findings of the Geotechnical Investigation for the Manila Municipal Airport (MXA) Construct Helipad project in Manila, Arkansas. This report includes detailed information on subsurface conditions and existing surface materials in addition to providing recommendations for site development and pavement design criteria. The significant findings listed below should not be used separately from the further discussion provided in the body of this report.

- MCE conducted a Geotechnical Investigation consisting of two (2) project borings.
- Surface (Stratum I) materials consist of a topsoil material encountered at a thickness of six (6) inches.
- Stratum II materials consist of Elastic Silt with Sand (MH) and Silty Clay with Sand (CL-ML).
- Stratum III materials consist of Poorly Graded Sand (SP) and Silty Sand (SM).
- MCE recommends that the Contractor budget for a minimum of six (6) inches of initial stripping to fully remove the existing surface materials across the project site.
- It is anticipated that a majority of the subgrade materials present within the planned project alignment will be stable at 3.5 feet below the existing surface elevations.
- It is recommended that the project allows for the placement of a minimum of three (3) feet of imported select fill material meeting a CBR of six (6) or greater will be sufficient to stabilize the helipad subgrade dimensions.
- For preliminary budgeting purposes and as an alternative to extensive undercutting, it is recommended that the Project Team consider a section consisting of (starting from the in-situ subgrade materials): one (1) layer of Tensar NX850 Geogrid (or approved alternate), followed by the placement of 16 inches of aggregate base course.
    - This Geogrid and Aggregate section can be utilized as part of the design pavement section and can utilize a CBR of eight (8) or greater.
    - Further coordination with the Geotechnical Engineer should be conducted if this plan of action is to take place before construction.
- Both subgrade remediation method would provide a modulus of subgrade reaction of 150 pounds per square inch per inch (pci).
- Through discussions with the Design Team, it is understood that the design helicopter for this helipad is a Sikorsky S-76C with a maximum gross weight of 11,700 pounds. The following pavement section is adequate for support of this helicopter.

Minimum Helipad Pavement Section

Pavement Type	Pavement Materials	Thickness (inches)
Concrete Pavement	P-501 PCC Surface	6.0
	P-209 Crushed Aggregate Base	12.0

Table of Contents

Tables

Appendices

1.0 Introduction

McClelland Consulting Engineers, Inc. (MCE) conducted a Geotechnical Investigation for the Manila Municipal Airport (MXA) Construct Helipad project located in Manila, Arkansas. The investigation was requested by Mr. Jarrett Elliot, P.E. with MCE, and authorized by Mr. John Gearhart, Airport Manager of the Manila Municipal Airport, to explore the subsurface soil conditions and prepare recommendations for site development and pavement design criteria.

2.0 Existing Site Description

The project site is located on the grounds of the Manila Municipal Airport (MXA), approximately 0.15 miles northeast of the intersection of Airport Road and E Lake Street in Manila, Arkansas. The airport is currently classified as a public general aviation airport by the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) and encompasses approximately 610.66 acres.

The development site is currently undeveloped and exists as greenspace. Onsite vegetation consists of low to medium-cut grass. Topographically, the project site is relatively flat-lying with minimal grade changes.

3.0 Project Scope

It is understood that the project scope includes the new construction of a helipad to serve the surrounding area. The helipad is expected to be approximately 3,670 square feet (sf) in size and is planned to be constructed utilizing rigid concrete materials.

4.0 Field Investigation

Based on the understood project scope, MCE conducted a Geotechnical Investigation consisting of two (2) project borings. A layout of the project boring locations is provided in Appendix A on Plate 1.

4.1 Project Borings

The project borings were conducted using a Diedrich D50 Turbo track-mounted drill rig, utilizing 4.5-inch diameter solid stem augers. Soil samples were obtained at the depths indicated on the boring logs with the use of a two (2) inch diameter split-spoon sampler. The split-spoon sampler was driven by blows from a 140-pound automatic hammer dropped from a fixed height of 30 inches.

The number of blows required to drive the split-spoon sampler the final 12 inches of an 18-inch drive, or portion thereof, is referred to as the Standard Penetration value, N, and is recorded on the boring logs in units of blows-per-foot. Final drilled depths are shown as the depths achieved by the split-spoon sampler. In addition to Standard Penetration Testing (SPT), the field tests performed included visual soil classifications and groundwater observations.

The visual soil classifications are given on the boring logs, which can be referenced in Appendix B on Plates 2 and 3; a key to the terms and symbols on the boring logs is provided on Plate 4. Table 1 below provides details of the project borings.

Table 1: Field Investigation Details

Boring ID	Existing Surface Elevations (feet)	Existing Surface Material and Thickness	Groundwater Depth (feet)	Total Depth Investigated (feet)	End of Boring Elevation (feet)
B-01	242.06	Topsoil (4")	6.0	10.0	232.06
B-02	242.12	Topsoil (4")	6.0	10.0	232.12

NOTES: Surface Elevations shown in Table 1 are rounded to the nearest 0.01 foot and are based on MCE Topographic Survey Data. The corresponding end of boring elevations are based off of these measurements.

4.2 Encountered Groundwater Conditions

Groundwater was encountered at both of the two (2) project boring locations at a depth of six (6) feet below the existing surface elevations. Installation and periodic measurement of monitoring wells would be required to establish seasonal piezometric surfaces below the project site. Project grading should be designed to properly discharge any surface water that may develop following precipitation events.

Any groundwater or perched water must be removed prior to the placement of fill or construction materials, if encountered during construction. To help reduce the potential for issues related to groundwater, it is recommended that earthwork operations take place during typically drier portions of the calendar year (June through September). General earthwork operations conducted outside of this recommended timeframe should expect typical dewatering measures to be required to maintain a desirable construction schedule.

4.3 Encountered Auger Refusal Materials

Auger refusal is generally defined as the point at which a boring encounters material through which it can no longer be advanced using traditional auger drilling techniques. Refusal is somewhat subjective and is dependent on the type of drilling equipment used and the down pressures exerted by the drill rig.

At the time of this investigation, materials resulting in auger refusal were not encountered during this investigation does not expect that rock removal techniques would be required during construction. Additional information pertaining to the local geology and how it affects the project site can be found in the *Local Geology of the Project Site* section of this report (Section 7.0).

5.0 Laboratory Analysis

Laboratory tests were performed on the soil samples recovered from the borings. The laboratory tests were conducted to determine the engineering properties of the project soil strata. The tests performed on soil samples collected from the borings included moisture content, Atterberg Limits, and sieve analyses. Results of laboratory testing for the project borings are provided on the boring logs and in the Laboratory Testing Results in Appendix C.

Table 2 below shows the relevant test method specifications utilized on the project.

Table 2: Laboratory Test Method Specifications

Test Designation	Test Method
ASTM D2488	Standard Practice for Description and Identification of Soils (Visual)
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purpose (USCS)
ASTM D2216	Standard Test Method for Lab Determination of Water Content of Soil
ASTM D6913	Standard Test Method for Particle-Size Distribution of Soils Using Sieve Analysis
ASTM D4318	Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

6.0 On-Site Soil Conditions

The following sections provide information regarding on-site conditions at the project location. This information includes descriptions of the existing soil types, imagery showing the approximate location of the existing soil types, and details about the local geology.

6.1 United States Department of Agriculture (USDA) Soil Types and Map

The following soil types exist in the project area according to current USDA soil maps, with descriptions from the Natural Resources Conservation Service (NRCS). The project site is located in Mississippi County in northeastern Arkansas. The soil types that exist in the project area according to current USDA soil maps are briefly detailed in Table 3 on the following page.

Table 3: USDA Local Soil Types

USDA Soil Type	USDA Symbol	USDA Descriptions
Tiptonville and Dubbs Silt Loams	Td	The Tiptonville series consists of very deep, nearly level, moderately well-drained soils. These soils formed in silty alluvium on stream terraces which are old natural levees of the Mississippi River. They also formed in silty colluvium at the foot of the loess bluff. Slopes range from zero (0) to three (3) percent. The Dubbs series consists of very deep, well-drained, moderately permeable soils that formed in loamy alluvium. These soils are on nearly level to sloping natural levees or low terraces of the Mississippi River and its tributaries in the Southern Mississippi Valley Alluvium Major Land Resource Area. Slopes range from zero (0) to eight (8) percent.

The above-referenced soils in the project area have a moderate-to-high potential for corrosion of concrete and steel materials used in construction. Figure 1 below provides imagery of the approximate site location and how it relates to the existing soil types.

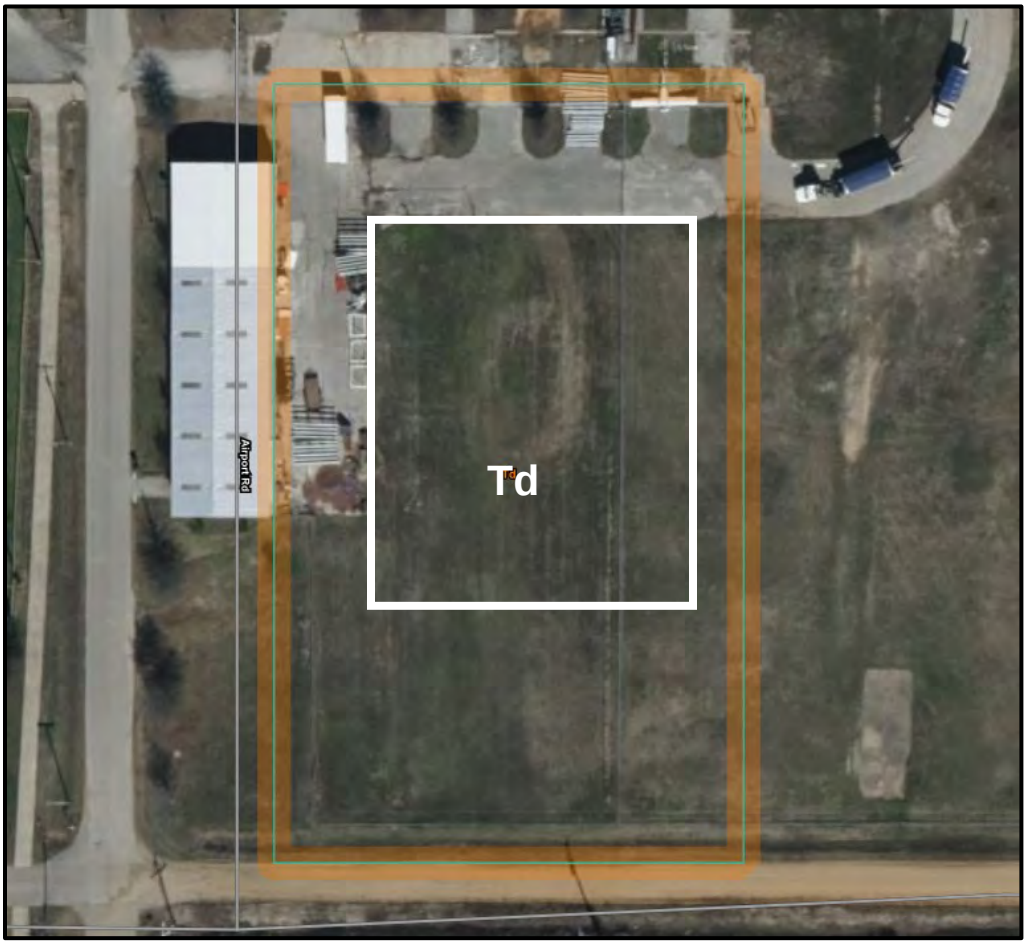


Figure 1: USDA Soil Survey Report Image
The image was produced by the United States Department of Agriculture.
The white outline represents the approximate project extent.

7.0 Local Geology of the Project Site

According to maps and literature published by the United States Geological Survey (USGS) and the Arkansas Geological Survey (AGS), the project site is underlain by the Quaternary Age (2.6 million years ago to present) Terrace Deposits.

A brief description from the Stratigraphic Summary of Arkansas – Information Circular 36 (IC-36) of the local geologic formation is provided below.

7.1 Terrace Deposits

The terrace deposits include a complex sequence of unconsolidated gravels, sandy gravels, sands, silty sands, silts, clayey silts, and clays. The individual deposits are often lenticular and discontinuous. At least three (3) terrace levels are recognized with the lowest being the youngest. Fossils are rare. The lower contact is unconformable. The thickness is variable.

Figure 2 below provides a visual of the local geologic formations in relation to the project site.

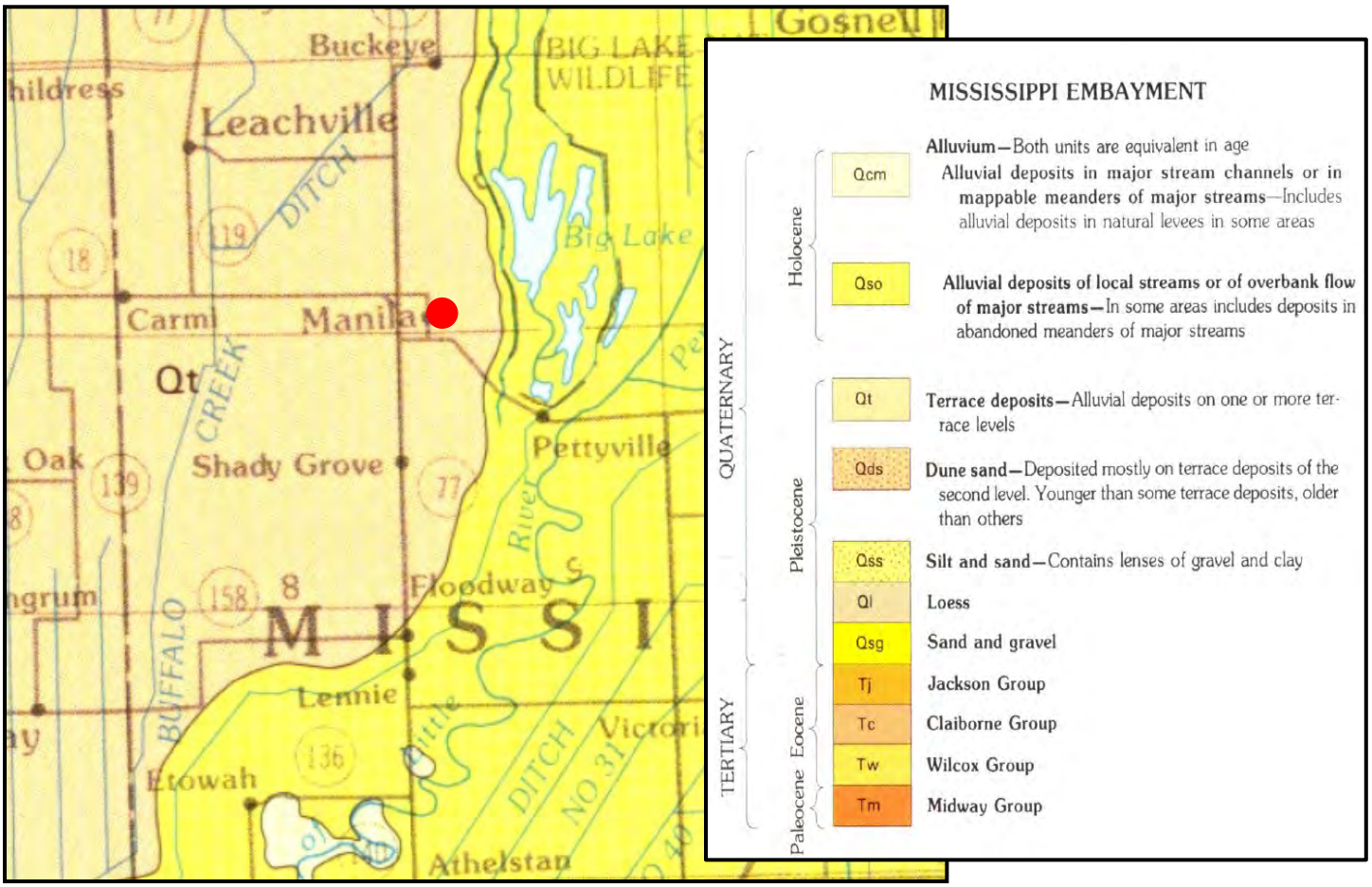


Figure 2: Image from the Geologic Map of Arkansas
The red dot represents the approximate location of the project site.

8.0 On-Site Soil Stratum Summary

This summary is based on a collection of field notes and field-testing values recorded during the on-site investigation, notes recorded during the laboratory analysis, and results from the laboratory testing. The encountered subsurface soil conditions are summarized on the following pages.

8.1 Stratum I – Surface Materials

The materials that make up Stratum I consisted of a topsoil material encountered at a thickness of six (6) inches. These thicknesses are only valid for the project boring locations and could fluctuate in the unexplored portions of the project site.

8.2 Stratum II – Fine-Grained Subgrade Materials

The materials that make up Stratum II consist of Elastic Silt with Sand (MH) and Silty Clay with Sand (CL-ML). These materials were generally encountered in various shades of brown and contained varying amounts of gravel, sand, and fines.

Consistency values for the Stratum II MH materials were determined to be medium-stiff, with corresponding N-values ranging from four (4) to five (5). The natural soil moisture content for these materials ranged from 20.1 to 21.6 percent. The Liquid Limit (LL) of these materials was determined to be 78, with a Plasticity Index (PI) of six (6). The fine fraction of these materials exhibited low plasticity characteristics. The fine fraction of these materials makes up approximately 78 percent of the overall soil mass, as indicated by the results of gradation analysis from the borings.

Consistency values for the Stratum II CL-ML materials ranged from stiff to very stiff, with corresponding N-values ranging from seven (7) to 13. The natural soil moisture content for these materials ranged from 18.5 to 21.8 percent. The LL of these materials was determined to be 24, with a PI of six (6). The fine fraction of these materials exhibited low plasticity characteristics. The fine fraction of these materials makes up approximately 71 percent of the overall soil mass, as indicated by the results of gradation analysis from the borings.

Figures 3 and 4 below provides examples of the soils encountered within Stratum II.

Figure 3: (Left) Stratum II MH material from B-01 encountered at approximately two (2) feet below the existing surface elevation.
Figure 4: (Right) Stratum II CL-ML material from B-02 encountered at approximately 0.33 feet below the existing surface elevation.

8.3 Stratum III – Coarse-Grained Subgrade Materials

The materials that make up Stratum III consist of Poorly Graded Sand (SP) and Silty Sand (SM). These materials were generally encountered in various shades of brown and contained varying amounts of gravel, sand, and fines.

Consistency values for the Stratum III SP materials ranged from loose to medium-dense, with corresponding N-values ranging from eight (8) to nine (9). The natural soil moisture content for these materials ranged from 20.3 to 20.9 percent. The LL and PI of these materials was determined to be non-plastic (NP). The fine fraction of these materials exhibited negligible plasticity characteristics. The fine fraction of these materials makes up approximately four (4) percent of the overall soil mass, as indicated by the results of gradation analysis from the borings.

Consistency values for the Stratum III SM materials were determined to be loose, with corresponding N-values ranging from four (4) to six (6). The natural soil moisture content for these materials ranged from 16.5 to 24.3 percent. The LL and PI of these materials was determined to be non-plastic (NP). The fine fraction of these materials exhibited negligible plasticity characteristics. The fine fraction of these materials makes up approximately 35 percent of the overall soil mass, as indicated by the results of gradation analysis from the borings.

Figures 5 and 6 below provide examples of the materials encountered within Stratum III.

Figure 5: (Left) Stratum III SP material from B-01 encountered at approximately 8.5 feet below the existing surface elevation.
Figure 6: (Right) Stratum III SM material from B-02 encountered at approximately 3.5 feet below the existing surface elevation.

9.0 Engineer's Analysis and Recommendations

At the time of preparing this report, it is understood that the project scope includes the new construction of a helipad to serve the surrounding area. The helipad is expected to be approximately 3,670 square feet (sf) in size and is planned to be constructed utilizing rigid concrete materials.

This investigation was intended to provide the Client with Geotechnical recommendations relating to the encountered subsurface conditions and their suitability in regards to the planned development features. Those recommendations and considerations are presented in the following subsections of this report.

9.1 Initial Site Preparation

As noted in *Section 9.1*, the surface materials encountered consisted of a topsoil material encountered at a thickness of six (6) inches. These thicknesses are only valid for the project boring locations and could fluctuate in the unexplored portions of the project site.

MCE recommends that the Contractor budget for a minimum of six (6) inches of initial stripping to fully remove the existing noted surface materials across the project extents.

9.2 Site Grading Considerations

As previously noted, it is anticipated that the final site elevations will remain near existing. For the purposes of this report, "suitable" materials refer to subgrade materials that MCE believes will pass proof rolling operations in their current state and will be adequately stable for the subsequent placement of select fill and/or construction materials. It is anticipated that the majority of the subgrade materials present within the planned project alignment will be stable at an average depth of 3.5 feet below the existing surface elevations, provided that weather patterns and site conditions at the time of construction are similar to those encountered during the investigation. "Unsuitable" ML materials were encountered until 3.5 feet below the existing surface elevations at the location of B-01. These materials should be removed full-depth from the site before the placement of select fill materials.

Materials recommended to be in suitable condition by the Geotechnical Engineer or his/her representative should be exposed prior to the placement of select fill or other construction materials. Further details pertaining to this verification process are provided in *Section 9.3* of this report.

Additional care should be taken by the Contractor to prevent saturation of the subgrade soils, as these materials are known to lose significant strength following increased moisture conditions. This can be achieved by providing positive drainage during construction and covering with select fill material soon after excavation, if applicable. The on-site subgrade soils will be especially susceptible to reduced shear strengths if construction occurs during historically wet portions of the calendar year, generally occurring between October and May.

9.2.1 Site Grading Considerations – Excavated Slopes/Vertical Trenching

Excavations should be performed in accordance with the requirements outlined by the *Occupational Safety and Health Administration (OSHA) 1926 – Subpart P – Appendix B*. Excavated slopes during construction with depths less than 20 feet should be benched or sloped to provide the minimum horizontal-to-vertical (H:V) ratios as noted in Table 4 below.

Table 4: Temporary Slopes During Construction

On-site Soil Stratum	Material Description	OSHA Soil Type	Maximum Allowable Slopes (H:V)
Stratum II	Coarse-Grained Subgrade Materials	Type B	1:1 (45°)
Stratum III	Fine-Grained Subgrade Materials	Type C	1 1/2:1 (34°)

Note: OSHA Soil Type assignments should be considered preliminary and should be verified at the time of construction, if applicable, by an OSHA-competent person.

If excavation efforts require deep vertical trenching (deeper than five (5) feet), and the minimum allowable slope ratio is not achievable, then the Contractor must establish a comprehensive Shoring Plan. That Shoring Plan should be reviewed and stamped by a licensed PE prior to excavation.

9.3 Subgrade Verification

Following stripping and initial grading within the project dimensions, the subgrade should be initially evaluated by the Geotechnical Engineer or his/her representative. All subgrade materials should be proof-rolled with a tandem-axle fully-loaded dump truck weighing approximately 60,000 pounds, or equivalent construction equipment.

The proof-rolling should be observed by the Geotechnical Engineer or his/her representative to verify and document suitable subgrade conditions. Alternative means of verification may be conducted under the direction of the Geotechnical Engineer. Any soft and/or yielding subgrade areas encountered should be repaired by undercutting and backfilling with select fill material and then subsequently evaluated by the Geotechnical Engineer or his/her representative for approval.

9.4 Helipad Subgrade Recommendations – Undercut and Replacement

Site grading for the planned helipad dimensions should initially consist of removing all Stratum I materials, followed by proof-rolling as previously described. Where finished subgrade elevations are planned to be below the existing surface elevations, the subgrade should be excavated to this elevation prior to proof-rolling operations. The recommendations contained herein are based on the anticipation that the final site grades within the apron dimensions will remain at or very near the existing surface elevations.

As noted in Section 9.2, should site conditions at the time of construction be similar to those at the time of this investigation, stable subgrade materials within the understood apron dimensions are largely anticipated to be stable at 3.5 feet below the existing surface elevations. It is recommended that the project allow for the placement of a minimum of three (3) feet of imported select fill material meeting a CBR of six (6) or greater will be sufficient to stabilize the helipad subgrade dimensions. This recommended subgrade remediation method would provide a modulus of subgrade reaction of 150 pounds per square inch per inch (pci).

Should additional undercut (greater than three (3) feet) be needed, then it is recommended that a minimum 24 inch "bridging" lift be placed in order to bridge over unsuitable materials. These operations should only be implemented under the direction of the Geotechnical Engineer. The top eight (8) inches of any thickened lift should be compacted and tested per project specifications. A minimum of one (1) standard lift should be placed above any thickened lift.

Project pavements may bear directly on in-situ materials if verified by the Geotechnical Engineer or his/her representative at the time of construction on a case-by-case scenario, though this should not be anticipated to be a general condition across a majority of the pavement improvement areas.

9.5 Helipad Subgrade Recommendations – Geogrid and Aggregate Section

Due to the presence of unsuitable and low-consistency materials that can deteriorate under elevated moisture conditions, it is recommended that the project budget for the use of a Geogrid and Aggregate section as a potential cost-saving approach compared to undercutting. This approach would be particularly beneficial if earthwork operations occur between the months of October and May, or during periods of moderate seasonal precipitation events. This specific section should be directed by the Geotechnical Engineer at the time of construction. For preliminary budgeting purposes, it is recommended that the Project Team consider a section consisting of (starting from the in-situ subgrade materials): one (1) layer of Tensar NX850 Geogrid (or approved alternate), followed by the placement of 16 inches of aggregate base course. For the purposes of this report, the aggregate base course is anticipated to be P-209 crushed aggregate base course material; however, ARDOT Class 7 base course material would be an approved equivalent for this function. This Geogrid and Aggregate section can be utilized as part of the design pavement section and can utilize a CBR of eight (8) or greater. This recommended subgrade remediation method would provide a modulus of subgrade reaction of 150 pounds per square inch per inch (pci). The base course section described in Table 5 below would be placed above the 16-inch aggregate stabilization layer.

9.6 Helipad Pavement Design Data

Based on the conditions encountered during this investigation and through ongoing coordination with the Design Team, it is recommended that a rigid concrete pavement section meeting the minimum requirements outlined in Table 5 below will be adequate for the construction of the helipad. The pavement section was designed utilizing data from the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5320-6G Airport Pavement Design and Evaluation and AC 150/5390-2D Heliport Design. These AC documents recommended that the pavement section provided below is intended to support helicopters with a maximum gross weight of less than 30,000 pounds. Through discussions with the Design Team, it is understood that the design helicopter for this helipad is a Sikorsky S-76C with a maximum gross weight of 11,700 pounds.

Table 5: Minimum Helipad Pavement Section

Pavement Type	Pavement Materials	Thickness (inches)
Concrete Pavement	P-501 PCC Surface	6.0
	P-209 Crushed Aggregate Base	12.0

The project pavement sections provided in Table 5 should be utilized as a minimum recommendation and may be increased at the discretion of the project Design Team.

9.7 Select Fill Material

Any select fill material planned or required for the project is recommended to be an off-site borrow material of locally available silty or clayey gravel or clayey sand meeting Unified Soils Classifications System (USCS) as a GC, GM, or SC material and having a PI of 35 or less, a LL of 55 or less, a minimum of 20% retained on the ¾-inch sieve and a maximum of 35% passing the No. 200 sieve.

When placing fill next to existing slopes, the slope face should be stripped of all vegetation and the face "benched" to allow the placement of horizontal lifts and bonding to the slope face. Table 6 below provides the recommended compaction parameters for select fill and Class 7 base course to be used on the project. Shale material should not be utilized as base course on the project.

Any material to be used as a select fill on the project should be reviewed and approved by the Geotechnical Engineer.

Table 6: Compaction Requirements

Material Type	Test Standard	Minimum Dry Density (%)	Optimum Moisture Range (%)
Select Fill (Typ.)	ASTM D698 / AASHTO T99	98	-3% to +3%
Class 7 Base Course	ASTM D1557 / AASHTO T180	95	Near Optimum

10.0 Construction Materials Testing and Special Inspections

Construction materials testing and special inspection services are recommended to be provided by MCE to provide consistency with the recommendations in this report and the documentation of those recommendations being implemented during construction.

Testing of the earthwork, concrete, structure, and other phases is recommended to be conducted and documented during construction to assure the Owner and Engineer that the construction complies with the specifications. Field verification of earthwork operations will be required to confirm the recommendations contained herein.

Additionally, all trenching and excavations should be conducted following the current Arkansas State Law and Occupational Safety and Health Administration (OSHA) guidelines and requirements.

11.0 Limitations and Reserved Rights

The recommendations and conclusions made in this report are based on the assumption that the subsoil conditions do not deviate appreciably from those disclosed in the subsurface exploration.

Should significant subsoil variations or undesirable conditions be encountered during construction operations that are not described herein, the Geotechnical Engineer reserves the right to inspect these conditions to reevaluate this report. A review of the final construction plans and specifications by this office is encouraged to ensure compliance with the intent of these recommendations.

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Appendix A:
BORING LAYOUT

Manila Municipal Airport (MXA)
P.O. Box 95
Manila, Arkansas 72442

PROJECT NUMBER

24-5838

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Manila Municipal Airport Construct Helipad

Manila, Arkansas

PLATE 1

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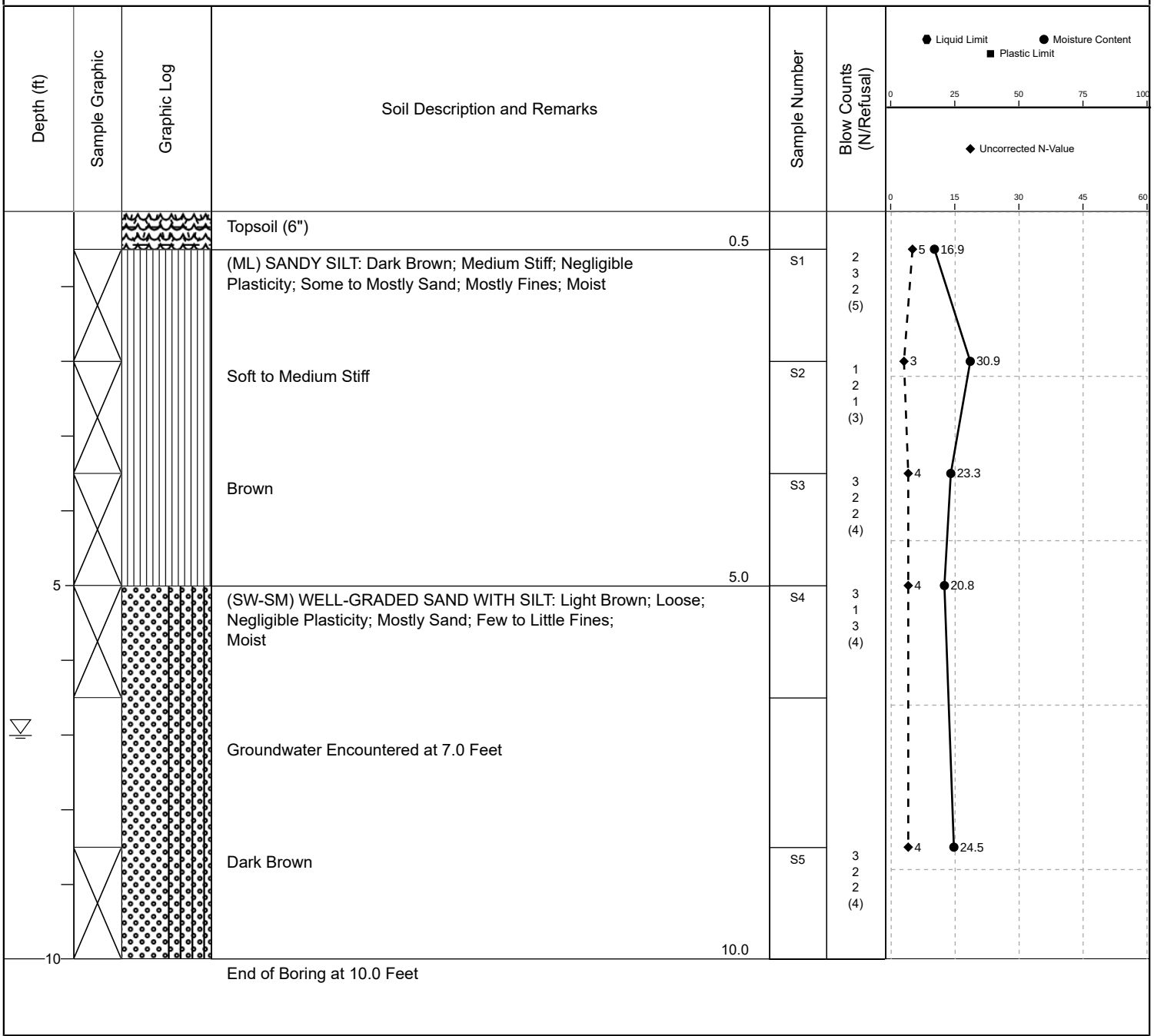
Appendix B: BORING LOGS

Manila Municipal Airport Expand Apron

Soil Boring: B-01

Project Number:	24-2155	Client Name:	Manila Municipal Airport	Coordinates:	35.89033, -90.155951
Date Started:	01/21/2025	Date Completed:	01/21/2025	Ground Elev.:	241.07
Drill Rig:	Diedrich D-50	Drilling Method:	Auger	Tooling:	4.5" Solid Stem Auger
Hammer Type:	Auto	Hammer Weight:	140		



Boring Date: **01/21/2025**
Field engineer/Technician: **C.Chiddister**
Driller: **B.Johnson**

Water Level

Depth	Hour	Date
7	-	-
N/A	-	-

Log of Soil Boring: B-01

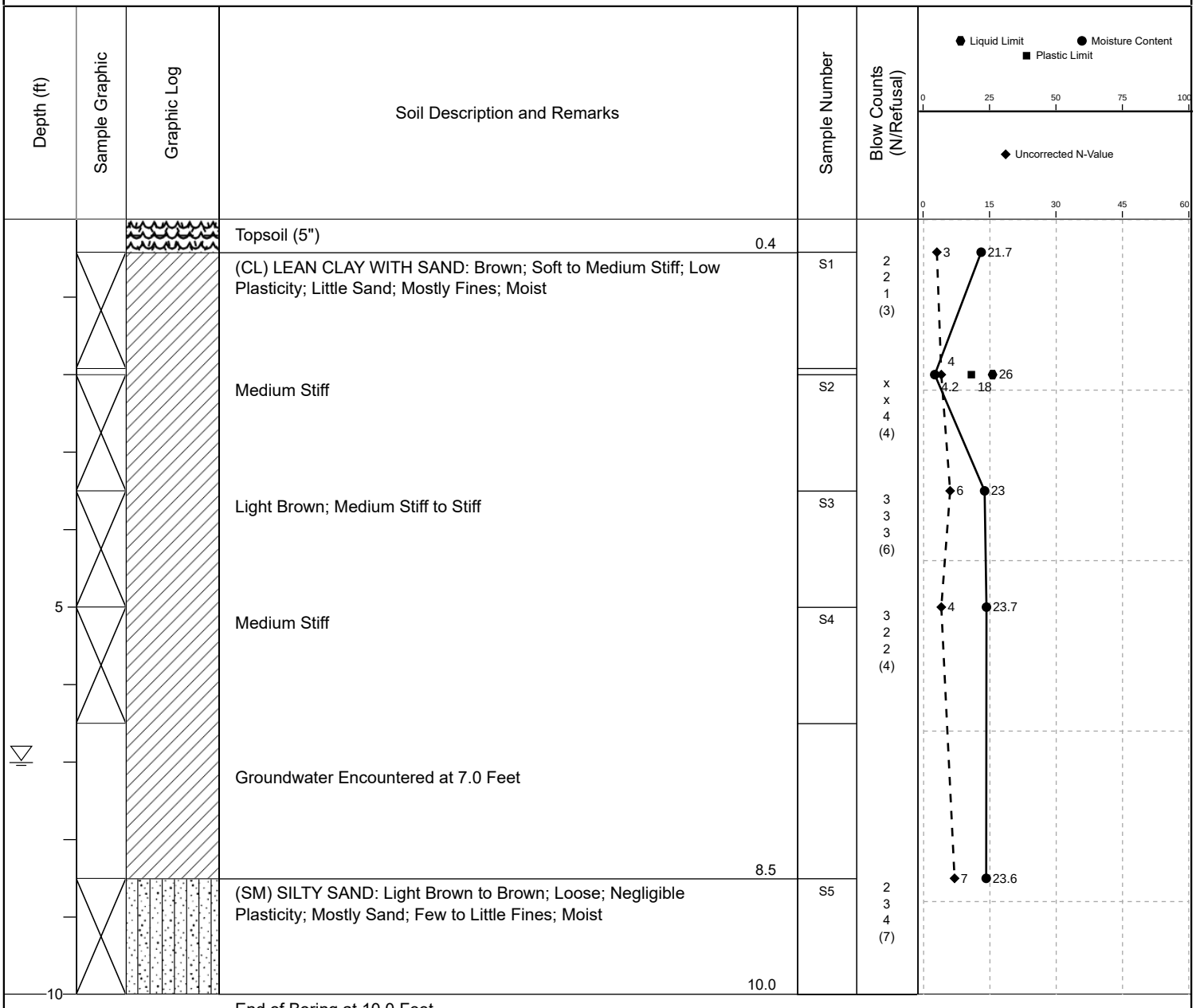
Manila Municipal Airport Expand Apron

Project No.: 24-2155

Manila Municipal Airport Expand Apron

Soil Boring: B-02

Project Number:	24-2155	Client Name:	Manila Municipal Airport	Coordinates:	35.890079, -90.156101
Date Started:	01/21/2025	Date Completed:	01/21/2025	Ground Elev.:	240.84
Drill Rig:	Diedrich D-50	Drilling Method:	Auger	Tooling:	4.5" Solid Stem Auger
Hammer Type:	Auto	Hammer Weight:	140		



Boring Date: **01/21/2025**
Field engineer/Technician: **C.Chiddister**
Driller: **B.Johnson**

Water Level

Depth	Hour	Date
7	-	-
N/A	-	-

McClelland Consulting Engineers, Inc.

