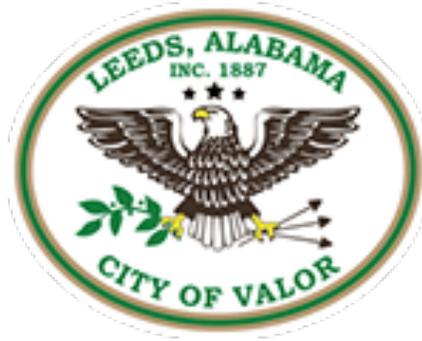


CITY OF LEEDS



PROJECT MANUAL FOR

Proposed Park Improvements New Leeds Pickleball Center

Project No. 24.006.26

Leeds, Alabama

December 2024

PREPARED BY:

HagerCo-LLC

Civil & Structural Engineers

keithlhager@icloud.com

1025 MONTGOMERY
HIGHWAY, Suite 110

Birmingham, AL 35216

Direct: 205.229.1738

PROPOSAL

MADE BY Milam & Company LLC
ADDRESS 2748 Alton Rd Ste 116 Birmingham, AL 35210

TO: CITY OF LEEDS, ALABAMA
1400 9TH STREET
Leeds, Alabama 35094

The undersigned, as Bidder, proposes and agrees, if this Bid is accepted, to enter a Contract with the

City of LEEDS, Alabama

in the form of Contract specified and shown in the attached Contract Documents, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the construction of the work described in the Advertisement for Bids and in the Contract Documents attached hereto, which are hereby referred to and made a part hereof to the same extent as if fully set out herein, and in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Plans, Specifications, and Contract Documents, to the full and entire satisfaction of the Owner, and with a definite understanding that no money will be allowed for extra work except as set forth in the attached Instructions to Bidders, General Conditions, and other Contract Documents, for the following lump sum and/or unit prices:



UNIT PRICES FORM – New Leeds Pickleball Center

1.1 BID INFORMATION

- A. Bidder: Milam & Company LLC
- B. Project Name: Leeds – Pickleball Center
- C. Project Location: Leeds, Alabama
- D. Owner: The City of Leeds, Alabama
- E. Owner Project Number: 24.006.26
- F. Engineer: HagerCo, LLC
- G. Engineer Project Number: 24.006.26

1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.
- B. The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work.
- C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."



1.3 BID PRICES

Item No	Description	Approximate Quantity	Units	Unit Price	Total Cost
1	Erosion Control including temporary seed & mulch all disturbed areas, furnished and installed	1	LS	14,242.00	14,242.00
2	Site Grading, including all Topsoil Removal and Replacement, including undercut for New Paved areas as Shown on the Grading Plans (unclassified), furnished and installed	1	LS	42,702.00	42,702.00
3	New Dumpster Encloser, furnished and installed:	1	LS	12,459.00	12,459.00
4	1 Each, PEMB 230'x155, including all foundation, Building Erection, Standing Seam metal roof, Turn-down Skirt as shown, with all framing, Furnished and Installed;	1	LS	762,754.00	762,754.00
5	12 Each, regulation size pickleball courts, including all Surface, Nets, Stripes, Black Vinyl Coated Fencing, Gates, as shown on plans, Furnished and Installed;	1	LS	313,811.00	313,811.00
6	4" Concrete Sidewalk Areas, including Stone Base, Grading, Forming and Broom finish, Furnished and Installed;	4,885	SF	8.42	41,140.00
7	18" Concrete Curb & Gutter, Furnished and Installed;	425	LF	28.50	12,113.00



Item No	Description	Approximate Quantity	Units	Unit Price	Total Cost
8	Main Parking Area, Standard Duty Asphalt Pavement, 6" Base, 2" Asphalt Binder, 1" Asphalt Seal, Furnished and installed;	1,700	SY	44.31	75,319.00
9	Parking Stripes and Signs, per Drawings, Furnished and Installed;	1	LS	5,700.00	5,700.00
10	Concrete Drainage Flume, per Design, Furnished and Installed;	440	LF	22.27	9,799.00
11	Concrete Low Water Crossing, per Design, Furnished and Installed;	1	LS	15,072.00	15,072.00
12	Electrical Service, Panels and Lighting, Controls, including sorry man 100-Amp stub for future connection to restroom, Furnished and Installed;	1	LS	68,405.00	68,405.00
Total Amount for Base Bid				\$ 1,373,516.00	
A1	Parking Area No.2, Standard Duty Pavement, 6" Base, 2" Asphalt Binder, 1" Asphalt Seal, Furnished and Installed;	975	SY	45.93	44,778.00
A2	Concrete Parking Stops, Furnished and Installed;	23	Ea.	167.83	3,860.00
A3	Parking Area No2, Parking Stripes and Signs, per Drawings, Furnished and Installed;	1	LS	1,710.00	1,710.00
A4	Solid Bermuda Sod, Furnished and Installed;	2,200	SY	8.42	18,526.00



Item No	Description	Approximate Quantity	Units	Unit Price	Total Cost
A5	Tree, Nuttall Oak, (6" minimal caliper at installation), Furnished and Installed;	7	Ea.	1,833.29	12,833.00
Total Amount of Alternates				\$81,707.00	
Total Amount of Base Bid + Alternates				\$1,455,223.00	

1.4 SUBMISSION OF BID SUPPLEMENT

Respectfully submitted this 28th day of January, 2025.

Submitted By: Milam & Company LLC
(Insert name of bidding firm or corporation)

Authorized Signature: *Kasondra Graveman*
(Handwritten signature)

Signed By: Kasondra Graveman
(Type or print name)

Title: Comptroller
(Owner/Partner/President/Vice President)

END OF DOCUMENT

The Bidder hereby agrees to commence work under this Contract on or before a date to be specified in written "Notice to Proceed" given by the Owner, and to fully complete the Contract with 180 consecutive calendar days thereafter as stipulated in the Contract Documents. The Bidder further agrees to pay as liquidated damages, the sum of \$ 250.00 for each consecutive calendar day thereafter as hereinafter provided in Article 16 of the General Conditions. The Bidder further agrees that he will not make any claim for extra compensation should completion of work under the Contract be affected in advance of the time specified hereinabove.

The Bidder declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the Plans, Specifications and Contract Documents relative to the work to be done; that he has read all special provisions furnished prior to the opening of bids; and that he has satisfied himself relative to the work to be performed.

The Bidder declares that he understands that the quantities shown in the Advertisement for Bids and in the Proposal are approximate only; and are subject to either increase or decrease and that should the quantities of any of the items of work be increased, the undersigned proposes to do the additional work at the unit prices set out herein. Actual quantities will be determined upon completion of the work.

The Bidder has attached hereto a certified check, drawn on a responsible bank or trust company, or a Bid Bond executed by a Surety Company authorized to do business in the State of Alabama and made payable to:

THE CITY OF LEEDS, ALABAMA

in amount of 5% of Bids not to exceed \$10,000.00.

The Bidder agrees that, upon receipt of the notice of acceptance this bid, he will execute the formal contract bound herein within 10 days from receipt of such notice and will furnish with the executed contract agreement proper Performance Bond and Labor and Material Bond as required by the General Conditions.

The Bidder further agrees that, in case of failure of his part to execute said Contract Agreement, and all Bonds required by the Contract Documents, within ten (10) consecutive calendar days after receipt of notice of award of Contract to him, the check or Bid Bond accompanying this Bid, and the moneys payable thereon, shall be paid to the Owner as liquidated damages for the delay and additional expense to the Owner caused by such failure on the part of the Bidder.

The Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The Bidder agrees that this bid shall be good for, and may not be withdrawn for, a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

The Bidder acknowledges receipt of the following addenda:

<u>ADDENDUM NO.</u>	<u>DATE:</u>
#1	1/20/25

The undersigned, as Bidder, hereby declares that the name (or names) of the only person (or persons) interested in this Proposal, as principal (or principals), is (or are) as hereinbelow set out and that no person other than that (or those) hereinbelow stated has any interest in this Proposal, or in the Contract to be entered into; that this Proposal is made without connection with any other person, firm or corporation making a proposal; and that it is in all respect fair and in good faith, without collusion or fraud.

Following are the full name and addresses of all persons, firms, and corporations interested in the foregoing bid:

2748 Alton Rd Ste 116

Milam & Company LLC

Birmingham, AL 35210

Address:

Respectfully submitted:

By: Kasondra Graveman

Comptroller

Title

Date 1/28/25

Contractor's License No. 43714

(SEAL - if Bid is made by a Corporation)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

Milam & Co., LLC

as Principal, and _____ Merchants National Bonding, Inc. _____

_____ as Surety, are hereby held and firmly

bound unto the City of LEEDS, Alabama as owner in the penal sum of 5% of Bid Amount not to exceed \$10,000.00 for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves our heirs, executors, administrators, successors and assigns.

Signed, this 28 day of January, 2022.

The condition of the above obligation is such that whereas the Principal has submitted to the City of LEEDS, Alabama a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the:

22.006.26 – Park Improvements – New Leeds Pickleball Center

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form

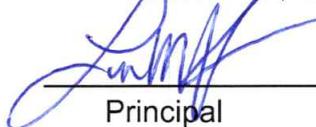
of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

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

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

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the day and year first set forth above.

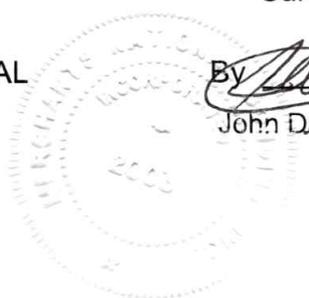
Mitam & Co., LLC

 _____ (L.S.)
Principal

Merchants National Bonding, Inc.

Surety

SEAL



By  _____
John David Hutto, Jr., Attorney-In-Fact

MERCHANTS
BONDING COMPANYTM
POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa, d/b/a Merchants National Indemnity Company (in California only) (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

John David Hutto Jr

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Authority is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and April 27, 2024 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 16, 2015 and amended on April 27, 2024.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 29th day of July, 2024.



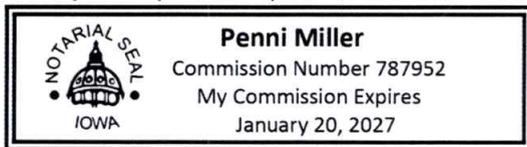
MERCHANTS BONDING COMPANY (MUTUAL)
MERCHANTS NATIONAL BONDING, INC.
d/b/a **MERCHANTS NATIONAL INDEMNITY COMPANY**

By

President

STATE OF IOWA
COUNTY OF DALLAS ss.

On this 29th day of July, 2024, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

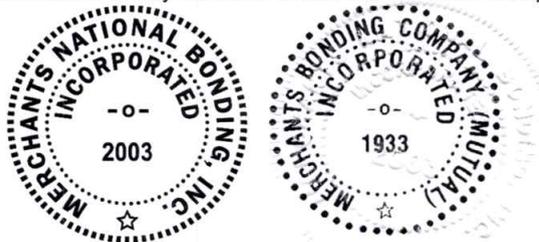


(Expiration of notary's commission does not invalidate this instrument)

Notary Public

I, Elisabeth Sandersfeld, Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 28 day of January, 2025.



Secretary

STATE OF ALABAMA



BID LIMIT: U
AMOUNT: UNLIMITED

LICENSE NO.: 43714
TYPE: RENEWAL

State Licensing Board for General Contractors

THIS IS TO CERTIFY THAT

MILAM & CO LLC
BIRMINGHAM, AL 35210

is hereby licensed a General Contractor in the State of Alabama and is authorized to perform the following type(s) of work:

ADM: NEW ADMINISTRATIVE, BC: BUILDING CONSTRUCTION, HRR-S: UNDERGROUND STORAGE TANK, MU: MUNICIPAL AND UTILITY

until April 30, 2025 when this Certificate expires.

Witness our hands and seal of the Board, dated Montgomery, Ala.,

30th day of April, 2024

205021

Michael B. Tate

SECRETARY-TREASURER

Charles T. Wade, Jr.

CHAIRMAN



Company ID Number: 514276

Information Required for the E-Verify Program	
Information relating to your Company:	
Company Name	Milam & Co. Construction, Inc.
Company Facility Address	2748 Alton Road Suite 116 Birmingham, AL 35210
Company Alternate Address	2748 Alton Road Suite 116 Birmingham, AL 35210
County or Parish	JEFFERSON
Employer Identification Number	631139608
North American Industry Classification Systems Code	236
Parent Company	
Number of Employees	10 to 19
Number of Sites Verified for	1 site(s)

NOTICE TO CONTRACTORS
ADVERTISEMENT FOR BIDS

Sealed Bids will be received by the CITY OF LEEDS, ALABAMA at the City Hall, 1400 9TH STREET LEEDS, AL. 35094, until 1:00 P.M. o'clock, (LOCAL TIME), TUESDAY – January 28, 2025 for furnishing all materials, labor, tools, and equipment, and for doing the work of constructing, according to Plans, Specifications and Contract Documents on file in CITY HALL of said CITY OF LEEDS, ALABAMA for Park Improvements – NEW PICKLEBALL CENTER hereinafter described. No bids will be received after the time set forth hereinabove; and the Proposals will be publicly opened and read.

The work of constructing said improvements will be let under one contract, the principal items of work are as follows:

12 Each Regulation Pickleball Courts, Including Surface, Fencing, Nets, and Striping (All-inclusive), 230'x150' PEMB Pavillion including roofing, Foundations, Sidewalk, Parking Areas, Electrical Service and Lighting, and Landscape.

Plans, Specifications and Contract Documents are open to public inspection at the City Hall of CITY OF LEEDS, ALABAMA or Copies of the proposed Contract Documents may be obtained directly from HagerCO, LLC for bidding purposes upon the conditions set forth in THESE DOCUMENTS – Advertisement for Bids, at:

HagerCo, LLC
1025 Montgomery Highway, Suite 110
Vestavia, Alabama 35216
205.229.1738

OR

Via email request: keithlhager@icloud.com

BID FORM

To receive consideration, make all bids in strict accordance with the following:

- Make bids upon the forms provided therefore, properly executed and with all items filled out.
- Do not change the wording of the Bid Form, and do not add to the Bid Form.
- Unauthorized conditions, limitations, or provisions attached to the proposal shall be cause for rejection of the proposal.
- Telegraphic bid or telegraphic modification of bid will not be considered.
- Bids received after the time fixed for receiving them will not be considered.
- Late bids will be returned to the sender unopened.
- Each bid shall be addressed to the Owner and shall be delivered to the Owner at the address given in the Bid Solicitation on or before the day and hour set for receiving bids.
- Each bid shall be enclosed in a sealed envelope bearing the title of the Work, the name of the Bidder and address, and the date and hour of the bid opening.
- It is the sole responsibility of the bidder to see that his bid is received on time.
- Prior to the opening of the envelope, the names of all Bidders listed thereon shall be read aloud at the official bid opening and incorporated into the bid.
- Only items listed on the bid form will be considered for payment.
- Only the items specifically listed by quantity will be paid by the actual quantity utilized.

The Owner reserves the right to reject any or all bids, to waive any informality in any bid, and to accept any bid considered advantageous to the Owner.

No bid will be withdrawn after the time for opening of bids has passed. The Owner reserves the right to hold the bids for a period of sixty (60) days after the date of receiving the bids.

A certified check bid bond in an amount of not less than five percent (5%) of the total bid must accompany each proposal not to exceed \$10,000.00. The payee of such check, or the obligee of such bond, shall be the CITY OF LEEDS, ALABAMA.

The successful bidder must furnish a Performance Bond for one hundred (100%) percent of the bid amount and must secure his bond for a bonding company's representative or agent in the State of Alabama.

The Contractor shall obtain and pay for all licenses and permits required by the State, County, or City authorities having jurisdiction over the various phases of the work.

The attention of all bidders is called to the provisions of State Law Governing General Contractors, as set forth in Chapter 4 (Section 65 to 82, inclusive) of Title 46 of the Code of Alabama for 1940, as amended; and bidders shall be governed by said law insofar as it is applicable. The above-mentioned provisions of the Code make it illegal for the Owner to consider a bid from anyone who is not properly licensed under such code provisions. The Owner, therefore, will not consider any bid unless the bidder produces evidence that he is so licensed. Neither will the Owner enter a Contract with a foreign corporation, which is not qualified under State Law to do business in the State of Alabama.

INSTRUCTIONS TO BIDDERS

RECEIPT OF BIDS

Sealed Bids will be received by the *City of LEEDS, Alabama*. at their City Hall, 1400 9TH STREET LEEDS, Alabama until 1:00 P.M. o'clock, (Local Time, January 28, 2025 for construction of improvements as set forth in the Advertisement for Bids.

PLANS AND SPECIFICATIONS

Plans, Specifications and Contract Documents are open to public inspection at the City Hall of CITY OF LEEDS, ALABAMA or Copies of the proposed Contract Documents may be obtained directly from HagerCO, LLC for bidding purposes upon the conditions set forth in THESE DOCUMENTS – Advertisement for Bids, at:

HagerCo, LLC
1025 Montgomery Highway, Suite 110
Vestavia, Alabama 35216
205.229.1738

OR

Via email request: keithlhager@icloud.com

BID FORM

To receive consideration, make all bids in strict accordance with the following:

- Make bids upon the forms provided therefore, properly executed and with all items filled out.
- Do not change the wording of the Bid Form, and do not add to the Bid Form.
- Unauthorized conditions, limitations, or provisions attached to the proposal shall be cause for rejection of the proposal.
- Telegraphic bid or telegraphic modification of bid will not be considered.
- Bids received after the time fixed for receiving them will not be considered.
- Late bids will be returned to the sender unopened.
- Each bid shall be addressed to the Owner and shall be delivered to the Owner at the address given in the Bid Solicitation on or before the day and hour set for receiving bids.
- Each bid shall be enclosed in a sealed envelope bearing the title of the Work, the name of the Bidder and address, and the date and hour of the bid opening.
- It is the sole responsibility of the bidder to see that his bid is received on time.
- Prior to the opening of the envelope, the names of all Bidders listed thereon shall be read aloud at the official bid opening and incorporated into the bid.
- Only items listed on the bid form will be considered for payment.
- Only the items specifically listed by quantity will be paid by the actual quantity utilized.

DEFINITIONS

The following terms as used in these Specifications and Contract Documents, are respectively defined as follows:

- (a) "Contractor" or "Contractors": The person, firm or corporation signing the Contract with the Owner.

- (b) "Sub-Contractor": One who contract with the Contractor to perform all or any part of the Contract to be performed by the Contractor under the attached Documents.

- (c) "Work at Site of Project": Work to be performed, including work normally done at the location of the project.

- (d) "Purchaser, Owner, Authority": City of LEEDS, Alabama

- (e) "Engineer" or "Engineers": InSite Engineering, LLC, or their duly authorized representative.

- (f) "Days": Calendar days, unless otherwise specified.

- (g) "Proposal": Wherever "Proposal" is used, it shall mean "Bid".

PROPOSAL FORM

The Engineers will furnish Bidders with a form of Proposal. No bid will be considered unless submitted on such form. All papers bound with, or attached, to the Proposal Form (including Instructions to Bidders, General Conditions, Specifications, Contract Documents, etc.) are a necessary part thereof and must not be detached.

The Bidders shall complete the Proposal Form in manner prescribed, using ink for writing in both words and figures. Words and figures may be typed. The Bidder must sign the Bid correctly and legibly; and shall state his interest, title, or office in the company submitting the Bid. If the Bid should be made by an individual, his full name and address shall be shown; if made by a firm or partnership, the full name and address shall be shown; if made by a firm or partnership, the full name and address of each member of the firm or each partner shall be shown; and if made by a corporation, the full names and addresses of the president, secretary and treasurer shall be shown.

Should the Proposal Form not be fully completed in ink by the Contractor, the Bid will be deemed to be informal and may be rejected. In case of any discrepancy between any price written and that shown in figures, the price written shall be used for determination of the Bid.

Bidders shall not attach any conditions or provisions to the Documents nor alter the Proposal Form in any manner whatsoever.

BIDS

Bids shall be enclosed in a sealed envelope, endorsed

“SEALED BID”

“DO NOT OPEN”

“Contractor’s License Number”

and addressed to:

The City of LEEDS, Alabama.
1400 9TH STREET
LEEDS, Al. 35127

The Contractor shall also show, on the outside of the envelope, his name, address, and State Registration No.

No Bid will be received after the time specified in the "Notice to Contractors", (Advertisement for Bids).

Any Bidder may withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for the receipt of bids.

No Bidder may withdraw his bid for a period of sixty (60) days after the date set for opening thereof, as set forth in the "Notice to Contractors", (Advertisement for Bids).

The right is reserved to reject any or all bids, to waive any informality in any bid, and to accept and bid considered advantageous to the Owner.

AWARD OF CONTRACT

The Contract, if awarded, will be awarded to the lowest and best bidder as soon as practicable, provided a satisfactory bid has been received.

GUARANTY

Each Bidder must enclose with his Proposal a certified check or bid bond in the amount of not less than five per cent (5%) of the total bid. The payee of such check or the obligee of such bond shall be the *City of LEEDS, Alabama*

Certified checks and bid bonds shall be returned to all bidders, other than the low and two next low bidders, when the low bids have been determined. Those of the three low bidders will be returned after execution of the Contract.

If a bidder to whom a contract is awarded shall refuse or neglect to execute the contract and furnish security in the amount required within ten (10) days after the notice has been given him of such award, his certified check or bidders bond shall be forfeited to the Owner as liquidated damages for such refusal or neglect.

The successful bidder will be required to furnish, through an authorized agent in the State of ALABAMA, a Performance Bond, Labor and Material Bond, Employer's Liability and Workmen's Compensation Insurance, Public Liability and Property Damage Insurance,

and shall furnish proof of carriage of all the above insurance all as set out in detail under "General Conditions" of these Specifications. The Performance Bond and the Labor and Material Bond must be countersigned by an agent whose office is located in the State of ALABAMA, and who is authorized to do business in the State of ALABAMA.

INTERPRETATIONS

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the Plans, Specifications, or other proposed Contract Documents, he may submit a written request to the Engineers for interpretations thereof. The persons submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum duly issued and copy of such addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanation of or interpretation of the proposed documents.

COMMENCEMENT AND COMPLETION OF WORK

Following the execution of the Contract by the Owner and the Contractor, the Contractor will be authorized to commence work by written order from the Owner. The Contractor shall then commence work on the project within the time stated in the Proposal, unless such time stated is extended by mutual agreement between the Owner and the Contractor and shall fully complete all work under the Contract with the number of consecutive calendar days specified in the Contract.

FAMILIARITY WITH LAWS

The Bidder is assumed to have familiarized himself with all state laws and with all local ordinances and regulations which, in any manner, may affect the conduct of the work, or those engaged or employed on the work, and no pleas of misunderstanding will be considered.

The attention of all bidders is called to the provisions of the State Law governing General Contractors and Sub-Contractors as set forth in Chapter 4 (Sections 65 to 82, inclusive of Title 46 of the Code of Alabama of 1940, as amended; and bidders shall be governed by the provisions of said Law insofar as they are applicable. The above-mentioned provisions of the Code prevent the Owner from considering a bid from anyone who is not licensed in accordance with the provisions of the Code. The Owner will, therefore, not consider any bid unless the bidder produces evidence that he is duly licensed and registered in accordance with the provisions of the Code of Alabama.

ASSIGNMENT OF CONTRACT

The Contractor shall not assign his Contract, nor any part thereof, nor any moneys due, or to become due thereunder, without prior written approval of the Owner. In case the Contractor, with the consent of the Owner assigns all or any part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of work under his Contract.

SUB-CONTRACTING

No part of the Contract shall be sublet without the prior written approval of the Owner. The Contractor shall, following execution of the Contract, immediately submit to the Owner the names of sub-contractors whom he proposes to employ on the project.

EXECUTION OF CONTRACT

The Contract Documents shall be executed in three (3), each counterpart of which shall be considered as an original counterparts or copies.

QUALIFICATIONS OF BIDDERS

A bidder being considered for award of the Contract shall present satisfactory evidence showing that he has the necessary capital, organization, facilities, and equipment to perform the work under the Contract; and showing that he has contracted for and performed similar work in a satisfactory manner.

1. SUPPLEMENTAL INFORMATION FOR BIDDERS - NONDISCRIMINATION
IN EMPLOYMENT

Contracts for work under this proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order No. 11246 or any previous Executive Order dealing with nondiscrimination in Federally assisted construction contracts (11114 or 10925).

Bidders must, if requested, submit a compliance report concerning their employment practices and policies to maintain their eligibility to receive the award of the contract.

Successful bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written signed statements from authorized agents of the labor pools with which they will or may deal for employees on the work, together with supporting information to the effect that said labor pools' practices and policies are in conformity with Executive Order 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the contract or, a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish same prior to the award of the contract.

Successful bidder must be prepared to comply all respects with the Contract Provisions regarding nondiscrimination, as stipulated under the Labor Standards. SECTIONS 10, 11, 12, 13, AND 14 HEREIN APPLY.

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into as of the _____
day of _____ in the year of _____, by and between the

City of LEEDS, Alabama

(hereinafter called the Owner), and

Milam & Company, LLC

(hereinafter called the Contractor).

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

Article I. CONTRACT DOCUMENTS. The Contract Documents shall consist of: this Agreement, Contractor's Proposal, Contractor's Bid Bond; Notice to Contractors (Advertisement for Bids); Instructions to Bidders; General Conditions, Supplemental Conditions; performance Bond; Labor and Material Payment Bond; all Addenda issued prior to the submittal of the Proposal; all Modifications issued and agreed upon by the Owner and the Contractor prior to and subsequent to the execution of this Agreement; and the Plans (Contract Drawings) and Specifications as prepared by:

HagerCo, LLC
1025 Montgomery Highway, Suite 110
Vestavia, Alabama 35216
205.229.1738

and as on file in the office of the Owner. The documents enumerated hereinabove form the Contract and all are as fully a part of the Contract as if attached to this Agreement and/or fully set forth herein.

Article II. SCOPE OF WORK. The work to be done under this Contract by the Contractor, at his own cost, shall consist of furnishing all labor, materials, supplies, tools and equipment, and of performing all work necessary to construct and fully complete the project entitled,

Park Improvements – New Leeds Pickleball Center 24.006.26

all in accordance with the Contract Drawings and Specifications and with the requirements and provisions of the Contract Documents, all of which for this Contract.

Article III. TIME OF COMPLETION. The work to be performed under this Contract shall be commenced within 10 calendar days after the date on which the Notice to Proceed is issued. The work shall be fully completed within 180 calendar days after the date on which the Notice to Proceed is issued, subject however, to such extensions of time as may be authorized in accordance with the provisions of the Contract Documents.