Log of Soil Boring: B-02

Manila Municipal Airport Expand Apron

Project No.: 24-2155

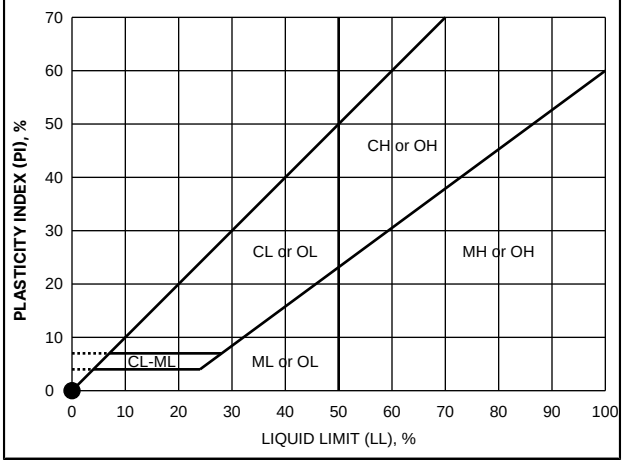
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly-graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly-graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly-graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction retained on No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly-graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly-graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly-graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic CLAY
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above 'A'-line)	organic CLAY
			OH (plots below 'A'-line)	organic SILT
	Highly Organic Soils		PT	Peat

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	3 - 8	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 23	15 - 42
Dense	31 - 50	64 - 105	23 - 38	43 - 70
Very Dense	> 50	> 105	> 38	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 2	< 2
Soft	2 - 4	3 - 5	2 - 3	2 - 3
Medium Stiff	5 - 8	6 - 10	3 - 6	4 - 6
Stiff	9 - 15	11 - 20	6 - 12	7 - 13
Very Stiff	16 - 30	21 - 39	12 - 23	14 - 26
Hard	> 30	> 39	> 23	> 26

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Appendix C:
LABORATORY RESULTS

McCLELLAND CONSULTING ENGINEERS, INC.

Laboratory Results Summary

PROJECT Manila Municipal Airport Expand Apron **PROJECT NO.** 24-2155
CLIENT Manila Municipal Airport **LOCATION** Manila, Arkansas

Boring ID	Sample ID	Depth (ft)	Moisture Content (%)	LL	PL	PI	%Gravel	% Sand	% Fines	USCS
B-01	S1	0.5-2	16.9		NP	NP	0	48	52	ML
B-01	S2	2-3.5	30.9							
B-01	S3	3.5-5	23.3							
B-01	S4	5-6.5	20.8							
B-01	S5	8.5-10	24.5		NP	NP	0	88	12	SW-SM
B-02	S1	0.42-1.92	21.7							
B-02	S2	2-3.5	4.2	26	18	8	0	21	79	CL
B-02	S3	3.5-5	23							
B-02	S4	5-6.5	23.7							
B-02	S5	8.5-10	23.6		NP	NP	0	87	13	SM

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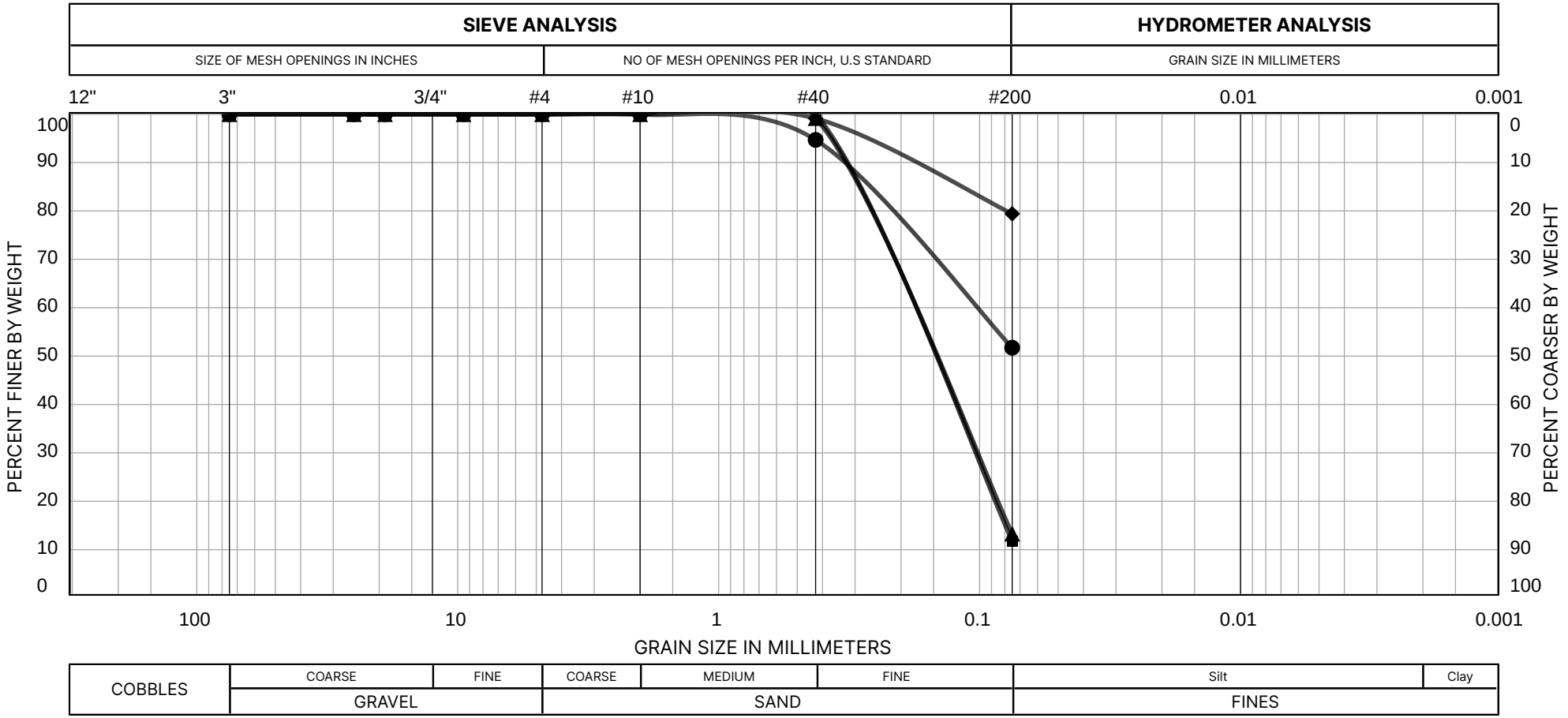
GRAIN SIZE DISTRIBUTION TEST RESULTS

Manila Municipal Airport Expand Apron
Manila, Arkansas



	EXPLORATION	SAMPLE NUMBER	DEPTH	UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) GROUP NAME	USCS SYMBOL	GRAVEL (%)	SAND (%)	FINES (%)	NAT WC (%)	D10	D15	D30	D50	D60	D85	D90	D100
●	B-01	S1	0.5	Sandy SILT	ML	0	48	52	16.9					0.16	0.36	0.4	50
■	B-01	S5	8.5	Well Graded SAND with SILT	SW-SM	0	88	12	24.5		0.11	0.23	0.31	0.34	0.4	0.41	50
◆	B-02	S2	2	LEAN CLAY with Sand	CL	0	21	79	4.2						0.18	0.27	50
▲	B-02	S5	8.5	Silty SAND	SM	0	87	13	23.6		0.1	0.22	0.31	0.34	0.4	0.41	50

DOCUMENT 00300

BID FORM

NOTE TO BIDDER: Please use BLACK ink for completing this Bid form.

To. _____

Address: _____

_____

_____

Project Title: **MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD**

Engineer's Project No.: **24-5838**

Date: _____ Arkansas Contractor's License No.: _____

Bidder: _____

Address: _____

Bidder's person to contact for additional information on this Bid:

Name: _____

Telephone: _____

ADDENDA

The Bidder hereby acknowledges that he/she has received Addenda Numbers:

_____ to these Specifications.
(Bidder insert number of each addendum received.)

INSURANCE AND BONDING REQUIREMENTS

The Bidder hereby acknowledges that he/she has read and understands the performance bond, payment bond, and insurance requirements for this project as specified in the General Conditions. If awarded a construction contract, the Bidder agrees to furnish the required bonds and insurance certificates within fifteen (15) days of the date the award is made.

Signature _____ Title _____

MEASUREMENT AND PAYMENT

The Bidder hereby acknowledges that he/she has read and understands Section 01025 - Measurement and Payment completely prior to completing this Bid Form.

Signature _____ Title _____

BIDDER'S DECLARATION AND UNDERSTANDING

The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this Bid are those named herein, that this Bid is, in all respects, fair and without fraud, that it is made without collusion with any official of the Owner, and that the Bid is made without any connection or collusion with any person submitting another Bid on this Contract.

The Bidder further declares that he has carefully examined the Contract Documents for the construction of the project, that he has personally inspected the site, that he has satisfied himself as to the quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of the quantities of work and materials, as included herein, is brief and is intended only to indicate the general nature of the work and to identify the said quantities with the detailed requirements of the Contract Documents, and that this Bid is made according to the provisions and under the terms of the Contract Documents, which Documents are hereby made a part of this Bid.

The Bidder further agrees that he has exercised his own judgment and has utilized all data which he believes pertinent from the Engineer, Owner, and other sources in arriving at his own conclusions.

The Bidder states that he has experience in and is qualified to perform the work herein specified and, if he does not have craftsmen experienced and qualified in any phase of the work for which this Bid is offered, that he will subcontract the work under said phase to a contractor who does have the necessary experience and qualifications.

CONTRACT EXECUTION AND BONDS

The Bidder agrees that if this Bid is accepted, he will, within 15 days after notice of award, sign the Contract in the form annexed hereto, and will at that time, deliver to the Owner the Performance Bond and Payment Bond required herein, and will, to the extent of his Bid, furnish all machinery, tools, apparatus, and other means of construction and do the work and furnish all the materials necessary to complete all work as specified or indicated in the Contract Documents.

CERTIFICATES OF INSURANCE, PAYMENT BOND, AND PERFORMANCE BOND

The Bidder further agrees to furnish the Owner, before executing the Contract, the certificates of insurance, Payment Bond, and Performance Bond as specified in these Documents.

START OF CONSTRUCTION, CONTRACT COMPLETION TIME, AND LIQUIDATED DAMAGES

Start of Construction, Contract Completion Time, and Liquidated Damages are stated in Document 00500 - Contract.

SALES AND USE TAXES

The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated bid prices for the work.

UNIT PRICE BASE BID

Any Bid may be rejected which contains material omissions, or irregularities, or in which any of the unit prices are obviously unbalanced in the opinion of the Owner. Also, a bid may be rejected if, in any manner it shall fail to conform to the conditions of the published Bidding Requirements and Contract Documents.

The bidder agrees to accept as full payment for the work proposed herein the amount computed under the provisions of the Contract Documents and based on the following unit price amounts, it being expressly understood that the unit prices are independent of the exact quantities involved. The bidder agrees that the unit prices represent a true measure of the labor and materials required to perform the work, including all allowances for overhead and profit for each type and unit of work called for in the Contract Documents.

CONSTRUCT HELIPAD

Item No.	Item Description	Unit	Quantity	Unit Price	Total
1	Mobilization (10% Maximum of Base Bid)	LS	1	$	$
2	Temporary Sand Bag Ditch Check	EA	1	$	$
3	Unclassified Excavation	CY	650	$	$
4	Embankment in Place	CY	580	$	$
5	Class 7 Crushed Aggregate Base Course (12" Depth)	SY	500	$	$
6	Concrete Helipad and Road (6" Depth)	SY	474	$	$
7	Joint Sealing Filler	LF	630	$	$
8	Pavement Markings	SF	331	$	$
9	Seeding and Mulching	LS	1	$	$
10	Trenching for Conduit and Counterpoise (18-Inch Minimum Depth), Cable Installed in Conduit, Counterpoise Installed Above Conduit Including Connections/Terminations, Sch. 40 PVC Conduit	LS	1	$	$
11	L-852H Green In-Pavement Heliport Perimeter Lights Installed, Base Mounted	EA	12	$	$
12	Electrical Utility Connection, Complete, With Rack and Disconnect, and Any Other Equipment Necessary to Make Connection	LS	1	$	$

Total Amount Schedule $_____

_____

Words

BASIS OF AWARD

The Bidder understands that the Contract will be awarded to the most qualified bidder with the lowest bid that the Owner may choose that makes the Project cost acceptable to the Owner. The Owner reserves the right to waive irregularities, reject bids, choose the most qualified bidder for the Project, and to postpone award of the Contract for a period of time which shall not exceed beyond 90 days from the bid opening date.

PAYMENT SCHEDULE

A detailed payment schedule for each structure or unit shall be submitted by the successful low Bidder. The successful low Bidder shall meet with the Engineer and Owner, to review the format and details of the payment schedule. This meeting shall be held within 5 days of notification that the Contractor is the low Bidder. The purpose of the meeting shall be to establish an acceptable format for the payment

schedule. The construction detailed payment schedule shall be completed by the Contractor 14 days after the meeting and submitted to the Engineer and Owner for review and approval. Failure of the Contractor to submit the payment schedule as required may result in the Owner's rejection of the Bid or delay in processing the Contractor's request for a progress payment.

Partial payments will be made where 50% of the intalled amount is due when the project reaches 50% complete and the remainder due after the project is 100% complete.

SUBCONTRACTORS

The Bidder further certifies that proposals from the following subcontractors were used in the preparation of this Bid; and if awarded a contract, Bidder agrees to not enter into Contracts with others for these divisions of the Work without written approval from the Owner and Engineer.

Subcontractor	**Subcontractor**
Arkansas Contractor License #	Arkansas Contractor License #
Street Address, City, State, Zip Code	Street Address, City, State, Zip Code
Subcontractor	**Subcontractor**
Arkansas Contractor License #	Arkansas Contractor License #
Street Address, City, State, Zip Code	Street Address, City, State, Zip Code

SUPPLIERS/VENDORS

The Bidder shall list the suppliers/vendors where material for this Project will be purchased from and successful Bidder shall updated suppliers/vendors during construction of the Project.

Supplier/Vendor Name	**Supplier/Vendor Name**
Street Address, City, State, Zip Code	Street Address, City, State, Zip Code
Phone Number	Phone Number
Supplier/Vendor Name	**Supplier/Vendor Name**
Street Address, City, State, Zip Code	Street Address, City, State, Zip Code
Phone Number	Phone Number

PERFORMANCE OF WORK BY CONTRACTOR

The Bidder shall perform at least 40 percent of the work with his own forces (70 percent for water and sewer line projects) (refer to Paragraph 24, INSTRUCTIONS TO BIDDERS. Bids from so called "Brokerage Contractors" will not be considered.) List below the items that the Bidder will perform with his own forces, if awarded this Contract, and fill in the blank showing the estimated total cost of these items.

Estimated total cost of the above items the Bidder states that will be performed with his own forces, if awarded Contract:

_____Dollars ($_____)
(Words)

EXPERIENCE OF BIDDER

The Bidder states that he is an experienced Contractor and has completed similar projects within the last 5 years. (List similar projects, with types, names of clients, construction costs, and references with telephone numbers. Use additional sheets if necessary.)

SURETY

If the Bidder is awarded a construction Contract on this Bid, the Surety who provides the Performance and Payment Bond will be:

_____ whose address is:

_____
Street, City, State Zip Code

BIDDER

The name of the Bidder submitting this Bid is:

_____ doing business at:

_____
Street, City, State, Zip Code

which is the address to which all communications concerned with this Bid and with the Contract shall be sent.

The names of the principal officers of the corporation submitting this Bid, or of the partnership, or of all persons interested in this Bid as principals are as follows:

_____

_____

_____

If Sole Proprietor or Partnership

IN WITNESS hereto the undersigned has set his (its) hand this _____ day of _____, 20___.

_____
Signature of Bidder

_____
Title

If Corporation

IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed

and its seal affixed by its duly authorized officers this ____day of _____, 20___.

_____
Name of Corporation

(SEAL)

By_____

Title_____

Attest_____
Secretary

DOCUMENT 00350

BID BOND

STATE OF ARKANSAS

KNOW ALL MEN BY THESE PRESENTS, that we:

_____

Principal and Contractor, and _____

_____

hereinafter called Surety, are held and firmly bound unto the **City of Manila, Arkansas** and represented by its Mayor and City Council, hereinafter called Owner, in the sum of

_____DOLLARS ($_____)

lawful money of the United States of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Principal contemplates submitting or has submitted a bid to the Owner for the furnishing of all labor, materials (except those to be specifically furnished by the Owner), equipment, machinery, tools, apparatus, means of transportation for, and the performance of the work covered in the Bid and the detailed Drawings and Specifications, entitled:

MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD – 24-5838
Manila, Arkansas

WHEREAS, it was a condition precedent to the submission of said bid that a cashier's check, certified check, or bid bond in the amount of 5 percent of the base bid be submitted with said bid as a guarantee that the Bidder would, if awarded the Contract, enter into a written Contract with the Owner for the performance of said Contract within 15 consecutive calendar days after written notice having been given of the award of the Contract.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal within 15 consecutive calendar days after written notice of such acceptance enters into a written Contract with the Owner and furnishes a Contract Surety Bond in an amount equal to 100 percent of the base bid, satisfactory to the Owner, then this obligation shall be void; otherwise the sum herein stated shall be due and payable to the Owner and the Surety herein agrees to pay said sum immediately upon demand of the Owner in good and lawful money of the United States of America, as liquidated damages for failure thereof of said Principal.

IN WITNESS WHEREOF, the said_____, as Principal herein, has caused these presents to be signed in its name by its_____ and attested by its _____under its corporate seal, and the said _____ as Surety herein, has caused these presents to be signed in its name by its_____ _____ under its corporate seal, this _____ day of _____ A.D., 20__.

Signed, sealed and delivered
in the presence of:

_____
Principal-Contractor

_____

By_____

_____
As to Principal

_____
Title

_____

Surety

_____

_____
Attorney-in-Fact
(Power-of-Attorney to be Attached)

_____
As to Surety

By_____
Agent

NOTICE OF AWARD

TO:

PROJECT: MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD – 24-5838

The OWNER has considered the BID submitted by you on May 14, 2025 for the above described WORK in response to its Advertisement for Bids and Instructions to Bidders.

You are hereby notified that your BID has been accepted in the negotiated amount of:

_____ Dollars ($_____)

You are required by the Instructions to Bidders to execute the Contract and furnish the required CONTRACTOR'S Performance BOND, Payment BOND, and certificates of insurance within fifteen (15) calendar days from the date of this Notice to you.

If you fail to execute said Contract and to furnish said BONDS within fifteen (15) days from the date of this Notice, said OWNER will be entitled to consider your bid in default, to annul this Notice of Award and to declare your Bid Security forfeited. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this_____ day of _____, 20___.

MANILA, ARKANSAS
Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by _____, this the_____ day of _____, 20___.

By _____

Title _____

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

CONTRACT

Effective Date of Agreement:
Amount:
Description (*Name and Location*): **MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD – 24-5838**

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other party*):

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*: **MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD – 24-5838**

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

    5.1 Claimants who do not have a direct contract with the Contractor,

        5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2 Pay or arrange for payment of any undisputed amounts.

    7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

DOCUMENT 00500

CONTRACT

PROJECT: MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD

PROJECT NUMBER: 24-5838

THIS AGREEMENT, made and entered into on the _____ day of _____, 20___ by and between _____, herein called the Contractor, and the **City of Manila, Arkansas**, hereinafter called the Owner:

W I T N E S S E T H:

That the Contractor, for the consideration hereinafter fully set out, hereby agrees with the Owner as follows:

2. That the Contractor shall furnish all the materials, and perform all of the work in manner and form as provided by the following enumerated Drawings, Specifications, and Documents, which are attached hereto and made a part hereof, as if fully contained herein and are entitled **Manila Municipal Airport (MXA) Construct Helipad – 24-5838,** dated April, 2025.

Advertisement for Bids	Payment Bond
Instructions to Bidders	General Conditions
Bid and Acceptance Thereof	Supplemental Conditions
Performance Bond	Specifications
	Drawings (See Sheet Index below)

SHEET INDEX

Sheet No.	Description
1.	Cover
2.	Construction Safety and Phasing Plan – Phase I
3.	Topographic Survey
4.	Site Overview
5.	Demolition and Erosion Control Plan
6.	Coordinate Plan
7.	Grading Plan
8.	Jointing and Elevation Plan
9.	Marking and Lighting Plan
10.	Miscellaneous Details I
11.	Miscellaneous Details II

2. That the Owner hereby agrees to pay to the Contractor for the faithful performance of this Agreement in lawful money of the United States, the amount of:

_____ Dollars ($_____).

3. The Work will be completed and ready for final payment in accordance with the General Conditions within 90 days after the date when the Contract Time commences to run as provided in Notice to Proceed.

4. Liquidated Damages: Owner and Contractor recognize that time is of the essence of this Agreement and the Owner will suffer financial loss if the Work is not completed within the time specified in above, plus any extensions thereof allowed in accordance with the General Conditions. They also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner Three Hundred and Fifty Dollars ($350.00) for each day that expires after the time specified in Paragraph 3 for completion and readiness for final payment.

5. That within 30 days of receipt of an approved payment request, the Owner shall make partial payments to the Contractor on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the Contractor, LESS the retainage provided in the General Conditions, which is to be withheld by the Owner until all work within a particular part has been performed strictly in accordance with this Agreement and until such work has been accepted by the Owner.

6. That the Contractor agrees to pay each Subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each partial payment the prime contractor receives from the Owner. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

7. That upon submission by the Contractor of evidence satisfactory to the Owner that all payrolls, material bills, and other costs incurred by the Contractor in connection with the construction of the work have been paid in full, final payment on account of this Agreement shall be made within 60 days after the completion by the Contractor of all work covered by this Agreement and the acceptance of such work by the Owner.

8. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the Surety Bond hereto attached for its faithful performance and payment, the Owner shall deem the Surety or Sureties upon such bond to be unsatisfactory or if, for any reason such bond ceases to be adequate to cover the performance of the work, the Contractor shall, at his expense, within 5 days after the receipt

of notice from the Owner, furnish an additional bond or bonds in such form and amount and with such Surety or Sureties as shall be satisfactory to the Owner. In such event, no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Owner.

9. No additional work or extras shall be done unless the same shall be duly authorized by appropriate action by the Owner in writing.

10. The Owner and Contractor agree that any controversy or claim arising out of or relating to the Contract, or breach thereof, shall be settled by arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgement on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and date first above written, in three (3) counterparts, each of which shall, without proof or accounting for the other counterpart be deemed an original Contract.

SEAL:

_____
CONTRACTOR

WITNESSES: By_____

_____ _____
Title

MANILA, ARKANSAS
OWNER

ATTEST: By_____

_____ _____
Clerk Title

Approved as to form:

_____ Attorney for Owner

NOTICE TO PROCEED

TO:

PROJECT: MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD – 24-5838

You are hereby notified to commence WORK in accordance with the Contract dated _____ on or before _____ , and you are to complete the WORK within **90** consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20___.

MANILA, ARKANSAS
Owner

By _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____, this the ___ day of _____, 20____.

By _____

Title _____

DOCUMENT 00700
GENERAL CONDITIONS
TABLE OF CONTENT

ARTICLE NUMBER AND TITLE ***PAGE NUMBER***

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DOCUMENT 00700

GENERAL CONDITIONS

These General Conditions contain contractual-legal Articles which establish the requirements and conditions governing responsibility, policy, and procedures that apply during the construction and warranty period. This part of the Contract Documents is preprinted. Any modifications to the following Articles that are special to the Project under consideration will be made in the Supplementary Conditions. Requirements and conditions which have special significance to the Contract for the contemplated Work on this Project are as set forth in the remaining Sections of these Contract Documents.

DEFINITIONS

Wherever in the Contract Documents the following terms are used, the intent and meaning shall be interpreted as follows:

1. AS APPROVED

The words "as approved", unless otherwise qualified, shall be understood to be followed by the words "by the Engineer".

2. AS SHOWN, AND AS INDICATED

The words "as shown" and "as indicated" shall be understood to be followed by the words "on the Drawings".

3. BIDDER

The person or persons, partnership, firm, or corporation submitting a Bid for the Work contemplated.

4. CONTRACT

The "Contract" is the written agreement covering the performance of the Work and the furnishing of labor, materials, incidental services, tools, and equipment in the construction of the Work. It includes supplemental agreements amending or extending the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments, or extensions to the Contract and include Contract Change Orders.

5. CONTRACT DOCUMENTS

The "Contract Documents" consist of the Bidding Requirements, Contract forms, Conditions of the Contract, the Specifications, and the Drawings, including all modifications thereof, incorporated into the Documents before their execution, and including all other requirements incorporated by specific reference thereto. These form the Contract.

6. CONTRACTOR

The person or persons, partnership, firm, or corporation who enters into the Contract awarded him by the Owner.

7. DAYS

Unless otherwise specifically stated, the term "days" will be understood to mean calendar days.

8. DRAWINGS

The term "Drawings" refers to the official Drawings, profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, sealed by the Engineer, which show the location, character, dimensions, and details of the Work to be performed. Drawings may either be bound in the same book as the Project Manual or bound separately and are a part of the Contract Documents, regardless of the method of binding.

9. ENGINEER

The person or organization identified as such in the Contract. The term "Engineer" means the Engineer or his authorized representative.

10. NOTICE

The term "notice" or the requirement to notify, as used in the Contract Documents or applicable state or federal statutes, shall signify a written communication delivered in person or by certified or registered mail to the individual, or to a member of the firm, or to an officer of the corporation for whom it is intended. Certified or registered mail shall be addressed to the last business address known to him who gives the notice.

11. OR EQUAL

The term "or equal" shall be understood to indicate that the "equal" product is the same or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the Project design requirements will be made by the Engineer. Such "equal" products shall not be purchased or installed by the Contractor without the Engineer's written approval.

12. OWNER

The person, organization, or public body identified as such in the Contract.

13. PLANS (See Drawings).

14. SPECIFICATIONS

Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto. Where standard specifications, such as those of ASTM, AASHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents.

Where portions of the Work traverse or cross federal, state, county, or local highways, roads, streets, or railroads, and the agency in control of such property has established standard specifications governing items of Work that differ from these Specifications, the most stringent requirements shall apply.

The Contractor shall comply with all regulations and requirements of the State Highway Department and the City and County Road Departments wherever the Work traverses or crosses state, city, or county roads.

15. NOTICE TO PROCEED

A written notice given by the Owner to the Contractor (with a copy to the Engineer) fixing the date on which the Contract time will commence to run and on which the Contractor shall start to perform his obligation under the Contract. The Notice to Proceed shall be given within 30 days following execution of the Contract by the Owner.

16. SUBSTANTIAL COMPLETION

"Substantial completion" shall be that degree of completion of the Project, or a defined portion of the Project, sufficient to provide the Owner, at his discretion, the full-time use of the Project or defined portion of the Project for the purposes for which it was intended.

Such substantial completion shall not relieve the Contractor from liquidated damages should the Owner have added costs after the completion date, i.e., if additional construction observation, interest paid, loss of revenue, or other expenses continue to be charged to the Owner.

17. WORK

The word "Work" within these Contract Documents shall include all material, labor, and tools; all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract; and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure. As used herein, "provide" shall be understood to mean "provide complete in place", that is, "furnish and install".

CONTRACT DOCUMENTS

18. INTENT OF CONTRACT DOCUMENTS

The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intent of the Documents is to include all Work (except specific items to be furnished by the Owner) necessary for completion of the Contract. Materials or Work described in words which so applied have a well-known technical and trade meaning shall be held to refer to such recognized standards.

19. DISCREPANCIES AND OMISSIONS

Any discrepancies or omissions found in the Contract Documents shall be reported to the Engineer immediately. The Engineer will clarify discrepancies or omissions, in writing, within a reasonable time.

In resolving inconsistencies among two or more Sections of the Contract Documents, precedence shall be given in the following order:

1. CONTRACT
2. SUPPLEMENTARY CONDITIONS
3. SPECIFICATIONS
4. INSTRUCTIONS TO BIDDERS
5. GENERAL CONDITIONS
6. DRAWING(S)

Figure dimensions on Drawings shall take precedence over scale dimensions. Detailed Drawings shall take precedence over general Drawings. It is understood and agreed that the Work shall be performed and completed according to the true spirit, meaning, and intent of these Documents.

20. ALTERATIONS - CHANGES IN WORK

The Owner, with or without notice to the Sureties and without invalidating the Contract, may order changes in the Work within the general scope of the Contract by altering, adding to, or deducting from the Work, the Contract being adjusted accordingly. To effect a change in the work a letter must be written by the OWNER to the ENGINEER stating any changes the OWNER requires in the project plans or specifications. Changes may necessitate a **Change Order** for the project and will be prepared by the ENGINEER and submitted to the CONTRACTOR and the OWNER for approval *prior to* effecting the change on the project. All such Work shall be executed under the conditions of the original Contract, except as specifically adjusted at the time of ordering such change.

*****NOTE:** The OWNER shall not direct the CONTRACTOR to change work. *******

In giving instructions, the Engineer may order minor changes in the Work not involving extra cost and not inconsistent with the purposes of the Project, but otherwise, except in an emergency endangering life or property, additions or deductions from the Work shall be performed only in pursuance of an approved Change Order from the Owner, signed or countersigned by the Engineer, or a Change Order from the Engineer stating that the Owner has authorized the deduction, addition, or change, and no claim for additional payment shall be valid unless so ordered.

If the Work is reduced by alterations, such action shall not constitute a claim for damages based on loss of anticipated profits.

21. SUB-SURFACE CONDITIONS FOUND DIFFERENT

Should the Contractor encounter sub-surface and/or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, the Contractor shall immediately give notice to the Engineer of such conditions before they are disturbed. The Engineer will thereupon promptly investigate the conditions, and if the Engineer finds that they materially differ from those shown on the Drawings or indicated in the Specifications, the Engineer will at once make such changes in the Drawings and/or the Specifications as he may find necessary. Any increase or decrease of cost resulting from such changes to be adjusted in the manner provided in the Paragraph titled “Changes in Work.”

22. VERIFICATION OF CONTRACT DOCUMENTS

The Contractor shall thoroughly examine and become familiar with all of the various parts of these Contract Documents and determine the nature and location of the Work, the general and local conditions and all other matters which can in any way affect the Work under this Contract. Failure to make an examination necessary for this determination shall not release the Contractor from the obligations of this Contract. The Contractor warrants that no verbal agreement or conversation with any officer, agent, or employee of the Owner or with the Engineer either before or after the execution of this Contract, has affected or modified any of the terms or obligations herein contained.

23. DOCUMENTS TO BE KEPT ON THE JOB SITE

The Contractor shall keep one copy of the Contract Documents on the job site, in good order, available to the Engineer and to his representatives.

The Contractor shall maintain on a daily basis at the job site, and make available to the Engineer on request, one current record set of the Drawings which have been accurately marked up to indicate all modifications in the completed Work that differ from the design information shown on the Drawings. Upon substantial completion of the Work, the Contractor shall give the Engineer one complete set of marked up record Drawings.

Failure of the Contractor to submit accurate Record Drawings to the Engineer will be adequate justification for postponement of the Final Inspection and Final Payment.

24. ADDITIONAL CONTRACT DOCUMENTS

The Engineer will furnish to the Contractor on request and free of charge, three copies of the Project Manual and three sets of full-size Drawings. Additional copies of the Project Manual and the Drawings may be obtained on request by paying the price as shown in the Invitation to Bid for the Contract Documents.

25. OWNERSHIP OF DRAWINGS

All Drawings, Plans, Specifications, and copies thereof furnished by the Engineer and the Owner are their property. They are not to be used on other work and, with the exception of the signed Contract set, are to be returned to them on request at the completion of the Work. Any reuse of these materials without specific written verification or adaptation by the Engineer and the Owner will be at the risk of the user and without liability or legal expense to the Engineer and the Owner.

Such user shall hold the Engineer and the Owner harmless from any and all damages, including reasonable attorneys' fees, from any and all claims arising from any such reuse. Any such verification and adaptation by the Engineer and the Owner will entitle the Engineer to further compensation at rates to be agreed upon by the user, the Engineer and the Owner. All models are the property of the Owner.

THE ENGINEER

26. AUTHORITY OF THE ENGINEER

The Engineer shall be the Owner's representative during the construction period. His authority and responsibility shall be limited to the provisions set forth in these Contract Documents. The Engineer shall have the authority to reject Work and material which does not conform to the Contract Documents. However, neither the Engineer's authority to act under this provision, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, their respective Sureties, any of their agents or employees, or any other person performing any of the Work.

27. DUTIES AND RESPONSIBILITIES OF THE ENGINEER

The Engineer will make periodic visits to the site of the Project to observe the progress and quality of the Work and to determine, in general, if the Work is proceeding in accordance with the intent of the Contract Documents. He shall not be required to make comprehensive or continuous inspections to check quality or quantity of the Work, and he shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work.

Visits and observations made by the Engineer shall not relieve the Contractor of his obligation to conduct comprehensive inspections of the Work and to furnish materials and perform acceptable Work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

The Engineer will make decisions, in writing, on all claims of the Owner or the Contractor arising from interpretation or execution of the Contract Documents. Such decision shall be necessary before the Contractor can receive additional money under the terms of the Contract. Changes in Work ordered by the Engineer will be made in compliance with the Article titled, ALTERATIONS - CHANGES IN WORK.

One or more construction observers may be assigned to observe the Work for compliance with the Contract Documents and to act in matters of construction under this Contract. It is understood that such construction observers shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. The Contractor shall furnish all reasonable assistance required by the Engineer or construction observer for proper review of the Work. Construction observers shall not have the power or authority to delete, increase, modify or otherwise change the requirements of the Contract Documents.

The above-mentioned observation shall not relieve the Contractor of his obligations to conduct comprehensive inspections of the Work and to furnish materials and perform acceptable Work and to provide adequate safety precautions, in conformance with the intent of the Contract.

28. REJECTED MATERIAL

Any material condemned or rejected by the Engineer or his authorized construction observer because of nonconformity with the Contract Documents shall be removed at once from the vicinity of the Work by the Contractor at his own expense, and the same shall not be used on the Work.

29. UNNOTICED DEFECTS

Any defective Work or material that may be discovered by the Engineer during construction or before the final acceptance of Work, or before final payment has been made, or during the guarantee period, shall be removed and replaced by Work and materials which shall conform to the provisions of the Contract Documents. Failure on the part of the Engineer to condemn or reject bad or inferior Work or materials shall not be construed to imply acceptance of such Work or materials. The Owner shall reserve and retain all of its rights and remedies at law against the Contractor and its surety for correction of any and all latent defects discovered after the guarantee period.

30. RIGHT TO RETAIN IMPERFECT WORK

If any part or portion of the Work done or material furnished under this Contract shall prove defective and not in accordance with the Drawings and Specifications, and if the imperfection in the same shall not be of sufficient magnitude or importance as to make the Work dangerous or unsuitable, or if the removal of such Work will create conditions which are dangerous or undesirable, the Owner shall have the right and authority to retain such Work but shall make such deductions in the final payment therefore as may be just and reasonable. The Owner shall also have the option to require, at no added cost to the Owner, extended warranties, maintenance bonds, or other remedies to provide for repair or reconstruction of imperfect Work.

31. LINES AND GRADES

The Contractor shall stake-out Work for this Contract and set the lines and grades necessary to complete the Work and shall keep the Engineer informed a reasonable time in advance of the times and places at which he wishes to do Work in order that the Engineer may review the lines and grades set by the Contractor and in order that the Engineer may make the necessary measurements for payment to the Contractor. All stakes, marks, and other information shall be carefully preserved by the Contractor, and in case of their careless or unnecessary destruction or removal by him or his employees, such stakes, marks, and other information will be replaced at the Contractor's expense.

Figured dimensions, when given in the Drawings, shall be accurately followed, even though they may differ from scaled measurements. No Work shown on the Drawings, the dimensions of which are not figured, shall be executed until instructions have been obtained from the Engineers as to the dimensions to be used. Large-scale and full-size drawings shall be followed in preference to small-scale drawings. The Engineer will provide the Contractor with bench marks to be used to establish grades and will also provide a baseline to be used to establish the proper lines. All Work done under this Contract shall be done to the lines and grades shown on the Drawings. The Contractor shall stake-out Work for this Contract and set the lines and grades necessary to complete the Work and shall keep the Engineer informed a reasonable time in advance of the times and places at which he wishes to do Work in order that the Engineer may review the lines and grades set by the Contractor and in order that the Engineer may make the necessary measurements for payment to the Contractor.

The Contractor shall furnish without charge competent persons from his force and such tools, stakes, surveying instruments, and other materials as the Engineer may require for reviewing the Contractor's stake-out of the Work and in making measurements for payment estimates or for surveys to establish temporary or permanent reference marks in connection with said Work.

Any Work done without lines, grades, and levels being reviewed by the Engineer, or other representative of the Engineer, may be ordered removed and replaced at the Contractor's cost and expense. The Contractor shall carefully preserve all monuments, bench marks, reference points, and stakes, and in case of willful or careless destruction of the same, he will be charged with the resulting expense of replacement and shall be responsible for any mistakes or loss of time that may be caused by their unnecessary loss or disturbance. In the event that the stakes and marks placed by the Engineer are destroyed through carelessness on the part of the Contractor, and that the destruction of these stakes and marks causes a delay in the Work, the Contractor shall have no claim for damages or extensions of time.

In the case of any permanent monuments or bench marks which must of necessity be removed or disturbed in the construction of the Work, the Contractor shall carefully protect and preserve the same until they can be properly referenced and relocated. The Contractor shall also furnish at his own expense such materials and assistance as are necessary for the proper replacement of monuments or bench marks that have been moved or destroyed.

32. SHOP DRAWING SUBMITTAL PROCEDURE

The Contractor shall submit a sufficient number of copies to allow the Engineer to retain four copies (2 for himself; 2 for the Owner) for review, such shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for construction, except as noted below.

Should the Contractor fail to submit acceptable shop drawings on the second submittal, one copy will be returned to him and the cost of the Engineer's time to review subsequent submittals on the unacceptable item will be deducted from the Contractor's monthly payment invoice. Shop drawings shall be submitted in sufficient time to allow the Engineer not less than 20 regular working days per submittal for examining the shop drawings.

These shop drawings shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the Contract Drawings and Specifications.

Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the shop drawings, or other approved means, that he (the Contractor) has checked the shop drawings, and that the Work shown is in accordance with Contract requirements and has been checked for dimensions and relationship with Work of all other trades involved.

The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to the Contractor for resubmission in the proper form.

When the shop drawings have been reviewed by the Engineer, two (2) sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the shop drawing may be rejected and one (1) set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit the shop drawings in quadruplicate, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to resubmitted shop drawings other than those changes indicated by the Engineer, unless such changes are clearly described in a letter accompanying the resubmitted shop drawings.

The review of such shop drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of dimensions, fabrication details, and space requirements or for deviations from the Contract Drawings or Specifications unless the Contractor has called attention to such deviations in writing by a letter accompanying the shop drawings and the Engineer approves the change or deviation in writing at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, the

Contractor shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

33. ADDITIONAL DETAIL DRAWINGS AND INSTRUCTIONS

The Engineer will furnish, with reasonable promptness, additional instructions by means of drawings or otherwise, if, in the Engineer's opinion, such are required for the proper execution of the Work. All such drawings and instructions will be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom.

THE CONTRACTOR AND HIS EMPLOYEES

34. INDEPENDENT CONTRACTOR

The Contractor shall perform all Work under this Contract as an Independent Contractor and shall not be considered as an agent of the Owner or of the Engineer, nor shall the Contractor's subcontractors or employees be subagents of the Owner or of the Engineer.

The Contractor shall employ only employees who are competent and skillful in their respective line of work, and local labor shall be given preference. Whenever the Engineer or the Owner notify the Contractor that any person on this work is, in their opinion, incompetent, disorderly, or refuses to carry out the provisions of this Contract, or uses threatening or abusive language to any person representing the Owner on the work or is otherwise unsatisfactory, such person shall be immediately discharged from the Project and shall not be re-employed thereon except with the consent of the Engineer by the Owner.

35. SUBCONTRACTING

Within 30 days after the execution of the Contract, the Contractor shall submit to the Engineer the names of all subcontractors proposed for the Work, including the names of any subcontractors that were submitted with the Bid. The Contractor shall not employ any subcontractors that the Engineer may object to as lacking capability to properly perform Work of the type and scope anticipated. No changes will be allowed from the approved subcontractor list without written approval of the Engineer.

The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the Owner.

36. INSURANCE AND LIABILITY

A. GENERAL

The Contractor shall provide (from insurance companies acceptable to the Owner) the insurance coverage designated hereinafter and pay all costs.

Before execution of the Contract, Contractor shall furnish the Owner with complete copies of all certificates of insurance specified herein showing the type, amount, class of operations covered, effective dates, and date of expiration of policies. Each Certificate

shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least thirty (30) days prior written notice has been give to the Owner.

In case of the breach of any provision of this Article, the Owner, at his option, may take out and maintain, at the expense of the Contractor, such insurance as the Owner may deem proper and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Contract.

All insurance contracts and certificates shall be executed by a licensed resident agent of the insurance company, and in all ways comply with the insurance laws of the State of Arkansas. Further, the said insurance company shall be duly licensed and qualified to do business in the State of Arkansas, and have an A.M. Best rating of A- or better and have a Positive or Stable Rating Outlooks.

In the event any Work under this Contract is performed by a subcontractor, the Contractor shall be responsible for any liability directly or indirectly arising out of the Work performed under this Contract by a subcontractor, which liability is not covered by the subcontractor's insurance.

The Contractor's and any subcontractor's general liability and automobile liability insurance policies shall include the Owner and Engineer, their officers, agents, subconsultants and employees as additional insureds for any claims arising out of Work performed under this Contract. Certificates of insurance shall explicitly name the Owner and Engineer as additional insureds. Inclusion of either party as "certificate holder" does not meet this requirement.

B. WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

Worker's Compensation Insurance in statutory limits shall be secured and maintained as required by the laws of the State of Arkansas. In addition, Employer's Liability Insurance in an amount not less than $500,000 for each accident, $500,000 for each employee regarding disease, and $500,000 policy limit regarding disease shall cover all employees who have performed any of the obligations assumed by the Contractor under these Contract Documents. This insurance will protect the Contractor against any and all claims resulting from injuries, sickness, disease, or death to employees engaged in work under this Contract. The Contractor shall require the subcontractor similarly to provide Worker's Compensation and Employer's Liability Insurance for all the latter's employees to be engaged in such Work. Workers Compensation and Employers Liability must include a Waiver of Subrogation in favor of the Owner and the Engineer.

Where Work under this Contract includes any water or navigational exposure, coverage shall be included to cover the Federal Longshoremen's and Harborworker's Act and the Federal Jones Act when applicable.

C. COMMERCIAL GENERAL LIABILITY INSURANCE

The Contactor shall maintain during the life of this Contract such *independent contractor's* general liability, completed operations and products liability, and automobile liability insurance as will provide coverage for claims for damages for bodily injury, including accidental death, as well as for claims for property damage which may arise directly or indirectly from performance of the Work under this Contract. The general

liability policy should also specifically ensure the contractual liability assumed by the Contractor under Article 38, Indemnity. The General Liability policy must provide coverage on an occurrence basis, not a claims-made basis. A Waiver of Subrogation is to be provided in favor of the Owner and the Engineer in regards to General Liability. A Designated Construction Project Aggregate (also known as Per Project Aggregate) liability limit is required also. The Contractor's General Liability policy is to be primary and non-contributory.

Required limits of General Liability Insurance
General Aggregate: Not less than $2,000,000
Completed Operations Aggregate: Not less than $2,000,000
Each Occurrence of Injury or Property Damage: Not less than $1,000,000 Combined Single Limit

D. COMMERCIAL AUTO LIABILITY INSURANCE

The Contractor shall maintain during the life of this Contract automobile liability insurance that will provide coverage for claims for damages for bodily injury, including accidental death, as well as for claims for property damage which may arise directly or indirectly from performance of the Work under this Contract.

Commercial Automobile Liability Insurance
Shall include Personal Injury and Property Damage coverage for "Any Auto", "Hired Autos", and "Non-Owned Auto" at a Combined Single Limit of not less than $1,000,000.

E. EXCESS UMBRELLA LIABILITY INSURANCE

$2,000,000 limit of liability policy shall be provided in additional limits to underlying Limits required for General Liability, Auto Liability, and Employers Liability.

F. OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY INSURANCE

The Contractor shall indemnify and save harmless the Owner and Engineer from and against all losses and all suits, claims, demands, judgments, actions, and payment of every description and nature brought or recovered against him by reason of any omission or act of the Contractor, his agents, or employees in the execution of the work or in the guarding of it. The Contractor shall secure and maintain protective liability insurance in the name of the Owner and the Contractor covering from contingent liability under this contract.

1) **General Aggregate:** Not less than $2,000,000

2) **Each Occurrence of Personal Injury or Property Damage:** Not less than $1,000,000 Combined Single Limit.

G. BUILDER'S RISK INSURANCE

The Contractor shall procure and maintain during the life of this contract Builder's Risk Insurance fire, lightening, extended coverage, vandalism, and property theft on the insurable portion of the Project on a 100 percent completed value basis against damage to the equipment, structures, or material. The Owner and the Contractor, as their interests may appear shall be names as the Insured.

H. INSTALLATION FLOATER INSURANCE POLICY

The Contractor shall procure and maintain during the life of this contract an Installation Floater for fire, lightening, extended coverage, vandalism, and property theft on the insurance portion of the Project. The Owner and the Contractor, as their interests may appear, shall be named as the Insured. Coverage shall be based on 100 percent of the total value of the competed Project. The Installation Floater Insurance Policy shall protect against damage to all equipment and materials.

Note: Builder's Risk Insurance must be procured and maintained during the life of the project if there is an actual structure being erected or which exists on the premises. If no structure exists, or is being erected an **Installation Floater Insurance Policy** must be procured and maintained during the life of the project.

Note: Builder's Risk Insurance and Installation Floaters do not provide coverage for Contractor's equipment if stolen or damaged at a job site. Contractors are responsible for insuring their own equipment.

I. INSURANCE COVERAGE FOR SPECIAL CONDITIONS

When the construction is to be accomplished within a public or private right-of-way requiring special insurance coverage, the Contractor shall conform to the particular requirements and provide the required insurance. The Contractor shall include in his liability policy all endorsements, or purchase additional liability insurance that the said authority may require for the protection of the authority, its officers, agents, and employees. Insurance coverage for special conditions, when required, shall be provided as set forth in the Supplementary Conditions.

J. NO PERSONAL LIABILITY OF PUBLIC OFFICIALS

In carrying out any of the provisions hereof in exercising any authority granted by the Contract, there will be no personal liability upon any public official.

37. PERFORMANCE AND PAYMENT BONDS

The successful Bidder shall furnish a Performance and Payment Bond in the amount equal to one hundred percent (100%) of the contract price on the forms provided in the Contract Documents as security for faithful performance of the Contract and payment of all obligations arising thereunder within ten days after receipt of the Notice of Award. The bond shall be written by a surety company qualified and authorized to do business in the State of Arkansas and shall be listed on the current U.S. Department of Treasury, Circular Number 570, or amendments thereto, in the Federal Register of acceptable Sureties for Federal projects. The bond shall be executed by a resident agent licensed by the State Insurance Commissioner to represent the surety company in Arkansas. The bond shall be written in favor of the Owner. Bond company rating by "AM Best Rating Company" to be "A-" or above and have a Positive or Stable Rating Outlooks.

The Attorney-in-Fact who executes this Performance Bond and Payment Bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond. All Contracts, Performance and Payment Bonds, and respective powers-of-attorney will have the same date.

If the Surety on any Bond furnished by Contractor is declared bankrupt, or becomes insolvent, or its right to do business is terminated in any location where any part of the project is located, or ceases to meet the requirements of the preceding paragraph, the Contractor shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to Owner.

Before execution of the Contract Documents, the Contractor shall submit the Bonds (in triplicate) to the Owner. The Bonds shall be submitted **WITHOUT DATES**, as they will be dated by the Owner at the same time as the Contracts are executed.

38. INDEMNITY

The Contractor shall indemnify and hold harmless the Owner, the Engineer, and their agents and employees from and against damages, losses, and expenses including attorney's fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury or to destruction of tangible property (other than the Work itself), including the loss of use resulting there from, and (2) is caused in whole or in part by any act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner, the Engineer, or any of their agents or employees by any employee of the Contractor, any subcontractor, anyone directly indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Article shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor under Worker's Compensation Acts, Disability Benefit Acts, or other Employee Benefit Acts.

39. TAXES AND CHARGES

The Contractor shall withhold and pay any and all sales and use taxes, including any and all charge of taxes thereof, and all withholding taxes, whether state or federal, and pay all Social Security charges and also all State Unemployment Compensation charges, and pay or cause to be withheld, as the case may be, any and all taxes, charges, or fees or sums whatsoever, which are now or may hereafter be required to be paid or withheld under any laws.

40. ORDINANCES, PERMITS, AND LICENSES

The Contractor shall keep himself fully informed of all local ordinances, as well as state and federal laws, which in any manner affect the Work herein specified. The Contractor shall at all times comply with said ordinances, laws, and regulations, and protect and indemnify the Owner, the Engineer and their respective employees, and its officers and agents against any claim or liability arising from or based on the violation of any such laws, ordinances, or regulations up to the amount of the Contract Price. All permits, licenses, and inspection fees necessary for prosecution and completion of the Work shall be secured and paid for by the Contractor, unless otherwise specified.

The Contractor shall observe and comply with all applicable local, state, and federal occupational safety and health regulations during the prosecution of Work under this Contract. In addition, full compliance by the Contractor with the U. S. Department of Labor's Occupational Safety and Health Standards, as established in Public Law 91-596, will be required under the terms of this Contract.

41. SUPERINTENDENCE

The Contractor shall keep on the Work, during its progress, competent supervisory personnel. The Contractor shall designate, in writing, before starting Work, one authorized representative who shall have complete authority to represent and to act for the Contractor. The Contractor shall give sufficient supervision to the Work, using his best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, and procedures, and for providing adequate safety precautions and coordinating all portions of the Work under the Contract. It is specifically understood and agreed that the Engineer, its employees and agents, shall not have control or charge of and shall not be responsible for the construction means, methods, techniques, procedures, or for providing adequate safety precautions in connection with the Work under the Contract.

42. RECEPTION OF ENGINEER'S DIRECTIONS

The superintendent, or other duly authorized representative of the Contractor, shall represent the Contractor in all directions given to him by the Engineer. Such directions of major importance will be confirmed in writing. Any direction will be so confirmed, in each case, on written request from the Contractor.

43. SANITATION

Sanitary conveniences conforming to state and local codes shall be erected and maintained by the Contractor at all times while workers are employed on the Work. The sanitary convenience facilities shall be as approved by the Engineer.

44. EMPLOYEES

The Contractor shall employ only men or women who are competent and skillful in their respective line of work. Whenever the Engineer or Owner shall notify the Contractor that any person on the Work is, in their opinion, incompetent, unfaithful, or disorderly or refuses to carry out the provisions of this Contract or uses threatening or abusive language to any person representing the Owner on the Work, or is otherwise unsatisfactory, such person shall be immediately discharged from the Project and shall not be re-employed thereon except with the consent of the Engineer by the Owner.

45. PROJECT MEETINGS

The Engineer may conduct Project meetings, as he deems necessary, for the purposes of discussing and resolving matters concerning the various elements of the Work. Time and place for these meetings and the names of persons required to be present shall be as directed by the Engineer. Contractor shall comply with these attendance requirements and shall also require his subcontractors to comply.

46. SAFETY

The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U. S. Department of Labor (OSHA); the State Labor Department Laws; all other applicable federal, state, county, and local laws, ordinances, and codes; the requirements set forth below; and any regulations that may be detailed in other parts of these

Documents. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve him from compliance with the obligations and penalties set forth herein.

The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

The Contractor, as a part of his safety program, shall maintain at his office or other well-known place at the job site, safety equipment applicable to the Work as prescribed by the aforementioned authorities, all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the job site.

If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the Owner. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses.

If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

47. CONTRACTOR'S TOOLS AND EQUIPMENT

The Contractor's tools and equipment used on the Work shall be furnished in sufficient quantity and of a capacity and type that will safely perform the Work specified, and shall be maintained and used in a manner that will not create a hazard to persons or property, or cause a delay in the progress of the Work.

48. PROTECTION OF WORK AND PROPERTY

The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. The Contractor shall at all times safely guard and protect from damage his own Work, and that of adjacent property (as provided by law and the Contract Documents). All passageways, guard fences, lights, and other facilities required for protection by federal, state, or municipal laws and regulations and local conditions, must be provided and maintained.

The Contractor shall protect his Work and materials from damage due to the nature of the Work, the elements, carelessness of other Contractors, or from any cause whatever until the completion and acceptance of the Work. All loss or damages arising out of the nature of the Work to be done under these Contract Documents, or from any unforeseen obstruction or defects which may be encountered in the prosecution of the Work, or from the action of the elements, shall be sustained by the Contractor.

In addition, the Contractor shall take special precautions to prevent the "flotation" of all tanks and structures prior to their final acceptance and filling for beneficial use. The Contract price shall include all costs associated with such special precautions.

Also, the Contractor shall not load or permit any part of any structure to be loaded with a weight that will endanger its safety or its structural integrity.

49. RESPONSIBILITY OF CONTRACTOR TO ACT IN EMERGENCY

In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor shall act, without previous instructions from the Owner or Engineer, as the situation may warrant. The Contractor shall notify the Engineer thereof immediately thereafter. Any claim for compensation by the Contractor, together with substantiating documents in regard to expense, shall be submitted to the Owner through the Engineer and the amount of compensation shall be determined by agreement.

50. MATERIALS AND APPLIANCES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, 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 as to the kind and quality of materials.

In selecting and/or approving equipment for installation in the Project, the Owner and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable national, state, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.

51. BUY AMERICAN

Unless otherwise stipulated, only steel and manufactured products produced in the United States will be used by the Contractor, subcontractors, materialmen, and suppliers in performance of the Work.

52. CONTRACTORS' AND MANUFACTURERS' COMPLIANCE WITH STATE SAFETY, OSHA, AND OTHER CODE REQUIREMENTS

The completed Work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the state and federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the Work (including Owner-selected equipment) subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. Contractors shall notify all equipment suppliers and subcontractors of the provisions of this Article.

53. SUBSTITUTION OF MATERIALS

Except for Owner-selected equipment items and items where no substitution is clearly specified, whenever any material, article, device, product, fixture, form, type of construction, or process is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design, and shall be deemed to be followed by the words "or equal". The Bidder may, in such cases, submit complete data to the Engineer 10 days prior to bid date for consideration of another material, type, or process which shall be substantially equal in every respect to that so indicated or specified. Substitute materials shall not be used unless approved in writing. The Owner or his authorized agent will be the sole judge of the substituted article or material.

54. TESTS, SAMPLES, AND INSPECTIONS

The Contractor shall furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the Engineer. When required, the Contractor shall furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.

The Owner, Engineer, authorized government agents, and their representatives shall at all times be provided safe access to the Work wherever it is in preparation or progress, and the Contractor shall provide facilities for such access and for inspection, including maintenance of temporary and permanent access.

If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any Work to be specially tested or approved, the Contractor shall give timely notice of its readiness for inspection. Inspections to be conducted by the Engineer will be promptly made, and where practicable, at the source of supply. If any Work should be covered up without approval or consent of the Engineer. it shall be uncovered for examination at the Contractor's expense.

55. ROYALTIES AND PATENTS

The Contractor shall pay all royalty and license fees, unless otherwise specified. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner and the Engineer harmless from any and all loss, including reasonable attorneys' fees, on account thereof, up to the amount of the Contract Price.

56. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the Work should be stopped under an order of any court or other public authority for a period of more than 3 months, through no act or fault of the Contractor, its Subcontractors, or respective employees or agents, then the Contractor may, upon 15 days' written notice to the Owner and the Engineer, if said default has not been cured, stop Work or terminate this Contract and recover from the Owner payment for the reasonable value of Work performed.

57. CORRECTION OF DEFECTIVE WORK

The Contractor hereby agrees to make, at his own expense, all repairs or replacements necessitated by defects in materials or workmanship supplied under terms of this Contract, and

pay for any damage to other works resulting from such defects, which are found during construction or become evident within 1 year after the date of final acceptance of the Work or within 1 year after the date of substantial completion established by the Engineer for specified items of equipment, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. The Contractor further assumes responsibility for a similar guarantee for all Work and materials provided by subcontractors or manufacturers of packaged equipment components.

The effective date for the start of the guarantee or warranty period for equipment qualifying as substantially complete is defined in Article 16, SUBSTANTIAL COMPLETION, and Article 69, SUBSTANTIAL COMPLETION DATE, in these General Conditions. The Contractor also agrees to hold the Owner and the Engineer harmless from liability of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written order for same from the Owner.

If the Contractor fails to make the repairs and replacements promptly, the Owner may do the Work, and the Contractor and his Surety shall be liable for the cost thereof. Any additional requirements for the Project relative to correction of defective Work after final acceptance are set forth in the Supplementary Conditions.

PROGRESS OF THE WORK

58. BEGINNING OF THE WORK

Before Work shall be started and materials ordered, the Contractor shall meet and consult with the Owner and/or Engineer relative to materials, equipment, and all arrangements for prosecuting the Work.

59. SCHEDULES AND PROGRESS REPORTS

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, records, and other data as the Owner may request concerning Work performed or to be performed under this Contract.

Construction Schedule Requirements: The Contractor shall comply with the following requirements concerning construction scheduling and payments:

The Contractor shall submit a construction schedule of the bar graph type (or other approved type) prior to the preconstruction conference showing the following information as a minimum:

a. Date of Notice to Proceed with Contract Work.

b. Actual date construction is scheduled to start if different from the date of Notice to Proceed.

c. Contract completion date.

d. Beginning and completion dates for each phase of Work.

e. The dates at which special detail drawings are required.

f. Respective dates for submission of shop drawings and the beginning of manufacture, the testing of, and the installation of materials, supplies, and equipment.

g. All construction milestone dates.

h. A separate graph showing Work placement in dollars versus Contract time.

The schedule shall incorporate approved Contract changes. The schedule shall be maintained in an up-to-date condition monthly and shall be available for inspection at the construction site at all times.

The construction schedule shall be submitted in conjunction with and/or in addition to any other requirements concerning schedules within these Specifications.

The construction schedule shall be updated and submitted with each monthly request for payment. Should the Contractor fall behind said schedule, he shall present in writing to the owner a revised plan of action to complete the project on time. Methods may include, but are not limited to additional manpower, equipment, working overtime, etc. as may be required. Also, the construction schedule shall be revised accordingly. Failure to submit such revised construction schedule and written explanation shall be reason to withhold payment entirely or reduce payment substantially.

60. PROSECUTION OF THE WORK

It is expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the Work are the essence of this Contract. The Work shall be prosecuted at such time, and in or on such part or parts of the Project as may be required, to complete the Project as contemplated in the Contract Documents and the approved construction schedule.

Regular Work hours shall be from 7:00 a.m. to 6:00 p.m. Monday through Friday. No Work requiring the presence of the Engineer's representative will be performed outside of regular Work hours. If, however, the Contractor works additional hours (other than specified herein), the Contractor shall pay the Owner for additional engineering services as outlined below.

The cost of additional engineering services shall be borne by the Contractor and will be based upon actual hours worked (labor cost x 3 x 1.5) plus out-of-pocket expenses such as lodging, mileage, materials, etc. Otherwise, the Contractor may perform clean-up work only outside of regular hours (including Saturdays and Sundays). No Work will be accomplished on holidays. McClelland Consulting Engineers, Inc. observes the following holidays during the year: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Friday following, Christmas Eve, and Christmas Day. When a holiday occurs on a Saturday, the Company will observe it on the Friday preceding, and when a holiday occurs on a Sunday, the Company will observe it on the following Monday.

61. 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 monies due or to become due to him hereunder without the prior written consent of the Owner.

62. OWNER'S RIGHT TO DO WORK

If the Contractor should, in the opinion of the Engineer, neglect to prosecute the Work properly or should neglect or refuse at his own cost to take up and replace Work as shall have been rejected

by the Engineer, then the Owner shall notify the Surety of the condition, and after 10 days' written notice to the Contractor and the Surety, or without notice if an emergency or danger to the Work or public exists, and without prejudice to any other right which the Owner may have under the Contract, take over that portion of the work which has been improperly executed or uncompleted, and make good the deficiencies and deduct the cost thereof from the payments then or thereafter due the Contractor, and if such payments are not sufficient thereof, charge the cost to the Contractor and its surety.

63. OWNER'S RIGHT TO TRANSFER EMPLOYMENT

If the Contractor should abandon the Work or should be adjudged bankrupt, or if he should make a general assignment 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 should fail, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if he should fail to make prompt payment to subcontractors for material or labor, or persistently disregard laws, ordinances, or the instructions of the Engineer, or otherwise be guilty of a substantial violation of any provision of the Contract or any laws or ordinance, the Owner may, without prejudice to any other right or remedy, and after giving the Contractor and Surety 7 days' written notice, transfer the employment for said Work from the Contractor to the Surety. Upon receipt of such notice, such Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the Work included under this Contract and employ, by Contract or otherwise, any qualified person or persons to finish the Work and provide the materials therefore, in accordance with the Contract Documents, without termination of the continuing full force and effect of this Contract.

In case of such transfer of employment to such Surety, the Surety shall be paid in its own name on estimates according to the terms hereof without any right of the Contractor to make any claim for the same or any part thereof.

If after the furnishing of said written notice to the Surety, the Contractor and the Surety still fail to make reasonable progress on the performance of the Work, the Owner may terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the Work by whatever method he may deem expedient and charge the cost thereof to the Contractor and Surety. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the expense of completing the Contract, including compensation for additional managerial and administrative services, shall exceed such unpaid balance, the Contractor and the Surety shall pay the difference to the Owner.

64. OWNER’S RIGHT TO SUSPEND OR TERMINATE WORK

Owner may suspend work under the following conditions:

At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contract makes an approved claim therefor as provided in per the General Conditions.

Owner may terminate:

Upon the occurrence of any one or more of the following events:

1. If Contractor persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established in the Contract Documents.

2. If Contractor disregards Laws or Regulations of any public body having jurisdiction.

3. If Contractor disregards the authority of the Engineers.

4. If Contractor otherwise violates in any substantial way any provisions of the Contract Documents.

Owner may, after giving Contractor (and the surety, if any) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of Contractor, exclude Contractor from the site and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient.

In such case Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by Owner arising out of or resulting from completing the Work such excess will be paid to Contractor. If such claims, costs, losses and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and when so approved by Engineer incorporated in a Change Order, provided that when exercising any rights or remedies under the paragraph Owner shall not be required to obtain the lowest price for the Work performed.

Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

Upon seven days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Contract. In such case, Contractor shall be paid (without duplication of any items):

1. For completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work.

2. For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses.

3. For all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others.

4. For reasonable expenses directly attributable to termination.

Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

65. DELAYS AND EXTENSION OF TIME

If the Contractor is delayed in the progress of the Work by any separate Contractor employed by the Owner, or by strikes, lockouts, fire, excessive adverse weather conditions not reasonably anticipated (on the basis of official weather records from the past ten years, minimum, from the locality involved), or acts of God, the Contractor shall, within 48 hours of the start of the occurrence, give written notice to the Owner of the cause of the potential delay and estimate the possible time extension involved, and within 7 days after the cause of delay has been remedied, the Contractor shall given written notice to the Owner of any actual time extension requested as a result of the aforementioned occurrence; then the Contract time may be extended by Change Order for such reasonable time as the Engineer determines.

It is agreed that no claim shall be made or allowed for any damages which may arise out of any delay caused by the above referenced acts or occurrences, other than claims for the appropriate extension of time.

No extension of time will be granted to the Contractor for delays occurring to parts of the Work that have no measurable impact on the completion of the total Work under this Contract; nor will extension of time be granted for delays to parts of Work that are not located on the critical path if the Critical Path Method (CPM) is used for scheduling the Work.

No extension of time will be considered for weather conditions normal to the area in which the Work is being performed. Unusual weather conditions, if determined by the Engineer to be of a severity that would stop all progress of the Work, may be considered as cause for an extension of Contract completion time. The Contractor shall provide official documentation of weather conditions experienced versus those anticipated as described above.

Delays in delivery of equipment or material purchased by the Contractor or his subcontractors (including Owner-selected equipment) shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all equipment and materials.

Within a reasonable period after the Contractor submits to the Owner a written request for an extension of time, the Engineer will present his written opinion to the Owner as to whether an extension of time is justified, and, if so, his recommendation as to the number of days for time extension. The Owner will make the final decision on all requests for extension of time. In no event shall the Contractor be entitled under this Contract to collect or recover any damages, loss, or expense incurred by any delay other than as caused by the Owner, as stipulated in the Article titled, NOTICE OF CLAIM FOR DELAY.

66. LIQUIDATED DAMAGES

The Work shall begin at the time stated in the Notice to Proceed issued by the Owner to the Contractor and shall be completed within the number of consecutive calendar days, or by the calendar date, stated in the accepted Bid and Contract. The time shall be computed from and including the date stated in the Notice to Proceed. It is agreed that time is of the essence of this Contract.

The Contractor agrees that said Work shall be prosecuted regularly, diligently, and uninterruptedly at such rate or progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner,

that the time for the completion of the Work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual construction conditions prevailing in this locality.

If the Contractor shall neglect, fail, or refuse to complete the Work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, a penalty put as liquidated damages for such breach of Contract, as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the Work.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would in such event sustain, and said amount shall be retained from time to time by the Owner from current periodic pay estimates.

67. OTHER CONTRACTS

The Owner reserves the right to award other Contracts in connection with the 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.

If any part of the Work under this Contract depends on the prior acceptable completion of Work by others under separate Contract(s), the Contractor shall inspect and promptly report to the Engineer any defects in such Work that would adversely affect the satisfactory completion of the Work under this Contract. The Contractor's failure to so inspect and report shall constitute acceptance of the Work by others as being suitable for the proper reception and completion of the Work under this Contract, excluding, however, those defects in the Work by others that occur after the satisfactory completion of the Work specified hereunder.

68. USE OF PREMISES

The Contractor shall confine his equipment, the storage of materials, and the operation of his workers to limits shown on the Drawings or indicated by law, ordinances, permits, or directions of the Engineer, and shall not unreasonably encumber the premises with his materials. The Contractor shall provide, at his own expense, the necessary rights-of-way and access to the Work which may be required outside the limits of the Owner's property.

69. SUBSTANTIAL COMPLETION DATE

The Engineer may, at his sole discretion, issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the Owner will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the Work or relieve the Contractor from completing the remaining Work within the specified time and in full compliance with the Contract Documents.

Such substantial completion shall not relieve Contractor from liquidated damages should the Owner have added costs after the completion date, i.e., if additional construction observation, interest paid, loss of revenue, or other expenses continue to be charged to the Owner.

Substantial completion of an operating facility shall be that degree of completion that will provide a minimum of 7 continuous work days of successful operation in which all performance and acceptance testing has been successfully demonstrated to the Engineer. All equipment contained in the Work, plus all other components necessary to enable the Owner to operate the facility in the manner that was intended, shall be complete on the substantial completion date. See "SUBSTANTIAL COMPLETION" under Article DEFINITIONS, of these General Conditions.

70. PERFORMANCE TESTING

Operating equipment and systems shall be performance tested in the presence of the Engineer to demonstrate compliance with the specified requirements. Performance testing shall be conducted under the specified design operating conditions or under such simulated operating conditions as recommended or approved by the Engineer. Schedule such testing with the Engineer at least 1 week in advance of the planned date for testing.

71. OWNER'S USE OF PORTIONS OF THE WORK

The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work. Such use shall not be considered as final acceptance of any portion of the Work, nor shall such use be considered as cause for an extension of the Contract completion time, unless authorized by a Change Order issued by the Owner.

72. CUTTING AND PATCHING

The Contractor shall do all cutting, fitting, or patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by Work of other Contractors shown upon or reasonably implied by the Drawings. Any defective Work or material, performed or furnished by the Contractor, that may be discovered by the Engineer before the final acceptance of the Work or before final payment has been made, shall be removed and replaced or patched, in a manner as approved by the Engineer at the expense of the Contractor.

73. CLEANING UP

The Contractor shall, at all times, at his own expense, keep property on which Work is in progress and the adjacent property free from accumulations of waste material or rubbish caused by employees or by the Work. Upon completion of the construction, the Contractor shall, at his own expense, remove all temporary structures, rubbish, and waste materials resulting from his operations.

PAYMENT

74. PAYMENT FOR CHANGE ORDERS

Payment or credit for any alterations covered by a Change Order shall be determined by one or a combination of the methods set forth in A, B, or C below as applicable:

A. UNIT PRICES. If applicable, those unit prices stipulated in the Bid, shall be utilized. If such Unit Prices are not applicable, the Contractor and Owner may utilize Unit Prices as mutually agreed upon.