Should the work under this Contract not be fully completed within the time specified, it is understood and agreed that there will be deducted from the periodic and final estimates of work performed by the Contractor a sum computed at the rate of \$250.00 per day for each additional day required to fully complete the work, beginning from the specified date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the sum thus deducted is extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, if the work should be completed in advance of the completion date specified, the Contractor will make no claim for extra payment therefor.

Article IV. CONTRACT PRICE. The Owner shall pay the Contractor in full payment for performance of work under this Contract, in accordance with the price or prices set forth in the Proposal submitted by the Contractor, which Proposal is bound herewith and made a part hereof to the same extent as if fully set out herein, but subject to such additions and deductions as provided for in the Contract Documents, the sum of:

One Million, Four hundred and Fifty-Five Thousand, Two Hundred and Twenty-three Dollars and xx/100 (\$ 1,455,223.00).

The Contract Price shall be equitably adjusted to compensate for any changes in the work or extra work as may be ordered by the Owner.

Article V. CHANGES IN WORK AND EXTRA WORK. The Owner shall have the right to increase or decrease quantities of work to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project.

Where new and/or unforeseen items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or unforeseen items of work shall be classed as Extra Work.

Where the satisfactory completion of the project requires that changes in work be affected or extra work be ordered, the procedure to be followed in such cases shall be in accordance with the provisions of the Articles of the General Conditions relating to CHANGES IN WORK, and PAYMENT FOR EXTRA WORK.

Article VI. PROGRESS PAYMENT. The Owner shall, on or before the 15th day of each calendar month, make a progress payment to the Contractor in amount equal to value of work performed on the project through the closing date of the preceding estimate period plus value of materials stored, but less ten percent (10%) of the combined values and less previous payments made. The ten percent (10%) retained percentage may be held by the Owner until the value of work completed at end of any estimate period equals or exceeds fifty percent (50%) of the total amount of the Contract, after which time, if the Owner and the Engineer deem that satisfactory progress is being made, the retained percentage may be reduced to five percent (5%) of the total of the value of completed work plus value of materials stored. When the work has been substantially completed, reviewed by the Owner and the Engineer, and found to be in accordance with the provisions of the Contract Documents, the retain age may be reduced to such an amount as would reasonably cover the cost of correction of minor items of work heretofore found to be faulty and the cost of work remaining to be done in order to effect the completion of all of the work in full accordance with the provisions of the Contract Document.

Any payment for materials stored shall be in accordance with the provisions of Article 36 and 45 of the General Conditions relating to storage of materials and payment for materials stored, respectively.

Article VII. FINAL PAYMENT. Final payment, constituting the entire balance of the Contract Price, shall be paid by the Owner to the Contractor within thirty days after the acceptance of the work. The work will not be accepted until the Contractor has certified that he has completed all of the work in full accordance with the provisions of the Contract Documents, the Owner and the Engineer have completed the final review of the work and found that it has been fully completed in accordance with the provisions of the Contract Document, the Contractor has advertised completion of the work in accordance with Article 47 of the General Conditions, and the Contractor has presented to the Owner satisfactory evidence that all indebtedness connected with the work has been fully paid and satisfied, all as set forth in Article 47 of the General Conditions.

Article VIII. MISCELLANEOUS PROVISIONS. Terms used in this Agreement which are defined in the General Conditions and in the Instructions to Bidders shall have the same meaning as designated in those component parts of the Contract Documents.

The Contract Documents, which constitute the entire agreement between the Owner and the Contractor are listed in Article I of this Agreement and, except for Modifications issued after the execution of this Agreement, are enumerated hereinbelow. The signatures which appear hereunder shall have the same force and effect as if appearing on all the Contract Documents enumerated as follows:

1. Contract Agreement	<u>Pages C-1 thru C-6</u>
2. Proposal	<u>Pages P-1 thru P-9</u>
3. Bid Bond	<u>Pages BB-1 thru BB-2</u>
4. Advertisement for Bids	<u>Pages A and B</u>
5. Instructions to Bidders	<u>Pages IB-1 thru IB-8</u>
6. General Conditions	<u>Pages GC-1 thru GC-27</u>
7. Supplementary Conditions	<u>Pages GC-28</u>
8. Performance Bond	<u>Pages PB-1 thru PB-3</u>
9. Labor and Material Payment Bond	<u>Pages LM-1 thru LM-4</u>
10. Specifications	<u>Pages 1-00 Thru 7-00</u>
11. Drawings	<u>1 -- 16</u>
12. Addenda	No1

IN WITNESS HEREOF, the said Contract has hereunder executed this Agreement by his signature shown hereon, and said Owner has hereunder executed this Agreement by affixing hereto his corporate seal and by signature of his corporate officer(s) as shown, on the date first written above, in THREE (3) counterparts, each of which shall, without proof or accounting for the other counterpart deemed an original.

ATTEST:

CITY OF LEEDS, ALABAMA

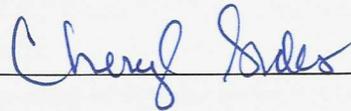


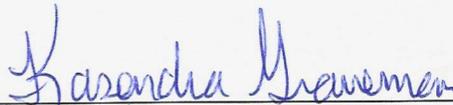
City Clerk



By: David Miller
Title: Mayor

ATTEST:





Bidder: Milan + Co. LLC

By: Kasandra Graveman
Title: Comptroller

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____, hereinafter called the principal, and hereinafter called the Surety, do acknowledge, ourselves to

be held and firmly bound unto *the **City of LEEDS, Alabama***

herinafter called the Owner, in the penal sum of **One Million, Four hundred and Fifty-Five Thousand, Two Hundred and Twenty-three Dollars and xx/100 (\$ 1,455,223.00)**.

for payment of which sum well and truly to be made in lawful money of the United States, we bind ourselves, our successors, heirs, executors, administrators, assigns and personal representatives, jointly and severally, firmly by these present.

THE CONDITION OF THIS OBLIGATION OR BOND IS THIS:

Whereas, the Principal has entered a certain written contract with the Owner, bearing the date of _____, 2025 for the construction of:

Park Improvements – New Leeds Pickleball Center

a copy of which contract is attached hereto, incorporated here by reference, and made a part of to the same extent as if set herein in full, and the Principal and Surety are bound under Bond which shall remain in full force and effect until all of the work under the Contract has been fully completed in full accordance with the covenants, terms, conditions, agreements and provisions of the Contract.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform all his duties, undertakings and obligations, all in accordance with the covenants, terms, conditions, agreements and provisions of the Contract during the original term thereof, and during any extensions thereof which may be granted by the Owner with or without the consent of the Surety, and if the Principal shall satisfy all claims and demands incurred under the Contract, shall fully correct all faulty work, shall fully indemnify and save harmless the Owner from all costs and damages whatsoever which the Owner may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner for any and all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the Specifications accompanying the same, shall in any wise affect the obligation of the Surety under this Bond and the Surety does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the Contract or to the work or to the Specifications.

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

IN WITNESS WHEREOF, this instrument is executed in THREE(3) counterparts, each one of which shall, without proof of or accounting for the other counterparts, be deemed an original, on this the _____ day of _____, 20_____.

ATTEST:

Principal

By _____
(Principal) Secretary

By _____

Title:

Address

Witness as to Principal

Address

Surety

ATTEST:

(Surety Secretary)

By _____
Attorney-in-Fact

Address

Witness as to Surety

Address

Countersigned _____

Resident Agent of Surety

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____

_____ hereinafter called the Principal, and _____

_____ hereinafter called the Surety, do acknowledge us to be held and firmly bound unto City of LEEDS, Alabama

hereinafter called the Owner, in the penal sum of

One Million, Four hundred and Fifty-Five Thousand, Two Hundred and Twenty-three Dollars and xx/100 (\$ 1,455,223.00).

for payment of which sum well and truly to be made in lawful money of the United States, we bind ourselves, our successors, heirs, executors, administrators, assigns and personal representatives, jointly and severally, firmly by these present

THE CONDITION OF THIS OBLIGATION OR BOND IS THIS: Whereas the Principal has entered into a certain written contract with the Owner, bearing the date

of _____, 2022, for the

Park Improvements – New Leeds Pickleball Center – 24.006.26

a copy of which contract is attached hereto, incorporated here by reference, and made a part of to the same extent as if set out herein in full, and the Principal and Surety are bound under

this Bond which shall remain in full force and effect until all claims and demands with respect to labor and materials connected with the work under the contract have been satisfied, subject however to statutory limitations and to such other conditions as hereinafter stated,

NOW, THEREFORE, if the Principal and all Subcontractors to whom any portion of the work provided for in the contract is sublet, and all assignees of said Principal and said Subcontractors, shall promptly make payment to all persons, firms, subcontractors and corporations for furnishing said Principal and said Subcontractors with labor, materials, equipment, machinery, parts, fuel, foodstuffs, supplies, or repairs on machinery or equipment used in or incorporated in the work, for performing any work in connection with the prosecution of the work under the Contract, and under any modifications or extensions thereof, for all insurance premiums in connection with the work, for all labor performed in connection with the work whether by subcontractor or otherwise, or claimants in suits under this Bond, then this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that the said, Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or to the Specifications accompanying the same, shall in any wise affect the obligation of the Surety under this Bond, and the Surety does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the Contract or to the Specifications.

PROVIDED FURTHER, that this Bond is subject to the following limitations and conditions:

(a) Any person, firm or corporation who has furnished labor, materials, equipment, machinery, fuel, parts, foodstuffs, supplies, or repairs for machinery or equipment used or incorporated in the prosecution of the work under the Contract, or amendment or extension thereof, and who has not received due

payment for furnishing such items, shall have a direct right of action in his or their name or names against the Principal and Surety on this Bond, which right of action shall be asserted in a proceeding instituted in a Court of competent jurisdiction in the area in which the work under the contract has been performed. Such right of action shall be asserted in a proceeding brought in the name of the claimant for his or their use and benefit against said Principal or Surety, or either of them not later than one year after the final settlement of the contract, in which action such claim or claims shall be adjudicated and judgment thereon.

(b) In addition to any other legal mode of service, service of summons and other process in suits brought on this Bond may be had on the Principal or Surety by leaving a copy of the summons and complaint, or other pleading or process, with the

City of LEEDS, Alabama

and the Principal and the Surety agree to be bound by such mode of service above described, and consent that such service shall be the same as personal service on the Principal or Surety.

(c) The Surety shall not be liable hereunder for any damage or compensation recoverable under any workmen's compensation or employer's liability statute.

(d) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after final settlement of the said Contract.

(e) No final settlement between the Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in THREE(3) counterparts, each one of which shall, without proof of or accounting for the other counterparts, be deemed an original, on this day the _____ day of _____, 2025.

ATTEST:

Principal

By _____
(Principal) Secretary

By _____

Title President

Address

Witness as to Principal

Address

Surety

ATTEST:

(Surety) Secretary

By _____
Attorney-in-Fact

Address

Witness as to Surety

Countersigned: _____



GENERAL CONDITIONS



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1. LOCATION OF THE WORK

The location of the work is shown on the Contract Drawings and described in the preface to the specifications. The Owner will provide access to the work site (or sites) as shown on the Drawings.

2. WORK TO BE PERFORMED

The work to be performed under this Contract shall include, but without limitation, the furnishing of all materials, labor, tools, appliances, equipment, transportation and services necessary to accomplish the work, and the complete of the work as shown on the Plans and as specified.

3. CONTRACT DOCUMENTS

The Contract Documents are comprised of the following documents, and shall include all additions, deletions and modifications incorporated in these documents before execution of the Contract Agreement.

- a. Advertisement for Bids (Notice to Contractors), listing date and time for receipt of bids, principal items of work, and requirements for bidding.
- b. Instructions to Bidders containing information for use of contractors preparing a Proposal.
- c. Proposal shall be tendered on Proposal Form bound in with the Contract Documents. The Proposal shall be properly executed and guaranteed as specified in the Instructions to Bidders.
- d. Bid Bond (or cashiers check) shall accompany the Proposal, and shall guarantee that the Bidder will enter into an agreement with the Owner for construction of the work should the Contract be awarded to him.
- e. Addenda to Contract Documents issued during the time of bidding (before receipt of bids) or forming a part of the Contract Documents issued to the Contractor for the preparation of his Proposal, shall be covered in the Proposal, and shall be made a part of the Contract. Receipt of each Addendum shall be acknowledged in the Proposal.
- f. Contract Agreement covers the performance of the work described in the Contract Document including all supplemental addenda thereto and all general and special provisions pertaining to the work or materials, therefore.
- g. Bonds shall be furnished by the Contractor at

the time of execution of the Contract Agreement, shall be in form prescribed by the Owner, shall be with a Surety Company authorized to do business in the State in which the work is located, and shall be countersigned by a resident agent of the Surety Company in that State. Bonds shall be as follows:

1. Performance Bond in an amount equal to 100% of the Contract Amount as a guaranty of good faith on the part of the Contractor to execute the work in accordance with the terms of the Contract.
 2. Labor and Material Payment Bond in an amount equal to 100% of the Contract Amount as a guarantee of good faith on the part of the Contractor to make all payments for labor, materials, supplies, and equipment in connection with the Contract.
- h. General Conditions outline certain responsibilities of the Owner and the Contractor (who are the parties to the Contract Agreement) and also those responsibilities delegated by the Owner to the Engineer who acts as the agent of the Owner. Supplemental General Conditions or Special Provisions, when required, are bound in the Contract Documents following the General Conditions, and are a part of the Contract.
- i. Drawings (Plans) and Specifications show and describe the work performed; and it is the intent of the Drawings and Specifications that the Contractor shall furnish all labor, tools, materials, equipment, transportation and services necessary for the proper execution of the work so shown and described, unless specifically noted otherwise. The Contractor shall execute all work so described in full conformance with the Plans, Specifications and all Contract Documents; shall perform all incidental work necessary to complete the project in an acceptable manner; and shall fully and satisfactorily complete all work, facilities, and improvements, ready for use, occupancy and operation by the Owner.

All discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported by

the Contractor to the Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. After discovery of such inconsistencies or ambiguities by the Contractor, any work done by the Contractor on any part of the project affected by such inconsistencies or ambiguities before receipt of written instructions (corrections) from the Engineer shall be at the Contractor's risk.

Responsibility for adequacy of the design and for sufficiency of the Drawings and Specifications shall be borne by the Owner. The complete requirements of the work to be performed under the Contract shall be set forth in Drawings and Specifications supplied by the Owner through the Engineer or by the Engineer as representative of the Owner. The Drawings and Specifications shall be inseparable documents, and in considering them, the Contractor shall use both instruments in performing the work in accordance with their combined intent.

Except as provided for otherwise, or specified to the contrary, all copies of Drawings and Specifications required for and necessary for the execution of the work will be furnished to the Contractor (on the Contract) without charge.

4. INSURANCE

The Contractor shall not commence any work on the project until he obtains, at his own expense, all required insurance; and the Contractor shall not, at any time, conduct any operations on the project or associated with the project unless such operations are covered by the specified insurance. Such insurance must have the approval of the Owner as to limit, form, and amount. The Contractor shall not permit any sub-contractor to commence work on the project until the same insurance requirements have been complied with by such sub-contractor (sub-contractors). The insurance coverage shall be maintained throughout the full period of the contract. Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guaranty period.

As evidence of specified insurance coverage, the Owner may, in lieu of receipt of actual policies, accept certificates issued by the insurance carrier showing such policies to be in force for the specified period.

Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under this Contract.

The types of insurance that the Contractor shall be required to obtain and maintain for the full period of the Contract are listed herein below:

a. Workmen's Compensation and Employer's Liability Insurance shall be in strict accordance with the requirements of the current and applicable Workmen's Compensation Laws of the State. The insurance shall cover all the Contractors employees employed or associated with the project, and where any part of the work is subcontracted, the Contractor shall require the subcontractor to provide similar Workmen's Compensation and Employer's Liability Insurance for all employees of the subcontractor unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide, adequate coverage for the protection of all employees on the project not otherwise protected under applicable provisions of the Statutes relating to Workmen's Compensation and Employer's Liability Insurance.

b. Comprehensive General Liability Insurance shall protect the Contractor and any subcontractors performing work under this Contract from any claims for bodily injury, for sickness or disease, for death, for personal injury, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury \$1,000,000 ea. occurrence, \$2,000,000 aggregate
Property Damage \$1,000,000ea. occurrence, \$2,000,000 aggregate
Personal Injury \$1,000,000 ea. occurrence, \$2,000,000 aggregate
Excess Liability Umbrella \$2,000,000ea. occurrence, \$2,000,000 aggregate

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to insure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

c. Comprehensive Automobile Liability Insurance shall protect the Contractor and subcontractor performing work under this Contract from any claims for bodily injury, for death, and for property damages, which may arise wither directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury \$1,000,000 per person, -\$1,000,000ea. occurrence
Property Damage - \$500,000ea. occurrence

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to insure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

d. Property Insurance shall afford protection against physical damage to the insured property during the entire construction period. Insurable portions of the project shall be covered on a completed value basis; and at any given time, the dollar coverage provided shall be the actual value of the insurable portions of the completed work, the value of the insurable portions of the work in progress, and the value of the insurable portions of stored materials. The named insured shall be the Owner, the Engineer, the Contractor, and all Sub-Contractors. The policy by its own terms or by endorsement shall specifically permit partial or beneficial occupancy or use prior to completion or acceptance of the entire work.

Perils named in the policy shall be Fire and Lightning, Extended Coverage, Vandalism and Malicious Mischief, and Additional Perils when named in Special Insurance Provisions under Supplemental General Conditions.

e. Special Insurance Provisions, when required shall be as set forth in the Article relating to Special Insurance Provisions under Supplemental General Conditions.

5. INDEMNITY

The Contractor shall hold harmless, indemnify and defend the Owner and the Engineer, and each of their officers, agents and employees, from and against all loss or expense (including costs and attorney's fees) by reason of any or all suits, action or claims of any character, name or description brought for or on account of any injuries or damages received or sustained by any person or persons, by any property, or by the Contractor or actions of his employees in connection with the prosecution of the work, or by or on account of any claim arising from or any amounts recovered under the Workmen's Compensation Law or any other law, ordinance, or decree, except only such injury or damage as shall have been occasioned by the sole negligence of the Owner or Engineer.

6. PATENTS AND ROYALTIES

The Contractor shall pay the costs of all royalties, license fees and patent fees involved by use, or manner of use, in the work of all designs, devices, materials, equipment or processes, and the Contractor shall provide for such use or manner of use by legal agreement with the owner of the patent or a duly authorized license of such

owner. All such costs referred to hereinabove shall be included in the price bid for the work under this Contract.

The Contractor shall save harmless the Owner and the Engineer from any and all loss or expense by reason of use, or manner of use, in the work of any design, device, material, equipment or process covered by letter of patent or copyright; and the Contractor shall defend all suits resulting from claims for royalties, license fees or patent fees on designs, devices, materials, equipment or processes purchased by the Contractor for use in the work, and from claims for royalties, license fees or patent fees involved by use, or manner of use, of such items by the Owner.

7. LICENSES AND PERMITS

All licenses and permits necessary for the prosecution of the work shall be secured and paid for by the Contractor at no expense to the Owner other than as reflected in the price bid for the work.

8. COMPLIANCE WITH LAWS, ORDINANCES AND REGULATIONS

The Contractor shall comply with all Federal, State, and Local Laws, Ordinances and Regulations, which in any manner affects the work or the conduct of the work; shall comply with all orders and decrees as may have been adopted or as may be enacted by bodies or tribunals having any legal jurisdiction or authority over the work. The Contractor shall file all reports and give all notices as required for compliance with the above. The Contractor shall indemnify and save harmless the Owner and the Engineer against any suits or actions of any kind or nature brought, or may be brought, against them for any claim or liability arising from or based upon the violation by the Contractor, his subcontractors, his agents, his representatives, his employees, or employees of his sub-contractors.

9. SAFETY

The Contractor shall always comply with the requirements of "Safety and Health Regulations for Construction", Occupational Safety and Health Administration, U.S. Department of Labor, and shall be responsible for filing all reports and data with the authority having jurisdiction. In the prosecution of his work the Contractor shall observe all precautions and safety provisions as outlined in the "Manual of Accident Prevention in Construction", as published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable laws or regulations.

The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the work; and this requirement shall not be limited in application to normal working hours, but shall apply continuously twenty-four (24) hours per day until acceptance of the work by the Owner.

The duty of the Engineer to inspect the work in order to determine its acceptability in accordance with the Specifications and to conduct construction review of the Contractor's performance for the benefit of the Owner, shall not be construed as a duty

to review the adequacy of the Contractor's safety measures on or near the construction site and/or to direct the actions of the Contractor's employees in the performance of the work as such a duty is not included in the responsibilities of the Engineer.

10. WARNING SIGNS AND BARRICADES

The Contractor shall provide adequate signs, barricades, warning lights and watchmen; and shall take all necessary precautions for the protection of the work and the safety of the public. Existence of all barricade's detours, and obstruction shall be clearly indicated by warning signs and by suitable signal lights which shall continuously function from end of daylight to beginning of daylight and during all other periods of poor visibility such as rain, hail, sleet, snow, fog, smog, etc. Barricades shall be of substantial construction and shall be painted in such a manner and with such paint formulation as would result in rapid identification during periods of poor visibility. Where work is located on, adjacent to, or across highways or roads, provisions, for control of traffic shall be in accordance with the State "Manual on Uniform Traffic Control Devices for Streets and Highways".

11. PUBLIC CONVENIENCE

The Contractor shall always so conduct his work as to insure the least possible obstruction to traffic, to insure the least possible inconvenience to the public and the residents in the vicinity of the work, and to insure the least possible inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the site of the work shall be always kept accessible to fire-fighting equipment. Temporary provisions shall be made by the Contractor to insure the safe use of sidewalks. The proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches shall be insured by constant clean-up along with the work and by provision of temporary facilities where required; and natural surface drainage shall not be obstructed.

12. SANITARY PROVISIONS

The Contractor shall be responsible for the sanitary conditions in the areas in which he is working and shall provide and maintain such sanitary accommodations for the use of his employees and of his subcontractor's employees in compliance with the requirements and regulation of the State Board of Health and other authorities having jurisdiction.

13. EXISTING CONSTRUCTION AND FACILITIES

Where new construction under this Contract is adjacent to or crosses highways, railroads, streets, roads, access facilities, or utilities under the jurisdiction of State, County, City or other Public Agency, public utility or private entity, the Contractor shall secure written permission from the proper authority and shall furnish such bond (Cash or Surety as required), or insurance agreement as may be required before executing such new construction. A copy of the written permission and bond or insurance agreement (when required) must be filed with the Owner before any work is done. The Contractor shall replace and/or repair all existing construction, utilities or facilities damaged in the execution of work under this

Contract. The Contractor will be required to furnish releases from all authorities affected by the work before final acceptance of the work under this Contract.

14. AVOIDANCE OF POLLUTION CONTRIBUTION DURING CONSTRUCTION OPERATIONS

The Contractor shall employ all safeguards and observe all precautions necessary to minimize contribution of pollution to the watercourses during the construction operations. The Contractor shall conduct excavation and backfilling operations in such a manner as to avoid concentration of run-off over freshly excavated or backfilled areas. The Contractor shall intercept and direct surface drainage around excavated areas; shall construct temporary terraces or dikes where necessary to prevent erosion and loss of soil from excavated areas; and shall insofar as is possible, minimize stream pollution resulting from soil transported in run-off from the construction site. At the conclusion of the work all temporary facilities shall be removed and all areas disturbed by construction operations shall be restored to as good condition as when found, or as required by these Specifications.

15. USE OF CHEMICALS

All chemicals used during construction of the project or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reagent, or of other classification, must show approval of EPA, USDA, or FDA, according to the purpose for which the chemical is to be used. Use of all such chemicals and disposal of residues therefrom shall be in strict accordance with the instructions of the manufacturers of the respective chemicals.

16. COMMENCEMENT, PROSECUTION, AND COMPLETION OF THE WORK

Following the execution of the Contract by the Owner and the Contractor, a written Notice to Proceed shall be given to the Contractor by the Owner. The Contractor shall commence work on the project in good faith within the number of days specified in the work order, and shall thereafter prosecute the work regularly, uninterruptedly, with all reasonable diligence, and with such force as to secure the completion of the work within the specified Contract time.

The time allowance specified in the work order for commencement of work shall be the number of consecutive calendar days specified in the Proposal for starting the work. The time allowance for completion of the work shall be the number of consecutive calendar days specified in the Proposal for completion of the work subject, however, to any extensions of time as may be provided for herein. It is intended that the date of issuance of the work order will coincide with date of the work order should be after the date of execution of the Contract, the time allowance for starting the work shall be reckoned from the date of the work order, and the time specified for completion of the work shall be reckoned from the date of the work order.

Should the work under this Contract not be completed within the time specified, it is understood and agreed that there will be deducted from the monthly and final estimates of work performed by the Contractor a sum computed at the rate of \$250.00 per day, beginning from the stated date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the above deduction is not a

penalty, but money due to reimburse the Owner for the extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, if the work should be completed in advance of the scheduled date of completion, the Contractor will make no claim for extra payment, therefore.

The Owner may grant an extension of time for completion of the work when prosecution of the work is delayed or halted by occurrences beyond the Contractor's control, such as strikes lockouts, acts or omissions on the part of the Owner, fire or other catastrophes, provided however that the Contractor shall immediately give written notice to the Owner of the cause of such delay. The Owner shall not suffer any loss or expense because of such occurrences or delays, except when caused by any act or omission on the part of the Owner; and the Contractor shall not be allowed any damages or claims for extra compensation resulting from such occurrences or delays, except when caused by any act or omission on the part of the Owner.

17. CONSTRUCTION SCHEDULE

The Contractor shall, following execution of the Contract, promptly prepare and submit to the Engineer a schedule of construction operations so planned as to ensure completion of the work within the time limit stated in the Proposal. In the event that the Contractor should, at any time, for any reason, fall behind said schedule, he shall promptly increase his work to expedite the work and to ensure that it shall be fully completed within the stated time limit. The Contractor shall not be allowed additional compensation for employment such measures.

The construction schedule shall show the proposed dates of commencement and completion of each of the various subdivisions and shall show the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule.

18. SUPERVISION OF THE WORK

The Contractor shall be responsible for planning, scheduling, organization and prosecution of the work in accordance with the Plans, Specifications and Contract Documents.

Observations, construction reviews, tests, recommendations or approvals by the Engineer, or by persons other than the Contractor, shall in no way relieve the Contractor of his obligation to complete all work in accordance with the Plans, Specifications and Contract Documents. All work shall be done under the direct supervision of the Contractor. The Contractor shall be responsible for construction means, methods, technique and procedures, and for providing a safe place for the performance of the work by the Contractor, by all subcontractors, by all suppliers, and by the employees of all of those heretofore named. The Contractor shall also be responsible for safe access to the work, safe use of the work, safe working conditions, and safe occupancy of the work by and/or for all authorized persons.