B. LUMP SUM. A total lump sum for the Work may be negotiated as mutually agreed upon by the Contractor and Owner.

In "A" and "B" above, Contractor's quotations for Change Orders shall be in writing and firm for a period of 90 days. Any compensation paid in conjunction with the terms of a Change Order shall comprise total compensation due the Contractor for the Work or alteration defined in the Change Order.

By signing the Change Order, the Contractor acknowledges that the stipulated compensation includes payment for the Work or alteration plus all payment for the interruption of schedules, extended overhead, delay or any other impact claim or ripple effect, and by such signing specifically waives any reservation or claim for additional compensation in respect to the subject of the Change Order.

The Owner's request for quotations on alterations to the Work shall not be considered authorization to proceed with the Work prior to the issuance of a formal Change Order, nor shall such request justify any delay in existing Work. Lump sum quotations for alterations to the Work shall include substantiating documentation with an itemized breakdown of Contractor and subcontractor costs, including labor, material, rentals, approved services, overhead, and profit calculated as specified under "C" below.

C. FORCE ACCOUNT WORK. If the method of payment cannot be agreed upon prior to the beginning of the Work, and the Owner or the Engineer directs that the Work be done by written Change Order or on a force account basis, then the Contractor shall furnish labor, equipment, and materials necessary to complete the Work in a satisfactory manner and within a reasonable period of time. For the Work performed, payment will be made for the documented actual cost of the following:

1) Labor, including foremen, who are directly assigned to the force account Work: (actual payroll cost, including wages, fringe benefits as established by negotiated labor agreements, labor insurance, and labor taxes as established by law). No other fixed labor burdens will be considered, unless approved in writing by the Owner.

2) Material delivered and used on the designated Work, including sales tax, if paid for by the Contractor or his subcontractor.

3) Rental, or equivalent rental cost of equipment, including necessary transportation for items having a value in excess of $100.

4) Additional bond, as required and approved by the Owner.

5) Additional insurance (other than labor insurance) as required and approved by the Owner.

To costs under 74C, FORCE ACCOUNT WORK, there shall be added the following fixed fees for the Contractor or subcontractor actually performing the Work:

A fixed fee not to exceed 15 percent of the cost of all items above.

The added fixed fees shall be considered to be full compensation, covering the cost of general supervision, overhead, profit, and any other general expense.

The Owner reserves the right to furnish such materials and equipment as he deems expedient, and the Contractor shall have no claim for profit or added fees on the cost of such materials and equipment.

For equipment under Item 3 above, rental or equivalent rental cost will be allowed for only those days or hours during which the equipment is in actual use. Rental and transportation allowances shall not exceed the current rental rates prevailing in the locality. The rentals allowed for equipment will, in all cases, be understood to cover all fuel, supplies, repairs, and renewals, and no further allowances will be made for those items, unless specific agreement to that effect is made.

The Contractor shall maintain his records in such a manner as to provide a clear distinction between the direct costs of Work paid for on a force account basis and the costs of other operations. The Contractor shall furnish the Engineer report sheets in duplicate of each day's force account Work no later than the working day following the performance of said Work. The daily report sheets shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces.

The daily report sheets shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type, and identification number of equipment and hours operated.

Material charges shall be substantiated by valid copies of vendors' invoices. Such invoices shall be submitted with the daily report sheets, or, if not available, they shall be submitted with subsequent daily report sheets. Said daily report sheets shall be signed by the Contractor or his authorized agent.

To receive partial payments and final payment for force account Work, the Contractor shall submit in a manner approved by the Engineer, detailed and complete documented verification of the Contractor's and any of his subcontractors' actual current costs involved in the force account Work pursuant to the issuance of an approved Change Order. Such costs shall be submitted within 30 days after said Work has been performed.

No payment will be made for Work billed and submitted to the Engineer after the 30-day period has expired. No extra or additional Work shall be performed by the Contractor, except in an emergency endangering life or property, unless in pursuance of a written Change Order, as provided in ALTERATIONS - CHANGES IN WORK.

75. PARTIAL PAYMENTS

A. GENERAL

Nothing contained in this Article shall be construed to affect the right, hereby reserved, to reject the whole or any part of the aforesaid Work, should such Work be later found not to comply with the provisions of the Contract Documents. All estimated quantities of Work for

which partial payments have been made are subject to review and correction on the final estimate. Payment by the Owner and acceptance by the Contractor of partial payments based on periodic estimates of quantities of Work performed shall not, in any way, constitute acceptance of the estimated quantities used as the basis for computing the amounts of the partial payments. For public works projects, each partial payment request and final payment request shall contain an affidavit by the Contractor that all provisions of the applicable federal and state requirements regarding apprentices and payment of prevailing wages have been complied with by him and by his Subcontractors.

B. ESTIMATE AND PAYMENT

Before the first working day of each calendar month, the Contractor shall submit to the Engineer a detailed estimate of the amount earned for the separate portions of the Work, and request payment. As used in this Article, the words "amount earned" means the value, on the date of the estimate for partial payment, of the Work completed in accordance with the Contract Documents, and the value of approved materials delivered to the Project site suitably stored and protected prior to incorporation into the Work. If the Contractor's estimate of amount earned conforms with the Engineer's evaluation, the Engineer will calculate the amount due the Contractor and make recommendation to the Owner for payment.

Partial payments will be made where 50% of the installed amount is due when the project reaches 50% complete and the remainder due after the project reaches project is 100% complete.

C. DEDUCTION FROM ESTIMATE

Unless modified in the Supplementary Conditions, deductions from the estimate will be as described below. The Owner will deduct from the estimate, and retain as part security, 5 percent of the amount earned for Work satisfactorily completed. However, no deduction or retainage will be made on the approved items of material delivered to and properly stored at the job site but not incorporated into the Work.

NOTE: Exception--If the Work includes water or sewer pipelines, the Contractor shall maintain the Work for a period of ninety (90) days following its acceptance by the OWNER. Up to five percent (5%) of the Contract amount shall be retained during this maintenance period. All prior payments shall be subject to correction in the final payment.
This 90-day period does not relieve the Contractor of the Performance and Payment Bond requirements regarding warranty of the Project. In such cases, the semi-final payment estimate shall indicate the initial acceptance of the Work, and the warranty shall begin on such date.

D. QUALIFICATION FOR PARTIAL PAYMENT FOR MATERIALS DELIVERED

Unless modified in the Supplementary Conditions, qualification for partial payment for materials delivered but not yet incorporated in to the Work shall be as described below. Materials, as used herein, shall be considered to be those items which are fabricated or manufactured material and equipment. To receive partial payment for materials delivered to the site, but not incorporated in the Work, it shall be necessary for the Contractor to include invoices of such materials and documentation warranting that the materials and equipment

are covered by appropriate property insurance and other arrangements to protect Owner's interest therein; all of which must be satisfactory to Owner.

At the time of the next partial payment request, the Contractor must submit the following documentation relative to materials paid on the previous partial payment: paid invoices of such materials or other documentation warranting that the Owner has received the materials and equipment free and clear of all liens, charges, security interests, and encumbrances (i.e., all materials have been paid for by Contractor). Failure to submit this documentation will result in an appropriate reduction on the current partial payment estimate for such materials.

At his sole discretion, the Engineer may approve items for which partial payment is to be made. Proper storage and protection shall be provided by the Contractor, and as approved by the Engineer. Final payment shall be made only for materials actually incorporated in the Work and, upon acceptance of the Work, all materials remaining for which advance payments had been made shall revert to the Contractor, unless otherwise agreed, and partial payments made for these items shall be deducted from the final payment for the Work.

E. PAYMENT

After deducting the retainages and the amount of all previous partial payments made to the Contractor, the amount earned as of the current month will be made payable to the Contractor within 30 days of the Owner's receipt of an approved request, except where the Owner is a municipality or other agency whose laws require the approval of each payment by a council or similar body, in which case, the payment shall become due and payable 10 days after the first regularly-scheduled meeting in the month following the submittal of such payment request.

76. CLAIMS

In any case where the Contractor deems additional compensation is due him for Work or materials not clearly covered in the Contract or not ordered by the Engineer according to provisions of Article 20 ALTERATIONS - CHANGES IN WORK, the Contractor shall notify the Engineer, in writing, of his intention to make claim for such compensation before he begins the Work on which he bases the claim, in order that such matters may be settled, if possible, or other appropriate action promptly taken. If such notification is not given or the Engineer is not afforded proper facilities by the Contractor for keeping strict account of actual cost, then the Contractor hereby agrees to waive the claim for such additional compensation. Such notice by the Contractor, and the fact that the Engineer has kept account of the cost as aforesaid, shall not in any way be construed as proving the validity of the claim. Claims for additional compensation shall be made in itemized detail and submitted, in writing, to the Owner and Engineer within 10 days following completion of that portion of the Work for which the Contractor bases his claim. In case the claim is found to be just, it shall be allowed and paid for as provided in the Article titled, PAYMENT FOR CHANGE ORDERS.

77. NOTICE OF CLAIM FOR DELAY

If the Contractor intends to file a claim for additional compensation for delay caused by the Owner at a particular time, he shall file a notice of claim with the Owner within 7 days of the beginning of the occurrence. The notice of claim shall be in duplicate, in writing, and need not state the amount. No claim for additional compensation will be considered unless the provisions of Article 65, DELAYS AND EXTENSION OF TIME, are complied with, and a notice of claim has been filed with the Owner in writing, as stated above.

Should the Owner be prevented or enjoined from proceeding with Work, either before or after its prosecution, or from authorizing its prosecution by reason of any litigation, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay; but time for completion of the Work will be extended to such reasonable time as the Owner may determine will compensate for time lost by such delay, with such determination to be set forth in writing.

78. RELEASE OF LIENS OR CLAIMS

The Contractor shall indemnify and save harmless the Owner from all claims for labor and materials furnished under this Contract. Prior to the final payment, the Contractor shall furnish to the Owner, as part of his final payment request, an affidavit that all of the Contractor's obligations on the Project have been satisfied and that there are no unpaid taxes, liens, vendors' liens, rights to lien or any other type of claim against the Project, and that the hourly wages paid to all persons on the Project were in accordance with the applicable wage scale determinations.

79. FINAL PAYMENT

Upon completion of all of the Work under this Contract, the Contractor shall notify the Engineer, in writing, that he has completed his part of the Contract and shall request final inspection. Upon receipt of the Contractor's written notice that the Work is ready for final inspection, the Engineer shall make such inspection and shall submit to the Owner his recommendation as to acceptance of the completed Work and as to the final estimate of the amount due the Contractor under this Contract.

Upon approval of this final estimate by the Owner and compliance with provisions in Article titled, RELEASE OF LIENS OR CLAIMS, and other provisions as may be applicable, the Owner shall pay to the Contractor all monies due him under the provisions of these Contract Documents. On contracts for public works, final payment of the retained percentage will not be made until the Contractor has also furnished the applicable apprenticeship wage certification.

80. NO WAIVER OF RIGHTS

Neither the inspection of the Owner, through the Engineer or any of his employees, nor any order by the Owner for payment of money, nor any payment for, or acceptance of, the whole or any part of the Work by the Owner or Engineer, nor any extension of time, nor any possession taken by the Owner or its employees shall operate as a waiver of any provision of this Contract, or any power herein reserved to the Owner, or any right to damages herein provided nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

81. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE

The acceptance by the Contractor of the final payment shall release the Owner and the Engineer, as agent of the Owner, from all claims and all liability to the Contractor for all things done or furnished in connection with the Work, and every act of the Owner and others relating to or arising out of the Work. No payment, however, final or otherwise, shall operate to release the Contractor or his Sureties from obligations under this Contract and the Performance and Payment Bonds, and other bonds and warranties, as herein provided.

END OF GENERAL CONDITIONS

DOCUMENT 00800

SUPPLEMENTAL CONDITIONS

GENERAL

The Contractor's attention is directed to Division 1, GENERAL REQUIREMENTS, which contains other directions pertinent to the project.

REVISIONS AND ADDITIONS TO THE GENERAL CONDITIONS

The **GENERAL CONDITIONS** are hereby revised as follows:

ARTICLE 50. "MATERIALS AND APPLIANCES"

After this Article, add the following:

EQUIPMENT NAMEPLATES

All manufacturer's nameplates on equipment items are to be kept visible and are not to be obscured by other equipment or piping nor are they to be covered by any paint or insulating material.

INSTALLATION OF EQUIPMENT

Where building openings are too small to permit the passage of an assembled unit of equipment, it shall be assembled at its permanent location unless otherwise specifically shown or specified.

ARTICLE 52. "TESTS, SAMPLES, AND INSPECTIONS"

Add the following:

COMPACTION TESTS

Density tests will be performed on all areas as required by the Engineer. Contractor shall inform Engineer as to when an area is ready for testing. Contractor shall give 24 hours notice to Engineer prior to requiring a test. Engineer will not be responsible for delay to Contractor due to testing agency. Any stand-by time charged by the testing agency due to Contractor delay shall be paid for by Contractor. Engineer will determine the number and location of tests to be performed.

All tests will be performed by a materials testing agency acceptable to the Owner. The Contractor shall pay for all testing. All materials and tests shall conform to the requirements of these Specifications and as required by the Engineer.

Add the following:

CONCRETE TESTING

The Contractor will retain an independent testing laboratory, acceptable to the Owner, to determine compliance with the Specifications. Four concrete test cylinders will be made by the Contractor from each day's pour and as specified in Section 03300 - Cast-In-Place Concrete. One slump test and one air test (if required) will be performed for each set of cylinders. The Contractor shall be responsible for storage of the cylinders and for delivering test cylinders to the laboratory for testing. The Contractor will pay for all testing.

END OF SUPPLEMENTARY CONDITIONS

SECTION 01001

BASIC REQUIREMENTS

A. GENERAL

1.1 SUMMARY OF WORK

A. Section Includes:

1.2 Description of Project
1.3 Site Investigation
1.4 Existing Utilities
1.5 Payment Schedule
1.6 Application for Payment
1.7 Change Order Procedures
1.8 Cutting and Patching
1.9 Conferences
1.10 Progress Meetings
1.11 Submittal Procedures
1.12 Construction Progress Schedule
1.13 Prosecution of the Work
1.14 Shop Drawings
1.15 Product Data
1.16 Manufacturers' Instructions and Certifications
1.17 Quality Assurance
1.18 References
1.19 Manufacturer's Field Services
1.20 Testing Laboratory Services
1.21 Temporary Electric Power and Lighting
1.22 Temporary Water
1.23 Sanitary Facilities
1.24 Water for Testing
1.25 Temporary Telephone Service
1.26 Temporary Water Control
1.27 Temporary Access Roads and Parking
1.28 Temporary Heating and Ventilating
1.29 Protection of Finished Work
1.30 Progress Cleaning
1.31 Field Offices
1.32 Removal of Utilities, Facilities, and Controls
1.33 Products
1.34 Transportation, Handling, Storage, and Protection
1.35 Substitutions
1.36 System Demonstration
1.37 Contract Closeout Procedures
1.38 Final Cleaning and Inspection
1.39 Final Submittals
1.40 Project Record Documents (“As-Builts”)
1.41 Operation and Maintenance Data
1.42 Guarantees, Bonds, Affidavits, and Warranties
1.43 Spare Parts and Maintenance Materials

1.2 DESCRIPTION OF PROJECT

A. Wherever in these Documents the word "Engineer" appears, it shall be understood to mean McClelland Consulting Engineers, Inc., acting either directly or indirectly as authorized agents of the Owner. In these Documents where the word "Owner" appears, it shall be understood to mean the City of Manila, Arkansas.

B. A General Contract for constructing a concrete helipad with lighting and concrete access road.

1.3 SITE INVESTIGATION

A. Information obtained by the Owner regarding site conditions; topography; existing construction of site facilities; and subsurface investigations, including test boring logs are available for examination at the office of the Engineer.

1.4 EXISTING UTILITIES

A. Approximate locations of major utilities and structures are shown on the Drawings, there may be some discrepancies and omissions in the locations and size of utilities and structures shown.

B. Notify all utilities affected by the construction operation at least 48 hours in advance of beginning work, and contact Arkansas One-Call at 1-800-482-8998.

1.5 PAYMENT SCHEDULE

A. Payment shall be made based on the payment schedule submitted by the Contractor in accordance with the Bid Form and the Engineers observation of work completed to date.

B. Payment for pipe shall be made at 85 percent of the unit bid price upon pipe installation, backfilling and rough grading. Payment shall be increased 5 percent upon completion of testing and disinfection. Payment will be increased 10 percent of the unit price bid upon completion and acceptance of final clean-up by the Owner and Engineer and in accordance with the General Conditions.

1.6 APPLICATION FOR PAYMENT

A. Submit three copies of each application on EJCDC Form C-620 or other format approved by Engineer.

B. For payment of stored materials, the Contractor shall submit a copy of supplier/vendor’s invoice for the materials with job name, delivery date, invoice number, and invoice amount on invoice attached with the Application for Payment. Stored materials shall be on site and stored in accordance with Contract Documents prior to making Application for Payment.

C. Contractor shall submit copies of paid invoices and proof of payment in the form of a lien release from the supplier/vendor for stored materials that the Owner has paid for previously with Application for Payment. Contractor’s subsequent Applications for Payment will not be approved without copies of paid invoices and lien releases.

D. Contractor shall submit lien release for all previous progress payments for materials, labor, and equipment that has been billed to the Owner in the present pay request. Lien release shall be submitted to the Engineer with next Application for Payment. Application for Payment submitted without lien release from previous Application for Payment will not be approved for payment until Engineer has received lien release. Submit lien release on the form found at the end of this Section.

E. Utilize Payment Schedule or Unit Prices for listing items in Application for Payment.

F. Pay Periods: Calendar Month.

1.7 CHANGE ORDER PROCEDURES

A. Submit on EJCDC Form 1910-8B.

1.8 CUTTING AND PATCHING

A. Employ a skilled and experienced installer to perform cutting and patching new Work; restore Work with new products.

B. Submit written request in advance of cutting or altering existing structures or utilities.

C. Fit work tight to adjacent elements and maintain integrity of existing work.

1.9 CONFERENCES

A. Engineer will schedule a preconstruction conference after Notice of Award for all affected parties.

B. Where required in individual specification Section, convene a pre-installation conference at project site prior to commencing Work of the Section.

1.10 PROGRESS MEETINGS

A. Schedule and administer meetings at the site throughout progress of the Work at minimum monthly intervals.

B. Preside at meetings, record minutes, and distribute typed copies within two days to those affected by decisions made.

1.11 SUBMITTAL PROCEDURES

A. The Contractor shall submit a sufficient number of copies to allow the Engineer to retain four copies (2 for himself; 2 for the Owner) for review. Submittals shall include shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for construction.

B. Submittal form to identify Project, Contractor, subcontractor or supplier, and pertinent Contract Document reference.

C. Apply Contractor's stamp, signed or initialed, certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

D. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

E. Revise and resubmit as required; identify all changes made since previous submittal.

1.12 CONSTRUCTION PROGRESS SCHEDULE

A. Submit initial Construction Progress Schedule in duplicate within 10 days after date of Contract. Engineer shall review Construction Progress Schedule and approve. Once approved by Engineer this Construction Progress Schedule shall become the "Approved Construction Progress Schedule" by which the Contractor shall plan, organize, direct, coordinate, and execute the Work, and the basis of evaluating progress of the Work.

B. "Approved Construction Progress Schedule" shall be a horizontal bar chart with separate lines for each major section of Work or operation, identifying first work day of each week.

C. Submit updated Construction Progress Schedule with each Application for Payment, identifying changes since previous updated Construction Progress Schedule. Indicate estimate percentage of completion for each item of Work at each submission.

D. Should updated Construction Progress Schedule show the Contractor to be 10 percent or more behind schedule, Contractor shall immediately devise a plan for recovery of lost time and submit to the Engineer for approval within 1 week. Once approved by the Engineer, the Contractor shall immediately put "Recovery Construction Progress Schedule" into action.

E. During period covered by "Recovery Construction Progress Schedule" plan, Contractor's progress will be monitored against the "Approved Construction Progress Schedule." If Contractor does not recover from delay as detailed in his "Recovery Construction Progress Schedule," the Engineer shall advise the Owner to exercise its options as described in the General Conditions.

F. Contractor shall bear all cost and expenses related to recovery from the Contractor's delays, including costs, expenses, and lost revenue by the Owner.

1.13 PROSECUTION OF THE WORK

A. It is expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the Work are the essence of this Contract. The Work shall be prosecuted at such time, and in or on such part or parts of the Project as may be required, to complete the Project as contemplated in the Contract Documents and the approved construction schedule.

B. Regular Work hours shall be from 7:00 a.m. to 6:00 p.m. Monday through Friday. No Work requiring the presence of the Engineer's representative will be performed outside of regular Work hours. If, however, the Contractor works additional hours (other than specified herein), the Contractor shall pay the Owner for additional engineering services as outlined below.

C. The cost of additional engineering services shall be borne by the Contractor and will be based upon actual hours worked (labor cost x 3 x 1.5) plus out-of-pocket expenses such as lodging, mileage, materials, etc. Otherwise, the Contractor may perform clean-up work only outside of regular hours (including Saturdays and Sundays). No Work will be accomplished on holidays.

1.14 SHOP DRAWINGS

A. Submit number of copies which the Contractor requires, plus four copies which will be retained by the Engineer.

B. Include as a minimum dimensions, size, location of connections to other work, weight of equipment, and supporting calculations.

1.15 PRODUCT DATA

A. Submit number of copies which the Contractor requires, plus four copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

1.16 MANUFACTURERS' INSTRUCTIONS AND CERTIFICATIONS

A. Submit as noted in individual specification Sections.

1.17 QUALITY ASSURANCE

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. Comply fully with manufacturer's instructions.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.18 REFERENCES

A. Conform to reference standard by date of issue current as of date of Contract.

B. Should specified reference standard conflict with Contract Documents, request clarification from Engineer before proceeding.

1.19 MANUFACTURERS' FIELD SERVICES

A. Representative shall submit written report to Engineer listing observations and recommendations.

1.20 TESTING LABORATORY SERVICES

A. Owner will approve the Contractor's selection of a testing laboratory to perform inspections, tests, and other services required by individual Specification Sections.

B. All costs for laboratory testing of earthwork and concrete shall be paid for by the Contractor.

C. Services will be performed in accordance with requirements of governing authorities and with specified standards.

D. Contractor shall cooperate with Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
   1. Notify Engineer/Testing Laboratory 48 hours prior to expected time for operations requiring testing services.
   2. Furnish and deliver samples/cylinders to lab for testing.
   3. Pay for testing.

1.21 TEMPORARY ELECTRIC POWER AND LIGHTING

A. Provide and pay for power services required from source.

B. Provide power outlets for construction operations, branch wiring, distribution boxes, and flexible power cords as required.

1.22 TEMPORARY WATER

A. Provide water, as needed, for own use.

B. Provide an adequate supply of potable drinking water for use by employees and Engineer's employees.

1.23 SANITARY FACILITIES

A. Provide and maintain required sanitary facilities and enclosures.

B. Maintain clean and sanitary condition.

1.24 NOT APPLICABLE

1.25 TEMPORARY TELEPHONE SERVICE

A. Provide on-site telephone service for Contractor's and Engineer's use during the period of construction of the Contract.

1.26 TEMPORARY WATER CONTROL

A. Maintain excavations and trenches free of water. Provide and operate pumping equipment of a capacity to control water flow.

B. Provide dewatering system and pumping to maintain excavations dry and free of water inflow on a 24 hours basis.

C. Provide piping to handle pumping outflow to discharge in a manner to avoid erosion or deposit of silt.

1.27 TEMPORARY ACCESS ROADS AND PARKING

A. Construct and maintain temporary construction access roads, parking areas, and detours as are required to execute the Work.

1.28 NOT APPLICABLE

1.29 PROTECTION OF FINISHED WORK

A. Protect installed work and provide special protection where specified in individual specification Sections.

1.30 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

1.31 NOT APPLICABLE

1.32 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary erosion control construction, above grade or buried utilities, equipment, facilities, and materials, prior to Substantial Completion inspection.

B. Remove and repair damage caused by installation or use of temporary work.

1.33 PRODUCTS

A. Products: New material, machinery, components, equipment, and systems forming Work, but does not include machinery or equipment used for preparation, fabrication, or erection of Work.

B. Use interchangeable components of the same manufacture for similar components.

1.34 TRANSPORTATION, HANDLING, STORAGE, AND PROTECTION

A. Transport, handle, store and protect Products in accordance with manufacturer's instructions.

1.35 SUBSTITUTIONS

A. Possible substitutions (“or approved equal”/ “or equal”) shall be submitted no later than 10 days prior to bid date for Engineer to review and consider requests from Contractor or Bidder for substitutions as equal . The Bidder may include substitutions not specified only if written approval is received from the Engineer prior to bidding. Otherwise, substitutions will be not allowed.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

1.36 NOT APPLICABLE

1.37 CONTRACT CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and Work is complete in accordance with Contract Documents and ready for Engineers inspection.

B. Submit final Application for Payment identifying total adjusted Contract Price, previous payments, and amount remaining due after Engineer has given written approval of Project Record Documents.

1.38 FINAL CLEANING AND INSPECTION

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view.

C. Clean debris, waste and surplus supplies, rubbish, and construction facilities from site.

D. After final cleaning and upon written notice from the Contractor that the Work is completed, the Engineer will make a preliminary inspection with the Owner and Contractor present. Upon completion of this preliminary inspection, the Engineer will notify the Contractor, in writing, of any particulars in which this inspection reveals that the Work is defective or incomplete.

E. Upon receiving written notice from the Engineer, the Contractor shall immediately undertake the work required to remedy defects and complete the Work to the satisfaction of the Owner.

F. When the Contractor has corrected or completed the items as listed in the Engineer's written notice, he shall inform the Engineer, in writing, that the required Work has been completed. Upon receipt of this notice, the Engineer, in the presence of the Owner and Contractor, shall make his final inspection of the Project.

G. Should the Engineer find all Work satisfactory at the time of his inspection, the Contractor will be allowed to make application for final payment in accordance with the provisions of the General Conditions. Should the Engineer still find deficiencies in the Work, the Engineer will inform the Contractor of the deficiencies and will deny the Contractor's request for final payment until the Contractor has satisfactorily completed the required Work.

H. Water courses, gutters, and ditches shall be opened and left in a condition satisfactory to the Engineer.

1.39 FINAL SUBMITTALS

A. No contract will be finalized until all of the following have been submitted:
   1. Final Shop Drawings.

2. Record Drawings.

1.40 PROJECT RECORD DOCUMENTS ("AS-BUILTS")

A. Maintain on Project site, one set of Contract Documents, Shop Drawings, and Product Submittals to be utilized for Record Documents.

B. Keep Record Documents and samples available for inspection by Engineer.

C. Maintain Record Documents in a clean, dry, and legible condition. **Do not use Record Documents for construction purposes**. If Contractor submits Record Documents that are in poor condition and is unacceptable by the Engineer, Contractor shall re-purchase a new set of Project Drawings and Project Manual and re-recording information on new purchased set and resubmit to Engineer.

D. Specification, Record Documents, and Shop Drawings: Legibly mark each item to record actual construction or product installed.

E. Record information in red ink on a set of blue line opaque Drawings, and in a copy of a Project Manual.

F. Record information concurrently with construction progress.

G. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
   1. Measured depths of elements of structures in relation to datum.
   2. Measured horizontal and vertical locations of underground utilities, valves, fittings, and other appurtenances incorporated in the Project, referenced to permanent surface improvements (3 each).
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
   4. Field changes of dimension and detail.
   5. Changes made by Modifications by either Field Orders or Change Orders.
   6. Details not on original Contract Drawings or referenced in Project Manual, but are part of the Project.

H. Specifications: Legibly mark each item to record actual construction, including:
   1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
   2. Changes made by Addenda, Field Orders, Change Orders, or other Modifications.

I. Other Documents: Maintain manufacturer's certifications, inspection certifications, field test records, and other required documentation required by individual Specifications Sections.

J. Transmit with cover letter in duplicate, listing:
   1. Date.
   2. Project title and number.
   3. Contractor's name, address, and telephone number.
   4. Number and title of each Record Document.
   5. Signature of Contractor or authorized representative.

K. Final Application for Payment shall not be approved until Project Record Documents ("As-Builts") are reviewed and approved by Engineer.

1.41 NOT APPLICABLE

1.42 GUARANTEES, BONDS, AFFIDAVITS, AND WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. No contract will be finalized until all guarantees, performance tests, bonds, certificates, licenses, affidavits, and warranties required for Work or equipment as specified are satisfactorily filed with the Engineer.

D. Submit prior to final Application for Payment.

1.43 NOT APPLICABLE

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

Not Used.

END OF SECTION

Contractor's Application for Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project: **MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD**	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: **24-5838**

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	**$** _____
2. Net change by Change Orders	**$** _____
3. Current Contract Price (Line 1 ± 2)	**$** _____
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	**$** _____
5. RETAINAGE:	
a. X _____ Work Completed	**$** _____
b. X _____ Stored Material	**$** _____
c. Total Retainage (Line 5a + Line 5b)	**$** _____
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	**$** _____
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$** _____
8. AMOUNT DUE THIS APPLICATION	**$** _____
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	**$** _____

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Endorsed by the Construction Specifications Institute.

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Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item		Scheduled Value	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Specification Section No.	Description		From Previous Application (C+D)	This Period				
	Totals							

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Progress Estimate

Contractor's Application

For (contract):							Application Number:			
Application Period:							Application Date:			
A				B	C	D	E	F		
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

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Stored Material Summary

Contractor's Application

For (contract):							Application Number:		
Application Period:							Application Date:		
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
		Totals							

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Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Manila Municipal Airport (MXA) Construct Helipad	Owner: City of Manila, Arkansas	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 24-5838

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: $_____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable):

_____ Date: _____

Change Order

Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

LIEN RELEASE

NAME OF GENERAL CONTRACTOR:

_____

PROJECT: MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD

ENGINEER'S PROJECT NUMBER: 24-5838

PAY REQUEST NUMBER: _____

The undersigned Contractor certifies that: (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment numbered 1 through ____ inclusive; (2) title to all Work, materials, labor, and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all (i.e., all stored materials, subcontracted work, labor, materials, equipment, and other items incorporated into Work have been paid to date by the Contractor) liens, claims, security interest, and encumbrances; and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not *defective* as that term is defined in Contract Documents.

If it is found that material or work has not been paid as sworn on this document, the full amount of the unpaid payment shall be withheld from the next pay estimate, and a check will be prepared by the Owner, made out jointly to the Contractor and the payee for materials or work. The check will be mailed to the payee.

Signed this _____ day of _____, 20___.

Subscribed and Sworn to before me

this ____ day of _____, 20___.

_____
Contractor

By _____

Notary Public

Title _____

My commission expires the _____ day of _____, 20____.

Certificate of Substantial Completion

Project: **MANILA MUNICIPAL AIRPORT (MXA) CONSTRUCT HELIPAD**	
Owner:	Owner's Contract No.:
Contract:	Engineer's Project No.: **24-5838**

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

State of Arkansas
Arkansas Department of Labor
Arkansas Occupational Safety and Health

10421 WEST MARKHAM • LITTLE ROCK, AR 72205-2190
Phone: 501-682-9091 Fax: 501-682-4532 TRS: 800-285-1131

CONTRACT FOR EXCAVATION REPORTING FORM

This form must be completed by any public body (state agency, county, municipality, school district, or other local tax unit or improvement district) awarding a contract for a public construction project which will involve any trench or excavation of five feet (5') or more. *Arkansas Code § 22-9-212.*

Name of Public Agency:_____

Address of Public Agency:_____

Contact Person:_____Phone number:_____

Person Filing Report:_____

Name of General Contractor:_____

Address:_____Phone number:_____

Name of any subcontractor doing trenching or excavation;_____

Subcontractor address:_____Phone number:_____

Estimated start date:_____

Estimated completion date:_____

Site location/address/street/road:_____

Arkansas Code § 22-9-212 also requires that the current federal OSHA standard for excavation and trenching be incorporated into the project's specifications and that the contract bid form include a separate pay item for trench or excavation safety systems.

The Arkansas Department of Labor provides free training on trenching and excavation safety.

SEND NOTICE TO:

Arkansas Department of Labor
Safety Division
10421 West Markham Street
Little Rock, AR 72205-2190
(501) 682-9091
fax: (501) 682-4532
e-mail: mike.watson@arkansas.gov

STATE OF ARKANSAS
DEPARTMENT OF LABOR
ARKANSAS OCCUPATIONAL SAFETY & HEALTH

10421 WEST MARKHAM • LITTLE ROCK, AR 72205-2190
Phone: 501-682-9091 Fax: 501-682-4532 TRS: 800-285-1131

REPORTING FORM FOR WORK NEAR OVERHEAD HIGH VOLTAGE POWER LINES AND CONDUCTORS

This form must be completed by any person, firm, or corporation that desires to carry on any work or activity within ten feet (10') of overhead energized electrical lines or conductors. *Arkansas Code § 11-5-307*. The ten feet clearance applies to any part of any machinery, equipment or materials, as well as any employee or person.

Name of company or individual:_____

Address:_____Phone Number:_____

Name & title of person filing report:_____

Date work to be performed:_____

Expected date of completion:_____

Has the operator of the electrical lines been notified?_____

IMPORTANT

*Arkansas Code § 11-5-307 also requires written notice to the owner or operator of the electrical lines. You must also make appropriate arrangements with the operator of the electrical lines **before** proceeding with any work which would violate the ten feet clearance requirement.*

The Arkansas Department of Labor provides free training on working safely near high voltage lines.

SEND NOTICE TO:

Arkansas Department of Labor
Safety Division
10421 West Markham Street
Little Rock, AR 72205
(501) 682-9091
fax: (501) 682-4532
e-mail: mike.watson@arkansas.gov

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1. GENERAL

1.1 RELATED SECTIONS

A. Document 00300 – Bid Form.

B. Section 00700 - General Conditions.

C. Section 01001 - Basic Requirements.

1.2 MEASUREMENT OF QUANTITIES

A. All work completed under the contract will be measured by the Engineer, or his/her authorized representatives, using United States Customary Units of Measure or the International System of Units.

B. The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

1.3 SCOPE OF PAYMENT

A. The Amount for Work listed in the Bid, whether lump sum or unit price, shall include all costs specified on the Bid Form, including all miscellaneous amounts (mobilization, demobilization, bonds, insurance, as built record drawings, traffic control, erosion control, plans and any items not covered elsewhere) to complete the project in accordance with the Contract Documents.

B. The quantities listed in these documents are approximate, for information only, and should be verified by each bidder prior to bidding

C. Payments for lump sum items shall be made in proportion to the amount of Work accomplished, as determined by the Engineer, as of the period ending date of each Application for Payment.

D. Payment for unit price items shall be made as the work progresses. Said payments will be based upon the work performed and materials complete in place in accordance with the contract, plans, and specifications, approved by the Engineer, as of the period ending date of each Application for Payment.

E. It is understood and agreed that the Contractor shall not be entitled to partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess

quantities have been determined by the Engineer to be a part of the final quantity for the item of work in question.

F. No partial payments shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment.

G. The Contractor has sole responsibility for providing materials, equipment and work which meet the specifications. In the event inspection or testing reveals that materials/equipment furnished or work performed by the Contractor does not meet the specifications, payment for said materials/equipment/work will be withheld until compliance with the specifications is demonstrated by the Contractor.

1.4 MEASUREMENT AND PAYMENT (BASE BID)

A. Item No. 1: Mobilization (10% Maximum of Base Bid)
   a. Measured per lump sum
   b. Paid for at the contract price per lump sum
   c. Price shall be full compensation for mobilization, demobilization, traffic control, insurance, bonds, as-built record drawings, and any items not covered elsewhere to complete the project per the plans and specifications

B. Item No. 2: Temporary Sand Bag Ditch Check
   a. Measured per each
   b. Paid for at the contract price per each
   c. Price shall be full compensation for temporary sand bag ditch check and any items not covered elsewhere to complete the project per the plans and specifications

C. Item No. 3: Unclassified Excavation
   a. Measured per cubic yard of unclassified excavation
   b. Paid for at the contract unit price per cubic yard of unclassified excavation
   c. Unsuitable material shall be disposed of off site at no additional cost
   d. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

D. Item No. 4: Embankment in Place
   a. Measured per cubic yard of embankment in place
   b. Paid for at the contract unit price per cubic yard of embankment in place
   c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications
   d. Select fill quantity is included in this pay item

E. Item No. 5: Class 7 Crushed Aggregate Base Course (12" Depth)
   a. Measured per square yard of class 7 crushed aggregate base course installed at the specified thickness
   b. Paid for at the contract unit price per square yard of class 7 crushed aggregate base course installed at the specified thickness
   c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

F. Item No. 6: Concrete Helipad and Road (6" Depth)
   a. Measured per square yard of concrete helipad and road pavement installed at the specified thickness
   b. Paid for at the contract unit price per square yard of concrete helipad and road pavement installed at the specified thickness
   c. Reinforcement steel shall be considered subsidiary to this pay item
   d. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

G. Item No. 7: Joint Sealing Filler
   a. Measured per linear foot of joint seal material installed
   b. Paid for at the contract unit price per linear foot of joint seal material installed
   c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

H. Item No. 8: Pavement Markings
   a. Measured per square foot of pavement markings applied and accepted
   b. Paid for at the contract unit price per square foot of pavement markings applied and accepted
   c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

I. Item No. 9: Seeding and Mulching
   a. Measured per lump sum of seeding and mulching
   b. Paid for at the contract unit price per lump sum of seeding and mulching
   c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications
   d. Price shall also include additional watering and maintenance until the grass has taken and is accepted by the owner

J. Item No. 10: Trenching for Conduit and Counterpoise (18-Inch Minimum Depth), Cable Installed in Conduit, Counterpoise Installed Above Conduit Including Connections/Terminations, Sch. 40 PVC Conduit

a. Measured per lump sum for trenching, installed cable, installed counterpoise, and installed conduit
b. Paid for at the contract unit price per lump sum for trenching, installed cable, installed counterpoise, and installed conduit
c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

K. Item No. 11: L-852H Green In-Pavement Heliport Perimeter Lights Installed, Base Mounted

a. Measured per each L-852H green in-pavement heliport perimeter lights installed and base mounted
b. Paid for at the contract unit price per each L-852H green in-pavement heliport perimeter lights installed and base mounted
c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications

L. Item No. 12: Electrical Utility Connection, Complete, With Rack and Disconnect, and Any Other Equipment Necessary to Make Connection

a. Measured per lump sum for electrical utility connection, complete, with rack and disconnect, and any other equipment necessary to make connection
b. Paid for at the contract unit price per lump sum for electrical utility connection, complete, with rack and disconnect, and any other equipment necessary to make connection
c. Price shall be full compensation for all hauling, labor, equipment, materials, tools, and any other incidentals necessary to complete this item in accordance with the plans and specifications
d. Price shall also include any utility coordination needed to complete this item

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

Not Used.

END OF SECTION

SECTION 02220

DEMOLITION AND REMOVAL OF FACILITIES

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Labor and material that is necessary for the work associated with the removal of the existing facilities as shown on the Drawings.

1.2 RELATED SECTION

A. Section 02300 - Earthwork.

1.3 SAFETY REQUIREMENTS

A. Work shall be done in conformance with federal, state, and local rules and regulations pertaining to safety and as specified elsewhere in these Specifications.

1.4 SALVAGE

A. Salvageable piping, valves, and materials removed during demolition are the property of the Owner. Place on the site in an area designated by the Owner.

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

3.1 PREPARATION

A. Make provisions to prevent the entrance of surface runoff from entering the area of excavation.

B. Coordinate any disconnect and capping of services with Owner before starting demolition.

C. Protect existing structures and underground utilities within the Work area from being damaged during demolition.

3.2 DEMOLITION AND REMOVAL

A. Excavate to the minimum extent necessary.

B. Dispose of demolition debris at a site approved by the Owner. Otherwise, to the nearest state approved landfill permitted to receive waste.

3.3 BACKFILLING

A. Begin backfilling excavated areas after receiving approval from Engineer.

B. Backfill in accordance with Section 02315.

C. Material excavated during demolition may be used as backfill.

D. Import backfill as required.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1. GENERAL

1.1 SUMMARY

A. Perform earthwork.

B. Meet requirements for excavation safety, or to facilitate construction due to wet conditions.

C. Perform excavation regardless of type, nature, or condition of materials encountered

D. Contractor shall make his own estimate of the type and extent of the various materials to be excavated in order to accomplish the work.

E. There will be no extra compensation for dewatering.

1.2 RELATED SECTIONS

A. Section 01001 - Basic Requirements.

1.3 REFERENCES

A. Arkansas Department of Transportation, Standard Specifications for Highway Construction, latest edition.
   1. ARDOT Section 303 - Aggregate Base Course.

B. ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA Phone: (610) 832-9585 Fax: (610) 832-9555.
   1. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12-in. Drop.
   2. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10 lb Rammer and 18-in. Drop.
   3. ASTM D2216 - Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
   4. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   5. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place of Nuclear Methods (Shallow Depth).

C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P: Excavations.

D. Arkansas Statute 291 of 1993.

1.4 DEFINITIONS

A. Relative Compaction:
   1. The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by the Standard Proctor Test, ASTM D698, or as determined by the Modified Proctor Test, ASTM D1557, as applicable.
   2. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.

B. Optimum Moisture Content:
   1. Moisture content of the material for which the maximum dry density is obtained as determined by ASTM D698 or D1557.
   2. Field moisture contents shall be determined on the basis of the fraction passing the 3/4-inch sieve.

C. Completed Course: A course or layer that is ready for the next layer or the next phase of construction.

1.5 SUBMITTALS

A. Submit in accordance with Section 01001.

B. Provide the following:
   1. Samples of imported material.
   2. Samples of onsite material to be used as fill.
   3. Certification that imported materials conform to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory.
   4. Proctor curves on fill material as prepared by approved laboratory.

1.6 PROJECT CONDITIONS

A. Beginning work of this Section means acceptance of existing conditions.

PART 2. PRODUCTS

2.1 FILL

A. Free from roots, organic matter, trash, and debris with maximum particle size of 1-1/2 inches.

B. It is intended that structural backfill material be obtained from on site to the maximum extent possible.

2.2 IMPORTED GRANULAR FILL

A. Provide granular fill beneath structures as noted on Drawings.

B. Imported granular fill to consist of a natural or artificial mixture of gravel and soil mortar, uniformly well graded from coarse to fine.

C. Conform to the ARDOT Section 303 classifications for Class 7 as designated on the Drawings.

2.3 TOPSOIL

A. Selected topsoil at the site, properly stored and protected, free from roots, sticks, hard clay, and stones which will not pass through a 2-inch square opening.

B. Provide imported topsoil of equal quality if required to accomplish the work.

2.4 COMPACTION EQUIPMENT

A. Provide compaction equipment of suitable type and adequate to obtain the densities specified.

B. Operate compaction equipment in strict accordance with the manufacturer's instructions and recommendations.

C. Hand-operated equipment shall be capable of achieving the specified densities.

2.5 MOISTURE CONTROL EQUIPMENT

A. Provide equipment for applying water of a type and quality adequate for the work; it shall not leak; and be equipped with a distributor bar or other approved device to assure uniform application.

B. Provide equipment for mixing and drying out material consisting of blades, discs, or other approved equipment.

2.6 WATER REMOVAL EQUIPMENT

A. Provide and operate equipment adequate to keep excavation and trenches free of water.

2.7 IMPORTED MATERIAL ACCEPTANCE

A. Import only if insufficient material is available on-site.

B. Locate and arrange use of a site near the construction area for obtaining borrow material.

C. Additional tests required at the borrow area:
   1. Modified Proctor Test.
   2. Remolded permeability.
   3. Atterberg limits.

D. Upon completion of removal of borrow material, grade the site to drain, place topsoil on disturbed areas, and establish grass.

E. Cost for testing and imported material shall be the responsibility of the Contractor.

2.8 SELECTED MATERIAL ACCEPTANCE

A. Provide samples for testing representative of the actual material to be installed in the work. Take samples from each 2,000 cubic yards of material stockpiled. Depending on the uniformity of the material, Engineer may request more frequent samples.

B. Forward test results to the Engineer at least 10 days before the material is required for use. If tests indicate that the material does not meet Specification requirements, the material shall not be installed in the work.

C. Material which is placed in the work but does not conform to the Specification requirements shall be removed and replaced at the Contractor's sole expense.

PART 3. EXECUTION

3.1 STRIPPING TOPSOIL

A. Remove existing grass and overburden before excavating topsoil.

B. Prior to beginning excavation or fill, strip the topsoil to a depth of at least 6 inches or to a depth sufficient to remove organic material and stockpile for future use.

C. In general, remove topsoil where structures are to be built, trenches dug, and roads, parking lots, walks, and similar improvements constructed within the areas presently covered with topsoil.

D. Store topsoil clear of the construction area.

E. Take reasonable care to prevent the topsoil from becoming mixed with subsoil or eroding.

3.2 STRUCTURAL EXCAVATION

A. Contractor shall be solely responsible for trench and excavation safety systems in accordance with ACT 291 of 1993 and OSHA requirements.

B. Identify required lines, levels, and grades.

C. Identify known underground utilities. Contractor will be responsible for locating utilities.

D. The method of excavation is optional, however, no equipment shall be operated in a manner that will endanger existing structures and their integrity.

E. Use excavation support system such as sheet piling where ever necessary.

F. Allow for forms, working space, granular base, and finish topsoil where shown on Drawings or required.

G. Do not carry excavation for footings and slabs deeper than the elevation shown on Drawings after allowing for base material. Excavation of material to depths below the grades indicated, unless so directed by the Engineer or Owner's representative, will be deemed unauthorized excavation.

H. If undercutting occurs below the planned dirt grade, the same fill material as specified for backfill shall be placed and compacted to 95 Percent Modified Proctor Density as defined in this Section up to the planned dirt grade in 8 inch lifts, at no additional cost to the Owner. Do not attempt to over compact excessively wet soil. Allow to dry first by scarifying and aerating before remolding.

3.3 DEWATERING EXCAVATION

A. Remove water during periods when concrete is being deposited, pipe is being laid, and placing of backfill unless water settling is required, and at other times as required for efficient and safe execution of the work.

B. Accomplish removal of groundwater in a manner that will preserve the strength of the foundation soils, will not cause instability of the excavation slopes, and will not result in damage to existing structures.

C. Where necessary to these purposes, lower the water level in advance of excavation, utilizing wells, well points, or similar methods.

D. Maintain the water level in the gravel stratum as measured in piezometers, a minimum of 3 feet below the prevailing excavation level or as needed to prevent bottom heave of the excavation.

E. Open pumping, sumps, and ditches: If these result in boils, loss of fines, softening of the ground or instability of slopes, areas shall not be accepted.

F. Install wells and well points with suitable screens and filters so that continuous pumping of fines does not occur.

G. Operate well points continuously to prevent boils and loss of consolidation.

H. Arrange discharge to facilitate collection of samples by Engineer.

I. Avoid settlement or damage to adjacent property.

J. Dispose of water in a manner that will not damage adjacent property, as approved.

3.4 GRANULAR FILL MATERIAL UNDER FACILITIES

A. Place fill granular material as specified in this Section within the influence area beneath slabs, walks, structures, roads, and parking areas, and as shown on the Drawings.

B. Do not exceed loose lifts of 6 inches.

C. Compact each lift to not less than 95 Percent Modified Proctor Density.

D. Place and compact a 6-inch layer of granular fill to at least 95 Percent Modified Proctor density immediately beneath spread footings, slabs on grade, or other concrete structures.

E. Moisten material as required to aid compaction (± 2 percent optimum moisture).

F. Place material in horizontal lifts and in a manner to avoid segregation.

G. Correct and repair subsequent damage to slabs, piping, concrete structures, facilities, or other structures caused by settlement of fill material.

3.5 BACKFILL AND STRUCTURES

A. Remove form materials and trash from excavation before placing backfill.

B. Do not operate earth-moving equipment within 5 feet of walls of concrete structures for the purpose of depositing or compacting backfill material.

C. Compact backfill adjacent to concrete walls with hand-operated tampers or similar equipment that will not damage the structure.

D. Backfill water-holding basins only after satisfactory leakage tests have been conducted.

E. Place earth fill in areas not designated to be structural fill or granular fill.

F. Deposit material in maximum 6-inch loose lifts, and compact each lift to not less than 95 Percent Modified Proctor.

3.6 FILL NOT BENEATH STRUCTURES OR FACILITIES

A. Place earth fill to the lines and grades shown.

B. Place fill material in maximum 6-inch loose lifts and compact each lift to not less than 95 Percent Modified Proctor.

C. Make proper allowance for topsoil where required.

3.7 MOISTURE CONTROL

A. During compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill.

B. Maintain moisture content uniform throughout the lift.

C. Add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill.

D. At the time of compaction, maintain the water content of the material at optimum moisture content, plus or minus 2 percentage points, except as otherwise specified for embankments.

E. Do not attempt to compact fill material that contains excessive moisture.

F. Aerate material by blading, discing, harrowing, or other methods, to hasten the drying process.

3.8 FIELD DENSITY TESTS

A. Test Methods: ASTM D2922, D1556, D2216, and D3017.

B. Cooperate with testing work by leveling small test areas designated by the Engineer.

C. Backfill test areas.

D. Field density test shall be performed for every 500 cubic yards of fill material placed.

E. Engineer may order testing of lift of fill at any time, location, or elevation.

3.9 SITE GRADING

A. Perform earthwork to lines and grades as shown on Drawings with proper allowance for topsoil where specified or shown on Drawings.

B. Shape, trim, and finish slopes to conform with the lines, grades, and cross sections shown.

C. Slopes shall be free of loose exposed roots and stones exceeding 3-inch diameter.

D. Round tops of banks to circular curbs, in general, not less than a 6-foot radius.

E. Neatly and smoothly trim rounded surfaces; over-excavating and backfilling to the proper grade are not acceptable.

F. Finished site grading shall be reviewed by the Engineer.

3.10 DISPOSAL OF EXCESS EXCAVATION

A. Dispose of excess excavated materials, not required or suitable for use as backfill or fill, outside of the area of work.

B. Compact excess material as specified for fill, dress the completed disposal area to slopes no greater than 4:1 (horizontal:vertical), and slope to drain.

3.11 SETTLEMENT

A. Settlement in backfill, fill, or in structures built over the backfill or fill, that may occur within the 1-year guarantee period in the General Conditions shall be considered to be caused by improper compaction methods.

B. Restore structures damaged by settlement to original condition.

END OF SECTION

SECTION 02315

TRENCH EXCAVATION, BACKFILL, AND COMPACTING

PART 1. GENERAL

1.1 SUMMARY

A. Work of this Section also includes:
   1. Replacing topsoil that contains regenerative material.
   2. Disposal of trees, stumps, brush, roots, limbs, and other waste materials from clearing operations.
   3. Imported topsoil.
   4. Crush rock backfill required by over-excavation.
   5. Imported pipe zone material.
   6. Trench settlement repair, including replacing roadway surfacing, sidewalk, or other structures.
   7. Replacing damaged culverts.

B. Trench excavation is classified as common excavation and includes removal of material of whatever types encountered including rock to depths shown or as directed by Engineer.

C. Pipe zone includes full width of excavated trench from bottom of pipe to a point 6 inches above top outside surface of pipe barrel.

D. Conform to federal, state, and local codes governing safe loading of trenches with excavated material.

E. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as Engineer considers to be in the best interest of Owner.

F. There shall be no extra compensation for dewatering and rock excavation.

G. Pipe shall be installed according to the latest version of AWWA C605.

1.2 REFERENCES

A. Arkansas Department of Transportation, P.O. Box 2261, Little Rock, Arkansas 72203, latest edition.
   1. ARDOT 303 - Aggregate Base Course.

B. ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 (latest edition).
   1. ASTM D448 - Classifications for Standard Sizes of Aggregate and Bridge Construction.

2. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb. (2.49-kg.) Rammer and 12-inch (304.8-mm) Drop.
3. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg.) Rammer and 18-inch (457-mm) Drop.
4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes.
5. ASTM D2922 - Test Methods for Density of Soils and Soil-Aggregates in Place by Nuclear Method.

C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P: Excavations.

D. The Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993.

PART 2. PRODUCTS

2.1 FOUNDATION STABILIZATION

A. Crushed gravel or crushed rock, free from dirt, clay balls, or organic material, well graded from coarse to fine, containing sufficient finer material for proper compaction, and meeting ASTM D448 Size No. 67 (Concrete Aggregate).

2.2 PIPE ZONE MATERIAL

A. Select material shall consist of fine loose earth or sand free from clods or rocks larger than 3/4 inches in dimension and of proper moisture content for maximum consolidation.

B. Crushed granular material conforming to ASTM D448, Size No. 67.

C. Washed stone bedding size 1/4-inch to 3/4-inch.

2.3 COMMON FILL MATERIALS

A. Material shall not contain pieces larger than 3 inches, and shall be free of roots, debris, or organic matter.

2.4 SELECT FILL MATERIALS

A. Class 7, Class 3, and Class 4 as established by Section 303 of Arkansas Department of Transportation Standard Specifications for Highway Construction.

B. ASTM Soil Classification GC as set forth in ASTM Designation D2487. On site material may be used, provided it is in accordance with ASTM D2487.

2.5 BEDDING MATERIAL

A. Pea gravel, sand, or other locally available bedding material, as approved.

2.6 TRENCH BACKFILL

A. Granular Backfill:
   1. Natural or artificial mixture of gravel and soil mortar uniformly well graded from coarse to fine.
   2. ARDOT Section 303 Class 3, Class 4, or Class 7 as specified in this Section.

2.7 PVC WATER AND SEWER PIPE TRENCH

A. See Drawings for trench details.

2.8 COMPACTION EQUIPMENT

A. Suitable type and adequate to obtain the amount of compaction specified.

B. Operate in strict accordance with manufacturer's instructions and recommendations and maintain in such condition so that it will deliver manufacturer's rated compactive effort.

2.9 IMPORTED TOPSOIL

A. Suitable sandy loam from an approved source.

B. Must possess friability and a high degree of fertility.

C. Free of clods, roots, gravel, and other inert material.

D. Free of quackgrass, horsetail, and other noxious vegetation and seed.

PART 3. EXECUTION

3.1 PREPARATION

A. Where clearing or partial clearing of right-of-way is necessary, complete prior to start of trenching.

B. Cut trees and brush as near to surface of ground as practicable, remove stumps, and pile for disposal.

C. Do not permit excavated materials to cover brush or trees prior to disposal.

3.2 PREVENT TRENCH WATER AND ANIMALS FROM ENTERING PIPE

A. When pipe laying is not in progress, including noon hours, open ends of pipe shall be closed; and no trench water, animals, or foreign material shall be permitted to enter the pipe.

3.3 DISPOSAL OF CLEARED MATERIAL

A. Dispose of material in such a manner to meet requirements of state, county, and local regulations regarding health, safety, and public welfare.

B. Dispose of nonflammable and flammable material off the construction site in an approved location.

C. Do not leave material on the Project site, shove onto abutting private properties, or bury in embankments or trenches.

3.4 REMOVAL OF OBSTRUCTIONS

A. Remove obstructions within trench area or adjacent thereto such as tree roots, stumps, abandoned piling, logs, and debris.

B. Engineer may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the intended function of the facility.

C. Dispose of obstructions in accordance with this Section.

3.5 REMOVAL AND REPLACEMENT OF TOPSOIL

A. Where trenches cross lawns, garden areas, pasturelands, cultivated fields, or other areas on which reasonable topsoil conditions exist, remove topsoil for a depth of 6 inches for full width of trench to be excavated.

B. Use equipment capable of removing a uniform depth of material.

C. Stockpile removed topsoil at regular intervals, and do not mix with other excavated material.

D. Locate stockpiles so that material of one ownership is not transported and stockpiled on property of another ownership.

E. Minimum finished depth of topsoil over trenches: 5 inches.

F. Imported topsoil may be substituted for stockpiling and replacing topsoil.

G. Maintain finished grade of topsoil level with area adjacent to trench until final acceptance by Engineer.

H. Repair damage to adjacent topsoil caused by work operations.
   1. Remove rock, gravel, clay, and other foreign materials from the surface.
   2. Regrade.
   3. Add topsoil as required.

3.6 TRENCH WIDTH

A. Minimum width of unsheeted trenches where pipe is to be laid shall be 18 inches greater than the outside diameter of the pipe, or as approved.

B. Maximum width at top of trench will not be limited, except where excess width of excavation would cause damage to adjacent structures or property or cause undue stresses on the pipe.

C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with affected property owner.

3.7 EXCAVATION

A. Excavate trench to lines and grades shown or as established by Engineer with proper allowance for pipe thickness and for pipe base or special bedding when required.

B. If trench is excavated below required grade, correct with foundation stabilization material.

C. Place material over full width of trench in compacted layers not exceeding 6 inches deep to established grade with allowance for pipe base or special bedding.

3.8 PREPARATION OF TRENCH - LINE AND GRADE

A. Do not deviate more than ½ inch from line or ½ inch from grade. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible variation in pipe wall thickness.

B. Grade the bottom of the trench by hand to the line and grade where the pipe is to be laid, with proper allowance for pipe thickness and for pipe base when specified or indicated.

C. Remove hard spots that would prevent a uniform thickness of bedding.

D. Check the grade with a straightedge and correct irregularities found.

E. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.

3.9 SHORING, SHEETING, AND BRACING OF TRENCHES

A. Sheet and brace trench when necessary to prevent caving during excavation in unstable material or to protect adjacent structures, property, workers, and the public.

B. Increase trench widths accordingly by the thickness of the sheeting.

C. Maintain sheeting in place until pipe has been placed and backfilled at pipe zone.

D. Remove shoring and sheeting as backfilling is done in a manner that will not damage pipe or permit voids in backfill.

E. Conform to safety requirements of federal, state, or local public agency having jurisdiction for sheeting, shoring, and bracing of trenches; the most stringent of these requirements shall apply.

3.10 LOCATION OF EXCAVATED MATERIALS

A. Place excavated material only within construction easement, right-of-way, or approved working area.

B. Do not obstruct private or public traveled roadways or streets.

3.11 REMOVAL OF WATER

A. Provide and maintain ample means and devices to promptly remove and dispose of water entering trench during time trench is being prepared for pipe laying, during laying of pipe, and until backfill at pipe zone is completed.
   1. These provisions apply during the noon hour as well as overnight.
   2. Provide necessary means and devices, as approved, to positively prevent under water from entering the construction area of another contractor.

B. Dispose of water in a manner to prevent damage to adjacent property.

C. Drainage of trench water through the pipeline under construction is prohibited.

3.12 FOUNDATION STABILIZATION

A. When existing material in bottom of trench is unsuitable for supporting pipe, excavate unsuitable material.

B. Backfill trench to subgrade of pipe base with foundation stabilization material specified.

C. Place foundation stabilization material over the full width of trench and compact in layers not exceeding 6 inches deep to required grade by making passes with a vibratory compactor (or equivalent).

D. Material shall be considered unsuitable when it contains more than 5 percent organic material by volumetric sampling or when it will not support a reading of 1.5 on a hand penetrometer.

3.13 ROCK IN PIPE TRENCH

A. Where rock is encountered in bottom of trench, support pipe on bedding material.

B. Minimum Bedding Thickness: Minimum of 4 inches or one eighth of the outside diameter of pipe, whichever is greater.

C. Extend bedding up pipe sides one sixth of outside diameter of the pipe, minimum.

D. Backfill over pipe according to pipe zone type.

3.14 PIPE ZONE BACKFILL

A. Depth of the pipe zone above pipe barrel varies with pipe material.

B. Particular attention must be given to area of pipe zone from flow line to centerline of pipe to ensure firm support is obtained to prevent lateral movement of pipe during final backfilling of pipe zone.

C. Backfill area of pipe zone from bottom of pipe to horizontal centerline of pipe by hand-placing material around pipe in 4-inch layers.

D. Achieve continuous support beneath pipe haunches by "walking in" and slicing with shovel.

E. Backfill area of pipe zone from horizontal centerline to top of pipe zone with pipe zone material as determined by class of backfill.

F. In lieu of selected material for pipe zone in upper portion of pipe zone, imported pipe zone material approved by Engineer for trench backfill may be substituted.

G. If the Engineer determines that the existing material is insufficient or unsuitable at trench side for selected material for pipe zone in upper portion of pipe zone, provide suitable material from other trench excavation along pipeline or imported pipe zone material.

3.15 TRENCH BACKFILL ABOVE PIPE ZONE

A. When backfill is placed mechanically, push backfill material onto slope of backfill previously placed and allow to slide down into trench.

B. Do not push backfill into trench in such a way as to permit free fall of material until at least 2 feet of cover is provided over top of pipe.

C. Under no circumstances allow sharp, heavy pieces of material to drop directly onto pipe or tamped material around pipe.

D. Do not use backfill material of consolidated masses larger than ½ cubic foot.

3.16 EXCESS EXCAVATED MATERIAL

A. Dispose of excess excavated material off project site in an approved area.

3.17 DRAINAGE CULVERTS

A. Replace drainage culverts which are removed on near right angles to pipe centerline.

B. If pipe cannot be reused or is damaged during removal, dispose of it and provide new pipe.

C. Protect culverts from damage or restore to equivalent condition.

D. Replace culverts to existing lines and grades.

E. Do not replace culverts until proposed pipeline is installed and backfill of trench has been completed to subgrade of culvert.

3.18 PIPE COVER

A. Place select material from excavation over pipe to provide minimum coverage, as shown on Drawings or as directed by Engineer.

3.19 DRAINAGE DITCH RESTORATION

A. Undercrossings of minor drainage ditches not covered in another Specification Section shall be backfilled so that upper 1 foot of material in ditch between ditch banks is clay.

B. Compact material for full ditch width by 6 passes of vibratory compactor (or equivalent).

C. Where indicated on Drawings, provide concrete arch, and/or riprap on ditch banks.

3.20 SETTLEMENT

A. Correct settlement noted in backfill, fill, or in structures built over backfill or fill within warranty period.

3.21 IMPORTED TOPSOIL

A. Should regenerative material be present in soil, remove both surface and root which appears in within 1 year following acceptance of Project in a manner satisfactory to Owner.

END OF SECTION

SECTION 02370

EROSION PREVENTION

PART 1. GENERAL

1.1 SUMMARY

A. Install slope protection and erosion control.

B. Complete Work to present a continuous appearance.

1.2 RELATED SECTIONS

A. Section 02300 - Earthwork.

B. Section 02315 - Trench Excavation, Backfill, and Compacting.

1.3 SAFETY REQUIREMENTS

A. Conform with OSHA requirements, federal, state, and local rules and regulations pertaining to safety and as specified elsewhere in these Specifications.

PART 2. PRODUCTS

2.1 FILTER FABRIC FOR SILT FENCING

A. Nonwoven polypropylene or polyester fabric.

B. Manufacturer: Typar 3401, Trevira S1115, or equal.

2.2 ACCESSORIES

A. Wood or steel stakes. If using steel stakes (rebar), stakes shall have safety caps meet OSHA requirements.

B. Rectangular hay bales secured with twine or nylon rope.

C. Filter fabric shall be supported by steel or wooden post and backed with a woven wire fabric for support.

PART 3. EXECUTION

3.1 INSTALLATION

A. Stake hay bales with wooden or steel stakes to prevent movement and to provide erosion control.

B. Install silt fencing to control dust movement and to prevent erosion.

C. Hay bales and silt fencing support shall be set in shallow trench and anchored a minimum of a 1-1/2 inch in ground surface.

END OF SECTION

SECTION 02722

AGGREGATE BASE COURSE

PART 1. GENERAL

1.1 SUMMARY

A. This item shall consist of a foundation course for surface course, for other base courses, or for pavements.

B. It shall be constructed on the prepared subgrade, subbase, or other completed base course according to these specifications and in substantial conformity with the lines, grades, compacted thickness, and typical cross section shown on the plans.

PART 2. PRODUCTS

2.1 MATERIALS

A. Aggregate Base Course shall be either gravel and/or crushed stone so proportioned as to meet the requirements for a class of aggregate specified in the following table:

Sieve,mm	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
				PERCENT PASSING				
75 (3")	100	100	100					
50 (2")	95-100	95-100	95-100					
37.5 (1-1/2")				85-100	100	100	100	
25.0 (1")								100
19.0 (3/4")	60-100	60-100	60-100	60-100	60-100	50-90	50-90	65-100
9.5 (3/8")	40-8-	40-80	40-80	40-80	40-80			
4.75 (#4)	30-60	30-60	20-60	30-60	30-60	25-55	25-55	25-55
2.0 (#10)	20-50	20-50	20-45	20-45	20-45			
0.425 (#40)	10-35	10-35	10-35	10-35	10-35	10-30	10-30	10-30
0.075 (#200)	3-15	3-15	3-12	3-12	3-12	3-10	3-10	3-10
MAX. PLASTICITY INDEX (MINUS								
0.425 MATL.)	13	10	6	6	6	6	6	6
(#40) MINIMUM PERCENT CRUSHED (RETAINED ON 4.75 mm [#4] SIEVE					15			
MINIMUM PERCENT CRUSHER-RUN MATERIAL						90	90	90

B. Class 7 and 8 shall be any mechanically crushed natural rock or stone of igneous, sedimentary, and/or metamorphic origin produced from a solid geological formation by quarrying method.

C. The Contractor shall have the option of using any higher numbered class Aggregate Base Course than that specified, provided that payment will be for the class specified.

D. Material furnished for Aggregate Base Course, Class 3 through Class 8, shall have a percent of wear by the Los Angeles Test not greater than 45 as determined by AASHTO T 96.

E. When it is necessary to blend two or more materials, each material shall be proportioned separately through mechanical feeders to ensure uniform production. Premixing or blending to avoid separate feedings will not be permitted. Production of material by blending materials on the roadway to obtain a mixture that will comply with the requirements specified herein will not be permitted.

F. For the purpose of this specification, shale and slate are not considered to be gravel or stone. The material furnished shall not obtain more than 5 percent by weight of shale, slate, and other objectionable, deleterious, or injurious matter.

G. For Class 1 and 2 materials, the fraction passing the 0.075 mm (#200) sieve shall not be greater than three-fourths of the fraction passing the 0.425 (#40) sieve. For Classes 3 through 8, the fraction passing the 0.075 mm (#200) sieve shall not be greater than two-thirds of the fraction passing the 0.425 mm (#40) sieve. For Classes 3 through 8 the fraction passing the 0.425 mm (#40) sieve shall have a liquid limit not greater than 25.

H. To ensure that gravel is uniformly graded, the difference between the percent passing the various sieves shall be as follows for Classes 3, 4 and 5:

Sieve		**Percent**
19.0 mm - 9.5 mm	(3/4" - 3/8")	5 min.
9.5 mm - 4.75 mm	(3/8" - #4)	5 min.
4.75 mm - 2.00 mm	(#4 - #10)	5 min.
2.0 mm - 0.425 mm	(#10 - #40)	4 min.

I. When the material contains aggregate larger than that specified above for the class called for in the Contract, the oversize aggregate shall be removed by screening or by screening and crushing. The removal of large size aggregate by hand methods will not be permitted.

PART 3. EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. The base course material shall be placed on a completed and approved subgrade or existing base that has been bladed to substantially conform to the grade and cross section shown on the plans.

B. The subgrade shall be prepared as specified in Section 02300 - Earthwork, and shall be free from an excess or deficiency of moisture at the time of placing base course material.
   1. The subgrade shall also comply, where applicable, with the requirements of other items that may be contained in the Contract that provide for the construction, reconstruction, or shaping of the subgrade or the reconstruction of the existing base course.

C. Base course material shall not be placed on a frozen subgrade or subbase.

D. The aggregate shall be placed on the subgrade or other base course material and spread uniformly to such depth and lines that when compacted it will have the thickness, width, and cross section shown on the Drawings.

E. If the required compacted depth of the base course exceeds 6 inches, the base shall be constructed in two or more layers of approximate equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches except when vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer of base course may be increased to 8 inches upon approval of the Engineer.

F. The material shall be spread the same day that it is hauled. Spreading shall be performed in such a manner that no segregation of course and fine particles nor nests or hard areas caused by dumping the aggregate on the subgrade will exist. Care shall be taken to prevent mixing of subgrade or unspecified material with the base course material during the blading and spreading operation.

G. Aggregate shall not be dumped or mixed on an existing or newly constructed ACHM course or PCC Pavement that will not be overlaid under the same Contract nor on any open graded base course. Mechanical spreading equipment shall be used, if necessary, to place the base course on the subgrade.

H. If sufficient working space is not available to allow proper aeration or addition of water to the base, the base material shall be mixed by any satisfactory method before placement.

I. Each course shall be thoroughly mixed for the full depth of the course and shall be compacted by any satisfactory method that will produce the density thereinafter specified.
   1. The aggregate shall be maintained substantially at optimum moisture during the mixing, spreading, and compacting operations, water being added or the material aerated as may be necessary.
   2. The specified grade and cross section shall be maintained by blading throughout the compaction operation.
   3. The material in each course shall be compacted to a density, as determined by ASTM D2922, of not less than 95 percent of the maximum laboratory density determined in the laboratory by ASTM D1557.
   4. The aggregate shall be compacted across the full width of application.

J. The compacted base course shall be tested for depth and any deficiencies corrected by scarifying, placing additional material, mixing, reshaping, and recompacting to the specified density, as directed.

K. Where neither prime coat nor surfacing is provided in the same Contract with the base course, the material in the base course shall be uniformly compacted, stable, and free of segregated areas.

L. The Contractor shall maintain the base course in a satisfactory condition until accepted.

3.2 QUALITY CONTROL

A. To assure that the material used meets the requirements of the specifications, certain tests for quality control and acceptance will be performed as specified herein. The properties for which quality control and acceptance testing will be performed are gradation, density, moisture content, plasticity index, and thickness as specified in each Section.

B. The maximum laboratory density shall be determined as follows:

% Retained - 4.75 mm (#4) Sieve	Test Method
10 Max.	AASHTO T 99, Method A
11 - 30	AASHTO T 99, Method C
31 Min.	AASHTO T 180, Method D

Note: In lieu of AASHTO T224, correction for coarse particles retained on the 3/4" (19.0 mm) sieve shall be determined by replacing with an equal mass of material passing the 3/4" (19.0 mm) sieve and retained on the #4 (4.75 mm) sieve.

C. The in-place density shall be determined by using AASHTO T 310, Direct Transmission. The moisture content shall be determined by AASHTO T 310 or ARDOT Test Method 347 or 348. A new maximum laboratory density and optimum moisture will be determined whenever the Engineer deems necessary or upon evidence provided by the Contractor.

D. Tests for gradation, liquid limit, and plasticity index shall be performed by AASHTO T 11, T 27, T 89, and T 90.

E. The Contractor shall furnish all personnel, equipment, and facilities necessary to perform the required sampling and testing.

F. The Contractor shall provide the Engineer with the opportunity to observe all quality control sampling and testing.

G. All quality control sampling and testing shall be performed by or under the direct supervision of a technician acceptable to the Owner and in accordance with ARDOT's Manual of Field Sampling and Testing Procedures. Test reports shall be signed and copies made available to the Engineer if requested.

H. If the results of any test shows that the required minimum density has not been obtained, corrective action shall be taken, followed by a re-test at the same location. The original and re-test reports shall be cross referenced. All corrective actions shall be performed by the Contractor at no cost to the Owner.

3.3 ACCEPTANCE

A. Acceptance testing for thickness (when specified on the Drawings), gradation, plasticity index, density, and moisture content will be based on lots. The size of standard lots will be 100 cubic yards. Partial lots, of any size, may be established by the Engineer at any time.