The Contractor shall maintain on the project a qualified superintendent who is acceptable to the Owner, and who shall provide the efficient supervision required for the successful and satisfactory completion of the work. The superintendent shall have the authority to act on behalf of the Contractor, and all communication with the

superintendent shall be considered a communication with the Contractor. The Contractor's superintendent shall be responsible for coordinating the work of all Subcontractors, and he shall always be present on the site of the work as required to adequately perform his supervisory duties and to coordinate the work of all Subcontractors.

19. SUBCONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the work, which under normal contracting practices, are performed by subcontractors. No part of the work, however, shall be sub-let by the Contractor without the prior written approval of the Owner, or the Engineer acting upon the instructions of the Owner. Following the execution of the Contract, the Contractor shall submit in writing for review by the Owner the names of Subcontractors to whom he proposes to subcontract portions of the work. The early selection of Subcontractors, in the case where the Contractor proposes to subcontract any part of the work, is essential to the proper organization of the work, and the Contractor shall therefore submit any names of proposed Subcontractors upon or before request by the Owner. The names of proposed Subcontractors so submitted shall not be changed except at the request of or with the approval of the Owner.

The Contractor shall be responsible to the Owner for the acts, deficiencies, and omissions of his Subcontractors and of their direct and indirect employees to the same extent as he is responsible for the acts, deficiencies, and omissions of his own and those of his employees.

The Contractor shall bind all Subcontractors to the terms of the General Conditions and Contract Documents insofar as they are applicable to work under subcontract, and shall insert in all agreements with Subcontractors appropriate provisions such as to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract Documents.

Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner.

For convenience of reference, to facilitate organization of the work, and for convenience in evaluating working progress, the Specifications have been separated into titled Sections. Such separation shall not, however, operate to make the Owner or the Engineer an arbiter to establish limits to the contracts between the Contractor and Subcontractors. The general charge to the Contractor is that all work shall be fully completed in accordance with the Plans, Specifications and Contract Documents.

20. CONTRACTOR'S RESPONSIBILITIES WITH RESPECT TO WORK BY OTHERS

The Owner may place portions of the work on the project under separate contracts. The Contractor shall cooperate with other contractors regarding use of the site, storage of materials, and execution of their work.

It shall be the Contractor's responsibility to inspect all work performed by other contractors, which in any manner affects his work, and to report to the Owner the existence of any irregularities or discrepancies, which will not permit him to complete his

work in a satisfactory manner. The failure of the Contractor to notify the Owner of the existence of such irregularities or discrepancies shall indicate of such of other contractors has been satisfactorily completed and is in condition to receive his work.

The Contractor shall keep himself informed of the progress and performance of other contractors; and, where the lack of progress or poor performance (defective workmanship) on the part of other contractors will affect the Contractor in the performance and completion of his work, he shall immediately notify the Owner of the existence of such conditions. Failure of the Contractor to keep himself informed of the status and condition of work being performed by other contractors on the project, where the status or condition of such work will affect the performance of his work, and failure of the Contractor to notify the Owner of status or conditions unfavorable to the proper coordination, performance, and completion of his work, shall be construed to be acceptance by the Contractor that the status and condition of work being performed by other contractors is satisfactory for the proper coordination, performance, and completion of his work.

21. SUNDAY, HOLIDAY, AND NIGHT WORK

Work on Sundays and Holidays, or at night, will be permitted only when the Contractor has received the written permission of the Owner. Work at such times may be required when special connections to existing systems are to be made, when new facilities are to be placed in service, when existing facilities are to be taken out of service, when it is more advantageous to the utilities involved, or when an emergency arises in the work schedule. In such cases the permission of the Owner shall be received, the work scheduled well in advance and arrangements made for prosecution of the work with all safety and minimum inconvenience to the public. All work necessary to be performed on Sundays and Holidays, or at night shall be so performed without additional expense to the Owner.

Maintenance work normally required for protection of persons, or for protection of the work or property, will be permitted at any time.

Work during an emergency threatening bodily injury, loss of life, or property damage shall be performed in accordance with the provisions of Article 22. of the General Conditions.

22. EMERGENCY WORK

The Contractors shall always guard against bodily injury or loss of life; and the Contractor shall at all times prevent damage to the Owners property, to his own work on the site, and to adjacent property. In the case of the development of an emergency which should threaten loss of life, injury to persons, or damage to property, the Contractor shall furnish and install all necessary materials and equipment and shall perform all work as could possibly be accomplished to prevent loss of life, bodily injury, or damage to property. Nothing stated hereinabove shall be construed as limiting the Contractor's Conditions and Contract Documents, to protect life and property and to pay claims resulting from loss of life, bodily injury, or damage to property. The substance of this Article of the General Conditions is that, in case of an emergency, the Contractor shall act with all speed, with all force, and in an expeditious manner, to avert loss of life, bodily injury, and property damage.

23. CHANGES IN WORK

The Owner shall have the right to increase or decrease quantities of work as established by the number of units of various items of work set forth in the Proposal Form, to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project. Such increases, decreases, changes, and extra work shall not invalidate the Contract. Should the Contract Price or the Contract Completion Time be affected by such increases, decreases, changes or extra work, the compensation and time shall be adjusted at the time when such increases, decreases, changes or extra work items are ordered.

24. EXTRA WORK

Where new and/or unforeseen items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or unforeseen items of work shall be classed as Extra Work. No Extra Work shall be undertaken except by written order from the Owner. The Contractor shall, upon receipt of written order from the Owner, perform such Extra Work and furnish such materials as may be required for the proper completion or construction of the whole work contemplated. In the absence of such written order no claim for extra compensation by reason of performance of Extra Work shall be allowed. Extra Work shall be performed in accordance with the Specifications and Contract Documents, insofar as they are applicable; and where such Extra Work is not covered by the Specifications and Contract Documents it shall be performed in accordance with the intent thereof.

25. FAULTY WORK AND DEFECTIVE WORK

Any faulty work or defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be corrected or removed within ten (10) days after written order is given by the Owner and in accordance with instructions therein; and the work shall be re-executed in satisfactory manner and form by the Contractor. The fact that the Engineer may have previously overlooked such faulty or defective work shall not constitute acceptance of any part of it.

26. USE OF COMPLETED PORTIONS OF THE WORK

The Owner shall have the right to take possession of and use any completed or partially completed portion of the work, notwithstanding that the time for completing the entire work or such portions of the work may not have expired; but such taking possession and use shall not be deemed to be acceptance of any work not completed in accordance with the Plans, Specifications, and Contract Documents. If such prior use should increase the cost of or delay the completion of uncompleted work or should cause refinishing of completed work subjected to such prior use, the Contractor shall be entitled to extra compensation or extension of time, or both, as agreed upon by the Owner.

27. CUTTING AND PATCHING OF WORK

The Contractor shall perform all necessary cutting and patching as required to connect new work to existing work and as required in new work to properly receive the work of the various trades involved in the entire work; and the Contractor shall restore all such cut and patched work, and shall refinish all surfaces affected by such work, to conditions approved by the Engineer. Cutting of the existing work, or any work, in such a manner as would endanger the work, adjacent property, the workmen, or the public, shall not be done.

28. CLEANING UP THE WORK

The Contractor shall remove from the property of the Owner, and from all public and private property, all temporary structures, rubbish, waste materials resulting from his operations or caused to be in such locations by actions of his employees, and surplus materials. The Contractor shall remove all his equipment, tools, and supplies from the property of the Owner. The entire work shall be clean and finished as specified. The site shall be clean, true to finished contours given, and improved as specified. The entire work shall be ready for permanent occupancy and/or use before acceptance of the work can become fact. After the completion of the work, should the Contractor fail to remove his equipment, tools and supplies from the property of the Owner, the Owner shall have the right to remove them at the expense of the Contractor.

29. CHARACTER OF WORKMEN

The Contractor shall always be responsible for the conduct and discipline of his employees and/or any Subcontractor or persons employed by any Subcontractors. All workmen must have sufficient knowledge, skill, and experience to efficiently, reliably, safely, and properly perform the work assigned to them. Any foreman or workman employed by the Contractor or Subcontractor who does not perform his work in manner as described hereinabove, who appears to be incompetent, or who acts in a disorderly or intemperate manner, shall, at the written request of the Owner, be immediately discharged and shall not be again employed on any portion of the work without the approval of the Owner.

31. MATERIALS AND EQUIPMENT

The materials and equipment incorporated and/or installed in the work shall meet the requirements of the Contract Documents. All materials and equipment shall be subject to review by the Engineer, and no materials and equipment shall be ordered until information relating to such materials and equipment has been reviewed by the Engineer. The Contractor shall be responsible for furnishing and installing all material and equipment required for the complete work.

To establish standards of quality the Engineer has in the detailed Specifications, or on the Plans, referred to certain product by name or by name and catalog number. This procedure is not to be construed as eliminating from competition other products of equal or better quality as manufactured by other companies. Any material or article, which according to the judgment of the Engineer, will fully meet the design criteria, is

equal in function and durability, and is suitable for use in arrangement as shown on the Plans, will be acceptable. The Contractor shall furnish the complete list of proposed desired substitutions prior to signing of the Contract together with such engineering and catalog data as the Engineer may require. All such proposals shall be submitted in writing by the Contractor and not by individual trades (subcontractors) or materials suppliers. The Engineer will review the proposed substitutions and make his recommendations within a reasonable item. The Contractor shall abide by the Engineer's decision when proposed substitute materials or equipment are not recommended for installation, and shall in such case, furnish the specified material or item of equipment.

It shall be the responsibility of the Contractor to ensure that materials and equipment to be furnished will fit the space available. The Contractor shall make field measurements necessary to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment as will contribute to efficient arrangements and results in final installation conforming to the true intent and meaning of the Contract Documents. Where, because of the particular equipment furnished and installed, arrangements of connections different from those shown are required, it shall be the responsibility of the Contractor to install the equipment in manner as to insure proper and satisfactory operation, to arrange the connections in a neat and efficient manner, and to make all changes in the work required by such arrangements, all in harmony with the intent of the Contract Documents.

All materials, manufactured articles, and equipment shall be applied, installed, connected, erected, used, conditioned for use, cleaned and used in accordance with instructions of the manufacturer.

All manufactured and fabricated items shall fully comply with applicable standards of the Occupational Safety and Health Administration.

Materials and equipment, which are not equal to samples reviewed by the Engineer, do not conform to the requirements of the Contract Documents or applicable standards, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall neither be furnished nor installed.

32. SAMPLES OF MATERIALS

All samples called for in the Specifications or required by the Engineer shall be furnished by the Contractor and submitted to the Engineer for his review. Samples shall be furnished well in advance of the anticipated time of fabrication or use of materials represented, and the Engineer shall be allowed reasonable time for consideration of samples submitted.

When required, samples shall be accompanied by laboratory test report and/or certified compliance statements indicating that the materials represented conform to the requirements of the Specifications. Sampling and testing of materials shall be performed in accordance with standard methods referred to in the Specifications.

All samples submitted by the contractor shall be accompanied by a covering letter indicating that such samples are recommended by the contractor.

33. TEST REPORTS AND CERTIFICATES

Laboratory test reports on materials proposed to be used in the work shall be furnished by the Contractor in accordance with the provisions of Article 32.

Certified statements of compliance, where required by the Specifications, shall be furnished by the Contractor.

Certified mill test reports, where required by the Specifications, shall be furnished by the Contractor.

34. SHOP DRAWINGS

The Contractor shall provide shop drawings, setting schedules, piping installation details, and such other drawings as may be necessary for the prosecution of the work in the shop and in the field, all as required by the Drawings, the Specifications, or the Engineer's instructions. The drawings shall be submitted in accordance with an orderly schedule based upon time required for fabrication or manufacture and delivery, and upon time at which materials, fabricated items, or manufactured items will be required to be incorporated in the work.

Deviations from the Drawings and Specifications shall be called to the attention of the Engineer at the time such shop drawings or other drawings are first submitted to the Engineer for his consideration. The Engineer's review of any drawings shall not release the Contractor for responsibility for such deviations, or any subsequent deviations not noted by the Contractor or the Engineer.

Shop drawings and other drawings submitted for review by the Engineer shall bear the Contractor's certification that he has reviewed, checked, and approved such drawings, that they are in harmony with the requirements of the project and with the provisions of the Contract Documents, and that he has verified all field measurements, construction criteria, materials, catalog numbers, and similar data. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and that the Contractor's Guaranty will fully apply.

The finished assemblies represented by the shop drawings and other such drawings shall fully conform to the standards of the Occupational Safety and Health Administration, wherever applicable.

36. EQUIPMENT DATA

The contractor shall submit, for review by the Engineer, complete catalog data for every manufactured item of equipment and all components to be used in the work, including specific performance data, material description, rating, capacity, working pressure, material gage or thickness, brand name, catalog number, general type, and other pertinent data. Submittals shall be compiled by the Contractor and reviewed by the Engineer before equipment is ordered. Where details of items of equipment are affected by details of items of other equipment, submittals for such associated items of equipment shall be compiled by the contractor and reviewed by the Engineer before any such associated items of equipment are ordered.

Catalog data for equipment reviewed by the Engineer shall not supersede the Contract Documents. The review by the Engineer shall not relieve the Contractor from responsibility for deviations from Drawings or Specifications, unless the Contractor has in writing called the attention of the Engineer to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in the items submitted. The Contractor shall check the work described by the catalog data against the requirements set forth in the Contract Documents in order to determine the existence of any errors or deviations.

Equipment data submitted for review by the Engineer shall be accompanied by a covering letter from the Contractor indicating that he has reviewed, checked, and approved the data submitted; that equipment represented by the submittal is in harmony with the requirements of the project and with the provisions of the Contract Documents, and that he has verified catalog numbers, and similar data. The Contractor shall also certify that the work represented by the manufacturer's drawings and equipment data is recommended by the Contractor and that the Contractor's Guaranty will fully apply for the length of the manufacturer's warranty.

36. STORAGE OF MATERIALS AND/OR EQUIPMENT

Materials and/or equipment to be incorporated in the work shall properly be housed or otherwise protected from corrosion and damage to insure the preservation of their finish, quality, and fitness for the work. Where considered necessary to secure proper protection, the materials shall be placed on racks, platforms, or hard clean surfaces not subject to surface drainage. Factory finished items shall be stored above ground, covered, individually sealed, or housed indoors as required. The Contractor shall be aware of the potential difficulties involved in the storage of equipment fitted with bearing, which may suffer damage for a long period of idleness and shall take such precautionary measures as required to preserve the life expectancy of the bearings.

Stored materials and equipment shall be located and arranged to facilitate prompt inspection. Private property shall not be used for storage purposes without the written consent of the owner or lessee of said property. When the Contractor desires to accept delivery of material or equipment which cannot be accommodated or housed on the site of the work he may, but only with the permission of the Owner, store such material and/or equipment in an insured warehouse. Any agreement for rental of such storage space by the Contractor shall contain a provision that the material and/or equipment thus stored shall not be subject a lien for payment of storage. The Owner shall be protected against loss of or damage to such stored equipment by the terms and endorsements of the Contractor's insurance policies.

37. CONTRACT DRAWINGS

The Contract Drawings, titled Proposed City Hall Renovations Contract 2015-064 are on file in the office of the Owner.

The aforesaid Drawings, together with the Proposal, Advertisement for Bids, Bidder's Bond, Instructions to Bidders General Conditions, Supplemental General Conditions (where required), Contract Agreement, Performance Bond, Labor and Material Bond, Specifications, and any Addenda, constitute the Contract Documents. The Drawings shall be used in connection with the Specifications and other Contract Documents, and shall constitute a part of the Contract as if set out herein in full.

The Owner reserves the right to amend or revise the drawings, and to furnish such other detail drawings as, in the opinion of the Engineers, may be necessary for the proper prosecution of the work. All such additional drawings shall have equal force and effect as the original drawings.

Any seeming conflict between the Drawings, Specifications and other Contract Documents, shall be submitted to the Engineer, and the Engineer's decision shall be final.

Drawings and Specifications are intended to be cooperative and where work is called for in one but not in the other, it shall be performed as though it were specified and/or indicated in both.

The figured dimensions and/or elevations shown on the Drawings shall be used by the Contractor for the layout of the work. Where the work of the Contractor is affected by finish dimensions, such dimensions shall be determined by the Contractor at the site of the work, and he shall assume the responsibility, therefore.

38. SURVEYS, BASE LINES, BENCHMARKS, CONTROL POINTS

The Owner has made, or caused to be made, the preliminary surveys and topographic surveys necessary for the design of the work and the preparation of the drawings. Such survey information is shown on the drawings.

Where the work consists of construction of units, facilities, or components on a project site, the Engineer will establish base lines necessary for the location of the principal components of the work, will set control points on or reference points for the base lines, and will set a suitable number of benchmarks adjacent to the work. The Contractor shall carefully preserve bench marks, reference points, and control points; and, in the case of destruction of or damage to such bench marks, reference points, or control points by the Contractor, or as a result of the Contractor's negligence, the Contractor shall be charged with the expense and damage resulting there from, and shall be responsible for any mistakes that may be caused by the loss or disturbance of such bench marks, reference points, or control points.

Based upon the base lines, benchmarks, reference points, and control points thus provided, and on the information shown on the Drawings, the Contractor shall develop and make all detailed surveys necessary for construction, including slope stakes; batter boards; grade hubs; stakes for locations of pipe lines, cables, conduits, poles, piles, etc.; and working points, lines and elevations.

Where the work consists of construction of water mains, sewers, or similar work, the Engineer will establish control points and reference points necessary for the location of the work and will set a suitable number of benchmarks along the route of the work. The

Contractor shall carefully preserve bench marks, control points, and reference points; and, in the case of destruction of or damage to such bench marks, control points and reference points by the Contractor, or as a result of the Contractor's negligence, the Contractor shall be charged with the expense and damage resulting there from, and shall be responsible for any mistakes that may be caused by the loss or disturbance of such bench marks, reference points, or control points.

Based upon the benchmarks, control points, and reference points thus provided, and on the information shown on the drawings, the Contractor shall develop and make all detailed surveys necessary for construction, including slope stakes; batter boards; grade hubs; stakes for location of underground obstructions; and working points, lines and elevations.

39. LANDS AND RIGHTS-OF-WAY

The Owner will provide the lands shown on the Drawings or described in the Specifications upon which the work under the Contract is to be performed, and which are to be used for access to the work. Any delay in furnishing these lands by the Owner that would prevent the Contractor from beginning the work or continuing the prosecution of the work, may be deemed to be proper cause for adjustment of the Time of completion of the work or for adjustment of the Contract Amount.

Any land and access thereto not specifically shown to be furnished by the Owner that may be required for temporary construction facilities or for storage of materials shall be provided by the Contractor with no liability to the Owner. The Contractor shall confine his equipment, apparatus and storage to such additional areas as he may provide at his own expense.

The Contractor shall not enter upon private property for any purpose without obtaining permission; and the Contractor shall be responsible for the preservation of all public property, trees, monuments, structures and improvements, along and adjacent to the street and/or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall use suitable precautions to prevent damage to pipes, conduits, other underground structures, and utilities. The Contractor shall carefully protect from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location; shall not remove such monuments and property marks until directed; and shall replace them in original location when required.

40. ACCESS TO THE WORK

The Engineer and his representatives shall have free access to the work and shall be given full opportunity to inspect the working progress and to examine such records of the Contractor as may have bearing on the proper inspection and observation of the work. The Contractor shall provide at the site of the work such space as would be reasonably adequate to serve as a field office for representatives of the Engineer and as storage area for their equipment and supplies.

Representatives of the City of LEEDS and HagerCo LLC

shall also have free access to the work whenever it is in preparation or progress; and the Contractor shall provide proper facilities for such access and inspection by the representative of the above-named authorities and/or agencies.

41. OBSERVATION OF THE WORK

The Engineer shall decide questions which may arise as to the quality and acceptability of materials and/or equipment furnished, the quality and acceptability of work performed, the note of progress of the work, interpretations of the Drawings and Specifications, and all questions as to the acceptable fulfillment of the Agreement on the part of the Contractor. The contractor shall abide by these decisions. The duties and responsibilities of the Engineer as set forth herein shall not be extended except through written consent of the Engineer and the Owner.

All materials and each part or detail of the work shall always be subject to observation by the Engineer and the Owner, and the Contractor shall be held strictly to the intent of the Contract Documents in regard to quality of materials, equipment and workmanship, and also in regard to the diligent execution of the Contract. Observation may be made at the site or at the source of material supply, whether mill, plant, or shop. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make his observations and construction review.

The Engineer's decision as to the acceptability or adequacy of the work shall be final and binding upon the Contractor. The contractor agrees to abide by the Engineer's decision relative to the performance of the work.

All claims of the Owner or the Contractor shall be presented to the Engineer for his decisions, which shall be final except in cases where time and/or financial consideration are involved, and such cases shall be subject to arbitration if not solved by mutual agreement between the Owner and the Contractor.

42. SUSPENSION OF WORK

The Owner shall have the right to suspend the work, wholly or in part, for such periods of time as he may deem necessary, when the prosecution of the work during unsuitable weather or under other conditions adversely affecting the work is considered to be unfavorable toward the satisfaction of the provisions of the contract, or when time is required to allow for supplying of materials meeting the requirements of the Contract Documents. The Contractor shall not claim damages, extra cost or additional monetary compensation by reason of such suspension of work but shall be entitled to an adjustment in the Time of Completion of the Contract to compensate for the time during which work was suspended.

43. BREAKDOWN OF CONTRACT AMOUNT

Where unit prices form the basis for payment under the Contract, such unit prices as set forth in the Proposal, when applied to the corresponding quantities of work

performed during a given estimate period, shall represent the value of work performed during that estimate period. The periodic partial payments to the Contractor for performance of work under the Contract, where unit prices form the basis for payment, shall be computed as described hereinabove. It shall be understood, however, that the estimated quantities of work shown to be paid for on unit price basis are given for the purposes of determining the approximate value of the work and comparing bids, that the Owner reserves the right to increase or decrease the estimated quantities of work as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated under this Contract, and that such increase or decrease in the estimated quantities of work shall in no way, neither vitiate this Contract nor give cause for claims or liability for damages.

Where lump sum prices form the basis for payment under the Contract, the Contractor shall, within ten (10) days of receipt of Notice to Proceed, submit a complete breakdown of the contract amount showing the value assigned to each part of the work, the total of the assigned values of all parts or components being equal to the total Contract Price. The division of the work into parts or components according to trades and/or sections of the Specifications shall be subject to the approval of the Engineer. Upon approval by the Engineer of the breakdown of the Contract Amount, such breakdown shall be used as the basis for estimating partial payments for work performed under the Contract. The costs shown in the breakdown shall not, however, be considered as fixing a basis for additions to or deductions from the Contract Price, nor shall they be considered as fixing a basis for computing the cost of Extra Work.

44. PERIODIC OR PARTIAL PAYMENTS

At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest herein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing the approved payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within then (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment based on the approved partial payment estimates less the retain age. The retain age shall be an amount equal to 10% of said estimate until 50% of the work has been completed. At 50% completion further partial payments shall be made in full to the contractor and no additional amounts may be retained unless the engineer certifies that the job is not proceeding satisfactorily but amounts previously retained shall not be paid to the contractor. At 50% completion or any time thereafter when the progress of the work is not satisfactory, additional amounts may be retained but in no event shall the total retain age be more than 10% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the work has

been substantially completed except for work which cannot be completed because of weather conditions, lack of materials or other reasons for non completion, owner may make additional payments, always retaining an amount sufficient to cover the estimated cost of the work to be completed. (Revised 2-15-78, PN 609)

Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

The Contractor agrees that he will indemnify and save the Owner and Engineer harmless from all claims arising out of the lawful demands of subcontractors, laborers, workmen, mechanics, and suppliers of machinery, parts, equipment, power tools, fuel, materials and other construction items, incurred in the performance of work under this Contract. The Contractor shall, at the Owners request, furnish satisfactory evidence that all obligations of the nature hereinabove described have been paid, discharged, or waived. If the Contractor should fail to do so, then the Owner may, after having served written notice on the Contractor, wither directly pay those unpaid bills of which the Owner has received written notice, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is presented that all such liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed in accordance with the terms of this Contract, but, in no event, shall the provisions of this sentence be construed to impress upon the Owner any obligations to either the Contractor or his Surety. In paying any unpaid bills of the Contractor the Owner shall be deemed to be the temporary agent of the Contractor for this specified purpose; and any payment so made by the Owner shall be considered as a payment made under the Contract by the Owner to the Contractor, and the Owner shall not be liable to the Contractor for any such payments made in good faith.

45. PAYMENT FOR MATERIALS STORED

Materials and/or equipment stored shall meet the requirements of Article 36 of theses General Conditions.

No materials or supplies for the work shall be purchased by the Contractor or by any Subcontractor subject to any Chattel mortgage, or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials, equipment, and supplies used by him in the work, and that such title is free from all liens, claims or encumbrance.

Payment for materials stored will be conditioned upon evidence submitted to establish the Contractor's title to materials and/or equipment stored, such as paid invoices, receipts of payment, satisfied purchase agreements, etc. When value of materials sorted is allowed to be included in the Contractor's periodic estimates, the materials and/or equipment represented by such value shall become the property of the Owner, and the Contractor shall be responsible for safeguarding and using such materials and/or equipment in accordance with the provisions of the Contract Documents.

46. PAYMENT FOR EXTRA WORK

Extra work shall be undertaken and prosecuted in accordance with the provisions of Article 24 of these General Conditions.

Payment for Extra Work may be made by use of any one of the following methods:

- a. Unit prices or combinations of unit prices which formed the basis of the original Contract.
- b. A lump sum based upon the Contractor's estimate and accepted by the Owner.
- c. Actual cost of performing the work plus fifteen percent (15%) of actual cost to cover supervision, overhead, bond and profit. The Contractor shall submit to the Owner itemized cost sheets showing actual cost of performance of the work. Actual costs are defined as follows:
 - (1) Labor cost, including time of foremen while engaged directly on the extra work.
 - (2) Labor insurance and Workmen's Benefits.
 - (3) Social Security, old age, and unemployment contributions.
 - (4) Ownership or rental costs of construction plant and/or equipment used in the actual prosecution of the extra work. Such costs shall not exceed the Associated General Contractors of America standard rental rates or rental rates prevailing in the area of the work. Charges for equipment already allocated to the project shall be based upon standard or prevailing monthly rental rates. Rental rates or use rates shall not be charged for equipment having a value of \$50.00 or less, since equipment and tools of the lesser values stated are considered to be 'small tools', and as such, are part of overhead.
 - (5) Costs of materials and/or equipment entering permanently into the work.
 - (6) Costs of power and consumable supplies for the operation of power equipment where such costs are not included in rental rates or use charges.