B. Test methods for acceptance shall be the same as specified for quality control testing.

C. The item of work being tested shall not be considered complete or accepted until passing test reports are submitted to the Engineer.

D. The Contractor shall take one test for all properties in each lot or partial lot at a location randomly selected by the Engineer.

E. In addition to the required acceptance tests, the Engineer may require the Contractor to test any location that, by visual observation, appears to be defective.

F. The Contractor's acceptance sampling and testing procedures and results will be subject to independent assurance sampling and testing conducted by the Owner. The Contractor shall be required to make changes to the equipment and/or procedures if the such tests are unable to verify the Contractor's test results.

G. All acceptance testing performed by the Contractor is subject to observation by the Engineer. All test reports shall be signed and submitted to the Engineer the next business day after the tests are performed.

H. If a lot or a partial lot fails to meet the specifications, the Contractor shall remove and replace that lot or partial lot with acceptable material at no cost to the Owner. Tests will be performed on the replacement material as required for the original material. Acceptance of the replacement material will be the same as for the original material.

I. Payment for the quantity in the original lot will be withheld or recovered, and released after the removal and replacement has been acceptably performed.

END OF SECTION

SECTION 02765

PAVEMENT MARKING

PART 1. GENERAL

1.1 SUMMARY

A. Paint helipad markings as shown on the Drawings.

1.2 SUBMITTALS

A. Provide the following:
   1. Paint System Data Sheet (PSDS) from paint manufacturer for each system used (sample form attached).
   2. Technical Data Sheets for each product used in the paint system.
   3. Copies of the paint system submittals to the coating applicator.

1.3 QUALITY ASSURANCE

A. Inspection by Engineer, or waiver of inspection of any particular portion of the Work, shall not be construed to relieve Contractor of his responsibility to perform the Work in accordance with these specifications.

1.4 WARRANTY

A. Contractor shall warrant to Owner and guarantee Work under this Section against defective workmanship and materials for a period of 1 year commencing on the date of final acceptance of the Work.

PART 2. PRODUCTS

2.1 PAINT

A. Sherwin-Williams, PRO-PARK Traffic Marking.
   1. White, Product B97WD2434.
   2. Black, Product B97BD2021

B. Colors where shown on Drawings.

PART 3. EXECUTION

3.1 GENERAL

A. Paint shall be applied in 2 coats to a clean dry surface using template or a striping machine. Stripes shall be a uniform width of 4 inches wide. Other markings shall be as shown on Drawings.

END OF SECTION

SECTION 02923

SEEDING

PART 1. GENERAL

1.1 SUMMARY

A. This item shall consist of furnishing and applying lime, fertilizer, seed, mulch cover, and water according to these specifications at locations shown on the plans or as directed.

B. The work under this item shall be accomplished as soon as practicable after the grading in an area has been completed in order to deter erosion.

1.2 REFERENCES

A. Arkansas Department of Transportation (ARDOT), Standard Specifications for Highway Construction, latest edition.

PART 2. MATERIALS

2.1 TOPSOIL

A. Existing topsoil shall be reused where practical.

B. Imported Topsoil:
   1. Furnished at sole expense of Contractor.
   2. Friable loam free from subsoil, roots, grass, excessive amounts of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; and containing a minimum of 4 percent and a maximum of 50 percent organic matter.

2.2 LIME

A. Lime shall be agricultural grade ground limestone or equivalent as approved by the Engineer.

2.3 FERTILIZER

A. Fertilizer shall be a commercial grade, uniform in composition, free flowing, and suitable for application with mechanical equipment.

B. Fertilizer shall be delivered to the site in labeled containers conform to current Arkansas fertilizer laws and bearing the name, trademark, and warranty of the producer.

2.4 SEED

A. Seed shall have a minimum of 98% pure seed and 85% germination by weight, and shall contain no more than 1% weed seeds.

B. A combined total of 110 noxious weed seeds shall be the maximum amount per 50 pounds of seed with the following exceptions: Johnson grass seed, wild onion seed, wild garlic seed, field bindweed seed, nut grass seed, sickle pod seed, sesbania seed, indigo seed, morning-glory seed, and cocklebur seed will not be allowed in any amount.

C. Seed shall be furnished in sealed, standard containers. Seed that has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.

D. Legumes shall be inoculated with an approved culture as recommended by the manufacturer, just prior to seeding.

E. Seeds shall be composed of the varieties and amounts by weight as shown below.

2.5 SEED MIX

A. Seed shall be Common Bermuda Grass, applied at the following rates:

	lbs./acre
March 1 - August 31	
Bermuda Grass (Common) unhulled - husk in tact	75
Bermuda Grass (Common) hulled - husk removed	25
September 1 - February 28/29	
Annual Ryegrass	50
Bermuda Grass (Common) unhulled - husk in tact	75

2.6 MULCH COVER

A. Mulch cover shall consist of straw from threshed rice, oats, wheat, barley, or rye; of wood excelsior; or of hay obtained from various legumes or grasses, such as lespedeza, clover, vetch, soybeans, bermuda, carpet sledge, bahia, fescue, or other legumes or grasses; or a combination thereof. Mulch shall be dry and reasonably free from Johnson grass or other noxious weeds, and shall not be excessively brittle or in an advanced state of decomposition. All material will be inspected and approved prior to use.

2.7 TACKIFIERS

A. Tackifiers used in mulch anchoring shall be of such quality that the mulch cover will be bound together to form a cover mat that will stay intact under normal climatic conditions.

2.8 WATER

A. Water shall be of irrigation quality and free of impurities that would be detrimental to plant growth.

PART 3. EXECUTION

3.1 PROJECT SCHEDULE

A. Project Schedule shall show an anticipated time for grading and seeding to take place, so that seasonal consideration can be given attention.

3.2 SITE GRADING

A. Shape, trim, and finish slopes to conform with lines and grades shown.

B. Make slopes free of loose exposed roots and stones exceeding 2 inches in diameter.

C. Ensure that site drains properly and there are no areas where water may pond.

D. Finished site grading will be reviewed by Engineer.

3.3 PREPARATION OF SEEDBED

A. Areas to be seeded shall be dressed to the shape and section shown on the plans.

B. If the plans call for replacing topsoil, this shall be done before any preparations for seeding.

C. Before beginning the seedbed preparation, soil samples shall be obtained from each major soil area for lime requirement analysis.

D. Lime at the rate determined by the lime requirement test, shall be uniformly spread on areas to be seeded prior to their being roughened or scarified. The seedbed shall be thoroughly pulverized by means of disk harrows or other approved methods, thoroughly mixing lime and soil to a depth of not less than 4 inches (2 inches for slopes 4:1 or steeper) below finish slope elevations. Regardless of the pulverizing method used, the soil shall be broken with the contour of the slope.

E. Objectionable foreign matter shall be removed and the soil left in a suitable horticultural condition to receive fertilizer and seed. Water may be applied before, during, and after seedbed preparation in order to maintain the desired moisture content in the soil.

F. When no lime is required, seedbed preparation shall be accomplished as specified above, regardless of the method used in the distribution of fertilizer, seed, and mulch cover.

G. Rake the area to a uniform grade so that areas drain in the same manner as at the start of the Project.

H. Lightly compact before planting grass.

I. Remove trash and stones exceeding 2 inches in diameter from area to a depth of 2 inches prior to preparation and planting grass.

3.4 FERTILIZATION

A. Fertilizer shall be applied at the rate of 800 pounds per acre of 10-20-10. Fertilizer shall be uniformly incorporated into the soil alone, or in conjunction with the required lime. If the Contractor so elects, the fertilizer may be drilled into the soil or combined with the seed in the hydro-seeding operation.

3.5 TIME OF SEEDING

A. Conduct seeding under favorable weather conditions during seasons which are normal for work as determined by accepted practice in locality of Project.

3.6 MECHANICAL SEEDING

A. Sow grassed areas evenly with a mechanical spreader, or as otherwise instructed by the Engineer. Roll with cultipacker to cover seed. Method of seeding may be varied at discretion of Contractor on his own responsibility to establish a smooth, uniformly grassed area.

3.7 HYDRO-SEEDING

A. If hydro-seeder is used for seeding, fertilizer and seed may be incorporated into one operation but a maximum of 800 pounds of fertilizer shall be permitted for each 1500 gallons of water. If the Contractor so elects, the fertilizer may be applied during preparation of the seedbed. The area shall be lightly firmed with a cultipacker immediately before hydro-seeding.

3.8 WINTER PROTECTIVE SEEDING

A. Winter barley or annual rye grass applied at a rate of 30 pounds/acre shall be used between September 1 and March 1.

B. Areas receiving temporary winter protective seeding shall be re-seeded when weather conditions become favorable.

3.9 MULCH COVER

A. Mulch cover shall be applied at the rate of 4,000 pounds per acre immediately after seeding and shall be spread uniformly over the entire area by approved power mulching equipment. When approved by the Engineer, the Contractor may use hand methods to apply mulch cover to small or inaccessible areas.

3.10 MULCH ANCHORING

A. The mulch shall be effectively pressed into the soil using steel cleated track or cleated roller equipment. The anchoring shall be performed so that the grooves formed are perpendicular to the flow of water down backslopes and foreslopes. The equipment and method used shall produce acceptable results.

3.11 WATER

A. After application of the mulch cover, water shall be applied in sufficient quantity, as Directed by the Engineer, to thoroughly moisten the soil to the depth of pulverization and then as necessary to germinate the seed.

B. When directed by the Engineer, the Contractor shall apply water in an amount such that, in conjunction with any rainfall, the seeded and mulched area will receive an amount equivalent to a minimum of 1 inch of water each week beginning the week after seeding and continuing for a minimum of 3 weeks.

3.12 MAINTENANCE

A. Begin maintenance immediately after each portion of grass is planted and continue until a reasonable stand of grass has been obtained. Repair washed out areas by filling with topsoil, fertilizing, and seeding.

3.13 GUARANTEE

A. If, at the end of a 180-day period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately, or, if after the usual planting season, during the next planting season. If a satisfactory stand of grass develops by July 1 of the following year, it will be accepted. If it is not accepted, a complete replanting will be required during the planting season.

B. A satisfactory stand is defined as grass or section of grass that has:
   1. No bare spots larger than 1 square foot.
   2. Not more than 15 percent of total area with bare spots larger than 6 inches square.

END OF SECTION

SECTION 03001

SITE CONCRETE WORK

PART 1. GENERAL

1.1 WORK INCLUDED

A. Cast-in-place concrete, including formwork.

1.2 REFERENCES

A. American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48219 (latest revision).
   1. ACI 211.1: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
   2. ACI 304R: Guide for Measuring, Mixing, Transporting, and Placing Concrete.
   3. ACI 304.2R: Placing Concrete by Pumping Method.
   4. ACI 304.3R: High Density Concrete: Measuring, Mixing, Transporting and Placing.
   5. ACI 305R: Hot Weather Concreting.
   6. ACI 306R: Cold Weather Concreting.
   7. ACI 309: Standard Practice for Consolidating of Concrete.
   8. ACI 309.1R: Behavior of Fresh Concrete During Vibration.
   9. ACI 309.2R: Identification and Control of Consolidation-Related Surface Defects in Formed Concrete.
   10. ACI 318: Building Code Requirements for Reinforced Concrete.
   11. ACI 347: Recommended Practice for Concrete Formwork.

B. American Society of Testing for Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103 (latest revision).
   1. ASTM C31: Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C33: Specification for Concrete Aggregates.
   3. ASTM C42: Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   4. ASTM C143: Test for Slump of Portland Cement Concrete.
   5. ASTM C150: Specifications for Portland Cement.
   6. ASTM C172: Sampling Freshly Mixed Concrete.
   7. ASTM C173: Test for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   8. ASTM C231: Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
   9. ASTM C260: Specification for Air-Entraining Admixtures for Concrete.
   10. ASTM C309: Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

11. ASTM C494: Specification for Chemical Admixtures for Concrete.
12. ASTM E329: Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

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

D. Local Codes and Ordinances: Wherever provisions of the Standard Building Code or the local current ordinances are more stringent that the above referenced Specifications and Standards, the local codes and ordinances shall govern.

1.3 SUBMITTALS

A. Submit the following in accordance with the Frontend Documents:
1. Product Data: Submit manufacturer's product data for reinforcement and forming accessories, patching compounds, curing compounds, and other materials.
2. Shop Drawings: Submit for review prior to Installation, Shop Drawings of all reinforcing steel, including bar cutting lists, typical bar bend diagrams, construction of forms including jointing, reveals, and location and pattern of form tie placement.
3. Design Mix: Prior to placement of concrete, the Contractor shall submit a design mix showing the proportions and compressive strength obtained from the concrete at 7 and 28 days. The design mix shall include a complete list of materials including type, brand, source, and amount of; cement, fly ash, ground slag, coarse aggregate, fine aggregate, water, air content and admixtures, if applicable. The mix design shall be submitted to the Engineer at least ten (10) days prior to the start of operations. Placement of concrete shall not begin until the mix design is approved in writing by the Engineer.

1.4 QUALITY ASSURANCE/ACCEPTANCE

A. Inspection: Engineer shall have access and rights to inspect batch plants, cement mills, and facilities of suppliers, manufacturers, and subcontractors providing products specified.

B. Batch Plant:
1. Certification: Current certification that weighing scales have been tested and are within tolerances as set forth in National Bureau of Standards Handbook No. 44.
2. Equipment: Semi-automatic or fully automatic.

C. Evaluation and acceptance of concrete shall conform to ACI 318.

D. The Contractor shall engage a testing laboratory acceptable to Owner and Engineer to perform material evaluation tests and to design concrete mixes. All testing shall be paid for by the Contractor.

E. The mixing or alternate use of cement from different manufactures will not be permitted. The source of any materials shall not be changed without the written approval of the Engineer.

F. If the cement furnished produces erratic results under field conditions incident to the placing of the concrete, or in regard to the strength of the finished product, or in the time of the initial or final set, the Contractor shall, without notice from the Engineer, cease the use of that source of cement.

G. Should a change in sources be made, or admixtures added or deleted from the mix, a new design mix must be submitted to the Engineer for approval.

H. The Contractor is responsible for product quality control during handling, blending, mixing, transporting, and placement operations, and for necessary adjustments in proportioning of the materials to produce an acceptable mix. The Contractor shall perform all applicable quality control sampling and testing required to ensure that the completed concrete complies with all requirements and specifications. The Contractor shall furnish all personnel, equipment, and facilities necessary to perform the required sampling and pay for testing.

I. The Contractor shall be responsible for ensuring that all concrete cylinders, including those made for determination of quality acceptance, are properly cured while at the jobsite.

J. Field Sampling and Testing:
   1. Field samples shall be made and cured in accordance with ASTM C31 for each concrete strength, at the rate of 4 test cylinders and one slump test for each 50 cubic yards of concrete from each days pour. Make air content check for each set of test cylinders in accordance with ASTM C173 or ASTM C231. Air content and slump shall be checked and recorded at both truck discharge and point of placement for pumped concrete from the first load each day and every 50 cubic yards thereafter.
   2. Test Cylinders: One at 7 days, two at 28 days, and reserve the remaining cylinder for testing after a longer period as required by the Engineer if the 28-day tests do not meet or exceed the required strength.
   3. The taking of samples from small pours of 10 cubic yards or less may be omitted at the discretion of the Engineer.
   4. Additional Test Slumps: Every 25 cubic yards, recording location for report.
   5. When early form removal is requested, field cure cylinders will be tested at 7 days or less to determine sufficient strength.

K. Testing: Where average strength of any group of 3 cylinders falls below the minimum comprehensive strength, or an individual cylinder falls more than 500 psi below minimum compressive strength specified, the Contractor will be required to have a certified laboratory core the concrete and test it in accordance with ASTM C42. Specimens shall be selected by the Engineer from location in structure represented by test specimen or specimens which failed. At the discretion of the

Engineer, Swiss hammer testing may or may not be used to aid in determination of acceptable concrete.

1. Specimens shall be secured, prepared, and tested in accordance with ASTM C42, within a period of 60 days after placement of concrete.
2. Concrete will be deemed approved meeting the strength requirements of this Section if it meets the strength requirements of ACI 318.
3. The cost of cutting specimens from the structure, patching the resulting holes, and making laboratory analysis shall be at the sole expense of the Contractor.
4. Holes from which the cored samples are taken shall be packed solid with no slump concrete proportioned in accordance with ACI 211. Patching shall have the same design strength as the specified concrete.
5. Should laboratory analysis indicate that the proper concrete mix has not been used, all concrete poured where inappropriate mix was used shall be subject to rejection, before, during, or after the pour.
6. If any of the specimens cut from the structure fail to meet the requirements of ACI 318, the Engineer shall have the right to require the defective concrete to be replaced, at the Contractors sole expense, and at no additional cost to the Owner.

L. Sampling: In addition the slump test specified in this Section, the Contractor shall keep a cone and rod apparatus on the Project site for random testing of batches. When concrete does not meet the specified slump requirements, and when directed by the Engineer, the Contractor will immediately perform a slump test in accordance with ASTM C143. Concrete not meeting the slump requirements shall be removed from the Project site.

M. The Contractor shall provide an opportunity for the Engineer to observe all quality control sampling and testing procedures.

PART 2. PRODUCTS

2.1 CEMENT

A. Portland cement: ASTM C150 Type I.

2.2 WATER

A. Clean and free from oil, acid, alkali, salt, organic matter, or other deleterious substances.

B. Potable.

2.3 CONCRETE AGGREGATES

A. General: Natural aggregates, well graded, free from deleterious coatings and organic materials conforming to ASTM C33 (latest revision).

1. Import non-reactive aggregates if local aggregates are reactive. (Appendix XI-ASTM C33).
2. Wash aggregates uniformly before use.
3. Other aggregate gradations can be approved by Engineer.

B. Fine Aggregates:
1. Clean, sharp, natural or manufactured sand, free of loam, clay, lumps, or other detrimental materials and conforming to ASTM C33.
2. Less than 2 percent passing the No. 200 sieve.
3. Maximum size 1-1/2 inches.

C. Coarse Aggregates:
1. Natural gravel, crushed gravel, crushed stone, or combination of these materials.
2. Less than 15 percent float or elongated particles (long dimension >5 times short dimension).
3. Less than 0.5 percent passing the No. 200 sieve.

2.4 CONCRETE AIR-ENTRAINING ADMIXTURES

A. Manufacturer:
1. Air-Mix or Perma-Air by the Euclid Chemical Co.
2. Sealtight Air Entraining Admixture by W.R. Meadows of Texas.
3. Master Builders, MB-VR.
4. Or approved equal.

B. ASTM C260; nontoxic after 30 days.

C. Use only the specified non-corrosive non-chloride accelerator. Calcium chloride is not permitted.

D. Provide for concrete exposed to freezing and thawing, required to be watertight or placed during cold weather. Air Content: 5 to 6 percent.

2.5 ADMIXTURES

A. Water-Reducing Admixture: Conforming to ASTM C494, Type A:
1. Eucom WR-75 by the Euclid Chemical Company.
2. Pozzolith 200N by Master Builder.
3. Plastocrete 160 by Sika Chemical Corporation.

B. Water-Reducing Retarding Admixture: Conforming to ASTM C494, Type D:
1. Eucom Retarder-75 by the Euclid Chemical Company.
2. Pozzolith 100XR by Master Builder.
3. Plastiment by Sika Chemical Company.

C. High-Range Water-Reducing Admixture (Superplasticizer): Conforming to ASTM C494, Type F or G:
   1. Eucom 37 by Euclid Chemical Company.
   2. Rheobuild 1000 by Master Builders.
   3. Sikament by Sika Chemical Company.

D. Non-Corrosive Non-Chloride Accelerator Admixture: Conforming to ASTM C494 Type C or E:
   1. Accelguard 80 by Euclid Chemical Company.
   2. Or approved equal.
   3. Manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least 1 year's duration) using an acceptable accelerated corrosion test method using electrical potential measures.

E. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions.

F. Certification: Submit written conformance to the requirements and chloride ion content of the admixture to Engineer prior to mix design review.

2.6 FORMS

A. Unexposed Finish Concrete: Plywood, lumber, metal or other acceptable material approved by the Engineer. Lumber shall be dressed on at least 2 edges and 2 sides for a tight fit if used.

B. Form Coatings: Commercial formulation from coating compound with maximum VOC of 350 mg/l that will not bond, stain, or adversely affect concrete surfaces in contact with and will not impair succeeding treatments of concrete surfaces.

C. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent deflection and spalling of concrete upon removal. Units provided shall not leave any metal closer than 1-1/2 inch to exposed surface. Provide ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

2.7 BONDING AGENT

A. Manufacturer: Sonnebond by Sonneborn; or approved equal.

B. Submit product specifications and manufacturer's specific instructions for application on this Project for Engineer's approval.

C. Product must meet Project requirements with regard to surface, pot life, set time, vertical or horizontal application, forming restrictions, or other stated requirements.

2.8 BOND BREAKER

A. Manufacturers:
   1. Williams Tilt-Up Compound, Williams Distributors Inc., Seattle, Washington.
   2. Silcoseal 77, Superior concrete Accessories, Franklin Park, Illinois.
   3. Or Equal.

B. Nonstaining type.

C. Provide positive bond prevention.

D. Submit copies of manufacturer's data, recommendations, and instructions for specific use on this Project for review.

2.9 CURING COMPOUND

A. Liquid Membrane-Forming Curing Compound: ASTM C309, Type I, Class A. Moisture loss not more than 0.005 gr./sq. cm. applied at 200 square feet per gallon.
   1. Conspec, Conspec Cure & Seal.
   2. Sonneborn, Kure-N-Seal.
   3. Master Builders, MasterKure.
   4. Or approved equal.

2.10 BONDING AND REPAIR MATERIALS

A. Rewettable Bonding Compounds:
   1. Polyvinyl acetate type.
   2. Manufacturer:
      a. Euco Weld by the Euclid Chemical Co.
      b. Weldcrete by the Larsen Co.
      c. Sonnocrete by Sonneborn.
      d. Daraweld C by W. R. Grace.
   3. Use only in areas not subject to moisture.

B. Non-Rewettable Bonding Compounds:
   1. Polymer modified type.
   2. Manufacturer:
      a. Euco-Bond by the Euclid Chemical Co.
      b. Or approved equal.

C. Bonding Admixture:
   1. Latex, non-rewettable type.
   2. Manufacturer:
      a. SBR Latex or Flex-Con by the Euclid Chemical Co.
      b. Daraweld C by W. R. Grace.

D. Patching Mortar:
   1. Free flowing or gel consistency.
   2. Polymer modified cementitious mortar.
   3. Manufacturer:
      a. Euco Thin Coat or Concrete Coat by the Euclid Chemical Co. for horizontal repairs.
      b. Verticoat by the Euclid Chemical Co. for vertical or overhead repairs.
      c. Sikatop 121 or 122 by the Sika Chemical Co. for horizontal repairs.
      d. Sikatop 123 by the Sika Chemical Co. for vertical or overhead repairs.

E. Underlayment Compound:
   1. Free-flowing, self-leveling, pumpable cementitious base compound.
   2. Manufacturer:
      a. Flo-Top by the Euclid Chemical Co.
      b. Or approved equal.

F. Repair Topping:
   1. Self-leveling, polymer modified high strength topping.
   2. Manufacturer: Thin Top SL by the Euclid Chemical Co.

PART 3. EXECUTION

3.1 DESIGN OF CONCRETE MIX

A. Submit mix design on each class of concrete for review, include standard deviation analysis or trial mixture test data.

B. Proportion mix design in accordance with ACI 318, Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures".

C. If trial batches are used:
   1. Prepare mix design by independent testing laboratory.
   2. Achieve an average compressive strength 1200 psi higher than the specified strength, or 1400 psi for specified concrete strengths over 5000 psi.
   3. Certified copies of laboratory trial mix reports and cylinder tests shall be submitted to Engineer by the testing laboratory for approval.

D. Do not place concrete prior to receipt of Engineer's written approval of mixes and cylinder test results.

E. Design mix and perform tests to meet the requirements as specified.

F. Slump: 2-4"

G. Water/Cement Ratio:
   1. Watertight concrete exposed to fresh water and freeze/thaw: 0.50 max.

2. Air entrained concrete exposed to fresh water: 0.50 max.

H. Combined Aggregate Gradings:
1. Aggregates for concrete shall be proportioned in accordance with "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete." ACI 211.1.
2. Maximum aggregate size: Do not exceed one-fifth the narrowest dimension between sizes of forms or 3/4 of the clear space between reinforcing bars, 1-1/2 inch maximum.

3.2 MIXES

A. Strength: Concrete minimum strength at 28 days shall be 4,000 psi or as noted on Drawings or as specified in other Sections.

B. Mix Designs:
1. Prepare design mixes for each type of concrete, in accordance with ACI 301 and ACI 318, except as otherwise specified.

C. Conform to ACI 304 current edition for measuring, mixing, transporting and placing concrete.

D. Concrete Mix Adjustments: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, and as approved by Engineer. Laboratory test data for revised mix design and strength results shall be submitted to and approved by Engineer prior to using in Work.

3.3 FORMS

A. Coordinate with other trades whose work may be located within or below concrete.

B. Coordinate installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

C. Notify Engineer 1 full working day prior to erection of forms for inspection.

D. Cleaning and Tightening:
1. Clean forms thoroughly and adjacent surfaces to receive concrete.
2. Remove chips, wood, sawdust, dirt or other debris immediately prior to concrete placement.
3. Retighten forms after concrete placement to eliminate leaks.

E. Design:
1. Design, erect, support, brace, and maintain formwork in accordance with:
a. Building Codes Requirements for Reinforced Concrete (ACI 318).
b. Recommended Practice for Concrete Formwork (ACI 347).

c. Construction Industry Standards (OSHA 2207).

2. Design formwork to be readily removable without impact, shock, or damage to concrete surfaces and adjacent materials.

F. Reuse of Forms: Do not reuse forms unless they are in new and undamaged condition.

G. Chamfer exposed corners and edges 3/4 inch unless otherwise specified or shown on Drawing. Use wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Preparation of Form Surfaces: Coat the contact surfaces of forms with a form-coating compound where applicable prior to placement of reinforcement.

I. Other Trades: Provide openings in concrete form work to accommodate Work of other trades. Determine size and location of openings, recesses, and chases for other trades providing such ties. Accurately place and securely support items built-in to form.

J. Form Tolerances: Construct forms to sizes, shapes, lines, and dimensions shown, work in finished structures.

K. Removal of Forms:

1. Do not disturb forms until concrete is sufficiently strong to withstand possible injury.
2. Do not remove shoring until member has acquired sufficient strength to support its weight and the load upon it.
3. Do not remove forms until the concrete has attained 67 percent of 28-day strength or a minimum of 4 days. Use a method of form removal which will not cause overstressing of the concrete.

3.4 FORM TIES

A. Place in uniform patterns on exposed surfaces.

B. Number and placement sufficient to withstand pressures and limit deflection of forms to acceptable limits.

3.5 PLACING CONCRETE - GENERAL

A. Do not place concrete without Engineer being present.

B. Allow other trades reasonable time to complete portions of work which must be completed before concrete is placed.

C. Notify Engineer at least 1 full working day in advance before starting to place concrete to permit inspection of forms, reinforcing, sleeves, conduits, boxes, inserts, or other work required to be installed in concrete.

D. Review curing methods with Engineer and verify curing materials and equipment are at Project site.

E. Placement shall conform to requirements and recommendations of ACI 304 and ACI 318, except as modified in these Specifications.

F. Place concrete as soon as possible after leaving mixer in layers not over 1.5 feet deep:
   1. Without segregation or loss of ingredients.
   2. Without splashing forms or steel above.

G. Do not use concrete truck chutes, pipes, finishing tools, etc., constructed of aluminum.

H. Before depositing concrete:
   1. Remove debris from space to be occupied by concrete.

   2. Dampen:
      a. Gravel fill beneath slabs on ground.
      b. Sand where vapor barrier is specified.
      c. Wood forms.
   3. Verify reinforcement is secured in position.

I. Before placing concrete, clean and inspect form work, reinforcing steel, and items to be embedded or cast-in-place. Notify other trades prior to placement of concrete to permit the installation of their Work. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

J. Conveying:
   1. Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials.
   2. Conveying equipment shall be capable of providing a supply of concrete at the site of placement without interruptions sufficient to permit loss of plasticity between successive increments.
   3. Provide equipment for chuting, pumping, and pneumatically conveying concrete of proper size and design to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials.
   4. Keep open troughs and chutes clean and free from coatings of hardened concrete.
   5. Do not allow concrete to drop freely more than 10 feet. Equipment and methods used for conveying are subject to the approval of Engineer.

3.6 ADDITION OF WATER AT PROJECT SITE

A. Do not add water to concrete at Project site if slump is within specified range.

B. With the Engineer's approval, add water to concrete arriving at Project site with a slump less than the specified range, provided it can be demonstrated that the specified water-cement ratio will not be exceeded.

C. All concrete shall be 4000 psi at 28 days with a maximum cement water ratio of .45 unless noted otherwise on Design Drawings.

3.7 CONSOLIDATION AND VISUAL OBSERVATION

A. Concrete shall be consolidated with internal vibrators having a frequency of at least 800 vpm, with amplitude required to consolidate concrete in the section being placed.

B. At least one standby vibrator in operable condition shall be at the placement site prior to and during placing concrete.

C. Consolidation equipment and methods shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete".

D. Vibrator operator is required to see the concrete being consolidated to ensure good quality workmanship; or Contractor shall have a person actually observe the vibration of the concrete and will advise the vibrator operator of changes needed to assure complete consolidation.

E. Do not use vibrators to transport concrete in forms.

3.8 PLACING CONCRETE IN HOT WEATHER

A. Comply with the requirements of ACI 305.

B. Do not place concrete at times when temperature is forecast to exceed 100 degrees F within 12 hours after the concrete is placed.

C. Fog spray forms, reinforcing steel, and subgrade just before placing concrete.

D. Make every effort to maintain concrete temperature:
   1. Temperature of concrete shall be below 90 degrees F at time of placement, cool the ingredients before mixing by use of chilled water.
   2. Concrete batches with temperature in excess of 90 degrees F will be rejected.

E. Place concrete promptly upon arrival at Project and vibrate immediately after placement.

F. Do not add water to retemper.

G. Consider placing concrete in late afternoon as opposed to early morning.

H. Protect and cure exposed surfaces by one of the following:
   1. Continuous water curing.
   2. Moisture-cover curing.

3.9 PLACING CONCRETE IN COLD WEATHER (ACI 306R)

A. Preparation:
   1. Comply with the requirements of ACI 306.
   2. Additives for the sole purpose of providing freeze protection shall not be used.
   3. Arrangements for covering, insulating, housing, or steam heating newly-placed concrete shall be made in advance of placement and shall be adequate to maintain temperature and moisture conditions recommended.

B. Placement:
   1. Surfaces to be in contact with concrete shall be free of snow, ice, and frost and shall be above 40 degrees F.
   2. Do not place concrete on frozen subgrade.
   3. Placement of insulating material, tarpaulins, or other movable coverings shall follow closely the placing of concrete so that only a few feet of concrete are exposed to outside air at any time.

C. Curing and Protection:
   1. Keep concrete continuously moist and covered and maintain concrete temperature at a minimum of 50 degrees F for 7 days; temperature shall be uniform throughout concrete. If high early strength concrete is used, this temperature requirement may be reduced to 3 days.
   2. It is recommended forms be left in place for the entire period of protection; use insulated blankets or other approved method on slab surfaces.
   3. Limit rapid temperature changes at end of protection period to avoid thermal cracking.

3.10 PATCHING - GENERAL

A. Prior to starting patching work, except as specified, obtain Engineer's approval of proposed patching techniques and mixes.

3.11 REPAIR OF DEFECTIVE AREAS

A. Definition: Concrete in place that does not conform to specified design strength, shapes, alignments, and elevations as shown on Drawings and contains surface defects.

B. Evaluation and acceptance of concrete shall conform to ACI 318.

C. With prior approval of Engineer, as to method and procedure, repair defective areas in conformance with ACI 301, Chapter 9, except that the specified bonding compound shall be used.

D. Surface Repairs:
   1. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Owner.
   2. Honey-combed areas and rock pockets:
      a. Repair immediately after removal of forms.
      b. Prepare no-slump concrete mortar and test so that, when dry, patching mortar will match surrounding color and strength.
      c. Cut out to solid concrete or minimum of 1-inch depth.
      d. Make edges for cuts perpendicular to the concrete surface.
      e. Thoroughly clean and dampen with water.
      f. Apply bonding compound.
      g. Compact no-slump concrete into patch, and finish to blend with adjacent finished concrete.
      h. Cure in same manner as adjacent concrete.
   3. High Areas: Grind after concrete has cured at least 14 days.
   4. Low Areas:
      a. Repair during or immediately after completion of surface finishing operations.
      b. Cut out low areas and replace with fresh concrete of same type and class as original concrete.
      c. Finish repaired areas to blend into adjacent concrete.
   5. Defective Areas:
      a. Cut out and replace with fresh concrete of same type and class as original concrete.
      b. Finish repaired areas to blend into adjacent concrete.
   6. Make structural repairs with prior approval of Engineer, as to method and procedure, using the specified epoxy adhesive or epoxy mortar. Where epoxy injection procedures must be used, use an approved low viscosity epoxy made by the manufacturers previously specified.
   7. Level floors for subsequent finishes by use of specified underlayment material.
   8. Where required, level exposed floors by use of the specified self-leveling repair topping.
   9. Repair methods not specified above may be used, subject to approval of Engineer.

3.12 BLOCKOUTS AT PIPES OR OTHER PENETRATIONS

A. Submit proposed blockouts for review in accordance with the Frontend Documents.

3.13 CONCRETE CURING

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

B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as specified herein.
   1. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by water-fog spray, or by covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.
   2. Provide moisture-cover curing by covering concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. Provide curing and sealing compound on interior slabs left exposed and to exterior slabs and walks, as follows:
      a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
      b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

C. Curing Formed Surfaces:
   1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed.
   2. If forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces:
   1. Cure unformed surfaces; i.e., slabs and other flat surfaces by application of appropriate curing compound.
   2. Final cure concrete surfaces to receive finish flooring by moisture-retaining cover, unless otherwise directed by Engineer.

3.14 SURFACE FINISHES

A. As-Cast Finish:
   1. For formed concrete surfaces not exposed-to-view in the finished work or by other construction, unless otherwise indicated.
   2. This is concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth Form Finish:
   1. For formed concrete surfaces exposed-to-view, or that will be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, i.e.; waterproofing, damp-proofing, painting or other similar system.
   2. This is cast-in-place concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams.
   3. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise specified or shown on Drawings.

D. Float Finish: Apply float finish to slab surfaces to receive trowel finish and other finishes specified.
   1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units.
   2. Check and level surface plane to tolerances of Ff 18 - Fl 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to uniform, smooth, granular texture.

E. Grout Cleandown Finish:
   1. After repairing defects, saturate surface thoroughly and keep saturated during grouting operations.
   2. Use a grout consisting of 1 part cement, 1-1/2 to 2 parts of fine sand and sufficient water for a thick creamy consistency.
   3. Apply by brush, trowel or rubber float to completely fill air bubbles and holes.
   4. Float vigorously with a wood, sponge-rubber or cork float immediately after applying grout. Excess grout shall be scraped off with a sponge-rubber float.
   5. After grout has been allowed to stand undisturbed to allow some loss of plasticity, but not damp appearance, the surface should be rubbed with a

clean, dry burlap to remove all excess grout. All air holes shall be filled but no visible film of grout shall remain after the rubbing.

F. Trowel Finish: After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of Ff 20 - fl 17. Grind smooth surface defects which would telegraph through applied floor covering. Apply where exposed-to-view, and where slab surfaces are to be covered other thin finish coating system.

G. Non-Slip Broom Finish:
   1. Finish concrete as specified, except only trowel the surface once.
   2. Finish surface by drawing fine-hair broom lightly across surface.
   3. Brooming:
      a. Broom in same direction and parallel to expansion joints.
      b. Inclined slab: Broom perpendicular to slope. Texture shall be as approved by the Engineer from sample panels.
      c. Round Roof Slab: Broom surface in radial direction.

H. Class 2, Rubbed Finish in accordance with Standard Specifications for Highway Construction, Section 802.20, Arkansas Department of Transportation, latest edition and this Section:
   1. After removal of forms, rubbing of concrete shall be started as soon as its condition will permit.
   2. Immediately before starting this Work, concrete shall be thoroughly saturated with water. Sufficient time shall have elapsed before wetting down to allow the mortar used in the pointing of rod holes and defects to thoroughly set.
   3. Surfaces to be finished shall be rubbed with a medium coarse carborundum stone using a small amount of mortar on its face.
   4. Mortar shall be composed of cement and fine sand mixed in proportions used in the concrete being finished.
   5. Rubbing shall be continued until form marks, projections, and irregularities have been removed, voids filled, and a uniform surface has been obtained.
   6. Paste produced from rubbing shall be left in place at this time.
   7. After concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. Rubbing shall be continued until the entire surface is smooth texture.
   8. Finish will not be acceptable if a uniform texture and color have not been achieved. Should the finish not be acceptable, the surface shall be given a sprayed finish or other approved finish that is satisfactory to the Engineer.
   9. After final rubbing is completed and the surface is dried, it shall be rubbed with burlap to remove loose power and left free from all unsound patches , paste, powder, and objectable marks.

I. Class 3, Textured Coating Finish in accordance with Standard Specifications for Highway Construction, Section 802.19, Arkansas Department of Transportation, latest edition and this Section:

1. Material provided for textured coating finish shall be a commercial paint type texturing product produced specifically for this purpose, and shall consist of a synthetic non-alkyd resin containing mica, perlite, non-biodegradable fibers, and durable tinting pigments. The material shall be listed on the QPL. Material shall be approved by Engineer.
2. Unless otherwise specified in the Contract, the color of the textured coating finish shall be concrete gray, equal or close to Shade 36622 of the Federal Color Standard 595 B. The exact shade shall be selected by the Owner.
3. Surfaces to be coated shall be free of efflorescence, laitance, flaking, coatings, dirt, oil, and other foreign substances.
4. The sprayed finish shall not be applied over surfaces cured with membrane curing compound until 30 days has elapsed from application of the membrane.
5. Prior to application of the finish, the surfaces shall be free of moisture, as determined by sight and touch, and in a condition consistent with manufacturer's published recommendations.
6. The finish shall be applied at a rate as recommended by the manufacturer and as approved by the Engineer.
7. The finish shall be applied with heavy duty spray equipment capable of maintaining a constant pressure as necessary for proper application.
8. Completed finish shall be tightly bonded to the structure and shall present a uniform appearance and texture equal to or better than the required for rubbed finish.
9. If necessary, an additional coat or coats shall be applied to produce the desired surface texture and uniformity.
10. Upon failure to adhere positively to the structure without chipping or cracking, or to attain the desired surface appearance, the coating shall be removed from the structure and the surface given a rubbed finish, or another approved finish satisfactory to the Engineer.

3.15 WATER LEAKAGE TESTS - WATER HOLDING STRUCTURES

A. Subject water holding structures to leakage tests after concrete has been cured and obtained its design strength and before backfill, brick facing, or other Work that will cover exposed faces of walls is begun.

B. Fill basins to be subjected to leakage tests with water to normal liquid level line.

C. After basin has been kept full for 48 hours, it will be assumed, for purposes of the test, that moisture absorption by the concrete in the basin is complete.

D. Valves and gates to the structure shall then be closed, and the change in water surface measured for a 24-hour period.

E. During test period, examine exposed portions of the structure and mark visible leaks or damp spots; such leaks or damp spots shall be later patched or corrected in a manner acceptable to Engineer.

3.16 MISCELLANEOUS ITEMS

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

B. Non-Shrink Grout Application: Grout base plates, equipment bases, clarifier base, and other location indicated with specified non-shrink grout. Provide non-metallic type where grout is exposed.

3.17 PROTECTION

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

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

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

END OF SECTION

SECTION 03002

SITE CONCRETE REINFORCING STEEL

PART 1. GENERAL

1.1 SUMMARY

A. Provide reinforcing steel and welded wire fabric.

B. Conform to "Placing Reinforcing Bars", Recommended Practices, Joint Effort of CRSI-WCRSI, prepared under the direction of the CRSI Committee on Engineering Practice.

C. Notify Engineer when reinforcing is ready for inspection and allow sufficient time for this inspection prior to casting concrete.

1.2 RELATED SECTIONS

A. Section 03001 - Site Concrete Work.

1.3 REFERENCES

A. American Concrete Institute, 22400 West Seven Mile Road, Detroit, Michigan 48219.
   1. ACI-318 - Building Code Requirements for Reinforcing Concrete.

B. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
   1. ASTM A185 - Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
   2. ASTM A497 - Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
   3. ASTM A615 - Specification for Deformed and Plain Billet-Steel for Concrete Reinforcement.

C. American Welding Society, 550 North West LeJeune Road, Miami, Florida 33126.
   1. AWS D1.4 - Structural Welding Code; Reinforcing Steel.

D. Concrete Reinforcing Steel Institute, 933 North Plum Grove Road, Schamburg, Illinois 60195.
   1. CRSI-MSP-1 - Manual of Standard Practice.

1.4 SUBMITTALS

A. Submit the following in accordance with the Frontend Documents:
   1. Bending lists.
   2. Placing drawings.
   3. Shop drawings.

B. Shop Drawings:
   1. Bars for footings, including dowels, shall not be fabricated and shipped without prior review of Shop Drawings by the Engineer.
   2. Otherwise, Shop and Placing Drawings shall include reinforcing placing plans and details indicating size, location, arrangement, placing sequence, etc., and shall conform to ACI 315.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel:
   1. Deliver with suitable hauling and handling equipment.
   2. Tag for easy identification.
   3. Store to prevent contact with the ground.

B. Unloading, storing, and handling of bars shall conform to CRSI publication "Placing Reinforcing Bars".

PART 2. PRODUCTS

2.1 DEFORMED REINFORCING BARS

A. Deformed billet-steel bars conforming to ASTM A615, Grade 60.

2.2 WELDED WIRE FABRIC

A. Conform to ASTM A185 or A497.

2.3 ACCESSORIES

A. Tie wire: 16-gage, black, soft-annealed wire.

B. Bar supports: proper type for intended use.

C. Bar supports in beams, columns, walls, and slabs exposed to view after stripping: Small rectangular concrete blocks of same color and strength of concrete that is being placed around them.

D. Concrete supports: for reinforcing concrete placed on grade.

E. Conform to requirements of "Placing Reinforcing Bars" published by CRSI.

PART 3. EXECUTION

3.1 REINFORCING STEEL

A. Clean metal reinforcement of loose mill scale, oil, earth and other contaminants.

B. Straightening and rebending reinforcing steel:
   1. Do not straighten or rebend metal reinforcement.
   2. Where construction access through reinforcing is a problem, use bundle or space bars instead of bending.
   3. Submit details and obtain Engineer's review prior to placing.

C. Protection, spacing, and positioning of reinforcing steel: Conform to the current edition of the ACI Standard Building Code Requirements for Reinforced Concrete (ACI 318), reviewed placing drawings and design drawings.

D. Location Tolerance: Conform to the current edition of "Placing Reinforcing Bars" published by Concrete Reinforcing Steel Institute and to the Details and Notes on the Drawings.

E. Splicing:
   1. Conform to Drawings and current edition of ACI Code 318.
   2. Stagger splices in adjacent bars.

F. Tying deformed reinforcing bars: Conform to current edition of "Placing Reinforcing Bars" published by Concrete Reinforcing Steel Institute and to details and notes on Drawings.

G. Field Bending:
   1. Field bending of reinforcing steel bars is not permitted when rebending will later be required to straighten bars.
   2. Consult with Engineer prior to pouring if there is a need to work out a solution to prevent field bending.

3.2 REINFORCEMENT AROUND OPENINGS

A. Place an equivalent area of steel around pipe or opening and extend on each side sufficiently to develop bond in each bar.

B. See Drawings for bar extension length each side of opening.

C. Where welded wire fabric is used, provide extra reinforcement using fabric or deformed bars.

3.3 WELDING REINFORCEMENT

A. Welding shall not be permitted unless Contractor submits detailed Shop Drawings, qualifications, and radiographic nondestructive testing procedures for review by Engineer.
   1. Obtain results of this review prior to proceeding.
   2. Basis for submittals: Structural Welding Code, Reinforcing Steel, AWS D1.4, published by American Welding Society, and applicable portions of ACI 318, current edition.
   3. Test 10 percent of welds using radiographic, nondestructive testing procedures in accordance to the above referenced codes.

3.4 PLACING WELDED WIRE FABRIC

A. Conform to ACI 318 and to current Manual of Standard Practice, Welded Wire Fabric, by Wire Reinforcement Institute regarding placement, bends, laps, and other requirements.

B. Placing:
   1. Extend fabric to within 2 inches of edges of slab.
   2. Lap splices at least 1-1/2 courses of fabric and a minimum of 6 inches.
   3. Tie laps and splices securely at ends and at least every 24 inches with 16-gage black annealed steel wire.
   4. Place welded wire fabric at the proper distance above bottom of slab.

END OF SECTION

SECTION 03004

SITE CONCRETE EXPANSION, CONSTRUCTION, AND CONTRACTION JOINTS

PART 1. GENERAL

1.1 SUMMARY

A. Provide expansion, construction, and contraction joints as specified.

1.2 RELATED SECTIONS

A. Section 03001 - Site Concrete Work.

1.3 REFERENCES

A. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
   1. ASTM A36 - Specification for Structural Steel.
   2. ASTM D226 - Specification for Asphalt-Saturated Organic Felt used in Roofing and Waterproofing.
   3. ASTM D994 - Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
   4. ASTM D1190 - Specification for Concrete joint Sealer, Hot-Poured Elastic Type.
   5. ASTM D1751 - Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

B. Corp of Engineers, (U.S. Department of the Army) Pulaski Building, 20 Massachusetts Avenue, North West, Washington, D.C. 20314.
   1. CRD-C-572 - Polyvinylchloride Waterstops.

C. Federal Specifications: SS-S-210A; Sealing Compound for Expansion Joints.

PART 2. PRODUCTS

2.1 WATERSTOPS

A. Center bulb type extruded from an elastomeric plastic compound, the basic resin of virgin polyvinyl chloride (PVC).

B. Size as recommended by manufacturer for each application or as shown on Drawing. Generally, 6 inches for walls with a 12 inches thickness and 9 inches for walls thicker than 12 inches.

C. Specific gravity approximately 1.37 and the shore durometer Type A hardness, approximately 80.

D. Meet the performance requirements of the Corps of Engineers' Specification CRD-C-572.

E. Constant thickness from the edge of the bulb to the outside edge.

F. Have a number of parallel ribs or protrusions on each side of the center of the strip.

G. Corrugated type or tapered waterstops are not acceptable.

H. The minimum weight per foot for waterstop shall be 0.75 pound for 3/16-inch by 6-inch, 1.35 pounds for 3/8-inch by 6-inch, and 2.05 pounds for 3/8-inch by 9-inch.

I. Manufacturers:
   1. Southern Metal and Plastic Products, Inc.
      a. Type 11RCB for 4-inch by 3/16-inch.
      b. Type 17RCB for 6-inch by 3/8-inch.
      c. Type 18RCB for 9-inch by 3/8-inch.
   2. Vinylex Corporation.
      a. Catalog No. RB6-38H for the 6-inch by 3/8-inch.
      b. Catalog No. RB9-38H for the 9-inch by 3/8-inch.
   3. Greenstreak Plastic Products.
      a. Style 732 for the 6-inch by 3/8-inch.
      b. Style 735 for the 9-inch by 3/8-inch.
   4. Or approved equal.

2.2 BOND BREAKER TAPE FOR EXPANSION JOINTS

A. Where indicated, adhesive-backed glazed butyl or polyethylene tape that will satisfactorily adhere to the premolded joint material or concrete surface.

B. Same width as joint.

2.3 PREMOLDED JOINT FILLER - BITUMINOUS TYPE

A. Bituminous type conforming to ASTM D994 or D1751, unless otherwise shown or specified.

B. Use around pipe penetrations through existing walls.

C. Manufacturers:
   1. Synko Flex Products Inc.; Synko Flex Preformed Plastic Adhesive Waterstop.
   2. American Colloid Co.; Waterstop RX.

2.4 BOND BREAKER

A. Bond breaker, except where a tape is specifically called for, shall be either bond breaker tape as specified or a bond prevention material, nonstaining type, as specified in Section 03001.

2.5 CORK EXPANSION JOINT FILLER

A. Manufacturer: W.R. Meadows Sealtight, or equal.

B. Seal joints with a pourable two-component cold-applied compound to depth as indicated on Drawings.

2.6 POURABLE JOINT FILLERS - RUBBER ASPHALT FILLER

A. Hot-pour type, conforming to ASTM D1190. Use primer recommended by the manufacturer.

2.7 COAL-TAR TAPE

A. Manufacturer's:
   1. Protecto Wrap 200, by Protecto Wrap Co., Denver, CO.
   2. Tapecoat CT, by Tapecoat Company, Inc., Evanston, IL.
   3. Or equal.

2.8 STEEL EXPANSION JOINT DOWELS

A. Smooth steel conforming to ASTM A36. Coating on bars with an approved, FUSION BONDED COATING.

PART 3. EXECUTION

3.1 INSTALLATION OF WATERSTOPS - GENERAL

A. Join waterstops at intersections so continuous seal is provided.

B. Center waterstop on joint.

C. Hold waterstop positively in correct position**.**

D. If waterstop is damaged, repair in acceptable manner.

E. Vibrate concrete to obtain impervious concrete in the vicinity of joints.

F. In horizontal joints, fill areas below waterstop completely with concrete; make visual inspection of entire waterstop area during concrete placement.

3.2 WATERSTOPS IN CONSTRUCTION JOINTS

A. Horizontal Waterstops:
   1. Place immediately after the pour is completed and before concrete has begun to set.
   2. Puddle each side to level concrete and assure that waterstop is properly embedded.
   3. Where stops are spliced, lap at least 12 inches and secure together.
   4. After concrete has set to the point where the surface can be cut with a broom or a stream of water, cut off the surface to a rough finish with laitance removed and the concrete left clean.

B. Vertical Waterstop: Place and secure in forms prior to placing concrete**.**

3.3 PLASTIC WATERSTOP

A. Install in accordance with details shown and manufacturer's instructions.

B. Allow at least 10 minutes before pulling or straining the new splice.

C. Finished splices shall provide a cross section that is dense and free of porosity with tensile strength of not less than 80 percent of unspliced materials.

3.4 SPLICES AND JOINTS

A. Prior to use of the waterstop material in the field, submit a sample of a fabricated cross constructed of each size or shape of material to be used for approval.

B. Fabricate samples so that the material and workmanship represent the fittings provided under this Section.

C. Make field splices and joints in accordance with waterstop manufacturer's instructions using a thermostatically controlled heating iron**.**

3.5 JOINT PREPARATION - GENERAL

A. Accurately locate and construct joints to produce straight joints.

B. Vertical or horizontal, except where walls intersect sloping floors.

C. Do not commence concrete pour until after joint preparation has been inspected and approved by Engineer.

3.6 CONSTRUCTION JOINTS

A. Prior to placing abutting concrete, clean contact surface by sandblasting or other approved means to remove laitance and expose the aggregate.

B. Remove concrete from exposed portion of reinforcing steel.

C. Do not damage the waterstop, if one is present, during the cleaning process.

D. Grout for horizontal construction joints shall be as specified in Section 03001.

E. Roughen surface of hardened concrete by one of the following methods:
   1. Sandblast foundation and reinforcing dowels after concrete has fully cured to remove laitance and spillage and to expose sound aggregate.
   2. Water blast the foundation and reinforcing dowels after concrete has partially cured to remove laitance and spillage and to expose sound aggregate.
   3. Green cut fresh concrete with high pressure water and hand tools to remove laitance and spillage from the foundation and reinforcing dowels, and to expose sound aggregate.

3.7 LOCATION

A. Joints as shown on the Drawings or approved by Engineer.

3.8 TIME BETWEEN POURS

A. At least 2 hours shall elapse after depositing concrete in long or high columns or heavy walls before depositing in beams, girders, or slabs supported thereon.

B. For short columns and low height walls, 10 feet or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

C. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor or roof system and shall be placed monolithically therewith.

D. Where cold joints will result and this joint will be below the finished water surface, provide and install a waterstop in the joint.

3.9 EXPANSION JOINTS - GENERAL

A. Provide premolded joint filler of sufficient width to completely fill the joint space.

B. If a waterstop is in the joint, accurately cut premolded joint filler to butt tightly against the waterstop and the side forms.

C. At locations where joint sealant is to be applied, precut premolded joint filler the required depth.

D. Form cavities for joint sealant with either precut, premolded joint filler or smooth, accurately-shaped material that can be removed.

E. Thoroughly vibrated concrete along the joint form to produce a dense, smooth surface.

F. Repair surface irregularities along the joint sealant cavity due to improper concrete consolidation or faulty form removal with an approved compound compatible with the joint sealant in a manner that is satisfactory to the sealant manufacturer.

3.10 INSTALLATION OF BITUMINOUS TYPE OR CLOSED CELL FOAM TYPE PREMOLDED JOINT FILLER

A. Drive nails at about 1 foot on centers through the filler to provide anchors into the concrete when it is placed.

B. Place premolded joint filler in the forms in the proper position before concrete is poured.

C. Install premolded joint filler in walks (to provide expansion and contraction joints at not more than 20-foot intervals), at changes in direction at intersections, and at each side of driveway entrances.

3.11 POURABLE JOINT FILLER - GENERAL

A. Install pourable joint fillers in accordance with the manufacturer's instructions.

B. Thoroughly clean joints by sandblasting concrete surfaces of each side of joint from plastic waterstop to top of joint, dry the joint, and remove dust and foreign material; prime before pouring the filler.

C. Avoid damaging waterstop by sandblasting operations.

D. Primer compatible with filler material.

3.12 RUBBER ASPHALT JOINT FILLER

A. Heat rubber asphalt filler material in a double-walled boiler and place in the joint by means of a nozzle.

B. Prevent spillage outside of the joint.

C. Begin pouring joint filler at the bottom of the horizontal joint and proceed upwards in a manner that will preclude the possibility of trapping air in the joint.

D. Use masking tape at each side of joint to assist in cleaning all spillage.

3.13 CONTROL JOINTS IN FLOOR SLABS

A. Form tongue-and-groove construction joints with keyway in bulkhead forms.

B. Key horizontal joints the full length of the member.

C. Key width shall occupy the interior one-third section, and depth of the key shall be 2 inches.

3.14 STEEL EXPANSION JOINT DOWELS

A. Install parallel to wall or slab face and in true horizontal position by securing tightly in forms with rigid ties.

B. Orient dowels to permit joint movement.

END OF SECTION

SECTION 16000

ELECTRICAL - GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials and equipment required and install complete and make operational, electrical system as shown on the Drawings and as specified herein.

B. The work shall include the following:

1. Coordinate the electrical service requirements with the power company and provide the electrical service(s) from the Power Company at the locations indicated.

2. Provide conduit, wire and field connections for all motors, motor controllers, control devices, control panels and electrical equipment furnished under Divisions 1, 11, 13 and 15.

3. Provide conduit, wiring and terminations for variable frequency drives, reactors, harmonic filters, transformers and power factor correction capacitors furnished and mounted under other related Divisions.

C. Each bidder or their authorized representatives shall, before preparing their proposal, visit all areas of the existing buildings and structures in which work under this sub-bid is to be performed and inspect carefully the present installation. The submission of the proposal by this bidder shall be considered evidence that their representative has visited the buildings and structures and noted the locations and conditions under which the work will be performed and that he/she takes full responsibility for a complete knowledge of all factors governing his/her work.

1.02 SUBMITTALS

A. As a minimum all equipment specified in each Section of Division 16 shall be submitted at one time. As an example all lighting fixtures shall be submitted together, all motor control centers shall be submitted together, etc. Submittals that do not comply will be returned disapproved.

B. Mark submittals to clearly identify proposed equipment including accessories, options, and features and to exclude parts not applicable to the project. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submittal piece of literature and each submittal drawing shall clearly reference the Project Specification and/or Contract Drawing that the submittal is to cover. General catalogs will not be accepted as cut sheets to fulfill submittal requirements.

C. Check shop drawings for accuracy prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to this Section and the Drawings. This statement shall also list all exceptions to this Section and the Drawings. Mark submittals to identify proposed equipment including accessories, options and features being

proposed for approval and exclude parts not to be used. Shop drawings not so checked and noted shall be returned marked NOT APPROVED.

D. The Engineer's check shall be for conformance with the design concept of the project and compliance with this Section and the Drawings. Errors and omissions on approved shop drawings shall not relieve the Contractor from the responsibility of providing materials and workmanship required by this Section and the Drawings.

E. All dimensions shall be field verified at the job site and coordinated with the work of all other trades.

F. Material shall not be ordered or shipped until the shop drawings have been approved. No material shall be ordered or shop work started if shop drawings are marked “APPROVED AS NOTED - CONFIRM," "APPROVED AS NOTED - RESUBMIT" or "NOT APPROVED."

G. Operation and Maintenance Data

1. Submit operations and maintenance data for equipment furnished under this Division, in accordance with Section 01730. The manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists including replacement part numbers, to instruct operating and maintenance personnel unfamiliar with such equipment.

2. Manuals shall include the following as a minimum:

a. A complete "As-Built" set of approved shop drawings.

b. A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.

c. Detailed service, maintenance and operation instructions for each item supplied.

H. Submittals will be returned to the Contractor under one of the following codes.

Code 1 -"APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 -"APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 -"APPROVED AS NOTED/CONFIRM" - This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may, at his own risk, release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 10 calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 -"APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 -"NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 -"COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

Code 7 -"RECEIPT ACKNOWLEDGED" - This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer's review and approval; and, is being filed for informational purposes only. This code is generally used in acknowledging receipt of *means and methods of construction* work plan, field conformance test reports, and Health and Safety plans.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

1.03 REFERENCE STANDARDS

A. Electric equipment, materials and installation shall comply with the National Electrical Code (NEC).

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 PRIORITY OF THE CONTRACT DOCUMENTS

A. If, during the performance of the work, the Contractor finds a conflict, error or discrepancy between or among one or more of the Sections or between or among one or more Sections and the Drawings, furnish the higher performance requirements. The higher performance requirement shall be considered the equipment, material, device or installation method which represents the most stringent option, the highest quality or the largest quantity.

B. In all cases, figured dimensions shall govern over scaled dimensions, but work not dimensioned shall be as directed by the Engineer and work not particularly shown, identified, sized, or located shall be the same as similar work that is shown or specified.

C. Detailed Drawings shall govern over general drawings, larger scale Drawings take precedence over smaller scale Drawings, Change Order Drawings shall govern over Contract Drawings and Contract Drawings shall govern over Shop Drawings.

D. If the issue of priority is due to a conflict or discrepancy between the provisions of the Contract Documents and any referenced standard, or code of any technical society, organization or association, the provisions of the Contract Documents will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or

discrepancy between standard specifications, or codes of any technical society, organization or association, or between Laws and Regulations, the higher performance requirement shall be binding on the Contractor, unless otherwise directed by the Engineer.

E. In accordance with the intent of the Contract Documents, the Contractor accepts the fact that compliance with the priority order specified shall not justify an increase in Contract Price or an extension in Contract Time nor limit in any way, the Contractor's responsibility to comply with all Laws and Regulations at all times

1.05 ENCLOSURE TYPES

A. Unless otherwise required, electrical enclosures shall be NEMA Types as follows:

1. NEMA 4 in outdoor locations, rooms below grade including basements and buried vaults and "WET" locations shown on the Drawings.

2. NEMA 4X in "CORROSIVE" locations shown on the Drawings.

1.06 SERVICE AND METERING

A. Service will be obtained at 240 Volts, 1 Phase, 3 Wire, 60 Hz.

B. The Contractor shall be responsible for the following work:

1. Obtain an estimate from the power company for the work described above and include the cost of the power company work in the Bid Price.

2. Make all arrangements with the power company for obtaining electrical service, pay all power company charges.

1.07 CODES, INSPECTION AND FEES

A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.

B. Obtain all necessary permits and pay all fees required for permits and inspections.

1.08 INTERPRETATION OF DRAWINGS

A. Unless specifically stated to the contrary, the Drawings do not show exact locations of conduit runs. Coordinate the conduit installation with other trades and the actual supplied equipment.

B. Install each 3 phase circuit in a separate conduit unless otherwise shown on the Drawings.

C. Conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed. Unless otherwise indicated install branch circuit conduits exposed in process/ industrial type spaces and concealed in finished spaces.

D. Where circuits are shown as "home-runs" all necessary fittings and boxes shall be provided for a complete raceway installation. Where home-runs indicate conduit is to be installed concealed or exposed the entire branch circuit shall be installed in the same manner.

E. Verify the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation.

F. Except where dimensions are shown, the locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the Contractor and approved by the Engineer during construction. Obtain information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner.

G. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials to install and place in satisfactory operation all power, lighting and other electrical systems shown.

H. Redesign of electrical or mechanical work, which is required due to the Contractor's use of an alternate item, arrangement of equipment and/or layout other than specified herein, shall be done by the Contractor at his/her own expense. Redesign and detailed plans shall be submitted to the Engineer for approval. No additional compensation will be provided for changes in the work, either his/her own or others, caused by such redesign.

I. Raceways and conductors for low voltage (120 Volts) thermostats controlling HVAC unit heaters, exhaust fans and similar equipment are not shown on the Drawings. Provide raceways and conductors between the thermostats, the HVAC equipment and the motor starters for a complete and operating system. Raceways shall be installed concealed in all finished space and may be installed concealed or exposed in process spaces. Refer to the HVAC drawings for the locations of the thermostats.

1.09 SIZE OF EQUIPMENT

A. Investigate each space in the structure through which electrical equipment furnished under Division 16 must pass to reach its final location. Coordinate shipping splits with the manufacturer to permit safe handling and passage through restricted areas in the structure.

B. The equipment shall be kept upright at all times during storage and handling. When equipment must be tilted for passage through restricted areas, brace the equipment to ensure that the tilting does not impair the functional integrity of the equipment.

1.10 RECORD DRAWINGS

A. As the work progresses, legibly record all field changes on a set of Project Contract Drawings, hereinafter called the "Record Drawings."

1.11 MATERIALS AND EQUIPMENT

A. Materials and equipment furnished under this contract shall be new.

B. Material and equipment of the same type shall be the product of one manufacturer and shall be UL listed.

1.12 EQUIPMENT IDENTIFICATION

A. Identify equipment, disconnect switches, separately mounted motor starters, control stations, etc. furnished under Division 16 with the name of the equipment it serves. Motor control centers, control panels, panelboards, switchboards, switchgear, junction or terminal boxes, transfer switches, etc, shall have nameplate designations as shown on the Drawings.

B. Nameplates shall be engraved, laminated plastic, not less than 1/16-in thick by 3/4-in by 2-1/2-in with 3/16-in high white letters on a black background.

C. Nameplates shall be screw mounted to NEMA 1 enclosures. Nameplates shall be bonded to all other enclosure types using an epoxy or similar permanent waterproof adhesive. Two sided foam adhesive tape is not acceptable. Where the equipment size does not have space for mounting a nameplate the nameplate shall be permanently fastened to the adjacent mounting surface.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LEEVES AND FORMS FOR OPENINGS

A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all slots for electrical work and form before concrete is poured.

B. Exact locations are required for stubbing-up and terminating concealed conduit. Obtain shop drawings and templates from equipment vendors or other subcontractors and locate the concealed conduit before the floor slab is poured.

C. Where setting drawings are not available in time to avoid delay in scheduled floor slab pours, the Engineer may allow the installations of such conduit to be exposed. Requests for this deviation must be submitted in writing. No additional compensation for such change will be allowed.

3.02 CUTTING AND PATCHING

A. Cutting and patching shall be done in a thoroughly workmanlike manner and be in compliance with modifications and repair to concrete as specified. Saw cut concrete and masonry prior to breaking out sections.

3.03 INSTALLATION

A. Work not installed according to the Drawings and Specification shall be subject to change as directed by the Engineer at Contractor's expense.

B. Electrical equipment shall be protected against mechanical and water damage. Store all electrical equipment in dry permanent shelters. Do not install electrical equipment in place until structures are weather-tight.

C. Damaged equipment shall be replaced or repaired by the equipment manufacturer, at the Engineer's discretion and at the Contractor's expense.

D. Repaint any damage to factory applied paint finish using touch-up paint furnished by the equipment manufacturer.

3.04 WORK SUPERVISION

A. The Contractor shall designate in writing the qualified electrical supervisor who shall provide supervision to all electrical work on this project. The minimum qualifications for the electrical supervisor shall be a master electrician as defined by the Arkansas Board of Electrical Examiners. The supervisor or his appointed alternate possessing at least a journeyman electrician license shall be on site whenever electrical work is being performed. The qualifications of the electrical supervisor shall be subject to approval of the Owner and the Engineer.

B. All master and journeyman electricians shall be licensed in accordance with Arkansas Code Title 17 Chapter 28 - Electricians. The website located at http://www.arkleg.state.ar.us publishes the text of this statutory requirement. No unlicensed electrical workers shall perform work on this project. Apprentice electricians in a ratio of not more than one apprentice per journeyman electrician will be allowed if the apprentices are licensed and actively participating in an apprenticeship program recognized and approved by the Arkansas Board of Electrical Examiners.

END OF SECTION

SECTION 16110

RACEWAYS, BOXES, FITTINGS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein.

B. Home runs indicated are to assist the contractor in identifying raceways to be installed concealed or exposed. Raceways identified to be installed exposed on the Drawings shall be run near the ceilings or along the walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes and hoists, lighting fixtures, doors and hatches. Raceways indicated to be run concealed shall be run in the center of concrete floor slabs, in partitions, or above hung ceilings, as required.

PART 2 PRODUCTS

2.01 RACEWAYS AND FITTINGS

A. Steel Conduit and Fittings

1. Rigid metal conduit (GRS), couplings, factory elbows and fittings shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading and shall comply with ANSI C 80.1 and UL/6.

2. Intermediate metal conduit (IMC), couplings, factory elbows and fittings shall be medium wall steel tubing with a hot-dipped galvanized finish inside and out after threading and shall comply with UL/1242.

3. Electrical metallic tubing (EMT), factory elbows and fittings shall be thin wall steel tubing with an electrically galvanized finish after fabrication and comply with ANSI C80.3 and UL/797.

4. Acceptable manufacturers:

   a. Allied Tube & Conduit Corp.

   b. LTV Steel Tubular Products Corp.

   c. Triangular PWC Inc.

   d. Or equal.

5. Rigid metal and intermediate metal conduit fittings shall be of the threaded type, and shall be steel or malleable iron, with a hot-dipped galvanized finish. Threadless fittings and split couplings are not allowed except in specific applications as approved by the Engineer.

6. Electrical metallic tubing fittings shall be of the rain tight, concrete tight, compression type with malleable iron or pressure cast steel body, steel hex type compression nut and electrically galvanized finish.

7. Acceptable manufacturers:

   a. Appleton Electric Co.

   b. O-Z Gedney Co.

   c. RACO Inc.

   d. Gould/Efcor

   e. Steel City

   f. Or equal

B. PVC Coated Rigid Steel Conduit and Fittings

1. PVC coated rigid steel conduit shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading with a minimum 0.040-in thick, polyvinyl chloride coating permanently bonded to it and an internal chemically cured urethane or enamel coating. The rigid steel conduit shall comply with ANSI C80.1 and UL/6 prior to coating.

2. PVC coated couplings, factory elbows and fitting shall be furnished with a PVC coating bonded to steel the same thickness as used on the PVC coated conduit. The ends of all couplings, fittings, etc. shall have a minimum of one pipe diameter in length of PVC overlap.

3. Acceptable manufacturers:

   a. “OCAL” as manufactured by Thomas & Betts

   b. "Plasti-Bond Red" as manufactured by Robroy Industries

   c. Triangle PWC Inc

   d. Or equal

C. Non Metallic Conduit and Fittings

1. PVC conduit shall be rigid polyvinyl chloride schedule 40. Rigid PVC conduit up to trade sizes 3-1/2-in shall comply with NEMA TC-2 and UL/651 and shall be sunlight resistant, rated for use with 90 degree C conductors in exposed, direct burial or concrete encased applications. Underground utility duct, 4-in trade size and above, shall be polyvinyl chloride (PVC).

2. Connectors, couplings, fittings and ancillary materials shall be supplied by the conduit manufacturer. Connectors, fittings and ancillary materials shall be rated for the environment for which they are installed.

3. Acceptable manufacturers:

   a. Carlon Corp.

   b. Certained Corp.

   c. Conux Pipe Systems, Inc.

   d. Or equal.

D. Liquid-tight Flexible Metal Conduit, Couplings and Fittings

1. Liquid-tight flexible metal conduit shall be square locked, galvanized steel flexible conduit with a moisture proof, flame resistant, polyvinyl chloride jacket, for use with rigid metal conduit systems. Sealtite, Type UA, manufactured by the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co. or equal.

2. Liquid-tight conduit fittings shall be hot-dipped mechanically galvanized, positive grounding, screw in type. Provide external bonding lugs on sizes 1-1/4-in and larger. Box connectors shall have insulated throats as manufactured by the Thomas & Betts Co.; Crouse-Hinds Co. or equal.

3. Acceptable Manufacturers:

   a. American Flexible Conduit Co.

   b. Anaconda Metal Hose/ANAMET Inc.

   c. Electri-flex Co.

   d. Thomas & Betts

   e. O-Z Gedney

   f. Or equal

2.02 BOXES AND FITTINGS

A. Dry and Damp Location Boxes and Fittings

1. Outlet boxes shall be zinc-galvanized, extra depth, pressed steel with knockouts and of size and type suitable for the intended application.

2. Boxes that are less than 100 cubic inches in size used for junction or pull boxes shall be zinc galvanized pressed steel not less than 14 USS gauge with appropriate blank covers, minimum size 4-11/16-in square by 2-1/8-in deep.

3. Boxes that are 100 cubic inches and larger shall be constructed of hop dip galvanized sheet steel without knockouts. Covers shall be secured with round head brass machine screws. All joints shall be welded and ground smooth.

4. Terminal cabinets shall be NEMA 12 sheet steel unless otherwise shown on the Drawings. Boxes shall be painted and have continuously welded seams. Welds shall be ground smooth and galvanized. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Terminal boxes shall be furnished with latching hinged doors, terminal mounting straps and brackets. Terminal blocks shall be rated not less than 20A, 600V.

5. Acceptable Manufacturers:

    a. Appleton

    b. Raco

    c. Steel City

    d. Hoffman

    e. Electromate Division of Robroy Ind.

    f. Wiegmann

B. Wet Location Boxes and Fittings

1. NEMA 4 terminal boxes, junction boxes, pull boxes, etc, shall be sheet Type 316 stainless steel unless otherwise shown on the Drawings. Boxes shall have continuously welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel clamps. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 Amps, 600 Volt.

2. Cast or malleable iron device boxes shall be Type FD. Boxes and fittings shall have cadmium-zinc finish with cast covers and stainless steel screws.