47. ACCEPTANCE AND FINAL PAYMENT

When the Contractor shall have completed all the work in accordance with the terms of the Contract Documents, he shall certify to the Owner that he has completed all of the work in full accordance with the provisions of the Contract Documents. The Contractor shall also prepare and submit to the Owner a Final Request for Payment in amount

which shall be the Contract Amount plus all approved additions, less all approved deductions and less previous payments made.

The Contractor shall give notice of the completion of the work by advertisement in a newspaper of general circulation in the area in which the work has been performed and said notice shall appear once each week for a period of four (4) consecutive weeks. Proof of publication of said notice shall be furnished by the Contractor to the Owner by affidavit of the publisher of the newspaper, to which affidavit shall be attached a copy of the Notice.

When the Owner and the Engineer have completed a review of the work and of the request for final payment, and have determined that all of the work has been fully and satisfactorily completed in accordance with the provisions of the Contract Documents, final payment of the amount determined to be due under the Contract will be made to the Contractor, provided that:

- a. Any deficiencies in the work noted during the review shall have been satisfactorily corrected; and
- b. The Contractor shall have submitted satisfactory evidence that all payrolls, all amounts due for labor and materials, and all other indebtedness connected with the work shall have been fully paid and satisfied, and that there are no outstanding claims or demands against the contractor in any manner connected with the work.

Acceptance of the work by the Owner will release the Contractor except as to the conditions of the Performance Bond and the Labor and Material Payment Bond, any legal rights of the Owner, required guaranties.

Acceptance of final payment by the Contractor shall be, and shall operate as, a release to the Owner of all claims and all liability to the Contractor for all things done or furnished in connection with the work, and for every act and neglect of the Owner and others relating to or arising out of the work.

48. TESTING OF COMPLETED WORK

After completion of work and before acceptance of the work by the Owner, the Contractor shall perform all tests as required by the Specifications. The cost of all labor, tools, materials and equipment necessary for making the required tests shall be borne by the Contractor. Any work found to be defective, faulty, or otherwise unsatisfactory shall be corrected by the Contractor without additional compensation.

49. INCIDENTALS ABSORBED

All work and material covered by these Specifications, or the drawings illustrating the same, or any work, or material that may be reasonable from the information given upon plans or in the Specifications and that is necessary to complete the work, or any tools, or

appliances, or structures that may be constructed by the Contractor for carrying out the work shall be furnished by the Contractor and the cost of all this material and work shall be included in and absorbed by the prices and amounts mentioned in the Contractor's Proposal.

50. ASSIGNMENT OF CONTRACT

The Contractor shall not assign his Contract, nor any part thereof, nor any moneys due, or to become due hereunder, without prior written approval of the Owner. In case the Contractor with the consent of the Owner, assigns any or all of any money due or to become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of work under this Contract.

51. ORAL AGREEMENT

No oral order, objections, claim, or notice given by any party to the others shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed upon waiver or modification thereof in writing, and no evidence of any other waiver or modification shall be introduced in any proceeding.

52. NOTICE AND SERVICE THEREOF

a. All notices, demands, requests, instructions, approvals and claims shall be in writing.

b. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the local office of the contractor or by personal service upon the representative of the Contractor in local charge of the work or by depositing in United States mail in a sealed envelope with sufficient postage prepaid, or delivered with charges prepaid to any telegraph company for transmission to the Contractor, addressed to such Contractor at the address stated by the Contractor in the Proposal, or at the local address used by the Contractor during the process of the work (or at such other address as the Contractor may from time to time designate to the Owner in writing). Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Owner or deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to said Owner or to authorized representatives of the Owner, or to such address as the Owner may subsequently specify in writing to the contractor for such purposes.

53. TERMINATION FOR BREACH

If any of the provisions of this contract are violated by the Contractor, or by any of his subcontractors the Owner may serve written notice upon the Contractor and Surety of its intention to terminate such Contract, such notices to be signed by the Owner and to contain the reason for such intentions to terminate the Contract. Unless within ten days after serving of such notice upon the Contractor such violation shall cease and

arrangements satisfactory to the Owner for the correction of such default be made the Owner may finally terminate the Contract by giving the Contractor notice of such termination for the reasons stated in the initial notice. In the event of any such final termination, the Owner shall immediately serve notice thereof upon the Surety and the Surety shall have the right to take over and complete the performance of the contract, providing, however, that if the Surety does not in good faith commence performance there of within thirty (30) days from the date of the mailing of such notice to such surety, the Owner may take over the work and prosecute the same to completion by the Contract or otherwise for the account of and at the expense of the Contractor, and the contractor and his Surety shall be liable to the Owner for any excess cost occasioned thereby, and in such event the Owner may take possession of any utilize in completing the work such materials, appliances, equipment, and plant as may be on the site of the work and necessary or useful, therefore.

54. ADDITIONAL OR SUBSTITUTE BONDS

If, at any time after the execution of the Contract Agreement and the Surety Bonds attached thereto, the Owner should, for justifiable cause, deem the Surety or Sureties then upon the Performance and/or Payment Bonds, the Contractor shall within five (5) days after notice form the Owner to do so, furnish an acceptable bond (or bonds) in such form as may be satisfactory to the Owner and with such Surety or Sureties as may be satisfactory to the Owner. The premiums on such bond (or bonds) shall be paid by the Contractor. In such event no further payments to the Contractor shall be deemed to be due until such new and/or additional security for the performance of the work and/or for the payment for labor and materials shall have been furnished in form and amount satisfactory to the Owner.

SUPPLEMENTARY CONDITIONS

1. INSURANCE

a. Special Hazards or Perils the Public Liability and Property Damage Insurance Coverage of the contractor's operations shall provide adequate protection against death, bodily injury, or property damage resulting from blasting operations.

b. General

The provisions of Article 5. of the General Conditions shall be fully implemented by the Contractor. Name insured shall include the Owner and the Engineer "Owner and Engineer" shall also mean each of their officers, agents and employees. The Contractor shall furnish to the Owner "Owners and Contractor' Protective Liability Insurance Coverage for Operations of Designated Contractor. Coverage shall not be less than the following:

Bodily Injury \$1,000,000 ea. occurrence, \$2,000,000 aggregate
Property Damage \$1,000,000ea. occurrence, \$2,000,000 aggregate
Personal Injury \$1,000,000 ea. occurrence, \$2,000,000 aggregate
Excess Liability Umbrella \$2,000,000ea. occurrence, \$2,000,000 aggregate

The Named Insured shall be the Owner, and by endorsement attached to the Policy the Named Insured shall also be the Engineer. The "Owner" and "Engineer" shall also mean each of their officers, agents and employees. As an alternate to the above insurance the Contractor may name the "Owner" and the "Engineer" as additional insured on his General Liability, Automobile liability and excess liability policies to at least the minimum limits listed on page GC-6 of these Specifications.

Technical Specifications

SPECIFICATIONS FOR CONSTRUCTION OF STORM DRAINAGE FACILITIES STREET REPAVING, GUTTERS & INLETS

SCOPE: These specifications, cover the construction and improvements to the existing road and storm drainage facilities (pipe and ditch improvements) and the materials used in or incorporated in the roadway construction.

LOCATION: The location of the work is within the City of Chelsea, Alabama.

WORK TO BE PERFORMED: The work to be done under this contract consists of furnishing all plant, labor, tools, materials, and equipment, and constructing complete, ready for use, the facilities specified herein, together with all necessary structures, connections, and all miscellaneous and necessary work. All work performed shall be in accordance with the Advertisement for Bids, the General Conditions, Contract and Surety Forms: Plans and Specifications. Plans in this contract are designated as Sheets 1 through 4 Contract No. 24.001.12

DESCRIPTION OF WORK: The principal items of work under this contract are as described in the Advertisement for Bids.

The general outline of principal items of work does not in any way limit the responsibility of the Contractor to perform all work and furnish all plant, labor, materials, and equipment required by the Plans and Specifications.

The Contractor shall arrange and pay for all water, lights, power, and telephone service used in his construction operations.

PAYMENT: Payment for performing the work outlined hereinabove and as described in these Specifications and shown on the drawings will be made on the basis of unit price bid or lump sum price bid for the particular item of work. The specified quantities for unit price are approximate only; and final quantities may vary from those specified. The Proposal will be evaluated, however, the quantities of the work specified. The amount in the column "TOTAL AMOUNT FOR ITEM" in the Proposal form will be determined by multiplying the number of units shown for each item by the unit prices bid for the particular items. The lump sum prices bid for lump sum items of work shall also be entered in the column headed "TOTAL AMOUNT FOR ITEM". The sum total of all the amounts entered in this column, both unit prices totals and lump sum prices will be the "TOTAL AMOUNT BID".

USE OF SPECIFICATIONS: All work, materials, and equipment shall be in accordance with the requirements of the applicable portions of these Specifications.

There are included in these Specifications certain sections which cover work and materials not included in this project. It is possible however, that situations could arise to which these sections would be

applicable. It is further possible that conditions could be encountered that are not covered by these Specifications. In such cases, the procedure to be followed shall be as established under provisions of the GENERAL CONDITIONS relating to EXTRA WORK.

EXECUTION AND COORDINATION:

a. It is intended that the work covered under this contract be done so as to cause the minimum interference and disruption in the normal daily flow of traffic.

No street excavation or ditches along streets will be left open at night or on weekends except in cases of extreme necessity. When it is necessary to leave open excavations during non-working hours, adequate barricades and flashing lights will be provided. The number of barricades and lights shall be subject to approval by the Engineer.

b. All work shall be prosecuted in a timely and orderly manner. The Contractor shall furnish for approval, a suitable progress chart or schedule in graphic forms showing the estimated schedule for the project.

WORK ON OR ADJACENT TO PRIVATE PROPERTY:

In connection with the work performed on or adjacent to private property, the contractor shall take every precaution to avoid damage to the property owner's buildings, grounds and facilities and shall be completely responsible for the repair of damage to same.

1-00

SITE WORK

1-00 GENERAL: Site work shall consist of preparation of site; clearing and grubbing; site grading; and removal and/or demolition of existing structures as specified or indicated on the drawings. Site work is considered incidental to the project. No extra payment will be allowed for site work unless specific site work item are listed in the proposal.

1-01 PREPARATION OF SITE: Preparation of site shall consist of removal of all fences, railings, poles, pipelines, culverts, structures, walkways, etc., located within the areas to be graded or to be occupied by new structures, pipelines, or other components of the project; the relocation and maintenance of all fences, railing, poles, pipelines, culverts, structures, roadways, walkways, etc., when the permanent use of such facilities will be required during construction and after construction has been completed, or when the temporary use of such facilities will be required during the construction work; and the provision of such drainage ditches, banks, travel ways, etc., as may be required for proper prosecution and protection of the work.

1-02 CLEARING AND GRUBBING: Clearing and grubbing shall consist of cutting, removing, burning and disposal of all trees, brush, stumps, grass, woods, roots, etc., within areas indicated to be graded filled, or occupied by structures or other facilities. All roots projecting from walls of excavation shall be

either cut or removed so that minimum clearance of three (3) feet from outside line of structure will be secured. No vegetation or other perishable matter shall be left within the area to be occupied by any part of the work.

1-03 SITE GRADING: The Contractor shall perform all excavation, shall construct all fills and embankments, and shall perform all grading work in accordance with the elevations and contours shown on the drawings. The excavation work, fill and embankment work, and grading work shall be paid on a unit price basis as listed in the proposal for the item of work performed.

Excavation shall conform to the limits shown on the drawings or specified herein. Excavation shall not be made below grade except to provide depth required for bedding materials as specified herein or to remove unstable material. Extra excavation for removal of unstable material shall be performed only at the direction of the Engineer. Any unauthorized excavation below grade shall be backfilled with approved material as specified herein and such excavation and backfill shall be at the expense of the Contractor. Excavated material suitable for use as backfill around structures, as trench backfill, or as embankment fill may be stored at the site of the work until backfilling operation have been completed. Material which is unacceptable for use as backfill around structures, as trench backfill, as embankment fill, or as general fill on the site of the work shall be removed from the site at the Contractor's expense. All excess excavated material shall be removed from the site of the work at the Contractor's expense.

Final backfill on the site of the work shall be of such material as will support vegetation in accordance with these Specifications. The entire area disturbed by the construction operations shall be restored to original condition by seeding and development of grass cover to prevent stream pollution resulting from soil erosion in accordance with the requirements of the GENERAL CONDITIONS.

All fill material placed in embankments, dikes, or other earth structures shall be compacted to 98% of maximum density as specified under Section 2-04.

All fill material placed in areas to be occupied by structures, bearing slabs, footing, roadways, and walks shall be compacted to 98% maximum density as specified under Section 2-04.

All fill material placed in areas of general fill, as distinguished from areas described hereinabove, shall be compacted to approximately 95% of maximum density, and shall be graded in accordance with contours shown on the drawings.

The Contractor shall consult with the Engineers regarding use of the site for fill areas and spoil areas, the purpose being to conserve the maximum amount of topsoil for use in final grading; to avoid rendering any usable part of the work site unfit for future use; to, insofar as is practicable handle and dispose of material in a manner conforming to final landscaping plans and to provide safe storage for materials and maximum freedom for construction. No payment will be made for materials stored.

1-04 DISPOSAL OF CLEARING DEBRIS: It shall be the responsibility of the Contractor to dispose of all debris resulting from clearing and grubbing operations. The Contractor shall consult with the Engineer regarding use of the site for any disposal of debris.

Burning of material on the work site, if permitted, shall be performed in accordance with the "Air Pollution Control Rules and Regulations" of the Alabama Air Pollution Control Commission. Burning shall be done only with the written approval of the County Health Officer and in full conformance with City Code and Ordinances.

Burning of material transported from the work site to other locations for disposal shall be subject to provisions and requirements as outlined under Paragraph 2 hereabout.

Burning, when permitted, shall be done in a manner approved by the authorities and agencies having jurisdiction; shall be limited to regulated quantities of materials so as to prevent any damage to adjacent structures and/or facilities adjoining property, or surrounding area; and shall be strictly controlled so as to avoid any inconvenience or discomfort to adjacent residents. Fires shall be attended at all times.

All liability of any nature resulting from the disposed of any cleared and grubbed material shall be the responsibility of the Contractor.

1-05 PROTECTION OF TREES AND SHRUBS: All existing trees and shrubs, except those whose removal is required for construction as directed by the Engineer, shall remain undisturbed. Adequate protection shall be provided all trunks, branches and roots of trees and shrubs designate to remain. Trees to remain in the construction area shall be boxed, fenced or otherwise protected prior to starting within the branch spread will not be permitted. Branches that will interfere with the construction shall be removed in such a manner as to prevent injury to the trunk, and the scars covered with approved tree paint.

1-06 EXISTING UTILITIES: Existing utilities have been located on the drawings from information supplied by the utility companies and from field survey data. The Owner or Engineer cannot assume responsibility for the accuracy of the information, although reasonable care has been used in the presentation of all available data. If underground utilities or structures are encountered, which are not shown on the drawings, the Contractor shall notify the Engineer immediately and obtain his instructions before proceeding with the work.

The Contractor shall notify all utilities involved of the date in which he plans to begin work and shall arrange actual location with the utility involved. During the work all existing utilities including water pipes, sewer pipes, storm water pipes, gas pipes, electric transmission lines and conduits, telephone lines and conduits, telephone and power poles and all service connections from these utilities shall be protected, supported, and maintained in service. They shall be restored to the condition in which they are found except that sanitary sewer service lines shall be replaced with Ductile Iron Pipe, all at no additional compensation (except when specifically called for in proposal). Notification to and regular contact with the utilities by the Contractor is mandatory in order that the utilities involved may take whatever steps necessary to protect their facilities. The

Contractor shall notify the Owner and Engineer of all utility relocation loops. All reallocations both vertical and horizontal are to be at Contractor's expense.

The locations of services from utilities are not always shown on the drawings. The Contractor shall determine their exact location and arrange for their protection during construction. Utilities that are to be abandoned, appurtenances, structures, etc., encountered during excavation shall be disposed of or removed as directed by the Engineer.

All utility pole relocation shall be coordinated and paid for by the Contractor. This item is considered incidental and no extra payment will be made for this item.

All water and gas valve risers and covers shall be raised flush with the final pavement. No extra payment for this work.

1-07 SALVAGE: All equipment and materials to be salvaged, as shown on drawings, shall remain the property of the Owner. All salvaged equipment and materials shall be carefully removed, cleaned, inspected and transported to the designated storage area. Salvaged materials are not to be incorporated in the new work unless specifically called for on the drawings.

2-00 Earthwork

2-00 EARTHWORK: The item "Earthwork" includes all earth excavation, rock excavation, backfill, drainage ditches, trenching for footings and pipelines, shoring and bracing of structures above and below ground during excavation, cutting and replacing of pavement, storage and disposal of excavated materials, cleaning up and restoration of surface, sprigging and other incidental work.

2-01 EARTH EXCAVATION FOR STRUCTURES: The term "Earth Excavation" shall be considered as a removal of all materials not including that specified under the "Clearing and Grubbing" and "Rock Excavation" items. Rocks and boulders eight (8) cubic feet or less in volume shall be classified as earth.

The excavation for every part of the respective structure shall be made to the depths shown on the plans. Care shall be exercised in excavating, for all footings foundations and floor slabs of the various structures. A firm and undisturbed soil or rock shall support these footings, foundations and floor slabs; and therefore, the last few inches of excavation shall be done by hand. In the event that a satisfactory foundation is not obtained at the depth shown, the excavation shall be carried down to soil having adequate bearing capacity, or special foundations shall be provided, whichever the Engineers deem necessary.

In the event the Contractor should excavate below the grade specified, and such excess excavation is not authorized or directed by the Engineers, it shall be refilled to grade and this work shall be done at the Contractor's expense. In general, excess excavation below the grade specified for the respective structures shall be filled with the same class of backfill used in structures, unless otherwise specifically noted.

All excavation for structures shall be protected in accordance with the requirements of OSHA "Safety and Health Regulations for Construction", as set forth in the Federal Register, latest revision. The Contractor shall furnish, place and properly maintain all sheeting and bracing to meet this requirement at his own expense; care shall be exercised in excavating for all footings, foundations and floor slabs of the various structures. A fine and undisturbed soil or rock shall support these footings, foundations and floor slabs; and therefore, the last few inches of excavation shall be done by hand.

When the item "Earth Excavation" is to be paid for on the basis of unit price bid, the limits of pay excavation shall be the neat lines of the structure for which the excavation is made. Slopes are not shown on the drawings, but shall be such as will meet the requirements of the aforementioned Regulations. When earth excavations to be paid for on the basis of unit price bid, the area will be cross-sectioned after the "Clearing and Grubbing" item has been completed and all measurements or payment of excavation will be based on the said cross-sections regardless of any change that may occur during the prosecution of the work. Earthwork shall be limited to the approximate quantities as shown on the bid proposal. The Contractor may employ surveyor to monitor the excavation of the areas, and any quantity may be submitted to the owner for evaluation of actual quantity. The Project engineer evaluate the survey information, and make a determination of pay quantity. No payment will be made in excess of the bid quantity on the basis of load count, loose embankment count or any other method that expressed above. The owner reserves the right to re-survey the areas in the event of new survey data.

When excavation is not paid for as a separate item, but is included in the lump sum price bid, the area will not be cross-sectioned unless it is found necessary to relocate a structure or excavate to a greater depth than that shown on the plans. In the event the structure is to be relocated, cross-sections of both the original site and the new site will be made to determine the difference in amount of excavation; if any. In the event the structure is not relocated, but excavation must be carried to a greater depth than that shown on the plans, cross-sections, if required, will be made for only that area below the grade originally shown on the plans.

2-02 ROCK EXCAVATION FOR STRUCTURES: In general, rock excavation shall consist of the loosening, removing, and disposing of all rock in original bed, in well defined ledges, or in boulder form. Hard earth and material excavated with back hoe equipment shall not be classified as rock. Material that can be loosened, separated, or ripped by means of heavy duty power tools or excavating equipment shall not be classified as rock.

Heavy blasting in rock which is to form a foundation will not be permitted. Blasting of rock for structures shall conform to the requirements of Section 2-07.

Where rock is found to be the supporting material, for footings, foundations, or floor slabs, it shall be freed from all loose materials; cleaned and cut to a firm surface; and either leveled, stepped or serrated as directed by the Engineers. All seams and crevices shall be cleaned out and filled with concrete, mortar or grout. To facilitate inspection, rock shall be thoroughly cleaned by air or water jets whenever required by

the Engineers. After the rock surface has been carefully prepared, care shall be taken that the surface does not disintegrate by weathering action. In the event this does occur the weathered part shall be picked or barred off the solid rock.

In the event a footing, foundation, or floor slab rests partly on rock and partly on dirt, the rock shall be excavated to six inches (6") below grade and a six (6") inch compacted cushion of crushed stone shall be placed on the rock before placing of concrete. The cushion shall be wetted before placing of concrete.

The measurement, for payment of length and width of rock excavated whether solid, in boulders or in ledges, shall be the neat lines of the structure plus 6", or actual length and width of rock excavated, whichever is the less. The measurement for payment of depth of rock excavated shall be limited to: (1) the actual thickness of rock excavated, if bottom of rock is above bottom of footing, foundation or floor slab, or; (2) the depth from top of rock to bottom of foundation, footing, or floor slab, where footings, etc., rest directly on rock, or (3) to 6" below footings, foundation, or floor slab where such structure rests partly on rock and partly on dirt.

2-03 BACKFILL FOR STRUCTURES: Earth fill shall be made around the walls of the structures as shown on the plans; and earth fill shall be placed only after the walls have gained sufficient strength to support the load. No rock shall be placed in fill within three (3') feet of the walls of the structures. In the fill work the best dirt shall be used as top soil for any planting, sprigging, or sodding that may be required.

Material for general backfill may be that excavated on the site; but in the event that the excavated material is not in suitable condition at the time when it is required for backfilling purposes, or the quantity of material excavated is not sufficient to make the finished fills indicated on the drawings, the Contractor shall provide; at his own expense, such additional suitable material as is required.

Backfill material placed within foundation walls, under walks, or slabs, under piping not laid on firm, undisturbed ground, under and around piping located in areas of general excavation (where because of proximity of several pipe lines individual trenches could not be excavated) shall be approved fill material as specified in Section 2-12 and 2-13. All such backfill material for purposes specified hereinabove shall be furnished and placed by the Contractor at his own expense.

The Contractor shall be responsible for maintenance of the backfill; and shall promptly refill any areas where settlement of backfill has occurred. All backfill around structures shall be sloped and graded as shown on the plans or as directed by the Engineers.

2-04 EMBANKMENT AND FILL WORK: Embankment and fills shall not be started until the areas they occupy are approved by the Engineers. The materials used in embankments and fill shall be free from frost, stumps, trees, roots, sod, muck or debris of any kind. Only approved materials shall be used. The material shall not be placed on frozen ground.

If embankment or fill is to be placed on a surface which slopes more than 3:1, the surface shall be scarified and compacted to provide land with the new material.

Wet ground to be covered by fill shall be drained, and the lower part of the fill shall be composed of a blanket of sand, gravel, or other approved material.

Compacted fills shall be constructed by repositioning fill materials in successive, uniform layers or not more than eight (8) inches in depth, loose measurement, over the foundation area and the surface of each layer shall be kept parallel to the elevation of the finished compacted fill by use of blade graders, except in proximity to existing structures where leveling shall be accomplished by use of small spreaders, bull dozers, or hand method. Each layer shall be compacted by use of sheep's foot roller, or other suitable roller, the use of a particular type being dependent upon character of material. The density of each Layer shall not be less than ninety-five (95) percent of the maximum density of the same material when tested in accordance with AASHTO Designation T-99, latest revision, Standard Method of Test for the Compaction and Density of Soils. Each layer shall be rolled and compacted to the specified density before the succeeding layer is placed. The final layer shall be brought to elevation of finished compacted fill before topsoil is placed to conform to finished contour shown on the drawings.

Rock greater than two (2) inches in any dimension shall not be placed in compacted fills. Rock may be used, in fills and embankments provided that all voids are filled with fine material and the whole is compacted to a dense mass. Rock greater than 1 cubic foot in volume, or having any dimension greater than 1 foot, shall not be placed in fill. Rock permitted in fill shall be placed in layers not greater than 1 foot in depth, and such rock layers shall be separated by not less than 1 foot compacted thickness of clay or other approved backfill material. Rock shall not be placed nearer than 2 feet to the surface of any fill or embankment, nor nearer than three feet to the wall or surface of any structure. Rock shall not be placed in fill in which pipes, conduit, cables, etc., to be laid, nor shall rock be placed in trench backfill except as permitted by these specifications.

2-05 DRAINAGE DITCHES: To provide for drainage around the structures, new ditches shall be graded, and existing ditches shall be cleaned out and extended, all as shown on the plans. Any other ditches needed shall be cut as directed by the Engineers. These ditches shall be cut to depth and sides sloped as shown on the plans or as directed by the Engineers. No Extra Payment.

2-06 TRENCH EXCAVATION: Trench excavation shall include clearing the site of the work, the loosening, loading, removing transporting and disposing of all material, wet and dry, necessary to be removed for the purpose of construction; and furnishing, placing and removing of all sheeting, bracing; the drainage and pumping of general excavations, trenches, sumps and pits; and making of all fills, embankments, and other incidental work.

All trenches for pipe shall be excavated in open cut, unless otherwise specified; to such depth as shown on the drawings; and to such widths as will give suitable space for placing and jointing the pipes for drainage; and for proper

blocking and backfilling around the pipe. In order to prevent any unnecessary loads on the pipe, the trench shall not be excavated any wider than is specified or necessary.

The length of open trench from forward cut to completely backfilled trench shall not exceed 300'; and shall be further limited by the Engineer when necessary to assure safe movement of traffic and safe ingress to and egress from adjacent property. New trenches will not be permitted when open trenches require backfilling or labor is needed to restore the surface of the streets to date and satisfactory condition. The Engineer will refuse to issue lines and grades for new trenches or to permit opening of new trenches should the contractor fail to meet the requirements specified herein regarding backfilling and surface restoration.

Width of trench shall be as narrow as practicable; but shall be sufficient to permit pipe laying, pipe joining, and placement of backfill around and above pipe. Vertical sides are desired insofar as the nature of the excavated material and the depth of the trench will permit. The maximum clear widths of trenches (as measured at level 1'-0" above top of the pipe) shall not be greater than two (2) feet plus the internal diameter of the pipe. Should the contractor, in his trenching operations, exceed the allowable widths, thereby increasing the backfill load and decreasing the permissible cover for the particular size and class of pipe, he shall be required to provide the class of pipe suitable for installation or shall be required to provide concrete cradle or encasement for the pipe as directed by the Engineer. The additional cost of providing pipe of heavier class shall be the expense of the Contractor; and the Contractor shall not be compensated by the owner for such additional expense.