3. Cast aluminum device boxes shall be Type FD. Boxes and fittings shall be copper free aluminum with cast aluminum covers and stainless steel screws

4. Acceptable Manufacturers:

    a. Appleton

    b. Crouse-Hinds

    c. Steel City

    d. Hoffman

    e. Electromate - Division of Robroy Ind.

    f. Or equal

2.03 HARDWARE

A. Conduit Mounting Equipment

1. In dry indoor areas, hangers, rods, backplates, beam clamps, channel, etc shall be galvanized iron or steel.

B. Conduit Supports

1. Trapezes

a. In dry indoor areas, beams, channels, struts, hangers, bracing, rods, beam clamps, accessories and components shall be galvanized steel.

2. Conduit Racks

a. In dry indoor areas, conduit racks, accessories and components shall be galvanized steel.

PART 3 EXECUTION

3.01 RACEWAY APPLICATIONS

A. Refer to Table 16110-1 for specific raceway application requirements.

B. All conduit of a given type shall be the product of one manufacturer.

3.02 BOX APPLICATIONS

A. Terminal boxes, junction boxes and pull boxes shall have NEMA ratings suitable for the location in which they are installed.

B. All conduit bodies and pulling outlets shall comply with NEC wire bending space requirements. Mogul type fittings shall be used for sizes 2-1/2-in and larger.

TABLE 16110-1 *Raceway Application Guidelines*	
Location/Circuit Type	***Raceway Type***
Clean, dry areas -	▪ Conceal raceways in walls above hung ceilings in rooms and areas that have finished interiors. Surface raceway for multiple receptacle, voice, and data outlets in labs and control rooms or in offices where specified. ▪ 3/4 or 1-in electrical metallic tubing (EMT) for lighting, switch, and receptacle circuits exposed above hung ceilings or concealed in partition walls. Galvanized rigid steel (GRS) above 1-in.
Hazardous areas - all locations - Class 1, Division 1 and 2.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS). ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS).
Outdoor areas - all locations.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS). PVC conduit shall not be used exposed. ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Schedule 40 PVC conduit when embedded within concrete structures.

3.03 FITTINGS APPLICATIONS

A. Combination expansion-deflection fittings shall be used where exposed conduits cross structure expansion joints or in straight runs where expansion is anticipated. Combination expansion-deflection fittings shall be installed where embedded conduits cross structural expansion joints. Refer to Structural Drawings for expansion joint locations. Provide bonding jumpers around fittings.

B. All underground conduit penetrations at walls or other structures shall be sealed watertight. Conduit wall seals and sleeves shall be used in accordance with the manufacturer's installation instructions and the details shown on the Drawings.

C. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.

D. Insulated throat grounding bushings shall be used where specified herein and where conduits stub up into electrical equipment such as MCC's, switchgear, etc.

3.04 INSTALLATION

A. No conduit smaller than 3/4-in electrical trade size shall be used, nor shall any have more than the equivalent of three 90 degree bends in any one run. Pull boxes shall be provided as required by the NEC after every 270 degrees of bends and for straight run not to exceed 200 feet or as directed.

B. All conduit which may under any circumstance contain liquids such as water, condensation, liquid chemicals, etc, shall be arranged to drain away from the equipment served. If conduit drainage is not possible, conduit seals shall be used to plug the conduits. The ends of all conduits shall be temporarily plugged to exclude dust, moisture and debris from entering during construction.

C. Conduit ends exposed to the weather shall be sealed with conduit sealing bushings.

D. Conduits noted as spare shall be capped or plugged at both ends with easily removable fittings.

E. Conduit terminating in NEMA 3R, 4, 4X enclosures shall be terminated with Myers type conduit hubs.

F. Conduit terminating in pressed steel boxes shall have double locknuts and insulated bushings.

G. Conduits containing equipment grounding conductors and terminating in sheet steel boxes shall have insulated throat grounding bushings.

H. Conduits shall be installed using threaded fittings except for PVC or EMT.

I. The use of running threads is prohibited. Where such threads are necessary, a 3-piece union shall be used.

J. All conduits entering or leaving a motor control center, switchboard or other multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway or other manufacturer's designated area, directly below the vertical section in which the conductors are to be terminated. The 3-in extension of conduit above the floor slab or concrete equipment pad may be reduced to a dimension that suits the equipment manufacturer's installation requirements if the 3-in stub-up interferes with the equipment being provided.

K. Rigid galvanized steel conduits buried in earth shall be completely painted with bitumastic.

L. Rigid galvanized steel conduits which have been field cut and threaded shall be painted with cold galvanizing compounds.

M. PVC coated rigid galvanized steel conduit shall be used for elbows at risers at the utility pole for electrical and telephone service conduits. Rigid galvanized steel conduit shall be used at utility pole for electrical and telephone service and fire alarm conduits to a height of 10-ft above finished grade. Furnish and install weather heads at service pole riser if required by utility company.

N. Liquid-tight flexible metal conduit shall be used for all motor terminations, the primary and secondary of transformers, generator terminations and other equipment where vibration is

present or may require removal. Non-metallic flexible conduit can be used with rigid PVC conduit systems.

O. Flexible couplings shall be used in hazardous locations for all motor terminations and other equipment where vibration is present.

P. PVC coated rigid steel conduit shall be used as a transition section where concrete embedded conduit stubs out of floor slabs or through below grade walls or where conduit installed under building slabs on grade stub out of floors. The PVC coated rigid steel conduit shall extend a minimum of 3-in into and out of the floor slab, concrete pad, or wall to allow for proper threading of the conduit.

Q. Expansion fittings shall be used on exposed runs of PVC conduit where required for thermal expansion. Installation and number of fittings shall be as recommended by manufacturer.

R. Conduit supports, other than for underground raceways, shall be spaced at intervals not exceeding the distance required by the NEC to obtain rigid construction.

S. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on fabricated channel trapeze type racks with steel horizontal members and threaded hanger rods. The rods shall be not less than 3/8-in diameter. Surface mounted panel boxes, junction boxes, conduit, etc, shall be supported by spacers to provide a minimum of 1/2-in clearance between wall and equipment.

T. Conduit Supports (Other than Underground Raceways)

1. Trapezes

    a. Conduit support trapezes shall be vertically supported every 10-ft or less, as required to obtain rigid conduit construction.

    b. Lateral seismic restraints (Sway Bracing) shall be spaced 30-ft or less.

    c. Horizontal seismic restraints shall be spaced at 40-ft or less. There shall be at least one horizontal restraint per horizontal run.

    d. Attachment to structural steel shall be by beam clamps or welded beam attachment. C-clamps will not be allowed for vertical hangers. Side beam clamps with beam hooks shall be used for seismic restraint only.

    e. Attachment to concrete shall be cast-in-place inserts, cast-in place welded plates with welded studs or stainless steel adhesive anchors.

2. Flush Mounted Supports

    a. Support shall be spaced 10-ft or less, as required to obtain rigid conduit construction.

    b. Attachment to concrete shall be with cast-in-place inserts, cast-in place welded plates with welded studs or stainless adhesive anchors.

3. Conduit Racks

   a. Support shall be spaced 10-ft or less, as required to obtain rigid conduit construction.

   b. Horizontal seismic restraints shall be spaced at 30-ft or less, with welded studs or stainless adhesive anchors.

4. Conduit Hangers

   a. Conduit hangers shall be vertical supported 10-ft or less, as required to obtain rigid conduit construction.

   b. Lateral seismic restraints (Sway Bracing) shall be spaced 20-ft or less.

   c. Horizontal seismic restraints shall be spaced at 30-ft or less. There shall be at least one horizontal restraint per horizontal run.

   d. Attachment to structural steel shall be by beam clamps or welded beam attachment. C-clamps will not be allowed for vertical hangers. Side beam clamps with beam hooks shall be used for seismic restraint only.

   e. Attachment to concrete shall be cast-in-place inserts, cast-in place welded plates with welded studs or stainless steel adhesive anchors.

5. All reinforcing bars shall be located by the Electrical Subcontractor with the use of a rebar locator prior to installing adhesive capsule type anchors. Mark the location of all reinforcing bars in an area bounded by a line drawn at least 18-in from the edge of the support bearing/weld plates on all four sides of the bearing/weld plates prior to fabricating and installing bearing/weld plates.

6. Where interference occurs, adjust anchor locations to clear reinforcing bars and alter support configuration at no additional cost to the Authority.

U. Miscellaneous steel for the support of fixtures, boxes, transformers, starters, contactors, panels and conduit shall be furnished and installed. Channel supports shall be ground smooth and fitted with plastic end caps.

V. Steel channels, flat iron and channel iron shall be furnished and installed for the support of all electrical equipment and devices, where required, including all anchors, inserts, bolts, nuts, washers, etc, for a rigid installation. Channel supports shall be ground smooth and fitted with plastic end caps.

W. 3/16-in polypropylene pull lines shall be installed in all new conduits noted as spares or designated for future equipment. Conduit noted as spare shall be capped or plugged at both ends with easily removable fittings

X. Where no type or size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of NEC Article 314. Enclosure type and material shall be as specified herein.

Y. Pull or junction boxes shall be furnished and installed where shown on the Drawings, in every 200 feet of straight conduit runs or in runs where more than the equivalent of four 90 degree bends occur or at any point necessary for wire pulling and splicing. Splices shall not be made in pulling elbows.

END OF SECTION

SECTION 16120

WIRES AND CABLES (600 VOLT MAXIMUM)

PART 1 GENERAL

1.01. SCOPE OF WORK

A. Furnish, install and test all wire, cable and appurtenances as shown on the Drawings and as specified herein.

1.02. DELIVERY, STORAGE AND HANDLING

A. Carefully handle all conductors to avoid kinks and damage to insulation.

PART 2 PRODUCTS

2.01. GENERAL

A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.

B. All conductors shall be stranded, except that lighting and receptacle wiring may be solid.

C. Except for control, signal and instrumentation circuits, wire smaller than No. 12 AWG shall not be used.

D. Wire shall have 600 Volt insulation except where indicated otherwise.

2.02. SPLICES (POWER CONDUCTORS)

A. Unless otherwise indicated on the Drawings, splices shall not be made in the cables without prior written approval of the Engineer. Where splicing is approved by the Engineer, splicing materials for all 600 Volt splices shall be made with long barrel, tin plated copper compression (hydraulically pressed) connectors and insulated with heavy wall heat shrinkable tubing. The conductivity of all completed connections shall be not less than that of the uncut conductor. The insulation resistance of all completed connections of insulated conductors shall be not less than that of the uncut conductor.

B. Wire lugs shall be tin plated copper, long barrel compression type (hydraulically pressed) for wire sizes No. 8 AWG and larger. Lugs for No. 10 AWG and smaller wire shall be locking spade type with insulated sleeve. Lugs shall be as manufactured by the Thomas and Betts Co.; Burndy; Amp; or equal.

C. Compression type connectors shall be insulated with a heat shrink boot or outer covering and epoxy filling. Splice kits shall be as manufactured by Raychem (Tyco); Ideal Industries; 3M Co. or equal.

D. Solderless pressure connectors shall be self-contained, waterproof and corrosion-proof units incorporating prefilled silicone grease to block out moisture and air. Connectors shall be sized

according to manufacturer's recommendations. The connectors shall be UL listed and CSA approved, as manufactured by King Innovation; Ideal Industries, Inc., or equal.

PART 3 EXECUTION

3.01. INSTALLATION

A. Uniquely identify all wires, cables and each conductor of multi-conductor cables (except lighting and receptacle wiring) at each end and in all manholes, hand holes and pull boxes with wire and cable markers.

B. Use lubrications to facilitate wire pulling. Lubricants shall be UL approved for use with the insulation specified.

C. Provide multi-conductor control and signal cables within the underground system. Cables shall be installed continuous from building to building without splices. Individual control conductors and twisted shielded pairs signal cables will not be allowed in underground systems.

D. The crimping tools used in securing the conductor in the compression type connectors or terminal lugs shall be those made for that purpose and for the conductor sizes involved. The crimping tool shall be the ratchet type which prevents the tool from opening until the crimp action is completed. Such tools shall be a product of the connector manufacturer.

E. Install an equipment grounding conductor in all raceways.

F. Seal openings in slabs and walls through which wires and cables pass.

G. Pull cables from the direction that requires the least tension. Use a feed-in tube and sheave designed for cable installation. Use sheaves with radii that exceed the cable manufacturer’s recommended minimum bending radius. Use a dynamometer and constant velocity power puller. Velocity should not be less than 15-ft./min. or more than 50-ft./min. Do not exceed the cable manufacturer’s maximum recommended tension.

H. If cable can not be terminated immediately after installation, install heat shrinkable end caps.

I. Fireproof exposed cables in manholes, vaults, pullboxes, switchgear and other areas not protected by conduit where medium voltage cables are present. Use fire-proofing tape and glass tape in accordance with the manufacturer’s instructions. Fire-proofing tape shall be installed with one half-lapped layer of Scotch Brand 77 Electric Arc and Fireproofing Tape (3M Corp., or equal). Tape shall be secured with a two-layer band of Scotch Brand 69 Glass Electrical Tape (3M Corp., or equal) over the last wrap.

3.02. WIRE COLOR CODE

A. All wire shall be color coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all junction boxes, manholes and other accessible intermediate locations as well as at each termination.

B. The following coding shall be used:

System	Wire	Color
240/120 Volts Single-Phase, 3 Wire	Neutral	White
	Line 1	Black
	Line 2	Red
208Y/120, Volts 3 Phase, 4 Wire	Neutral	White
	Phase A	Black
	Phase B	Red
	Phase C	Blue
240/120 Volts 3 Phase, 4 Wire delta, center tap ground on phase coil A-C	Neutral	White
	Phase A	Black
	Phase B (High)	Orange
	Phase C	Blue
480Y/277 Volts 3 Phase, 4 Wire	Neutral	White
	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow

C. Neutral or ground wires that terminate in a Panelboard and require color tape shall have the color tape extend at least 6-in from the termination point.

3.03. TERMINATIONS AND SPLICES

A. Power conductors: Unless otherwise indicated on the Drawings, no splices may be made in the cables without prior written approval of the Engineer. Where splicing is approved, terminations shall be die type or set screw type pressure connectors as specified. Splices (where allowed) shall be die type compression connector and waterproof with heat shrink boot or epoxy filling for copper conductors # 4 AWG and larger. Splices shall be solderless pressure connectors with insulating covers for copper conductors # 6 AWG and smaller. Aluminum conductors (where specified) shall employ terminations and splices specifically designed for aluminum conductors.

3.04. FIELD TESTING

A. Test all 600 Volt wire insulation with a megohm meter after installation and prior to termination. Make tests at not less than 1000 Volts DC. Test duration shall be one minute. Submit a written test report of the results to the Engineer. Notify the Engineer in writing 48 hours prior to testing.

B. Field testing and commissioning shall be done in accordance with the latest revision of the "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems" published by the International Electrical Testing Association (NETA Standard ATS-1999) unless otherwise modified by this Section. Minimum wire insulation resistance shall not be less than 250 Megohms.

END OF SECTION

SECTION 16141

WIRING DEVICES

PART 1 GENERAL

1.01. SCOPE OF WORK

A. Furnish all labor, materials, equipment and install wiring devices as shown on the Drawings and as specified herein.

B. Provide all interconnecting conduit and branch circuit wiring for receptacle circuits in accordance with the NEC.

1.02. REFERENCE STANDARDS

A. Wiring devices shall comply with the requirements of the National Electric Code (NEC) and shall be Underwriters Laboratories (UL) labeled.

PART 2 PRODUCTS

2.01. MATERIALS

A. Wall switches shall be heavy duty, specification grade, toggle action, flush mounting quiet type. All switches shall conform to the latest revision of Federal Specification WS 896. Wall switches shall be suitable for the area classification indicated and shall be of the following types and manufacturer:

1. Single pole, 20 Amp, 120/277 Volt - Cooper Wiring Devices; Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

2. Double pole, 20 Amp, 120/277 Volt - Cooper Wiring Devices; Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

3. Three way, 20 Amp, 120/277 Volt - Cooper Wiring Devices, Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

4. Four way, 20 Amp, 120/277 Volt - Cooper Wiring Devices; Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

B. Receptacles shall be heavy duty, specification grade of the following types and manufacturer or equal. Receptacles shall conform to Fed Spec WC596-F.

1. Duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire; Cooper Wiring Devices; Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

2. Weatherproof/corrosion resistant single, 20 Amp, 125 Volt, 2 Pole, 3 Wire, with cover; Crouse-Hinds Co., “weatherproof while in use”; Appleton Electric; Pass & Seymour or equal.

3. Weatherproof/corrosion resistant duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire, with cover; Crouse-Hinds Co “weatherproof while in use”; Appleton Electric; Pass & Seymour or equal.

4. Ground fault interrupter, duplex, 20 Amp, 125 Volt, 2 Pole, 3 Wire, GFCI feed thru type with "test" and "reset" buttons. Cooper Wiring Devices; Hubbell Wiring Devices-Kellems; Pass & Seymour, Inc. or equal.

C. Device Plates

1. Plates for indoor flush mounted devices shall be of the required number of gangs for the application involved and shall be as follows:

a. Administration type buildings: Smooth, high impact nylon of the same manufacturer and color as the device. Final color shall be as selected by the Architect.

b. Where permitted in other areas of the plant, flush mounted devices in cement block construction shall be Type 302 high nickel (18-8) stainless steel of the same manufacturer as the devices.

2. Plates for indoor surface mounted device boxes shall be cast metal of the same material as the box, Crouse-Hinds No. DS23G and DS32G; Appleton FSK1DRC, FSK1TSEC; Pass & Seymour or equal.

PART 3 EXECUTION

3.01. INSTALLATION

A. Switch and receptacles outlets shall be installed flush with the finished wall surfaces in areas with stud frame and gypsum board construction, in dry areas with cement block construction or when raceways are shown as concealed on the Drawings.

B. Do not install flush mounted devices in areas designated DAMP, WET or WET/CORROSIVE on the Drawings. Provide surface mounted devices in these areas.

C. Provide weatherproof devices covers in areas designated WET or WET/CORROSIVE on the Drawings.

D. Convenience outlets shall be 15-in above the floor unless otherwise required.

E. Convenience outlets installed outdoors and in rooms where equipment may be hosed down shall be 18-in above floor or grade.

F. Switches and dimmer controls for lighting shall be mounted 48-in above the finished floor unless otherwise noted or required.

G. The location of all devices is shown, in general, on the Drawings and may be varied within reasonable limits so as to avoid any piping or other obstruction without extra cost, subject to the approval of the Engineer. Coordinate the installation of the devices for piping and equipment clearance.

END OF SECTION

SECTION 16191

MISCELLANEOUS EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install all miscellaneous equipment as shown on the Drawings and as specified herein.

1.02 EQUIPMENT LIST

A. This Section provides the requirements for miscellaneous equipment typically employed in a facility, however, not all components specified in this Section are necessarily utilized on this project.

PART 2 PRODUCTS

2.01. MATERIALS

A. Fused Disconnect Switches

1. Fused disconnect switches shall be heavy-duty, quick-make, quick-break, visible blades, 600 Volt, 3 Pole with full cover interlock, interlock defeat and flange mounted operating handle. All current carrying parts shall be copper.

2. Fuses shall be rejection type, 600 Volts, 200,000 A.I.C., dual element, time delay, Bussman Fusetron, Class RK-5 or equal.

3. NEMA 4 enclosures shall be stainless steel.

4. NEMA 4X enclosures shall be stainless steel.

5. Switches shall be as manufactured by the Square D Co.; General Electric; Cutler-Hammer, or equal.

B. Horsepower Rated, Toggle Switch Type Disconnect Switch

1. Toggle type disconnect switches shall be manufactured of thermoplastic materials with screw-type terminals. The switches shall be rated 600 VAC and 20A at 600 VAC.

2. Toggle type disconnect switches shall be similar to a manual non-reversing starter without overloads and shall be 3 Pole, capable of “on-off” control of a 10 horsepower motor at 460 VAC.

3. Enclosure shall be provided with lock off provisions.

4. NEMA 4 enclosures shall be die-cast zinc.

5. Switches shall be as manufactured by the Square D Co.; Siemens Electrical Products; Cutler-Hammer or equal.

C. Transient Voltage Surge Suppressors (TVSS) as indicated on the Drawings

1. TVSS unit shall be a hybrid device utilizing a linear array of balanced MOV (Metal Oxide Varistors) and a series assembly of silicon avalanche diodes.

2. The TVSS unit shall be tested and labeled in accordance with the following standards: ANSI/IEEE C62.41, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits, Category C; ANSI/IEEE C62.45, Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits; NEMA LS-1 (1992), Low-Voltage Surge Protective Devices; UL 1449-Current Edition; UL 1283 for noise attenuation devices and NEC Article 285.

3. Unit shall have:

a. Parallel Line-Neutral, Line-Ground and Neutral-Ground connection configuration.

b. One Nanosecond or less response time.

c. Extend noise filtration with a 10 kHZ to 100 MHZ range.

d. Fused internal disconnect switch with 60 Amps, 300,000 AIC rating.

e. Surge current rating of 100,000 Amps per mode at service entrance

f. Surge current rating of 80,000Amps per mode at distribution panels

g. Surge current rating of 65,000Amps per mode at branch panels

h. LED indications

i. Six digit surge counter

j. Form C output contacts

k. System voltage shall be 120/240 grounded neutral, 120/208 grounded wye, 277/480 grounded wye, 240 delta, or 480 delta as indicated on the Drawings

l. NEMA 4 enclosure (steel type)

m. The Maximum Continuous Operating Voltage (MCOV) for all voltage configurations shall be 125 percent of nominal or greater.

n. The fusing system shall be capable of allowing the rated maximum surge current to pass through without fuse operation.

o. TVSS devices at distribution panels or switchboards shall be mounted integral to the equipment with leads as short as possible (not to exceed 24-in) and the lead size shall be a minimum of 6 AWG or larger. The TVSS shall include an integral disconnect switch which has been tested to the surge current rating of the TVSS and

shall match or exceed the fault current rating of the board. The disconnect switch shall switch the phases and neutral.

p. TVSS devices at branch panels shall be direct bus-to-bus connected with leads as short as possible (not to exceed 24-in) and lead size shall be a minimum of 6 AWG or larger.

4. TVSS shall be Model PDX3 as manufactured by United Power Corporation; Transtector Systems; Current Technology or equal.

D. Detectable Warning Tape

1. Each duckbank section shall be marked by means of a detectable warning tape (tracer tape) as shown on the Drawings. The detectable warning tape shall be capable of being detected or located by either conductive or inductive location techniques.

2. The detectable warning tape shall consist of 5 mil (.005-in) overall thickness; five-ply composition; ultra-high molecular weight; virgin polyethylene; acid; alkaline and corrosion resistant; with 150 pounds of tensile break strength minimum per 6-in width.

3. The top side of the tracer tape shall be color banded red for electrical and high voltage lines, and orange for signal, communication, telephone and fire alarm lines. Tracer tape shall be 4-in wide with four color bands. The tape shall be inscribed with the warning message for the utility such as "CAUTION – ELECTRICAL LINED BURIED BELOW". Tape shall be as manufactured by Mutual Industries, Inc.; Terra Tape, Div. of Reef Industries Inc. or equal.

E. Photocells

1. The photocells shall be suitable for power duty with individual fixtures or for pilot duty with contactors as detailed on the Drawings. Enclosure shall be NEMA 3R or 4. Contacts shall be rated for 2,000 watts continuous at 120 Volts. The unit shall turn on at 1.5 footcandles and off at 5.5 footcandles.

2. Photocells shall be Tork, Model 2101; Intematic; Paragon, or equal.

F. Equipment Identification Nameplates

1. All field mounted electrical equipment such as disconnects, push button stations, etc, shall be provided with a weather resistant engraved laminoid equipment identification nameplate screwed or bolted adjacent to the device. Nameplate shall identify the mechanical equipment controlled exactly as shown on the electrical singleline drawings (i.e, P-95 Cooling Water Pump No. 1).

G. Lighting Contactor

1. Lighting contactor shall be of the electrically operated, mechanically held type mounted in NEMA 1, enclosures (except where noted otherwise on the Drawings) with number of poles as noted on the Drawings. Operating coils shall be rated for 120 Volts unless otherwise indicated on the Drawings and shall be for momentary operation. Provide with "Hand Off-Auto" switch on cover where shown on the Drawings.

2. Contactors shall be rated for 20 Amps, 600 VAC and shall be Automatic Switch Co., Bulletin 917 RC, similar by Square D Co.; Cutler-Hammer, or equal.

H. Arc Flash Protection Warning Signs

1. Provide field-affixed arc flash warning labels on all switchboards, panelboards, industrial control panels, and motor control centers in accordance with National Electrical Code Article 110.16.

2. As a minimum, warning signs shall state "WARNING: Arc Flash and Shock Hazard, Appropriate PPE required", and shall be designed in accordance with ANSI Z535.4-1998. Where available from the equipment manufacturer, additional information including Flash Hazard boundary, incident energy, voltage shock hazard, PPE required, etc. shall be provided.

PART 3 EXECUTION

3.01. INSTALLATION

A. Mounting Stands

1. Field mounted disconnects, pushbutton control stations, alarm panels, enclosed starters and circuit breakers, transformers, automatic transfer switches, wireways, contactors, terminal boxes, junction and pull boxes shall be mounted on galvanized or stainless steel stands as specified. Where clearance requirements for stands may not be maintained, the Engineer may direct electric control equipment to be wall-mounted adjacent to the driven equipment, but in no case shall the distance from the drive motor to the control station exceed 3-ft, all at no additional cost to the Owner.

2. Channel supports shall be ground smooth and fitted with plastic end caps.

3.02. FIELD TESTING

A. Before supplying power to the alarm panels, the following tests shall be done: Verify that all wiring connection interfaces that are required are present. Check for secure connections. Using a continuity device, verify that all discrete inputs and output to and from the control panel are wired in correct polarity and are operating in the correct state of operation (normally open or closed state). Check for any direct short circuits across all voltage supply sources. As each of the above tests are performed, the Electrical Contractor shall highlight and initial each circuit that is tested. This set of prints shall be signed and left inside the enclosure.

B. In the event of an equipment fault in the panel, notify the Engineer immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor and Engineer. Repair or replace the equipment as directed by the Engineer prior to placing the equipment back into service at no additional cost to the Owner.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 GENERAL

1.01. SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install all panelboards as shown on the Drawings and as specified herein.

1.02. REFERENCE STANDARDS

A. Panelboards shall be in accordance with the Underwriter Laboratories (UL) "Standard for Panelboards" and "Standard for Cabinets and Boxes" and shall be so labeled where procedures exist. Panelboards shall also comply with NEMA Standard for Panelboards and the National Electrical Code (NEC).

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03. MANUFACTURERS

A. 120/240 Volt, single phase, 3 Wire and 120/208 Volt, 3 Phase, 4 Wire panelboards shall be Sentron Type P1 as manufactured by Siemens; Type NQOD by Square D Co.; Type Pow-R-Line C by Cutler-Hammer; or Type AQ as manufactured by the General Electric Co.

B. NEMA 3, 4 and 12 panelboards shall be similar to those specified above with appropriate enclosure modifications as required by voltage application. Panel enclosures shall be provided as specified in Section 16000 and 16110.

PART 2 PRODUCTS

2.01. GENERAL

A. Rating

1. Panelboard ratings shall be as shown on the Drawings. All panelboards shall be rated for the intended voltage.

2. Circuit breaker panelboards shall be fully rated for the specified circuit breaker fault current interrupting capacity. Series connected short circuit ratings will not be acceptable.

2.02. MATERIALS (NEMA 1)

A. Interiors

1. All interiors shall be completely factory assembled with circuit breakers, wire connectors, etc. All wire connectors, except screw terminals, shall be of the anti-turn solderless type and all shall be suitable for copper or aluminum wire of the sizes indicated.

2. Interiors shall be so designed that circuit breakers can be replaced without disturbing adjacent units and without removing the main bus connectors and shall be so designed that circuits may be changed without machining, drilling or tapping.

3. Branch circuits shall be arranged using double row construction except when narrow column panels are indicated. Branch circuits shall be numbered by the manufacturer.

4. A nameplate shall be provided listing manufacturer's name, panel type and rating.

B. Buses

1. Bus bars for the mains shall be of copper. Full size neutral bars shall be included. Phase bussing shall be full height without reduction. Cross connectors shall be copper.

2. Neutral bussing shall have a suitable lug for each outgoing feeder requiring a neutral connection.

3. Spaces, provision for future breakers, shall have bus straps bolted onto the bus so that future breakers can be bolted into the panel.

4. Equipment ground bars shall be furnished.

C. Boxes

1. Recessed or flush mounted boxes shall be made from galvanized code gauge steel having multiple knockouts, unless otherwise noted. Boxes shall be of sufficient size to provide a minimum gutter space of 4-in on all sides.

2. Surface mounted boxes and trims shall have an internal and external finish as specified in Paragraph 2.04D4 below. Surface mounted boxes shall be field punched for conduit entrances.

3. At least four studs for mounting the panelboard interior shall be furnished.

D. Trim

1. Hinged doors covering all circuit breaker handles shall be included in all panel trims.

2. Doors shall have semi flush type cylinder lock and catch, except that doors over 48-in in height shall have a vault handle and 3-point catch, complete with lock, arranged to fasten door at top, bottom and center. Door hinges shall be concealed. Furnish two keys for each lock. All locks shall be keyed alike; directory frame and card having a transparent cover shall be furnished on each door.

3. The trims shall be fabricated from code gauge sheet steel.

4. All exterior and interior steel surfaces of the panelboard shall be properly cleaned and finished with ANSI Z55.1, No. 61 light gray paint over a rust-inhibiting phosphatized coating. The finish paint shall be of a type to which field applied paint will adhere.

5. Trims for flush panels shall overlap the box by at least 3/4-in all around. Surface trims shall have the same width and height as the box. Trims shall be fastened with quarter turn clamps.

6. Door-in-door type construction shall be provided so that trim may be opened to access wire ways without removing the trim from the panel

2.03. MATERIALS (NEMA 3, 4 and 12)

A. Interiors and Buses

1. Interiors and buses shall be as hereinbefore specified for NEMA 1 construction.

B. Boxes and Covers

1. Boxes and covers shall be made from painted galvanized steel with natural finish.

2. Boxes and covers shall be bolted together and gasketed.

3. Conduit openings shall be tapped.

2.04. CIRCUIT BREAKERS

A. Panelboards shall be equipped with circuit breakers with frame size and trip settings as shown on the Drawings.

B. Circuit breakers shall be molded case, bolt-in type.

C. Circuit breakers shall be as manufactured by the panelboard manufacturer.

PART 3 EXECUTION

3.01. INSTALLATION

A. Mount boxes for surface mounted panelboards so there is at least 1/2-in air space between the box and the wall.

B. Connect panelboard branch circuit loads so that the load is distributed as equally as possible between the phase busses.

C. Type circuit directories giving location and nature of load served. Install circuit directories in each panelboard.

D. Install markers on the front cover of all panelboards which identify the voltage rating. Markers shall be made of self sticking B-500 vinyl cloth printed with black characters on an Alert

Orange background, 2-1/4-in high by 9-in wide, Style A as manufactured by W.H. Brady Co. or equal.

E. Install a 1-in by 3-in laminated plastic nameplate with 1/4-in white letters on a black background on each panelboard. Nameplate lettering shall be as shown on the Drawings. Nameplates shall be stainless steel screw mounted.

END OF SECTION

SECTION 16660

GROUNDING SYSTEM

PART 1 GENERAL

1.01. SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install a complete grounding system in strict accordance with Article 250 of the National Electrical Code NEC.

B. All raceways, conduits, ducts and multi-conductor cables shall contain equipment grounding conductors sized in accordance with the NEC. Minimum sizes shall be No. 12 AWG.

1.02. A supplemental grounding conductor shall be provided from each switchgear, switchboard, motor control center, power panelboard, lighting panelboard, to the buried ground grid. Supplemental grounding conductors shall be installed in PVC Schedule 80 conduit.

PART 2 PRODUCTS

2.01. MATERIALS

A. Conduit shall be as specified under Section 16110.

B. Wire shall be as specified under Section 16120.

C. Ground rods shall be 3/4-in by 10-ft copper clad steel and constructed in accordance with UL 467. The minimum copper thickness shall be 0.25 mm. Ground rods shall be Copperweld; Blackburn; Erico, Inc. or equal.

D. Grounding conduit hubs shall be malleable iron type, and of the correct size for the conduit, as manufactured by Thomas & Betts Co.; Catalog No. 3940 Series, similar by Burndy; O.Z. Gedney Co. or equal.

E. Water pipe ground clamps shall be cast bronze saddle type, and of the correct size for the pipe, as manufactured by Thomas & Betts Co. Cat. No. 2 (1/2-in, 3/4-in, or 1-in size), similar by Burndy; O.Z. Gedney Co. or equal and of the correct size for the pipe.

F. Buried grounding connections shall be by Cadweld process, or equal exothermic welding system.

1. Molds, cartridge materials and accessories shall be provided in kit form and selected per the manufacturer's written instructions for specific types, sizes and combinations of conductors and connected items. Molds and powder shall be furnished by the same manufacturer.

PART 3 EXECUTION

3.01. INSTALLATION

A. Run grounding electrode conductors in rigid steel conduits. Bond the protecting conduits to the grounding electrode conductors at both ends. Do not allow water pipe connections to be painted. If the connections are painted, dis-assemble them and re-make them with new fittings.

B. Install equipment grounding conductors with all feeders and branch circuits.

C. Bond all steel building columns in new structures together with ground wire in rigid conduit and connect to the distribution equipment ground bus, as shown on the Drawings.

D. Ground wire connections to structural steel columns shall be made with exothermic welds.

E. Metal conduits stubbed into a motor control center or floor mounted electrical enclosure shall be terminated with insulated grounding bushings and connected to the motor control center or electrical enclosure ground bus. Bond boxes mounted below motor control centers to the motor control center ground bus. Size the grounding wire in accordance with NEC Table 250-122, except that a minimum No. 12 AWG shall be used.

F. Liquid tight flexible metal conduit in sizes 1-1/2-in and larger shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with plastic tie wraps.

G. Ground transformer neutrals to the nearest available grounding electrode with a conductor sized in accordance with NEC Article 250-66.

H. Drive grounding electrodes as shown on the Drawings.

I. All equipment enclosures, motor and transformer frames, conduits systems, cable armor, exposed structural steel and all other equipment and materials required by the NEC to be grounded, shall be grounded and bonded in accordance with the NEC.

J. Seal exposed connections between different metals with No-Oxide Paint Grade A or equal.

K. Ground metal poles supporting outdoor lighting fixtures to a supplemental grounding electrode (rod) in addition to the separate equipment grounding conductor run with the supply branch circuit.

L. Install driven ground rods in manholes and handholes close to wall and set rod depth so 4-in will extend above finished floor. Protect ground rods with double wrapping of pressure-sensitive tape or heat shrunk insulating sleeve from 2-in above to 6-in below concrete floor. Seal floor opening with waterproof, non-shrink grout. Where ground rods are installed outside of manhole or handhole, provide a No. 4/0 AWG bare, tinned copper conductor from ground rod into manhole or handhole through a waterproof sleeve in the wall.

3.02. INSPECTION AND TESTING

A. Inspect the grounding and bonding system conductors and connections for tightness and proper installation.

B. Use Biddle Direct Reading Earth Resistance Tester or equivalent test instrument to measure resistance to ground of the system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

C. Resistance to ground testing shall be performed during dry season. Submit test results in the form of a graph showing the number of points measured (12 minimum) and the numerical resistance to ground.

D. Testing shall be performed before energizing the distribution system.

E. Test all grounded cases and metal parts associated with the electrical equipment for continuity with the ground system.

F. Notify the Engineer immediately if the resistance to ground for any building or system is greater than five ohms.

END OF SECTION

APPENDIX

Contractor is responsible for adherence to all applicable Federal and State Laws and Regulations including, but not limited to, the following and any applicable amendments:

Ark Act 291 of 1993
Trench and Excavation Safety Systems

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Code of Federal Regulations Title 29
website: http://ecfr.gpoaccess.gov/

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Arkansas State Licensing Law for Commercial Contractors
website: www.arkansas.gov/clb