The trenches shall be excavated to the alignment and grades as shown on the drawings. The bottom of the trenches shall be prepared for pipe laying either by trimming to exact grade or, at the Contractor's option, by under cutting to a depth of two (2) or three (3) inches and backfilling with approved bedding material to form a firm and uniform bed for the pipe. Such bedding material shall be firmly compacted.

Where rock is encountered in trenches, the excavation shall be carried to a depth of 6" below the barrel of pipe, and at locations of bells or bubs, to a depth of 3" below the outside bell; and the excess excavation shall be backfilled with approved bedding material, firmly compacted in accordance with these specifications.

Boulders, large stones, rock or shale shall be removed so that such material will not project inside of vertical lines drawn six inches (6") outside of the barrel of the pipe (at locations of bells), above horizontal line drawn three inches (3") below the bell of the pipe (at locations of bells).

Should the Contractor excavate the trench to a depth below the grade specified hereinabove he shall correct such excess excavation by backfilling to desired level of pipe bed with approved bedding material, all at his own expense. Where the Contractor receives the written direction of the Engineer to excavate below the grade shown on the drawings or specified herein, he shall perform such excavation and backfill with approved material as directed. Payment for such excavation and backfill shall be made on the basis of unit price bid per cubic yard for additional excavation and backfill with approved bedding or stabilizing material. Measurement of such additional excavation and backfill (both included in the unit price bid for such work) shall be based upon the length and depth of additional excavation and actual trench width up to the maximum trench width specified herein.

When using trenching equipment or other construction equipment, care shall be taken to avoid damage to trees, structures, or facilities above and below ground.

All trench organization work shall be prosecuted in accordance with the requirements of OSHA, "Safety and Health Regulations for Construction", as published in the Federal Register, latest revision.

2-07 ROCK EXCAVATION IN TRENCHES: Where rock is encountered in trenches the excavation shall be carried to a depth of six inches (6") below the barrel of the pipe; and the excess excavation shall be backfilled with approved bedding material firmly compacted.

Rock excavation shall be as defined under Section 2-02.

All excavation both earth and rock shall be "unclassified" and shall be of whatever character encountered in the work. The "unclassified" excavation will not be paid under a separate bid item but will be included in the unit price for pipe, ditch or structure items.

Where rock is encountered the Contractor shall "mattress" the trench during blasting operations and shall use all precautions necessary to protect adjacent property against damage resulting from his operations. Blasting operations in proximity to other pipes or structures shall be conducted with the utmost care to prevent damage to the pipes or structures and any such damage caused shall be promptly repaired by the Contractor at his expense. Blasting operations shall not be conducted within twenty-five (25) feet of installed pipe; and rock excavation shall be completed at least twenty-five (25) feet ahead of pipe laying.

The Contractor shall be fully responsible for the protection of lines and property from any harm or damage as would result from exposure to the construction work. The Contractor shall, in all his acts and work, comply with the safety and health regulations referred to hereinabove and with all local ordinances and regulations pertaining to the work. The area of the work shall be isolated by warning signs and barricades; guards shall be stationed to prevent entry into the area; an efficient and adequate, signal system shall be employed to give warning before blasting; and it shall be the responsibility of the Contractor to determine that the area is clear before the signal to fire is given. The handling, storing, loading, and firing of explosives shall be performed only by workmen experienced in blasting work. The Contractor hereby agrees to indemnify and save harmless the owner and the, Engineer against all claims, damages, personal injury, death and expense arising from or caused by; in any manner whatsoever, the handling, storage, or use of explosives on the work, or any blasting on the work. No extra payment will be made for rock excavation. Include in the unit price of pipe or structure.

2-08 SHEETING AND SHORING: Sheeting and shoring shall be furnished and placed in accordance with the requirements of OSHA, "Safety and Health Regulations for Construction", as published in the Federal Register, latest revision. Trench sheeting, where used shall remain in place until the pipe has been laid, tested for defects, and repaired (if required); and until backfill material and earth have been compacted around the pipe and over the pipe to a level at least 1'-0" above the top of the pipe. Sheeting shall then be pulled in a manner approved by the Engineer.

2-09 REMOVAL OF WATER: The Contractor shall, at all times during construction, provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work and shall keep said excavation and work dry until the structures to be built therein are completed, or until the Engineers direct the Contractor to discontinue denaturing operations. Wherever judged necessary by the Engineer, the Contractor shall employ well points to insure a dry excavation. No claims for an amount of money in excess of the bid price for the work will be entertained or allowed on account of the character of the ground in which the trench or other excavations are made.

The trench shall be so drained that workmen can work safely and efficiently therein. The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property owners. It is essential that the discharge from trench pumps be led to natural drainage channels. No water shall be drained into work built under construction unless the consent of the Engineers is first obtained.

2-10 STORAGE OF EXCAVATED MATERIALS: All excavated materials shall be piled in a manner that will not endanger the work under construction, will not obstruct driveways, sidewalks, or traffic and will not endanger existing structures. Drainage lines shall not be obstructed nor shall natural drainage of the surrounding ground be altered or obstructed.

The Contractor shall not store excavated materials outside of easement strips unless he has made satisfactory arrangements with the owners of property adjoining the easement strips for storage of such excavated materials. It shall be the contractor's responsibility to make satisfactory arrangements for the storage of excavated materials on land adjoining said easement strips for such purpose.

Information relating to length and width of easement strips acquired by the Owner for the construction of the pipelines may be obtained from the office of the Owner.

2-11 DISPOSAL OF SURPLUS EXCAVATED MATERIAL: The Contractor shall dispose of all excavated material that is not needed for backfill around structures, that cannot be placed in the trench or that is not needed for embankments, or slopes along the pipelines or adjacent to the structures. This shall include all excavated material in excess of that required to backfill to the original surface, allowing approximately 15% for settlement in those areas where mounding of earth over the trench is permitted. This does not relieve the contractor of the responsibility of the maintenance of backfill around structures or of backfilled trenches. The Contractor shall make all necessary arrangements for disposal areas, and pay all costs incidental to securing permissions for use and shall dispose of all surplus materials without cost to the Owner, other than as reflected in the prices bid.

All surplus materials shall be so deposited that they will not interfere with free drainage.

2-12 BACKFILL FOR TRENCHES: The backfilling of trenches in which pipe lines have been installed shall not be undertaken until the permission of the Engineer has been secured.

Backfill for pipe line trenches shall be placed in four inch (4") layers from bottom of trench to level 12" above top of pipe. Material for backfill shall be as specified under Section 2-13. Backfill material throughout this section of trench depth shall be hand placed and thoroughly compacted by means of pneumatic tampers or mechanical tampers. Hand tampers may be used when backfilling around pipe lines of size 3" and smaller provided that the permission of the Engineer has been secured, and then only so long as the Engineer permits hand tampers to be used. Each layer shall be carried up to the same level on both sides of the pipe so as to avoid unbalanced loading, and each layer shall be evenly compacted on both sides of pipe before the next layer is placed. Where crushed stone is used for backfill material from springline of pipe to level 1'-0" above top of pipe the requirement regarding hand placement may be waived, provided that the crushed stone is carefully dumped and evenly distributed in layers (not exceeding thickness) on each side of pipe and above pipe, and that each layer is thoroughly compacted as specified hereinabove.

From level 12" above top of pipe to level one foot (1') below surface of ground the material as excavated from the trench will be suitable for general use except in the following locations: under paved streets; under paved areas; under slab; under walks; or in areas as specifically specified herein or as noted on plans. The use of such material between level 12" above crown of pipe and level 4'-0" above crown of Pipe shall not exceed 4" in any dimension; (2), broken rock mixed in with backfill between level shall not exceed 2" in any dimension; (3), material placed in top foot of trench depth shall be selected so as to be suitable for support of vegetation as hereinafter specified; and (4), backfill material placed in trenches cut in streets but not under paving shall not contain rock greater than 2" in any dimension.

Where trenches are located in streets but not under paving, the backfill from level 12" above the crown of the pipe shall be placed in layers not exceeding 12" in thickness; and each layer shall be thoroughly compacted by use of pneumatic (or mechanical) tampers or by other method satisfactory to the Engineers.

Where the trenches are located under paved streets or elsewhere under paved areas, the backfill from level 12" above crown of pipe to base of paving shall be placed in 6" layers, each layer being thoroughly compacted by tamping.

The backfill shall extend out from either end (or side) of the paved areas and along the trench on a 1:1 slope. Backfill material to be used under paved areas shall be brushed stone as described under APPROVED MATERIAL FOR BEDDING AND

BACKFILL.

In areas of general excavation (where pipe lines are installed and where, because of proximity of several pipe lines individual trenches cannot be excavated) the backfill from bottom of trench to level one foot (1') below finished grade shall be limestone screenings or crushed stone.

The top 12" of depth of all trenches (except under slabs, roads, walks, and paved areas) shall be backfilled with earth (or clay) and top soil that can be smoothly dressed to match surface or ground adjoining the edges of the trench, and that surface of ground adjoining the edges of the trench, and that will support the vegetation desired, for the finished surface.

The Engineers shall have full authority over the backfilling operation both as to character of backfill material and method of backfilling. After the pipe has been covered to elevation one foot (1') above top of pipe, backfilling may be accomplished by use of bulldozer, bucket or other mechanical equipment if carefully performed in a manner approved by the Engineers.

2-13 APPROVED MATERIAL FOR BEDDING AND BACKFILL: Approved material for bedding and backfill shall be limestone screenings, crushed limestone meeting AHD Gradation 478, and clay mixtures as found in the general area of work. Approved material shall be furnished and placed as follows:

(1) The bottom of the trench shall be excavated to a depth of 3' below the barrel of the pipe and, at locations of bells, to a depth of 3" below outside of bell. Limestone screenings or crushed stone (AHD 978) shall be placed and compacted to form a firm bed for the pipe. After the pipe has been adjusted to correct alignment and grade on the prepared bed, limestone screenings or crushed stone (AHD #78) shall be placed and firmly compacted around the pipe to level of springline of pipe. Backfill from level of springline of pipe to level 12' above top of pipe shall be crushed limestone (AHD #78) and backfill from level 12" above top of pipe to surface of ground shall be as specified under Section 2-12. No extra compensation shall be allowed for such bedding and backfill. The above method of bedding and backfill shall generally apply except where trenches are cut in pavement, in paved area, or in rock.

(2) Where rock is encountered the trench shall be excavated to depth of 6" below the barrel of the pipe and, at locations of bells, to a depth of 3" below outside of bell, limestone screenings or crushed stone (AHD #78) shall be placed and compacted to form a firm bed for the pipe. After the pipe has been adjusted to correct alignment and grade on the prepared bed, limestone screenings or crushed stone (AHS #78) shall be placed and firmly compacted around the pipe to level of springline of pipe. No extra compensation shall be allowed for such bedding and backfill.

Backfill from level of springline of pipe to level 12" above top of pipe shall consist of limestone screenings or crushed stone (AHD #78) firmly compacted. Payment for such backfill (between level of springline of pipe and level 12" above top of pipe) shall be made on the basis of unit price bid per cubic yard for backfill material compacted in place. Pay width of trench shall be the O.D. of the storm drainage pipe plus 12" the depth will be measured from below the binder course to a point 12" above the top of the culvert.

Backfill from level 12' above top of pipe to surface of ground shall be as specified under Section 2-12. No extra compensation shall be allowed for such backfill.

(3) Where rock is encountered and where the contractor has blasted the rock to a depth greater than 6" under the barrel of the pipe or the bell of the pipe, he shall remove such blasted rock and replace the blasted rock with layer of AHD crushed stone (choked with screenings) to bring the stone bed up to a level 6" below barrel of pipe. No extra compensation shall be allowed for such bedding preparation.

The bedding and backfill from level 6' below barrel of pipe to surface of ground shall be as specified in Part (2) hereinabove. No extra compensation shall be allowed for bedding and backfill up to level of springline of pipe and no extra compensation shall be allowed for backfill from level 12" above top of pipe to surface of ground.

Payment for backfill between level of springline of pipe and level 12" above top of pipe shall be made in accordance with the provisions of Part (2) hereinabove.

(4) Where the character of the soil is such that with proper and adequate drainage of the work a satisfactory bed for the pipe can not be obtained (at depth at which the pipe is to be laid), the Engineers may direct the Contractor to excavate below the depth required to secure the minimum cover specified under Section 7-13 and to backfill such excess excavation with crushed stone suitable for the conditions encountered.

(5) Where trenches are cut in paved streets or in paved areas, whether trench excavation is in earth or rock, bedding and backfill to level 72" above top of pipe shall be limestone screenings. The backfill material from level 12" above top of pipe to base of paving shall be limestone screenings or crushed stone choked with fines. Size of stone shall not be greater than AHD #3. Backfill shall be thoroughly compacted by: (1) pneumatic tamping equipment; (2), flooding, puddling, and jetting. It is expected that material (screenings) can be compacted to 85% of loose volume. No extra compensation will allowed for such bedding and backfill.

2-14 SPECIAL NOTES: In general, the specifications in Sections 2-00 through 2-13 apply to both drainage pipe and open trench excavation. All excavation both earth and rock shall be "unclassified" and shall be of whatever character encountered in the work. The "unclassified" excavation will not be paid under a separate bid item but will be included in the unit price for pipe, ditch or structure items.

Many of the drainage ditches to be improved in this contract have existing rock bottoms. It is not intended to do any additional rock excavation on the bottoms but rather to improve the flow characteristics by cleaning out debris and improving the earth banks.

Where storm drainage pipe is installed, all pipe shall be backfilled to the springline of the pipe with crushed stone as specified under Section 2-13 (1) and (2) and shall be included in price bid per foot of pipe.

2-15 SURFACE RESTORATION: The Contractor shall dispose of excess materials as specified. He shall clean up all rubbish and surface material and leave the ground in presentable shape at least comparable with the condition in which it was before construction work began.

The Contractor shall replace all surface materials, shall restore lawns, roads, shrubbery, and sod or other surface disturbed to condition equal to that before the work began, furnishing all labor and materials incidental thereto.

Where private lawns are disturbed, the Contractor shall replace the lawn, in kind, in a manner approved by the Engineer. In existent lawns, where possible, the contractor shall remove the sod and topsoil and return same at the completion of construction operations. The Contractor will be responsible for maintaining and protecting the stockpiled sod and topsoil.

Where grasses cannot be removed as sod, they shall be replaced by seeding with the same grass that existed prior to construction operations.

Those areas to receive new grass shall be seeded with a mixture of Kentucky 31 and Red Clover. The Kentucky 31 shall have a minimum purity of 95% and the minimum percent germination shall be 75%. The Red Clover shall have a minimum purity of 90%.

In the event, due to the construction schedule it becomes unrealistic to sow Kentucky 31 and Red Clover, the Contractor shall seed Winter Rye as a temporary grass, but shall, as soon as possible, seed the Kentucky 31 and Red Clover mixture.

2-16 TOPSOIL FROM EMBANKMENTS: The contractor shall remove all of the existing topsoil from the project site and store the topsoil on site for use on the slope embankments. Payment will be made on a cubic yard basis under the appropriate item number in the proposal for both removal and placement on sloped and disturbed areas. This topsoil shall be protected from erosion with a silt fence. The topsoil shall be placed on the slope prior to placement of grassing.

2-17 SILT FENCING: The Contractor shall install silt fencing at the toe of all fills. Silt fence fabric shall be Mirage Enviroforce on 39" hog wire with steel "T" post installed @ 10'-0" o.c. The Contractor shall be responsible for maintaining the silt fencing for the duration of the project and shall remove the silt fencing as directed by the engineer at the project completion.

2-18 COMPACTED EARTH CUT AND FILL: The quantities shown for earth cut and fill were computed by the Average End Area Method for computing earth cut and fill. Cross Sections will be established prior to excavation and after placement of final sub grade. Payment will be made for compacted material in place. The Owner reserves the right to adjust final grade to stay within the quantities listed in the proposal.

2-19 COMPACTION TESTS: The Contractor shall provide in-field density tests on sub-grade on each fifty feet of roadway prior to placement of sub-grade. Include the price of testing in the price per cubic yard of unclassified excavation material.

3-00 CONCRETE

3-00 GENERAL: Concrete shall be composed of cement, fine and coarse aggregate, and water so proportioned and mixed as to produce a plastic, workable mixture in accordance with all requirements under these Specification and suitable to the conditions of placement.

3-01 CEMENT: Portland Cement shall be of a brand approved by the Engineers and shall conform to the Standard Specifications of ASTM Designation C150-61, Type I. Sacks of ninety-four (94) pounds net shall be considered as one (1) cubic foot. One brand only shall be used where concrete is exposed in order to insure uniform color.

3-02 FINE AGGREGATE: All fine aggregate shall consist of clean, hard, durable, uncoated particles of natural sand, the amounts of deleterious substances not to exceed the limits prescribed under ASTM Designation C33-61T, shall be well graded from course to fine; and when tested by laboratory sieves, shall conform to the following requirements:

	<u>Percent by Weight</u>
Passing 3/8" Standard Square Sieve	100
Passing # 4 Standard Square Sieve	95-100
Passing # 8 Standard Square Sieve	80-100
Passing # 16 Standard Square Sieve	50-85
Passing # 30 Standard Square Sieve	25-60
Passing # 50 Standard Square Sieve	10-30
Passing # 100 Standard Square Sieve	2-10

Fine aggregate shall be natural quartz sand. Local sand or sand made from crushing local stone will not be accepted. Sand shall be from a source proven acceptable by satisfactory test reports.

Unless specifically noted to the contrary, all sand shipments shall be tested in accordance with ASTM C33-61 requirements for fine aggregate and these Specifications; and such testing shall be performed by a laboratory approved by the Engineers. The Engineers must be furnished with satisfactory laboratory results, in triplicate form, before such fine aggregate may be brought to the site of the work. Copies of sieve analyses shall be furnished to the Engineers for their review and approval. The furnishing of such information, however often repeated before a satisfactory aggregate is found shall be the responsibility of the Contractor and at the expense of the Contractor.

3-03 COURSE AGGREGATE: All coarse aggregate shall be composed of hard, durable, dense particles of stone, or gravel, free from adherent coatings, the amount deleterious substance not to exceed the limits prescribed under ASTM Designation C33-61T, shall be well graded, and when tested by laboratory sieves, shall conform to the following requirements:

	<u>Percent by Weight</u>
Passing 1 1/2" Standard Square Sieve	100
Passing 1" Standard Square Sieve	95 - 100
Passing 1/2" Standard Square Sieve	25 - 60
Passing # 4 Standard Square Sieve	0 - 10
Passing # 8 Standard Square Sieve	0 - 5

Unless specifically noted to the contrary, all coarse aggregate shall be tested in accordance with the requirements of ASTM C33-61T for Coarse Aggregate; and further requirements outlined under the third paragraph of Section 3-02 hereinabove shall apply.

3-04 WATER: Water used in mixing concrete shall be clean, clear and free from oil, acids, salts, alkali, organic matter, or other deleterious substances

3-05 CLASS OF CONCRETE: Concrete shall be made in two classes: Class "A" and Class "B".

Class "A" concrete shall be used throughout the entire project except where Class "B" concrete is specifically called for... In general, the use of Class "B" concrete shall be limited to plain concrete for pipe bracing, sub-footing, and foundation pads.

Class "A" concrete mix shall be designed in accordance with ACI 513 employing dispersing agents as hereinafter specified. "Normal" additive shall meet the requirements of ASTM Specification C494, Type A; and "Retarding" additive shall meet the requirements of ASTM Specification C494, Type D. The additives shall be used in accordance with the manufacturer's recommendations; and shall be introduced in such amount that the concrete mix will have the plasticity desired to obtain maximum workability and homogeneity, and the concrete produced will have the strength specified herein. The method of introducing the admixture and the equipment used shall be as recommended and/or manufactured by the supplier of the admixture the supplier of the admixture shall furnish the services of the representative at such times and for such periods as are required for setting up the equipment and insuring the proper control of the mix. The minimum compressive strength of any cylinder made from Class "A" concrete used on the project shall not be less than 3,000 p.s.i. (See Section 3-25, QUALITY OF CONCRETE).

Each cubic yard of Class "A" concrete shall contain not less than 6 sacks Portland Cement and total water content shall not exceed 36 gallons. The slump may vary from 1" to 3 1/2". The contractor shall furnish and have available during the pouring of concrete a slump cone, straight edge, etc., for conducting slump tests.

Each cubic yard of Class "B" concrete shall contain at least five sacks of Portland Cement and not more than 35 gallons total water. The minimum compressive strength of any cylinder made from Class "B" concrete shall not be less than 2,500 p.s.i.

Contractor shall submit to the Engineers for approval the design mixes for Class "A" concrete and Class "B" concrete that he proposed to supply for the project

3-06 STORAGE OF MATERIALS: Materials stored on the site shall be adequately protected against contamination from surface run-off, trash, debris, dust, dirt, site materials, oils, greases, etc.

Coarse aggregate shall be handled and stored in bins or compartments and shall be protected as stated hereinabove.

Fine aggregate shall be handled and stored so as to prevent segregation.

Cement shall be stored in dry, watertight, well ventilated storage sheds or in bins similarly protected.

3-07 BATCHING AND MIXING: Should the Contractor elect to store materials and mix concrete at the job site he shall provide a semi-automatic batching plant and concrete mixing equipment capable of producing in an eight (8) hour period, concrete in quantity not less than 200% of the maximum pour estimated to be made on the job within an eight (8) hour period. A semi-automatic plant is defined herein as one in which batching weights are manually set, mixes are manually set, and materials are automatically batched. The plant shall be equipped with devices for recording weights of cement, aggregates, and water. Where admixtures are specified, the plant shall be equipped with automatic dispensers for such admixtures.

Batching Plant: The batching plant shall have separate bins for each different size of coarse and fine aggregate and separate bins for bulk cement. In the semi-automatic plant aggregates may be weighted cumulatively in one weighing batcher on one scale, or in separate batchers with individual scales. The bulk cement shall be weighed in a separate scale in a separate batcher. The batcher controls should be interlocked so that a batching cycle cannot be started until all batchers are completely empty.

The batching scales shall deliver the specified weight of each ingredient within the following limits of accuracy: cement -1% by weight, water - 1%, fine aggregate 2%, coarse aggregate - 2%, admixtures - 1%.

Standard test weights should be provided by the Contractor to verify the accuracy of the batching scales. Periodic tests shall be made in the presence of the Inspector to verify this accuracy. The weighing equipment should be arranged so that the plant operator and plant inspector can observe all batching loads during the plant operation.

Automatic recorders shall be provided for the batching plant. The recorder shall be placed in a convenient position for observation by the plant inspector. Further, the recorder shall produce a printed record on a chart or tape of the weights of all the aggregates as batched, and after the batch is discharged, return to zero. The charts or tapes shall clearly be so marked that variations in batch weights of each type of mix can be readily observed.

Water and Admixture Control: The equipment for batching water admixture shall be provided at the batching plant or included with the mixer. A suitable water measuring device shall be provided and capable of measuring mixing water within the specified requirements. The filling and discharge valves for the water batchers shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. Admixtures may be added at the mixer, provided a suitable device for measuring and dispensing the admixture is provided. The admixture device shall be capable of adjustment to permit varying the quantity of material to the mix.

The plant shall be capable of ready adjustment for the varying moisture content of the aggregates, and to change the weights of the materials being batched.

Mixers: Concrete mixers may be either stationary mixers or truck mixers of an approved design: Stationary mixers may consist of either single drum tilt-type or dual drum or single drum paving type mixers. The mixers shall have a rated capacity excess of the capacity recommended by the manufacturer. Mixers shall be capable of combining the materials into a uniform mixture and, of discharging without segregation. The following mixture capacity and mixing times are recommended: 1 1/2 C.Y. or less - 1 1/2 min.; 2 C.Y. - 2 min. Device shall be provided to lock the mixer discharge mechanism until the required mixing time has elapsed. Truck mixers shall be equipped with accurate revolution counters to insure the proper mixing is attained. The mixing plant shall also include a device for automatically counting the total number of batches of concrete mixed. The mixers shall be operated at the manufacturers recommended drum speed and mixing periods. Mixing water should be introduced into the dry mix before 25 percent of the mixing time has elapsed.

3-08 READY-MIX CONCRETE: Where concrete for the project is to be supplied from ready-mix concrete plants, the Contractor shall furnish to the Engineer an affidavit or statement of record from the ready-mix concrete supplier from whom he proposes to secure concrete for the project; and the affidavit or record shall show that such supplier has satisfactorily furnished concrete of quality specified herein and in quantity desired to projects of similar size and nature or to the State Highway Department. The Contractor shall also furnish to the Engineer an inspection report from an approved Testing Laboratory, which report shall state that the ready-mix concrete plant from which the Contractor proposes to secure concrete for the project is currently capable of producing concrete of quality specified herein and in quantities required for satisfactory prosecution of the project; and that the plant is equipped with all control devices, recorders, dispensers for introduction of admixtures, etc., as specified herein.

Truck mixers for transportation of ready-mix concrete shall be equipped as specified under Section 3-07.

3-09 MATERIALS TESTING: All sampling and testing of materials shall be performed in accordance with applicable standards (latest revision) of the American Society for Testing Materials. All sampling and testing work shall be performed by a reputable independent testing laboratory approved by the Owner. The Contractor shall submit to the Owner the name or names of the testing laboratories that he proposes to use.

The sources from which concrete aggregates are to be obtained shall be selected by the Contractor well in advance of the time when concrete will be required at the site of the work. The Contractor shall submit to the Owner: sieve analyses of the aggregates (fine and course); test reports on the aggregates indicating that they have been found to conform to ASTM requirements for concrete materials; and of the concrete materials furnished for the project shall be in accordance with the approved analyses. The Contractor shall also submit to the Owner a "Design of Concrete Mixes for the Project". Aggregates used in the design mixes shall be those selected, tested, and approved for the project. Test cylinders shall be prepared in accordance with ASTM Standard Methods. Test reports on specimens broken at 7 days and at 28 days shall demonstrate that the aggregates are suitable components for concrete mixes of the quality desired, and that the design mix will

produce concrete meeting the requirements of these Specifications. All sampling, testing, reporting, and preparation of design mix, all as described hereinabove shall be at the expense of the Contractor.

During the progress of the work standard concrete specimens shall be made from the concrete mix placed in the permanent work. From each sampling of the concrete mix placed in permanent work. From each sampling of the concrete mix there shall be prepared three (3) standard test specimens which shall constitute a laboratory test series. One sample shall be taken for each continuous pour made during a single day except that; (1) when several pours of less than three (3) cubic yards each are made in a single day, one sampling of the total pour during the day will suffice and (2), when the quantity of concrete poured in a single day exceeds fifty (50) cubic yards, one sampling shall be made for each fifty (50) cubic yards of concrete or fraction thereof. The specimens shall be carefully prepared, stored, and protected at the job site in manner approved by the Engineer until they are ready for transportation to the Testing Laboratory. The furnishing of cylinders for concrete specimens, the specimens, and the transportation of the specimens to Testing Laboratory shall be at the expense of the contractor.

The cost of testing the specimens and the cost of reporting the results of such tests will be borne by the Contractor.

3-10 CONSISTENCY: Any addition of mixing water at the job site shall be as determined and/or approved by the Engineers. In general, a minimum amount of water shall be used to produce the workability required. The consistency of concrete shall be such that:

- (1.) the mortar clings to the coarse aggregate;
- (2.) segregation does not take place;
- (3.) there shall be no free water standing on the concrete when placed in the forms;
- (4.) spading or vibrating;
- (5.) it shall flow readily in metal chute at a thirty degree angle with the horizontal without segregation;
- (6.) the surface of the hardened concrete shall be free of any excess of laitance. Slumps may vary from 1 1/2" for slabs to 3 1/2" for walls, columns, etc.

3-11 BONDING: Rock surfaces on which concrete is to be placed shall be rough and free from loose materials, clay, mud or other foreign matter that will prevent a proper bond. Immediately before concrete is placed on rock, the surface shall be given a coating of grout of the same proportions as is contained in the concrete mortar and shall be worked thoroughly with brooms into all surface irregularities. Concrete shall be placed on this surface while grout is still fresh.

In joining fresh concrete to concrete that has already set, the surface of the concrete in place shall be cut over thoroughly with a suitable tool to remove all laitance and loose and foreign material. This surface shall then be washed and wired broomed. Before concrete is placed, all forms shall be tightened against concrete already in place and the surface shall be thoroughly saturated with water. To insure an excess of mortar at the junction of the hardened and the newly deposited concrete, the cleaned and saturated surfaces, including the vertical and inclined surfaces, shall first be thoroughly covered with a coating of 1:1 grout against which the new concrete shall be placed before

the grout has attained initial set. This specification does not apply to surfaces forming expansion and contraction joints.

Where new concrete structures connect with existing concrete structures, a construction joint shall be cut in the existing concrete. Immediately before placing new concrete, the construction joint shall be thoroughly cleaned and wetted and painted with a cement grout coating.

3-12 PLACING CONCRETE: Before beginning to place concrete, hardened concrete and foreign material shall be removed from the inner surface of the mixing and conveying equipment.

Before placing concrete, debris shall be removed from the space to be occupied by the concrete. Reinforcement shall be thoroughly secured in position and the approval of the Engineer obtained.

Water and mud shall be entirely removed from the forms. Any flow of water into or through the forms shall be diverted through proper side drains into a sump, or be removed by other approved methods which will prevent washing the freshly deposited concrete.

Immediately after preparing the sub grade for any water containing structure, the ground, including any depressions for footings, shall be covered by 1" of Class "B" concrete, accurately screeded to the required surface and allowed to set before floor concrete is placed thereon. This 1" of concrete shall be in excess of the thickness of the bottom slabs or footings specified on the plans. If slabs and footings for water containing structures are founded on hard rock, thoroughly cleaned, this requirement may be waived.

Concrete shall be handled from the mixer to the place of final deposit as rapidly as possible by methods which will prevent the segregation or loss of the concrete. Under no circumstances shall partially hardened concrete be placed in the work. Concrete shall be placed in the forms as nearly as practicable in its final position to avoid rehandling or flowing along forms. It shall be placed as to maintain, until completion of the unit, a plastic surface approximately horizontal. The concrete shall be placed in continuous horizontal layers of such depth that not more than thirty (30) minutes shall elapse between placing of successive layers; to depth of any layer shall not exceed twelve inches.

When conveying concrete by chutes, the equipment shall be of such size and design as to insure a continuous flow in the chute. The chute shall be metal or metal lined and the different runs shall have approximately the same slope. The slope shall not be less than one vertical to two horizontal and shall be such that will prevent the segregation of the matter. The discharge end of the chute shall be not more than five feet above the surface of the concrete.

In the event of any emergency that prevents the completion of a pour, any uncompleted layer shall terminate in a vertical keyed bulkhead, and the horizontal surface shall be treated for any other horizontal construction joint; and feather-edging will not be permitted.

3-13 COMPACTION: Concrete shall be compacted in the, forms by spading, puddling, tamping or vibrating with an umber and type of tool approved by the Engineer so that the concrete shall be thoroughly worked around the reinforcement, around embedded fixtures, and into the corners of the forms, reinforcing steel, or the compaction of the succeeding layer.

Accumulation of water on the surface due to water gain, segregation or other causes, during placement and compaction, shall be prevented as far as possible by adjustments in the mixture. Provisions shall be made for the removal of such water, as may accumulate so that under no circumstances shall concrete be placed in such accumulations.

3-14 FINISHING: All concrete surfaces not covered by forms, shall be brought to the proper elevation and be finished with a wood float without the addition of mortar, or given other special finishes as described hereinafter, except that those surfaces on which grout will be later added shall not be finished but shall be roughed up and cleaned prior to placing of grout. On surfaces covered by forms, the forms shall be removed as soon as possible.

Upon removal of wall forms, all forms tie holes shall be filled immediately with a mixture of one part cement and one part sand, thoroughly mixed and moistened enough so that. The mixture of cement and sand shall be forced into the holes using special tamping or caulking tools.

Immediately upon removal of forms, all imperfections and joints in the surface of the concrete shall be pointed with mortar made by mixing one part Portland Cement (or cement to match in shade that used in concrete) to two parts of sand. All finished surfaces and patches must be smooth and true to line and grade shown on the plans. All projections of fins shall be removed or rubbed down with a carborundum brick or wire gauze. All exterior surfaces of walls, columns, and beams permanently exposed to view shall be rubbed while "green" with a carborundum stone to a smooth even surface showing no marks, joints, or grain of forms. All holes or imperfections shall be neatly patched before rubbing.

3-15 QUALITY OF CONCRETE: The intent of these specifications is to aid the contractor in the construction of watertight structures. The quality of concrete attained is an important factor in the securing watertight structures. By specifying cement content, water-cement ratio and workability, the intention is to achieve both the proper amount of paste necessary for water tightness and the proper water-cement ratio for strength leaving the contractor and supplier considerable latitude in selection of materials, proportions and consistency. The cement content and the water-cement ratio specified for the job should consistently produce concrete having a 28-day compressive strength in the range of 3000 - 3500 p.s.i. The absolute minimum compressive strength of any cylinder (at 28-days) shall not be less than 3000 p.s.i. If careful attention be given to the quality of concrete poured, satisfactory watertight structures should be obtained.

3-16 PAYMENT: Payment for structural concrete shall be made on the basis of lump sum prices bid for the particular structure or on the basis of unit price bid per cubic yard, whichever is applicable to the particular item in accordance with the descriptions in the Proposal Form and in these Specifications. The lump sum or unit, prices bid for structural concrete shall include the cost of excavation, formwork, reinforcing steel, concrete finishing, and all other items of work necessary to complete the particular structure.

Payment for cradle or encasement concrete shall be made on the basis of unit price bid per cubic yard for Class "B" concrete, and shall include the cost of any additional excavation required (except rock excavation which shall be paid for at the unit price bid). Should cradle or encasement be required by reason of failure by the Contractor to maintain a trench width within the limits specified the cost of such cradle or encasement concrete shall be borne by the Contractor.

4-00 FORMWORK

4-00 FORMWORK: The Contractor shall furnish, maintain, erect, and remove all forms, molds, centers, and bulkheads, templates on profiles, and shall furnish and maintain all screeds and bonding grooves, key way materials or other forms necessary for construction of the concrete included in this contract. Except as hereinafter specified otherwise, forms shall be of wood or metal, and of type approved by the Engineers.

4-01 MATERIALS: For wood forms, face lumber shall be tongue and groove, good quality, straight grained, free from warp, wind shake, torn grain, knots larger than pin knots, and shall be surfaced on both sides and edges to a uniform thickness. Form lumber shall have a maximum width of 8", and its thickness shall depend upon the design of the form. Lumber once used in forms shall have nails withdrawn and surfaces in contact with concrete thoroughly cleaned before being used again.

Where the underside of concrete slabs form the finished ceiling of the structures, the material for the contact surfaces of forms shall be 3/4" five ply, Douglas Fir Plywood, laminations bonded with water-proof glue, and especially manufactured for concrete form work. The surfaces shall be paraffin treated at the manufacturer's plant according to best thickness, and of such a size as to cause as few joints as possible.

Forms for structure walls to be exposed to view as finished surfaces in vaults, by-pass boxes, etc., shall be constructed of material as specified above. Forms of walls, exposed to view above ground shall also be constructed of similar material.

Consideration will be given to the use of prefabricated form assemblies, such as steel panels or steel framed plywood panels (with reinforcement), subject to approval of the Engineer, and with the understanding that the Contractor shall secure the finish desired for the particular Surfaces

4-02 CONSTRUCTION OF FORMS: Forms shall be well built, substantial, unyielding, tight, and properly braced and tied together by means of tie rods, or belts. Spacing, size and type of sheeting holes or recesses left in the concrete shall be filled or plugged in manner satisfactory to the Engineers. No tie shall be used which leaves a hole entirely through the concrete walls, or which leaves metal within 1" of the surface of concrete. Form ties for reinforced concrete walls of water-containing structures shall be equipped with integral water stops.

Bevel strips shall be placed at all angles of the forms as specified by the Engineers so that all exposed edges and intersections will be chamfered.

The inside of forms shall be coated, with an approved non staining mineral oil. Care shall be taken that the oil does not come into contact with the reinforcing steel or the surface to which the concrete is to be bonded.

All forms for surfaces that will be exposed to view in the completed work, either on the outside or on the interior, shall be constructed of material as specified for exposed work under Section 4-01. Such forms shall have tight, flush joints, solidly backed and rendered watertight by use of paraffin or other suitable material. All imperfections shall be neatly filled to produce a smooth, finished surface for the concrete. Angles; corners, recesses and intersections shall be neatly rounded off.

Temporary opening shall be provided at the base of wall forms to facilitate cleaning and inspection immediately before depositing concrete

The Contractor shall provide special forms where required for openings in walls and floors for the installation of pipes, gates, flanges, etc.

4-03 REMOVAL OF FORMS: The removal of forms shall not be started until the concrete has obtained the necessary strength to support its own weight or any construction live loads. The time of removal shall be with the approval of the Engineers and such time may vary on account of conditions of weather and placement.

5-00 REINFORCING STEEL

5-00 REINFORCING STEEL: The Contractor shall furnish and install all reinforcing steel, as shown on the drawings or as otherwise directed, and in accordance with these Specifications.

Reinforcing steel, except 1/4", shall be billet-steel bars of deformed shape conforming to ASTM Specification Serial Designation A615, latest revision, Grade 60; or shall be real-steel bars of deformed shape conforming to ASTM Specification Serial Designation A616, latest revision, Grade 60. All welded steel wire fabric shall conform to ASTM Specification A185, latest revision. Plain round bars for sleeve bars (dowels for insertion in sleeves crossing expansion and/or contraction joints) shall conform to ASTM Specification Serial Designation A306, latest revision, Grade 80.

The Contractor shall furnish to the Engineers independent laboratory certificates showing the heat numbers, chemical and physical properties and the results of tests made in accordance with the above ASTM Specifications.

The contractor shall furnish for approval reinforcing bar details and marking or erection diagrams. These shall be of the same size drawing as the Engineers' plans, and shall be clear and legible.

The steel shall occupy exactly the position in the finished work as indicated on the detail drawings. Bars in slabs and beams shall be supported on metal chairs of an approved type and worked together about 4' on centers. The use of stakes, stones, or bricks to support reinforcing steel will not be permitted

5-01 FABRICATION: Reinforcement shall be accurately formed to the dimensions indicated on the drawings. Bends shall be made around a pin having a diameter not less than six (6) times the bar diameter except for bars larger than one (1) inch, in which case the bends shall be made around a pin of eight (8) diameters. All bars shall be bent cold.

5-02 STRAIGHTENING AND REBENDING: Metal reinforcement shall not be straightened nor re-bent in a manner that will injure the material. Bars with bends or kinks not shown on the plans shall not be used. Heating of the reinforcement will be permitted only when the entire operation is approved by the Engineers.

5-03 STORAGE: All reinforcement shall be stored above the surface of the ground on skids, or other supports, and shall be protected at all times from injury or surface deterioration

5-04 CLEANING: All reinforcing steel shall be thoroughly cleaned before placement; and shall be free from mill scale, surface rust, coatings, mortar droppings, oil, grease, ice, dust, or any other surface coating that would affect bonding. Should concrete not be poured immediately after steel has been cleaned and inspected or should a delay occur between scheduled pouring the steel shall be re-inspected, and if found to be required, surface conditions as mentioned hereinabove shall be corrected

5-05 PLACEMENT OF STEEL: Reinforcing steel shall be accurately positioned as shown on the drawings and shop drawings; and should be secured against displacement by using annealed iron wire tight or approved clips at bar crossings and intersections. Reinforcing steel shall be supported by metal hangers, chairs, clips, spacers, or other approved devices and accessories. Metal clips or supports, unless otherwise indicated or specified shall not be placed in contact with forms. All steel shall be so braced, tied, and supported that it will remain in correct position when concrete is placed in the forms, in slabs, or in footings.

5-06 SPLICING: When it is necessary to splice reinforcement at points other than shown on the drawings, the character of the splice shall be determined by the Engineers. In such places the bars shall be placed in contact and securely wired. Wherever possible, splices in adjacent bars shall be staggered. Lengths of splices or laps shall be as indicated on the drawings, but in no case shall length of lap be less than thirty-two (32) bar diameters.

6-00 PAVEMENT CONSTRUCTION

6-00 GENERAL: All new street construction will be in accordance with street details shown on the plans and specifications. Payment for items used in the construction of streets will be made on a unit price per item as shown in the proposal form.

6-01- OMIT

6-02 THE BASE-COURSE: For pavement shall have a compacted thickness of not less than 6". The base material shall consist of crushed stone, gradation No. 3 of Alabama State Highway Department Specifications, shall be choked with fines, or dense grade base as approved by the Engineer. Aggregate shall conform to and shall be placed in accordance with Section 820 (Selected materials Bases) of the Alabama State Highway Department Specifications, latest revision. Compaction test shall be required on the base course every 100 feet. Include compaction testing in the price per cubic yard of 6" compacted stone base.

6-03 SURFACING: In areas of roadway construction the final asphalt wearing surface shall be applied after the stone base course has been completed in accordance with Section 401, Alabama State Highway Department Specifications, latest revision. Final bituminous surfacing shall consist of a binder course and a final asphalt wearing course. The bituminous wearing course shall meet the requirements of Alabama State Highway Department Specification, 416 Plant Mix "A", placed 1" thick minimum at the rate of 165 pounds per square yard (165 #/S.Y.). It is intended that a slag type aggregate be used in the wearing surface for non-skid properties. The bituminous binder course shall meet the requirements of Alabama State Highway Department Specifications, Section 414, Plant Mix "B", placed 2" thick minimum at the rate of 230 pounds per square yard (230 #/S.Y.). Before the final wearing surface is applied a tack coat is to be applied in accordance with Section 405.

6-04 EXISTING UTILITIES: All water valve covers, gas valve covers shall be raised flush to the final bituminous wearing course elevation. All labor and materials involved in rising these utility covers shall be incidental to the street repaving. No extra payment for this work. Several Water Meeters and Service lines are expected and within the Right of way for the Road. The Contractor shall locate these lines and protect the service for the Houses and repair any damage to the service lines each day. Water service must be repaired for each home and may not be turned off for extended periods of time.

The Contractor shall submit a design mix to the Engineer for approval on both the asphalt binder and seal prior to installing any asphalt. The use of a small binder in place of the Section 414, Plant Mix "B" will be considered for use in places where required. This substitution will be at no additional cost.

7-00 PIPE WORK

7-00 GENERAL: Before starting work on the project, the Contractor shall secure such permits and post such bonds and/or guarantees; as are required by the Alabama State Highway Department, the County, and the City. Sufficient sets of Plans and Specifications, or excerpts there from, as required to accompany applications for permits, will be furnished to the Contractor.

Pipe shall be stored or strung along the route of the work only in such quantity as will be sufficient to maintain continuous laying operations and prevent delays due to shortages of materials. The contractor shall avoid stringing or storing pipe in locations that might cause inconvenience to the public, operation of businesses, or hindrance to traffic such as across driveways, entrances and fire lanes, or adjacent to fire hydrants and shall avoid stringing pipe in locations that would interfere with drainage.

Where pipelines are to be constructed in easements the Contractor shall continue in operations to such easement or temporary work strings might be made available adjacent to the easements. The contractor may obtain information regarding such easements and/or work strips from the office of the owner. The contractor shall make his own arrangements for storage of pipe or other materials on property outside of public ways easements, or temporary work strips; and use of such areas shall be at his own responsibility.

The Contractor shall keep the City, the County, and the State well informed on his construction schedule, and/or any changes in the schedule; shall consult with the respective Engineering and Traffic Departments of the authorities mentioned hereinabove before beginning work on the particular section of the work located in public ways under the jurisdiction of such Departments; shall follow the recommendations of the respective Departments relative to work on public ways; and shall make such provisions for maintenance of traffic flow, regulation of traffic and protection of traffic and public as required by the respective Departments.

The Contractor shall furnish and install all pipe fittings, accessories and appurtenances; shall furnish and install all other pipe line materials required in the work; shall furnish and install all materials required for bracing of pipe and fittings. The prosecution of the work, handling of any laying of pipe; excavation and backfill; location and depth of mains; installation of valves, fittings, and appurtenances; restoration of surfaces; provision of handling traffic; and other acts associated with the construction work, shall be in accordance with these Plans and Specifications. Should special conditions arise that in the opinion of the contractor, warrant some deviation from the Plans and specifications, the approval of the Engineer must be secured before any change is made.

7-01 HANDLING PIPE AND ACCESSORIES: Proper equipment, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Pipe fittings and other accessories shall at all times be handled with care to avoid damage.

The Contractor shall carefully examine all pipes and other materials immediately before placing them in the trench; and if any such pipe or materials are found to be defective, the Contractor shall notify the Engineers and shall, under their direction, discard such materials.

All pipe, fittings, and appurtenances shall be carefully lowered into the trench piece by piece in such a manner as to prevent damage. The interior of all pipe, fittings, and other accessories shall be kept free from dirt and foreign material at all times.

7-02 REINFORCED CONCRETE PIPE: The reinforced concrete pipe shall comply with ASTM specification C-76 latest revision. In addition to the requirements of these specifications the concrete pipe shall be made from crushed limestone aggregate and the cement shall be Type 11 (sulfate resistant) cement. The concrete when tested in compression shall not be less than 5000 p.s.i. and the absorption shall not exceed 6%. The reinforced concrete pipe in classes I, II, and III shall be B wall thickness. Classes IV and V shall be C wall thickness. The joints shall be tongue and groove type.

Elliptical steel will not be allowed. For classes I, II, and III, pipe 36" in diameter and larger shall have two lines of reinforcing steel. For classes IV and V, concrete pipe 24" in diameter and larger shall contain two circular lines of reinforcing steel.

A record of the pipe supplied for the project shall be furnished to the Engineers by the manufacturer. All pipe shipped to the job shall be clearly marked as to the type, date of manufacture, and name or trademark of manufacturer.

7-03 MORTAR JOINTS: The mixture shall be one part Portland cement and two part sand by volume. The quantity of water in the mixture shall be sufficient to produce a stiff, workable mortar but shall in no case exceed 5 ½ (five and one-half) gallons of water per sack of cement. Sand shall conform to the specifications H-45 and cement shall conform to the specifications M-85 of the American Association of State Highway Officials. The pipe then shall be thoroughly cleaned and wetted with water before the joint is made. Stiff mortar shall then be placed in the lower half of the groove of the pipe section already laid. Mortar shall be applied to the upper half of the tongue of the pipe section being laid. The tongue end of this pipe shall be inserted in the groove end of the pipe already laid, the joint pulled up tight taking care to see that the interior surfaces of the adjoining pipe sections are flush and even. Sufficient mortar shall be used to fill the joints of tongue and groove pipe to fill completely and to form a bead on the outside of the pipe.

7-04 PIPE LAYING: Contractor must examine the areas and conditions under which storm sewer work is to be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the contractor.

Inspect conduit before installation to detect any apparent defects. Mark defective materials with white paint and promptly remove from the site.

Lay conduit beginning at the low point of a system, true to the grades and alignment indicated with unbroken continuity of invert. Place groove end of concrete conduit pacing upstream. Install in accordance with applicable provisions of the American Concrete Pipe Association "Concrete Pipe Field Manual", unless otherwise indicated.

Clear the interior of dirt or other superfluous material as the work progresses. Maintain a swab or drag in the line and push past each joint as it is completed.

Place plugs in the ends of uncompleted conduit at the end of the day or whenever work stops. Flush lines between manholes if required to remove collected debris.

Inspect conduit to determine whether line displacement or other damage has occurred. Make inspections after lines between manholes, or manhole locations, have been made and approximately two feet of backfill is in place and at the completion of the project.

If the inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, take whatever steps are necessary to correct such defects to the satisfaction of the Engineer.

7-05 EXISTING CULVERTS: The contractor shall remove any existing cross drains or driveway culverts located in the right-of-way. Existing culvert removal shall be considered incidental no extra payment for culvert removal.

8-00 DITCHING MULCHING GRASSING & LANDSCAPING

8-01 DRAINAGE STRUCTURES: Drainage structures shall be constructed in accordance with details shown on the plans. Structures shall be of Class A concrete, or 8" brickwork using solid first quality brick as approved by the engineer.

Cast iron gratings or other castings shall be of type and design as indicated on the plans. Iron castings shall conform to the Standard Specifications for Gray Iron Castings, ASTM Specifications A 48-60T, Class 20.

Reinforced concrete drainage pipe and/or culvert pipe, shall be as specified under Section 7-02.

8-02 DITCH SHAPING & IMPROVEMENTS: It is the general intention of these specifications to clear and grub the existing ditches shown on the drawings to be improved in accordance with section 1-02 of these specifications. After clearing and grubbing the existing ditches shall be shaped to the slopes shown on the drawings

8-03 FINISH GRADING AND GRASSING, FERTILIZING & MULCHING: The Contractor shall backfill around all ditches and structures to be built under this Contract and shall accurately form all berms and slopes to general conformance with the details as shown on the plans. The remainder of the sites shall be smoothly graded to general conformance, it is meant that the surfaces shall be shaped to conform, but elevation of top of sub-soil shall be left down approximately 6" to accommodate thickness to topsoil layer.

All areas that have been shaped, cleared and grubbed, or otherwise disturbed, not occupied by structures, buildings, roads, walks, paved areas, riprap, etc., shall be finish graded and grassed. All cut banks, slopes, or other areas outside of the construction area that have been disturbed by the Contractor's construction operations shall also be graded and grassed or otherwise restored as specified herein.

Before placement of topsoil the sub-soil shall be loosened to depth of not less than four (4) inches but not greater than eight (8) inches; and the surfaces shall be cleared of all rock three (3) inches or larger in size, all construction debris, or other objectionable material. The topsoil previously removed and stored shall then be placed over the prepared subsoil. The loose depth of the topsoil shall be sufficient to allow for natural settlement, so that after such settlement has taken place the surface of the topsoil layer will conform to the finished elevations and contours shown on the Drawings. After placement of topsoil the surface shall be raked to remove clods, stones over one (1) inch in diameter, brush, roots and construction debris.

Should the stockpile of topsoil not be adequate for supplying the quantities of topsoil required for preparation of the areas described hereinabove, the Contractor shall furnish, at his expense, topsoil from other sources to meet any deficiencies.

After placement of topsoil the contractor shall immediately proceed with the grassing work. Grassing work shall consist of soil preparation, furnishing and spreading fertilizer, furnishing and spreading mulch, and furnishing and sowing seed.

Lime shall be uniformly spread over all areas to be seeded immediately prior to soil preparation. Rate of application of lime shall be accomplished by use of any approved method.

Soil preparation shall be performed immediately prior to seeding, and shall consist of loosening of the soil by discing, harrowing or other approved methods. On areas having a slope of 3:1 or flatter, the soil shall be loosened to a depth of approximately three inches (3"); and, on slopes steeper than 3:1 the soil shall be merely roughened to a depth of approximately one inch (1"). All clods, loose stones, and other foreign materials which are larger than 3" in any dimension shall be removed. All gullies and washes that develop in the loosened soil prior to seeding shall be repaired. Seeding shall immediately follow soil preparation so as to avoid both compaction and/or wash by heavy rainfall and crust formation by sun baking. Seeding will not be permitted on hard or crusted soil surfaces.

Fertilizer shall be uniformly applied to the designated area at the time of seeding; and rate of application shall be 800 lbs. 10-20-10 per acre.

Fertilizing shall be performed using any approved method. If liquid fertilizer should be used, it shall be kept agitated during application and shall be applied in amounts sufficient to provide the same value of nutrients per acre as that specified for dry fertilizer. Should the Contractor elect to use liquid fertilizer in a hydro seeder, the material shall be applied on a poundage basis, mixed with the same volume of water that would be used with dry fertilizer.

Seeding shall consist of uniformly sowing seed, spreading fertilizer, and spreading mulch in the areas prepared as specified herein, and at the rates specified herein. The cost of mulch shall be included in the cost of soil preparation, seeding and fertilizing.

Seed mixes shall be Alabama State Highway Department Seed Mix, 15-B, 9-B, or 8-B, the use of a particular seed mixture being determined by the time of year during which seeding is to be done. The pounds of seed to be used

per acre shall be accordance with the quantities specified (in Alabama State Highway Department Specifications) for the seed mixes given hereinabove.

All cut banks, slopes, or other areas outside of the limits indicated that have been disturbed by construction operation shall be seeded or sprigged as required. All slopes or cut banks where slopes are to steep to permit seeding shall be sprigged. Sprigs shall be placed horizontally in continuous furrows and spaced not farther than 12" apart each way. Sprigs shall be Bermuda Variety and native to the locality of the work. All shale ditches shall have solid sod ditch cheeks across bottom and slopes, such ditch cheeks to be placed at a greater than ten feet intervals.

Hydro seeding will be permitted when approved equipment is used and all mixtures are constantly agitated from the time that they are mixed until they are finally applied to the seed bed. All such mixtures shall be used within eight (8) hours from time of mixing. Nozzles or sprays shall not be directed toward the ground in such a manner as to cause erosion or runoff.

When hay or straw is used for mulch, it shall be spread over all seeded areas at the rate of approximately two (2) tons per acre; and shall be applied to a uniform depth, by an approved method, and in such a manner that not more than ten (10) percent of the soil surface is exposed. The use of wet hay or straw will not be permitted. Mulch shall be applied within 48 hours after the seeding operation. Mulch shall be anchored to the seeded surface by spraying with asphalt; by discing or punching the mulch partially into the soil; by use of approved netting or by use of the methods and/or materials approved by the Engineer. The contractor may use more than one method on the project. In the event that asphalt should be used, it shall be applied in such a manner that uniform distribution is obtained and that a rate of not less than 60 gallons per ton of mulch is obtained.

When hood cellulose fiber is used for mulch, it shall be applied at a rate of approximately 1500 pounds (dry weight) per acre and in such a manner that uniform distribution is obtained. It shall be the responsibility of the Contractor to secure a satisfactory stand of grass of such uniformity and cover as to present the appearance of a finished lawn; to maintain all seeded areas until final acceptance of the work; to restore or replace any portion of the grassing work that is found to be defective; which results in an unsatisfactory stand of grass, or which becomes damaged prior to acceptance of the work. The responsibility of the Contractor shall continue to the following extent: should all other work at the plant site have been completed and accepted, and should the Contractor have removed all forces and equipment from the plant site, he shall nevertheless, in the event of failure or partial failure of the grassing will be obtained under the terms of the bond given to the Owner to return such forces and equipment to the plant site as are necessary to insure the satisfactory completion of this item of work under the Contract. Payment for grassing will be made on a LUMP SUM price basis as shown on the proposal form.

9-00 TRAFFIC CONTROL

9-00 TRAFFIC CONTROL: The contractor shall provide traffic control in accordance with the National Manual on Uniform Traffic Control Devices both in the right-of-way of the highway and on the City right-of-way. Traffic

control shall be paid on a lump sum basis listed in the proposal. Amount to be invoiced for traffic control on shall be approved by the engineer per pay estimate.

10-00 IMPORTANT SPECIAL INSTRUCTIONS TO CONTRACTORS

10-00 GENERAL: The information contained in this section of the Specifications is furnished to the Contractor for use in the preparation of his bid.

10-01 CONTRACTOR'S QUALIFICATIONS, EXPERIENCE, AND RESPONSIBILITIES: By his tender of a bid for performing the work of constructing the proposed project, the contractor implies that he is experienced in such construction and is familiar with all phases of the work necessary for a complete job.

The Contractor shall have on the work at all times a superintendent who shall also be experienced in the particular type of construction, shall be familiar with all phases of the work, shall be capable of direction of work of all trades and crafts associated with the work, and shall be capable of making decisions relative to construction procedure.

It shall be the responsibility of the Contractor to ascertain whether his sub-contractors have supplied him with all the components necessary for a complete job, since, in making his bid, the contractor has assumed full responsibility for a complete and satisfactorily operative job. Indication of items of work on certain sheets of the drawings and not on others or mention in certain sections of the specifications and not in others, even though the items may be associated with the work covered by the sections of specifications or drawings from which such items were omitted, shall be construed to mean that the inclusion of all such items of work is fully intended, and the Contractor shall be held responsible for the performance of such items of work.

The Contractor is advised that, for equipment of different manufacture, control circuits and pipe connections are not necessarily similar. The drawings and specifications do not presume to show or describe control circuits and piping connections necessary for the various types of equipment which may be used. It shall be the responsibility of the Contractor to secure detailed drawings of connections and control circuits from the manufacturer of the equipment that he used and make all necessary arrangements for a satisfactorily operative installation.

The Contractor is reminded that it shall be his responsibility to take out and pay for all necessary licenses and permits; and no claims for extra compensation will be allowed by reason of the contractor's failure to take such items and costs into consideration in the preparation and tender of his bid. The Contractor shall contact all authorities having jurisdiction in the area of the work in order that he may be fully informed of the requirements relative to licenses and permits.

The Contractor shall be solely and fully responsible for all acts of his employees, sub-contractors, and suppliers at the sit of the work and in connection with the work.

10-02 PROTECTION OF THE OWNER, AGENTS OF THE OWNER, WORKMEN AND THE PUBLIC:

The Contractor and the Superintendent are requested to carefully read the Articles of the General

Conditions relating to protection of the Owner, agents of the Owner, workmen, and the public, such as Insurance; Indemnity; Licenses and Permits; Compliance with Laws, Ordinances and Regulations; Safety; Warning Signs and Barricades; Public Convenience; Sanitary Provisions; Etc. This request is made to stress the importance of safe prosecution of the work, and does not imply that the Contractor and his Superintendent should not be completely familiar with all articles of the General Conditions and all other provisions of the Contract Documents. Under the terms and conditions of this Contract, the Engineer shall not be required to act as safety Engineer or Safety Supervisor and such responsibility shall remain solely with the Contractor, who shall conduct all work in accordance with the requirements of "Safety and Health Regulations for Construction Occupational Safety and Health Administration, U.S. Government Department of Labor", and of other authorities having jurisdiction, and shall observe all precautions and safety provisions as outlined in the "Manual of Accident Prevention in Construction", as published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable laws or regulations.

26. RIP-RAP

Stone rip-rap shall be furnished and installed where indicated on the drawings or directed by the Engineer. Size of stone shall not be less than 12"x12"x6", and stone cover shall not be less than 12" thick. The area to be covered shall be roughly level before placement of the stone. Payment for furnishing and placing rip-rap will be made on the basis of unit price bid per square yard.

Voids in placed rip-rap shall be filled with Class "B" concrete as shown on the plans or as directed by the Engineer, at a rate of 10 C.Y per S.Y. of rip-rap. Payment for furnishing and placing Class "B" concrete shall be made on the basis of unit price bid per cubic yard.

27. SEEDING AND FERTILIZATION OF RIGHT OF WAY

After the sewer is installed and back filled and a sufficient amount of time has elapsed for the back fill to settle, the total disturbed area shall be machined to a smooth surface matching the adjacent or adjoining ground surfaces and the ground profile on the plans.

The ground preparation before seeding shall consist of cultivation to a loose depth of approximately four (4) inches minimum and the application of lime to the soil at the rate of two(2) tons per acre. The plowing, harrowing, cultivating and all other operations shall be performed with proper equipment and in such a manner as to break clods, lumps, or earth balls, and remove all boulders, stumps, large roots or other particles which would interfere with the work and which will result in a suitable bed for seed grass. The ground shall be plowed to the required depth then cultivated with a rotary tiller and/or disc harrow, in both directions if feasible, until approved. In smaller or inaccessible areas the use of hand tools will be permitted.

The contractor shall add sufficient water to wet the soil in order to prepare the ground to be seeded. Nine hundred twenty (920) pounds of 13,13,13 commercial grade fertilizer per acre of ground shall be spread uniformly into the areas to be planted. The fertilizer shall be pulverized and free of lumps when applied. In no case shall full strength fertilizer be permitted in direct contact with the seeds. When fertilizers are applied hydraulically they must, be diluted sufficiently as directed so that no damage is done to either seed or established grasses and legumes.

Work area seeding mixtures shall be as follows:

September through March	Winter		
<i>Kentucky Blue Grass</i>		6	<i>lbs/acre</i>
<i>Pensacola Bahia</i>		20	<i>lbs/acre</i>
<i>Re seeding white Cover</i>		30	<i>lbs/acre</i>
<i>Kentucky 31 Fescue</i>		20	<i>lbs/acre</i>
April through June	Spring		
<i>Pensacola Bahia</i>		20	<i>lbs/acre</i>
<i>Kentucky 31 Fescue</i>		20	<i>lbs/acre</i>
<i>Common Lespedeza (Var. Tenn.)</i>		10	<i>lbs/acre</i>
<i>Bermuda Grass</i>		12	<i>lbs/acre</i>
July and August	Summer		
<i>Bermuda Grass</i>		5	<i>lbs/acre</i>
<i>Pensacola Bahia</i>		20	<i>lbs/acre</i>
<i>Re-seeding White Clover</i>		30	<i>lbs/acre</i>
<i>Kentucky 31 Fescue</i>		20	<i>lbs/acre</i>

Sowing Of seed shall, in general, follow promptly after incorporation of fertilizer in a uniform manner at the rate specified for each seed specie. Approved mechanical seeders shall do sowing. No sowing shall be done during windy weather, when the prepared surface is crusted or when the ground is frozen, wet or other wise in a non-tillable condition. Unless otherwise directed, after seed has been sown the seedbed shall be compacted immediately by means of a cultipacker, light roller or approved drag, rolling or covering of seed may be omitted when seeding is done hydraulically and mulched. Straw mulch shall be applied at the rate of two and half (2.5) tons per acre within 48 hours after seeding has been first applied. Water necessary to satisfactorily prepare, establish and maintain mulching placed under this section shall be classified as a part of the mulching item involved. The amount of water and when it shall be applied shall be the contractor's responsibility until acceptance of the project.

Straw and hay mulch shall be applied with mechanical mulch spreaders designed break up balls of balls or clusters of mulch and apply it evenly over the surface so as to provide adequate shading from direct sunlight. If asphalt adhesive is used on the mulch, the mulch spreader shall be equipped and so designed

to apply effectively the asphalt adhesive to the mulch and form a uniform porous and stable blanket held in place by the adhesives over the designated area.

Hay or straw material, which contains an excessive quantity of matured seeds or noxious weeds or spews which would constitute a menace to the planted species and to surrounding farmland, will not be acceptable. Mulch, which is too fresh, or excessively brittle, or so decomposed as to retard growth of grass, will not be acceptable.

The acceptance of designated seed area will be based on verification of a satisfactory stand of grass in the season for each species required by the mixed designated for use. If a satisfactory stand of grass is not established the area shall be re-seeded without additional cost to the owner.

The contractor shall be responsible for securing a satisfactory stand of grass and legumes in accordance with the Specifications.

The contractor may, at his option, employ additional measures (other than those specified) to prevent the loss of, or damage to the work. No additional payment will be made for the employment of such additional measures.

The erosion control work shall cover all disturbed areas within the sewer right of way and/or easement along which the sewer has been installed. Erosion control work shall not be limited to the easement but shall include all disturbed areas as necessary to complete the grassing of the project. Solid sod may be used if directed by the Engineer or as specified in the proposal. The preparation of the ground will be the same as for seeding. The sod will be placed so as to give a smooth and uniform surface that is being sodded. Fescue may be substituted for Bahia in work areas adjacent to residential lawns, as directed by the Engineer.

Payment shall be made on per LUMP SUM basis as outlined in the proposal furnished and installed complete.

29. HIGH-WAY CROSSINGS

GENERAL

Before beginning work on the Highway Crossings the Contractor shall have secured permits and complied with the requirements of the Highway Department with respect to proper surety, etc. The Contractor shall advise the Highway Department of the date on which they expect to begin work on the particular crossing.

13-00 FINAL INSPECTION

13-00 FINAL INSPECTION: Upon notification by the Contractor that the work has been completed and that the Contractor is ready for final inspection, the Engineers shall carefully inspect the entire work; and if the work should fail to comply with these Specifications in any respect, the Contractor shall at once correct any defects or faulty work pointed out by the Engineers.

The Contractor shall maintain and service the work and keep all pipe lines, equipment and structures in good and workable condition until final acceptance of the work.

After the items of work have been completed to the satisfaction of the Engineers, the Contractor shall publish notice of completion of the work. Two copies of affidavits of publication of such notice shall be furnished to the Engineers. Final payment will not be made earlier than 30 days after the date of first appearance of said notice of completion.

PICKLEBALL COURT SURFACING - Specifications

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide pickleball court surfaces as shown and specified. The work includes:

1. Pickleball courts surfaces.

B. Related work:

1. Earthwork
2. Asphaltic Concrete Paving

1.2 QUALITY ASSURANCE

A. Bidder qualifications:

1. Prime Bidder must be Alabama General Contractor

C. Materials and methods of construction shall comply with the following standards:

1. U.S. Tennis Court and Track Builders Association, (USTCTBA).
2. The United States Lawn Tennis Association, (USLTA).
3. National Collegiate Athletic Association, (NCAA), applicable standards.

1.3 SUBMITTALS

A. Submit manufacturer's product data for each type of coating or equipment required, including finish indicated.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver manufactured products in manufacturer's original, unopened, and undamaged containers with labels intact and legible.
- B. Store and handle manufactured products to prevent damage and deterioration.
- C. Materials specified for the Color System shall be delivered F.O.B. to the site in sealed, painted containers, properly labeled with Manufacturer's labels, and stenciled with the proper batch code number. Products packaged or labeled in any other manner will not be accepted. Mixing with clean fresh water shall only be done at the job site. Spreading rates are based upon material prior to mixing with water as directed. Upon completion, the Contractor shall remove all containers, surplus, materials and debris, and leave the site in a clean and orderly condition acceptable to the Owner.

1.5 PROJECT CONDITIONS

- A. Do not begin final surface work before completion of final asphalt surface including curing.
- B. Do not install surface coatings and colorings if rainfall is imminent or when temperature is 50 degrees F. or below. Do not apply to wet base surface.

PART 2 - PRODUCTS

2.1 PICKLEBALL COURTS

- A. Surface manufacturer and type: "Acrytech" Surfacing System. Or approved equal.
 - 1. Court color: To be approved by Owner from standard colors.
 - 2. Border color: To be approved by Owner from standard colors.
 - 3. Court Patch Binder: High strength acrylic latex bonding liquid designed for mixing with silica sand and Portland cement.
 - 4. Acrylic Resurfacer: Asbestos free, 100% acrylic latex binder for job mixing with silica sand for filler coat to reduce surface porosity.
 - 5. Color Concentrate
 - 6. Acrylic Finish Coat: Pigmented acrylic emulsion.
 - 7. Line Paint: White line paint, 100% acrylic latex.
 - 8. Water: The water used in all mixtures shall be fresh and potable.
 - 9. Silica sand: Clean, dry, and free of dust. No. 80 mesh rounded silica sand.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine base asphalt conditions. Allow minimum 2 weeks curing on asphalt. Flood courts and mark depressions. Do not start surface application until unsatisfactory conditions are corrected. Maximum surface variation in base asphalt shall not exceed 1/4 inch in 10 feet.
- B. Prior to the asphalt installation, 2'x2'x3' foundations are excavated for the net posts. A 3" ID schedule 40 PVC sleeve is embedded in 300psi concrete in the net post foundations. An American Center Anchor is installed in a 1'x1'x1' concrete foundation. The following equipment is then installed: 2 7/8" Putterman internal wind net posts, American 3.0 nets, American Center Straps, and American Center Anchors, or approved equals by submittal.

3.2 PREPARATION

- A. After base asphalt has thoroughly cured, sweep and blow all debris, sand, dirt, etc. Surface must also be dry. Thoroughly clean and pressure wash the units utilizing a pressure washer with at least 3500 psi.
- B. All seams, roller marks, etc. should be patched and leveled with Acrylic Resurfacer as described.

- C. Material mixing areas will be located away from concrete walks. Walk areas used for court access shall be covered to protect from staining. Stained walks will be removed and replaced at contractor's expense.

3.3 SURFACE PREPARATION

- A. Prior to the application of surfacing materials, the entire surface should be checked for minor depressions or irregularities. After the courts have been flooded, any depressions covering a nickel shall be corrected by the following method. Depressions and irregularities shall be filled with Court Patch Binder according to specifications using the following mix:

100 lbs 60-80 mesh silica sand (dry)
2 gallons of Portland Cement and add Binder mixed until designed consistency is achieved

After patching, the surface shall not vary more than 1/8" in ten feet measured in any direction.

3.4 FINISHED COURSE PREPARATION

- A. Over the Asphaltic Surface Course, apply two (2) coats of Acrytech Acrylic Resurfacer in accordance with the manufacturer's directions at a rate of not less than .04-.06 gallons per square yard (32-48 gallons for 800 square yards). Dilution rate will not exceed 1 part water, 2 parts concentrate.
- B. The third coat should be Acrytech Color Concentrate in accordance with the manufacturer's directions at a rate of not less than .03-.06 gallons per square yard (24- 48 gallons for 800 square yards). Dilution for this texture coat shall be 2 parts concentrate, 1 part water, and one part sand. (Color: light green/dark green)
- C. The final Finish Coat of Acrytech shall be applied as directed by the manufacturer at a rate of not less than .03-.06 gallons per square yard (24-48) gallons for 800 squares yards). Dilution for this texture coat shall be 2 parts concentrate, 1 part water, and one part sand. (Color: light green/dark green)

3.5 PLAYING LINES

- A. Four hours minimum after completion of the color resurfacing, 2-inch wide playing lines, minimum 2 coats, shall be accurately located, marked, and painted with Textured Acrylic Line Paint as specified by American Sports Builders Association

3.6 WEATHER LIMITATIONS

- A. No parts of the construction involving the Acrytech System conducted during rainfall or when rainfall is imminent. The air temperature must be at least 50 degrees F and rising.

3.7 GUARANTEE

- A. The Contractor shall guarantee labor, materials, and workmanship for a period of one (1) year from the date of the final billing. Anytime during the period, the

Contractor shall make necessary repairs to the surface without cost to the Customer.

3.8 CLEANING

- A. Upon completion, the contractor shall remove all containers, surplus materials and debris and leave the site in a clean and orderly condition acceptable to the owner. Gates shall be secured. Repair any damage resulting from surfacing.

END OF SECTION

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide Asphaltic concrete paving as shown and specified. The work includes:

1. Final subgrade preparation and paving base.
2. Pickleball court paving.

B. Related work:

1. Earthwork
2. Cement Concrete Pavement
3. Pickleball Court Surfacing

1.2 QUALITY ASSURANCE

A. Testing and inspection: Performed by a qualified independent testing laboratory.

B. City to provide and pay for testing and inspection during paving operations. Laboratory and inspection service shall be acceptable to the Landscape Architect.

C. Materials and methods of construction shall comply with the following standards:

1. Alabama State Highway Department Standard Specifications for Highways and Bridges, latest edition.
2. American Society for Testing and Materials, (ASTM).
3. American Association of State Highway and Transportation Officials, (AASHTO).
4. Asphalt Institute, (AI)
5. National Crushed Stone Association, (NCSA).
6. International Slurry Seal Association, (ISSA).

D. Provide material furnished by a bulk asphaltic concrete producer regularly engaged in the production of hot-mix, lot-laid asphaltic concrete paving materials.

E. Tolerances:

1. In-place compacted thickness:
 - a. Base Course: Plus, or minus 1/2 in.
 - b. Surface course : Maximum 1/4" plus, minus 0".
2. Finished surface smoothness:
 - a. Surface course: Maximum 1/4" in 10'-0", any direction.

1.3 SUBMITTALS

A. Product data:

1. Submit mix design on asphalt for approval.
2. Submit herbicide product data.

B. Submit reports for testing and inspection of the following:

1. Subgrade surfaces.
2. Base materials.
3. Surface materials.
4. Compaction operations.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver manufactured products in manufacturer's original, unopened, and undamaged containers with labels intact and legible.
- B. Store and handle manufactured products to prevent damage and deterioration.

1.5 PROJECT CONDITIONS

A. Weather limitations:

1. Do not install base course materials over wet or frozen subgrade surfaces.
2. Do not apply prime and tack coat materials when temperature is 50 degrees F or below. Do not apply to wet base surface.

B. Grade control: Establish and maintain the required lines and grades, including crown, inverted crown, and cross-slopes, for each course during paving operations.

C. Provide temporary barricades and warning lights as required for protection of project work and public safety.

D. Protect adjacent work from damage, soiling, and staining during paving operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subgrade fill: In accordance with Section 02300: Earthwork.

B. Aggregate base surface courts: In accordance with Section 02300: Earthwork.

1. 6" crushed aggregate Base Course (ALDOT Section 825B) compacted to 100% standard Density.

- C. Soil sterilizer: Granular weed growth inhibiting type herbicide, labeled for use under asphaltic concrete pavement surfaces. Material shall not damage trees and plants adjacent to pavement surfaces.
- D. Asphalt: Conform to Alabama Highway Department specification Section 429A Hot Bituminous Pavement and 429B Bituminous Binder. All aggregates, fine (sand type) and coarse shall be crushed stone (limestone) free of gravel, sand, and iron pyrites and conforming to Section 801.03. Submit mix design for approval.
- E. Pickleball court surface: See Section 02462 for pickleball court surfacing.
- F. Paving Geotextile: Nonwoven polypropylene, specifically designed for paving applications, resistant to chemical attack and mildew.

2.2 EQUIPMENT

- A. Paving equipment: Spreading, self-propelled asphalt paving machines capable of maintaining line, grade, and thickness shown.
- B. Compacting equipment: Self-propelled rollers, minimum 10-ton weight.
- C. Hand tools: Rakes, shovels, tampers, and other miscellaneous equipment required to complete the work.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine subgrades and installation conditions. Do not start asphaltic concrete paving work until unsatisfactory conditions are corrected.

3.2 INSTALLATION: GENERAL

- A. Comply with Asphaltic Institute (AI) MS-3 Asphalt Plant Manual for material storage, control and mixing, and for plant equipment and operation.
- B. Transport asphaltic concrete mixtures from the mixing plant to the project site in trucks with tight, clean compartments.

3.3 INSTALLATION: SURFACE MATERIALS

- A. Remove loose and foreign material from compacted base immediately before application of surface materials. Do not start surface work until all other work which may damage the finish surface is completed.
- B. Apply herbicide at manufacturer's recommended rates.

- C. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches.
 - 1. Protect paving geotextile from traffic and other damage and place overlay paving the same day.
- D. Install asphaltic material in one course, total compacted depth of not less than 2.5". Apply in a north/south direction.
- E. Place materials in strips not less than 10'-0" wide. After the first strip has been placed and rolled, place all succeeding strips and extend rolling to overlap previous strips.
- F. Carefully make joints between old and new pavements, and between successive day's work, to ensure a continuous bond between adjoining work. Construct joints to have the same texture, density, and smoothness as other sections of the asphalt concrete course.
- G. Begin rolling operations when the asphalt concrete mixture will bear the weight of the roller without excessive displacement.
- H. Perform breakdown, second and finish rolling until the asphalt concrete mixture has been compacted to the required surface density and smoothness. Continue rolling until all roller marks are eliminated. Provide a smooth compacted surface true to thickness and elevations required.
- I. After final rolling, do not permit vehicular traffic on to the pavement.
- J. Protect newly placed material from traffic by barricades or other suitable methods acceptable to the Landscape Architect.

3.4 FIELD QUALITY CONTROL

- A. Provide field quality control testing and inspection during asphaltic concrete paving operations.
- B. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist Test Agency and their representatives in execution of their function.
- C. Before constructing base course, field verify subgrade surfaces are adequate and meet or exceed design bearing values.
- D. Coordinate laboratory tests on asphalt pavement mixes to determine compliance with specified requirements.
- E. Coordinate tests for aggregate base for each course for each day's work.
- F. Test in-place asphalt base course and surface courses for compliance with density and thickness. Take not less than 4" diameter pavement specimens of each completed course. Repair test specimen holes to match adjacent work.

1. Average density of in-place material: Equal to or greater than 97%, with no individual determination less than 95% of average density of laboratory specimens.
 2. Perform 1 test for density for each course for each day's work.
 3. Thickness: Make 1 test (minimum) for each 2,500 sq. ft. of each type of paving.
- G. Test for surface smoothness with 10'-0" straight-edge. Deficient areas shall be defined, removed, and replaced, or adjusted to design thickness by methods acceptable to the Landscape Architect.
- H. When, during progress of work, field tests indicate that installed compacted materials do not meet specified requirements, remove defective materials, install new materials, and retest at contractor's expense, as directed by the Landscape Architect.

3.5 PROTECTION

- A. Protect paving from damage due to construction and vehicular traffic until final acceptance.

3.6 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from paving operations.

END OF SECTION

CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes colored-textured exterior cement concrete pavement for the following:
 - 1. Walkways
 - 2. Sidewalks
 - 3. Paving Areas
- B. Related Sections include the following:
 - 1. "Earthwork" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

- A. Submit name of concrete plant meeting qualifications listed below:
- B. Design mixes and material certificates will not be required, provided that concrete materials are provided by approved concrete plant. Concrete must pass all strength testing.

1.5 INFORMATIONAL SUBMITTALS

- A. Installer Qualifications: An experienced installer who has completed concrete pavement work similar in material, design, size, and scope to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance with a minimum of 5 years' experience.
- B. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
- D. Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

- A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.
- B. Portland Cement: ASTM C 150, Type I or II.
 - 1. Fly Ash: ASTM C 618, Class F or C.
 - 2. Ground Granulated Blast- Furnace slag: ASTM C 989, Grade JOO or 120
- C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
 - 1. Maximum Aggregate Size: 1 inch nominal.
 - 2. Do not use fine or coarse aggregates containing substances that cause spalling.

2.4 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain no more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Bars: ASTM A 615/A 615M, Grade 60 (Grade 420);
- D. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type II, 1/2 to 1" (13 to 25mm) long.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.6 CONCRETE MIXES

- A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
- B. Proportion mixes to provide concrete with the following properties:
 - 1. Compressive Strength (28 Days): 3000 psi or as noted in drawings.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Slump Limit: 4 inches.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.
- D. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Synthetic Fiber: Uniformly dispense in concrete mix at manufacturer's recommended rate but not less than 1.5 lb/cuyd.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
 - 1. Apply epoxy repair coating to uncoated or damaged surfaces of epoxy-coated reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated.
 2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 3. Provide tie bars at sides of pavement strips where indicated.
 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips or eurathane joints, as indicated when paving, abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of **50 feet** unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
- D. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints as detailed.
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
- F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
1. Radius: 1/4 inch or as noted on drawings.

3.5 CONCRETE PLACEMENT

- A. Inspection Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast-in.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery, at Project site, or during placement.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

- F. Consolidate concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- G. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if approved by Landscape Architect.
- H. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or derbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.
- I. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

- A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide uniform, fine-line texture directions of brooming across walks or as noted on drawings.
 - 2. Smooth, steel-trunnel, surface adjacent to joints as noted on drawings.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

3.8 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 1/4 inch
 - 2. Thickness: Plus 3/8-inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: The contractor will engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Assist with the taking of samples and preparation of test cylinders.

3.10 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not comply with requirements in this Section.
- B. Drill test cores, where directed by the Landscape Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. PVC-coated, steel chain-link-fabric
 - 2. PVC-coated, galvanized, steel framework. Court fence vinyl coated galvanized steel chain link fabric, gates and accessories as per plans. Provide Top Rail and Bottom and mid rails per details.
- B. Related Sections include the following:
 - A. Division 2 Section "Earthwork" for filling and for grading work.

1.3 DEFINITIONS

- A. CLFMI: Chain Link Fence Manufacturers Institute.

1.4 SUBMITTALS

- A. Product Data: Material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:
 - 1. Fence and gate posts, rails, and fittings.
 - 2. Chain-link fabric, reinforcements, and attachments.
 - 3. Gates and hardware.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed chain-link fences, backstops, and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Chain-Link Fences and Gates: Obtain each color, grade, finish, type, and variety of component for chain-link fences and gates from one source with resources to provide chain-link fences and gates of consistent quality in appearance and physical properties.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others.
- B. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work.

2.2 CHAIN-LINK FENCE FABRIC

- A. Steel Chain-Link Fence Fabric: (8 feet minimum fabric height). Provide 9-gauge core fabric fabricated in one-piece widths for fencing in height of 8 feet and less. Comply with CLFMI's "Product Manual" and with requirements indicated below:
 - 1. Mesh and Wire Size: 2-inch mesh.
 - 2. PVC-Coated (Galvanized) Fabric: ASTM F 668, Class 2b applied to steel wire according to ASTM A 817.
 - 3. Coat selvage ends of fabric that is metallic coated during the weaving process with manufacturer's standard clear protective coating.
- B. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMING

- A. Round Steel Pipe: Schedule 40, galvanized steel pipe complying with the following standard weight per foot: 1-5/8"–2.27 lbs, 2"–2.72.lbs, 2-1/2"–3.65 lbs, 3"–5.79 lbs, and 4"–9.11 lbs. Contractor to provide mill certifications.
- B. Post Brace Rails: Match top rail for coating and strength and stiffness requirements. Provide brace rail with truss rod assembly for each gate, end, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly, for each corner post and for pull posts. Provide rail ends and clamps for attaching rails to posts.
- C. Top Rails: Fabricate top rail from lengths 21 feet or longer, with swaged-end or fabricated for expansion-type coupling, forming a continuous rail along top of chain-link fabric.
- D. Intermediate Rails: Match top rail for coating and strength and stiffness requirements.
- E. Color: Black complying with ASTM F 934

2.4 TENSION WIRE

- A. General: Provide horizontal tension wire at the following locations: 1. Location: Extended along bottom of fence fabric.
- B. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire complying with ASTM A 824 and the following:
 - 1. Coating: Type I, aluminum coated (aluminized).

2.5 SWING GATES

- A. General: Comply with ASTM F 900 for the following swing-gate types:
 - 1. Single gate.
 - 2. Double gate.
- B. Metal Pipe and Tubing: Schedule 40, galvanized steel pipe complying with the following standard weight per foot: 1-5/8"–2.27 lbs, 2"–2.72.lbs, 2-1/2"–3.65 lbs, 3"– 5.79 lbs, and 4"–9.11 lbs. Contractor to provide mill certifications.
- C. Frames and Bracing: Fabricate members from round, galvanized steel Schedule 40 pipe with outside dimension and weight according to ASTM F 900 for the following gate fabric height:
 - 1. Gate Fabric Height: 6 feet or less.
- D. Frame Corner Construction:
 - 1. Assembled with corner fittings and 5/16-inch- diameter, adjustable truss rods for panels 5 feet wide or wider.
- E. Gate Posts: Fabricate members from round galvanized steel pipe with outside dimension and weight according to ASTM F 900 for the following gate fabric heights and leaf widths:
- F. Gate Posts: Fabricate members from round aluminum pipe with outside dimension and weight according to ASTM F 900.
- G. Hardware: Latches permitting operation from both sides of gate, hinges, center gate stops and, for each gate leaf more than 5 feet wide, keepers. Fabricate latches with integral eye openings for padlocking, padlock accessible from both sides of gate.

2.6 POLYMER FINISHES

- A. Supplemental Color Coating: Provide fence components with polymer coating
- B. Metallic-Coated Steel Tension Wire: PVC-coated wire complying with ASTM F 1664, Class 2b
- C. Metallic-Coated Steel Framing: Comply with ASTM F 1043 for polymer coating applied to exterior surfaces and, except for tubular shapes, to exposed interior surfaces.
 - 1. Polymer Coating: Not less than 10-mil-(0.254-mm-) thick PVC
- D. Fittings, Post and Line Caps, Rail and Brace Ends, Top Rail Sleeves, Tension and Brace Bands, Tension Bars, Truss Rod Assemblies, Tie Wires, Clips, and Fasteners: Comply with ASTM F 626 for polymer coating applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces.
 - 1. Polymer Coating: Not less than 10-mil-(0.254-mm-) thick PVC
- E. (Metallic-Coated Steel) PVC-coated wire complying with ASTM F 1665 2b
- F. Color: Black

2.7 CAST-IN-PLACE CONCRETE

- A. General: Comply with ACI 301 for cast-in-place concrete.
- B. Materials: Portland cement complying with ASTM C 150, aggregates complying with ASTM C 33, and potable water complying with ASTM C 94.
 - 1. Concrete Mixes: Normal-weight concrete air entrained with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
 - 1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 300 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

- A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
- B. Post Setting: Set posts in 4" diameter schedule 40 PVC sleeves embedded 3000 PSI concrete ribbon curb with non-shrinking grout. Protect portion of posts aboveground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.
 - 1. Dimensions and Profile: As indicated on Drawings.

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment as indicated on Drawings.
- B. Line Posts: Space line posts uniformly as indicated on drawings.
- C. Post Bracing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches O.K. Install tension wire in locations indicated before stretching fabric.

- 1. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same gage and type of wire.

- D. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.
- E. Intermediate Rails: Install in one piece as indicated on Drawings, spanning between posts, using fittings, special offset fittings, and accessories.
- F. Bottom Rails: Install, spanning between posts, using fittings and accessories as indicated on drawings.
- G. Chain-Link Fabric: Apply fabric to court side. Leave 1 inch between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to braces 24 inches o.c.
- J. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side except for outfield curved fence. Peen ends of bolts or score threads to prevent removal of nuts.

3.5 GATE INSTALLATION

- A. General: Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 ADJUSTING

- A. Gate: Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION

LANDSCAPING

PART 1 - GENERAL

RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Trees.
 - 2. Plants.
 - 3. Lawns.
 - 4. Topsoil and soil amendments.
 - 5. Fertilizers and mulches.
 - 6. Stakes and guys.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 2 Section "Earthwork" for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
 - 1. Manufacturer's certified analysis for standard products.
 - 2. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.
- C. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
 - 1. Analysis of imported topsoil.
- D. Planting schedule indicating anticipated dates and locations for each type of planting.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

- B. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."
- C. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil.
 - 1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.
- D. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."
- C. Trees and Shrubs: Deliver freshly dug trees and shrubs. Do not prune before delivery, except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.
- D. Handle balled and burlapped stock by the root ball.
- E. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.
 - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 2. Do not remove container-grown stock from containers before time of planting.
 - 3. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.6 PROJECT CONDITIONS

- A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavates, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Warrant the following living planting materials for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.
 - 1. Trees.
 - 2. Shrubs
- C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.
- D. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
- E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.9 TREE AND SHRUB MAINTENANCE

- A. Maintain trees and shrubs by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings. Maintain trees and shrubs for the following period:
 - 1. Maintenance Period: 30 days following Substantial Completion.

1.10 LAWN MAINTENANCE

- A. Maintain newly sodded lawn areas by watering, weeding, mowing, fertilizing, and other operations as required to establish healthy, viable turf for the following period:
 - 1. Maintenance Period: 30 days following Substantial Completion.

PART 2 - PRODUCTS

2.1 TREE AND SHRUB MATERIAL

General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

2.2 SHADE AND FLOWERING TREES

- A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.
 - 1. Branching Height: 1/3 to 1/2 of tree height.
- B. Small Trees: Small upright or spreading type, branched or pruned naturally according to species and type, and with relationship of caliper, height, and branching recommended by ANSI Z60.1, and stem form as follows:
 - 1. Form: Multistem, shrub, with multiple stems.
- C. Provide container-grown trees as indicated.
 - 1. Balled and burlapped trees will be acceptable in lieu of container-grown trees subject to meeting ANSI Z60.1 limitations for container stock and prior approval by Landscape Architect.

2.3 GRASS MATERIALS

- A. Sod: Certified turfgrass sod complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted.
 - 1. Species: Provide sod of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on the drawings.

2.4 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2.5 SOIL AMENDMENTS

- A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.
 - 1. Provide lime in the form of dolomitic limestone.
- B. Aluminum Sulfate: Commercial grade, unadulterated.
- C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.
- F. Peat Humus: For acid-tolerant trees and shrubs, provide moss peat, with a pH range of 3.2 to 4.5, coarse fibrous texture, medium-divided sphagnum moss peat or reed- sedge peat.
- G. Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
 - 1. When site treated, mix with at least 0.15 lb of ammonium nitrate or 0.25 lb of ammonium sulfate per cu. ft. of loose sawdust or ground bark.
- H. Herbicides: EPA registered and approved, of type recommended by manufacturer.
- I. Water: Potable.

2.6 FERTILIZER

- A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.7 MULCHES

- A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of the following:
 - 1. Type: Shredded Bark Mulch Approved by Owner

2.8 STAKES AND GUYS

- A. Anchors: Aluminum-alloy triangular arrowhead anchors (4 inches by 3-3/4 inches) with 1/2 inch by 3/4 inch round opening at top.
- B. Guy Lines: Flat woven, UV resistant, 3/8 inch by 15 feet polypropylene guy line with 600-pound break strength.
- C. Tension Bar: Adjustable tension bar with round openings at each end.

2.9 MISCELLANEOUS MATERIALS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Landscape Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3 PLANTING SOIL PREPARATION

- A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
- B. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.
 - 1. A "Planting Soil Amendments Schedule" as indicated on the drawings.
- C. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site.
- D. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.
 - 1. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants.
 - 2. Apply phosphoric acid fertilizer, other than that constituting a portion of complete fertilizers, directly to subgrade before applying planting soil and tilling.

3.4 SOD PLANTING PREPARATION

- A. Limit subgrade preparation to areas that will be planted in the immediate future.
- B. Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous materials.
- C. Spread topsoil mixture to minimum of 4" depth and as required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.
 - 1. Place approximately 1/2 the thickness of topsoil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
 - 2. Allow for sod thickness in areas to be sodded.

- D. Grade sod areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches in any dimension, and other objects that may interfere with planting or maintenance operations.
- E. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.5 EXCAVATION FOR TREES AND SHRUBS

- A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.
 - 1. Balled and Burlapped Trees and Shrubs: Excavate approximately 1-1/2 times as wide as ball diameter and equal to ball depth, plus the following setting layer depth:
 - a. Setting Layer: Allow 6 inches of planting soil.
 - 2. Container-Grown Trees and Shrubs: Excavate to container width and depth, plus the following setting-layer depth:
 - a. Setting Layer: Allow 6 inches of planting soil.
- B. Dispose of subsoil removed from landscape excavations. Do not mix with planting soil or use as backfill.
- C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - 1. Hardpan Layer: If encountered, drill 6-inch- diameter holes into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.
- E. Fill excavations with water and allow to percolate out, before placing setting layer and positioning trees and shrubs.

3.6 PLANTING TREES AND SHRUBS

- A. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.
 - 1. Carefully remove containers so as not to damage root balls.
 - 2. Place stock on setting layer of compacted planting soil.
 - 3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.
- B. Dish and tamp top of backfill to form a 3-inch- high mound around the rim of the pit. Do not cover top of root ball with backfill.

3.7 TREE AND SHRUB PRUNING

- A. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Landscape Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are size after pruning.

3.8 TREE AND SHRUB GUYING AND STAKING

- A. Upright Staking and Tying: Stake trees of 2-inch through 4-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip-out. Use a minimum of 3 arrowhead anchors to penetrate at least 12-inches to 18-inches below bottom of backfilled excavation. Set anchors and space to avoid penetrating balls or root masses. Support trees with 3 strands of guy line wrapped around the tree trunk just above the lowest established branch. Secure each guy line through a tension bar (one per guy line) and pull taut for any slack. Allow enough slack to avoid rigid restraint of tree.
- B. Guying and Staking: Guy and anchor trees exceeding 14 feet and more than 3-inch caliper unless otherwise indicated. Securely install no fewer than 3 anchors and 3 guy lines pulled taut through 3 tension bars.

3.9 PLANTING GROUND COVER AND PLANTS

- A. Space ground cover and plants as indicated.
- B. Space ground cover and plants not more than 24 inches apart.
- C. Dig holes large enough to allow spreading roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.10 MULCHING

- A. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.
- B. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems.
 - 1. Thickness: 3 inches.

3.11 SODDING

- A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine

sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

- C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1- 1/2 inches below the sod.

3.12 INSTALLATION OF MISCELLANEOUS MATERIALS

- A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.
 - 1. When deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

3.13 CLEANUP AND PROTECTION

- A. During landscaping, keep pavements clean and work area in an orderly condition.
- B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, reinforcement, concrete materials, mix design, placement procedures, and finished for the following:
 - 1. Footings
 - 2. Concrete Ribbon Curbs
 - 3. Slabs-on-grade
 - 4. Vehicular concrete
- B. Contractor shall engage and pay for concrete testing.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast- furnace slag, and silica fume.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - a. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing materials.
 - 5. Bonding agents.
 - 6. Adhesives.
 - 7. Repair materials.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- C. Testing Agency Qualifications: Owner to provide independent testing agency, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows: B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in concrete surface.

2.2 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I/II.
 - 1. Fly Ash: ASTM C 618, Class C or F.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Nominal Maximum Aggregate Size: 1 inch (25 mm).
- C. Water: Potable and complying with ASTM C 94.

2.3 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
- F. Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed. Fiber Reinforcement: Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu.yd.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

- E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- F. Products: Subject to compliance with requirements, provide one of the following:
1. Clear, Waterborne, Membrane-Forming Curing Compound:
 - a. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
 - b. ChemMasters; Safe-Cure & Seal 20.
 - c. Conspec by Dayton Superior; Cure and Seal WB.
 - d. Dayton Superior Corporation; Safe Cure and Seal (J-18).
 - e. Edoco by Dayton Superior; Spartan Cote WB II.
 - f. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
 - g. Lambert Corporation; Glazecote Sealer-20.
 - h. L&M Construction Chemicals, Inc.; Dress & Seal WB.
 - i. Meadows, W. R., Inc.; Vocomp-20.
 - j. Metalcrete Industries; Metcure.
 - k. Symons by Dayton Superior; Cure & Seal 18 Percent E.
 - l. Vexcon Chemicals, Inc.; Starseal 309.
 2. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
 - a. BASF Construction Chemicals - Building Systems; Kure 1315.
 - b. ChemMasters; Polyseal WB.
 - c. Conspec by Dayton Superior; Sealcure 1315 WB.
 - d. Edoco by Dayton Superior; Cureseal 1315 WB.
 - e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
 - f. Lambert Corporation; UV Safe Seal.
 - g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
 - h. Meadows, W. R., Inc.; Vocomp-30.
 - i. Metalcrete Industries; Metcure 30.
 - j. Symons by Dayton Superior; Cure & Seal 31 Percent E.
 - k. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

2.5 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

2.6 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 20 percent.
- D. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 - 1. Air Content: 2 percent – 4 percent
- E. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- F. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3 mm).
 - 2. Class C, 1/2 inch (13 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete

surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 3. Locate joints for slabs in the middle third of spans.
 4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
 - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

- F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.5 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.
1. Apply to concrete surfaces exposed to view.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 MISCELLANEOUS CONCRETE ITEMS

- A. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, and other surfaces, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

- a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Apply number of coats as recommended by manufacturer. Recoat areas subjected to rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.8 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

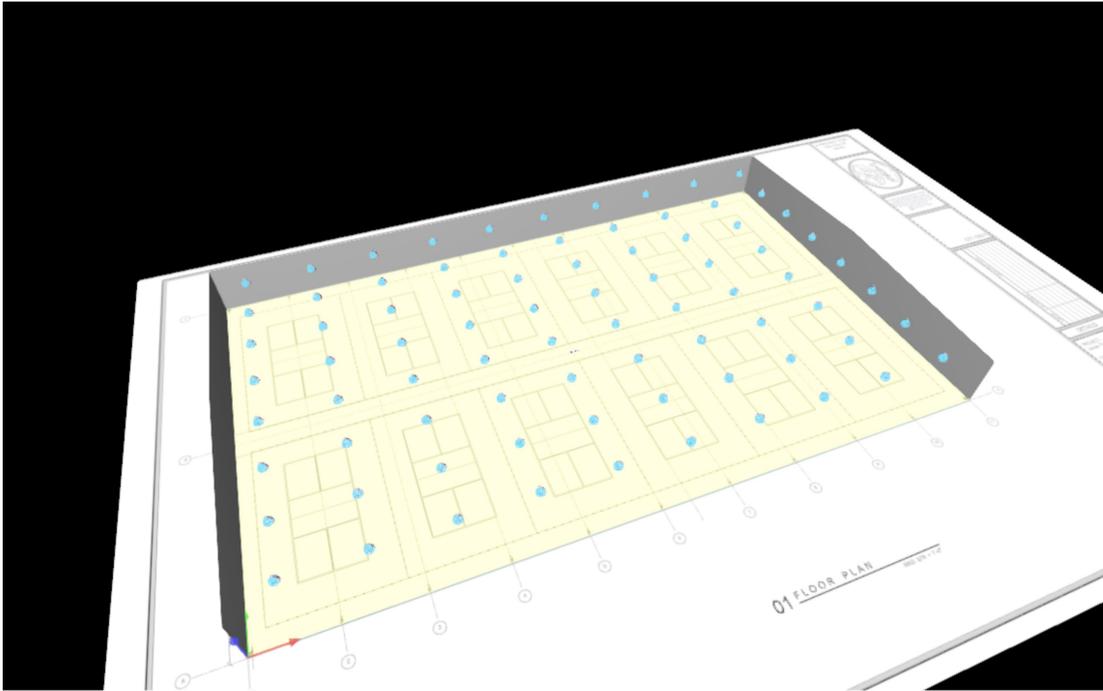
3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage and pay for a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 3. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 - 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 - 5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 - 7. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - 8. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
- C. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain

Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

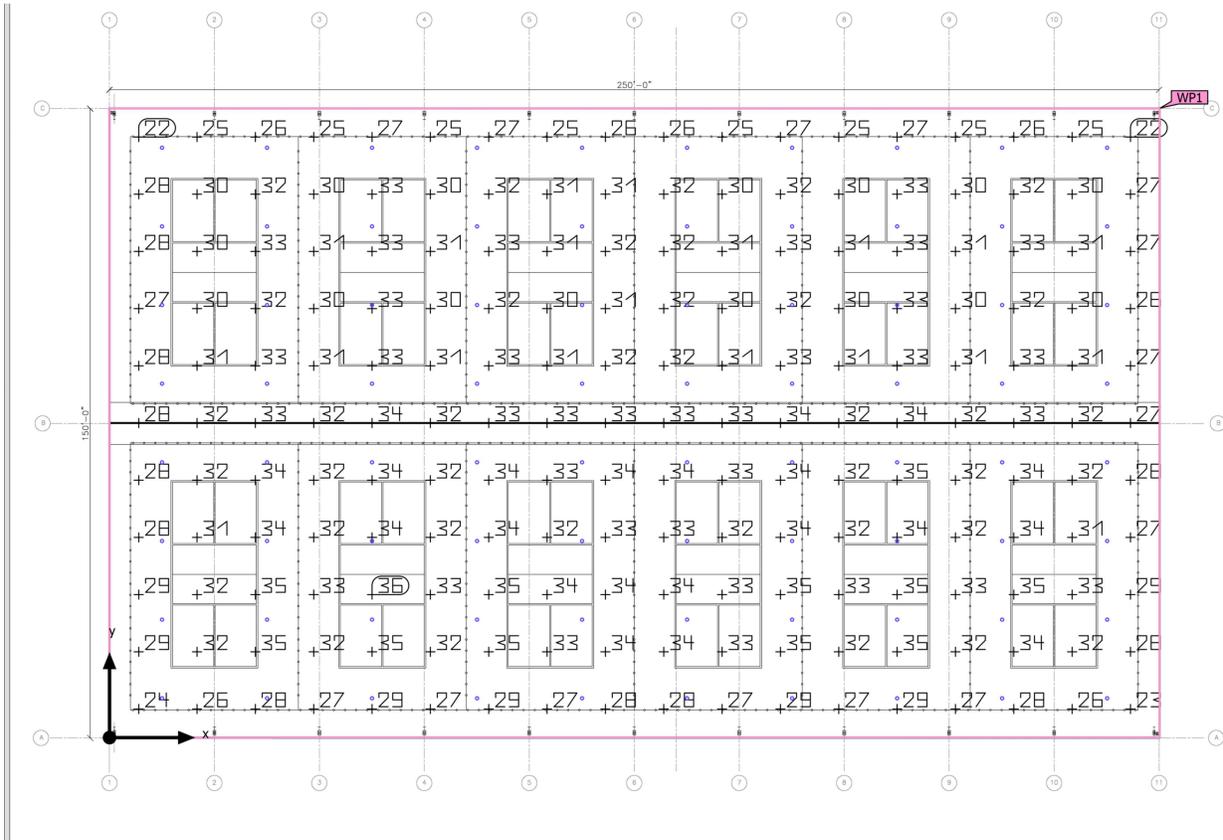
END OF SECTION



Pickleball



Site 1 · Building 1 · Storey 1 (Light scene 1)
 Summary



Ground area	37500.88 sq ft	Clearance height	20.034 ft – 24.000 ft
Reflection factors	Ceiling: 50.0 %, Walls: 50.0 %, Floor: 20.0 %	Mounting height	20.000 ft – 21.000 ft
Maintenance factor	0.80 (fixed)	Height Working plane	0.000 ft
		Wall zone Working plane	0.000 ft



Site 1 · Building 1 · Storey 1 (Light scene 1) Summary

Results

	Symbol	Calculated	Index
Working plane	perpendicular	30.7 fc	WP1
	$/E_{min}$	2.45	WP1

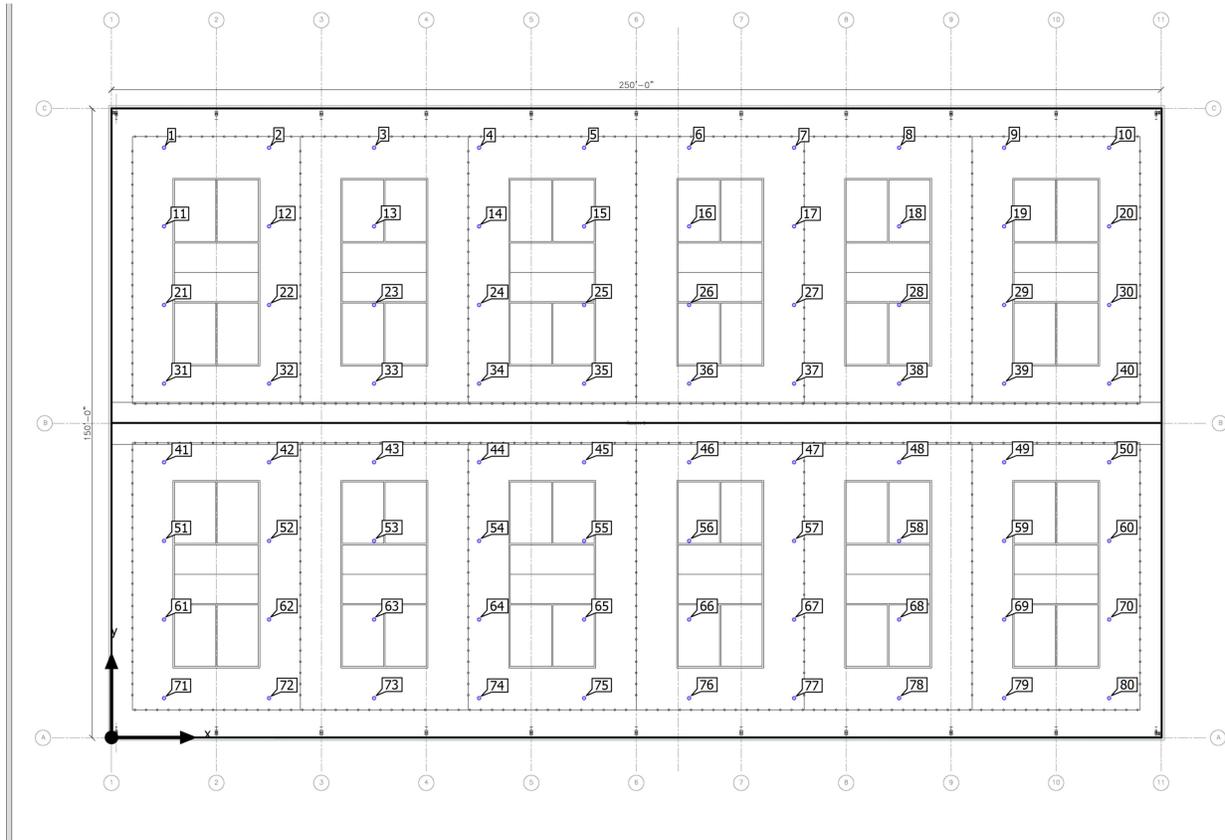
Notes on planning:
E = AVG (Average lighting level)

Luminaire list

pcs.	Manufacturer	Article No.	Article name	P	Luminous efficacy	
80	ASD Lighting Corp		ASD-UHB5-PRO-100BK	97.3 W	17569 lm	180.6 lm/W



Site 1 · Building 1 · Storey 1 Luminaire layout plan





Site 1 · Building 1 · Storey 1 Luminaire layout plan

ASD Lighting Corp - - ASD-UHB5-PRO-100BK 1x

X	Y	Mounting height	Housing rotation	MF	Luminaire
12.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	1
37.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	2
62.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	3
87.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	4
112.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	5
137.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	6
162.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	7
187.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	8
212.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	9
237.500 ft	140.625 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	10
12.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	11
37.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	12
62.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	13
87.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	14
112.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	15
137.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	16
162.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	17
187.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	18
212.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	19
237.500 ft	121.875 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	20
12.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	21



Site 1 · Building 1 · Storey 1 Luminaire layout plan

X	Y	Mounting height	Housing rotation	MF	Luminaire
37.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	22
62.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	23
87.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	24
112.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	25
137.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	26
162.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	27
187.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	28
212.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	29
237.500 ft	103.125 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	30
12.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	31
37.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	32
62.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	33
87.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	34
112.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	35
137.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	36
162.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	37
187.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	38
212.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	39
237.500 ft	84.375 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	40
12.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	41
37.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	42
62.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	43
87.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	44



Site 1 · Building 1 · Storey 1 Luminaire layout plan

X	Y	Mounting height	Housing rotation	MF	Luminaire
112.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	45
137.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	46
162.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	47
187.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	48
212.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	49
237.500 ft	65.625 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	50
12.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	51
37.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	52
62.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	53
87.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	54
112.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	55
137.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	56
162.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	57
187.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	58
212.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	59
237.500 ft	46.875 ft	21.000 ft	0.0° / -0.0° / -0.0°	0.80	60
12.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	61
37.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	62
62.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	63
87.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	64
112.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	65
137.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	66
162.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	67

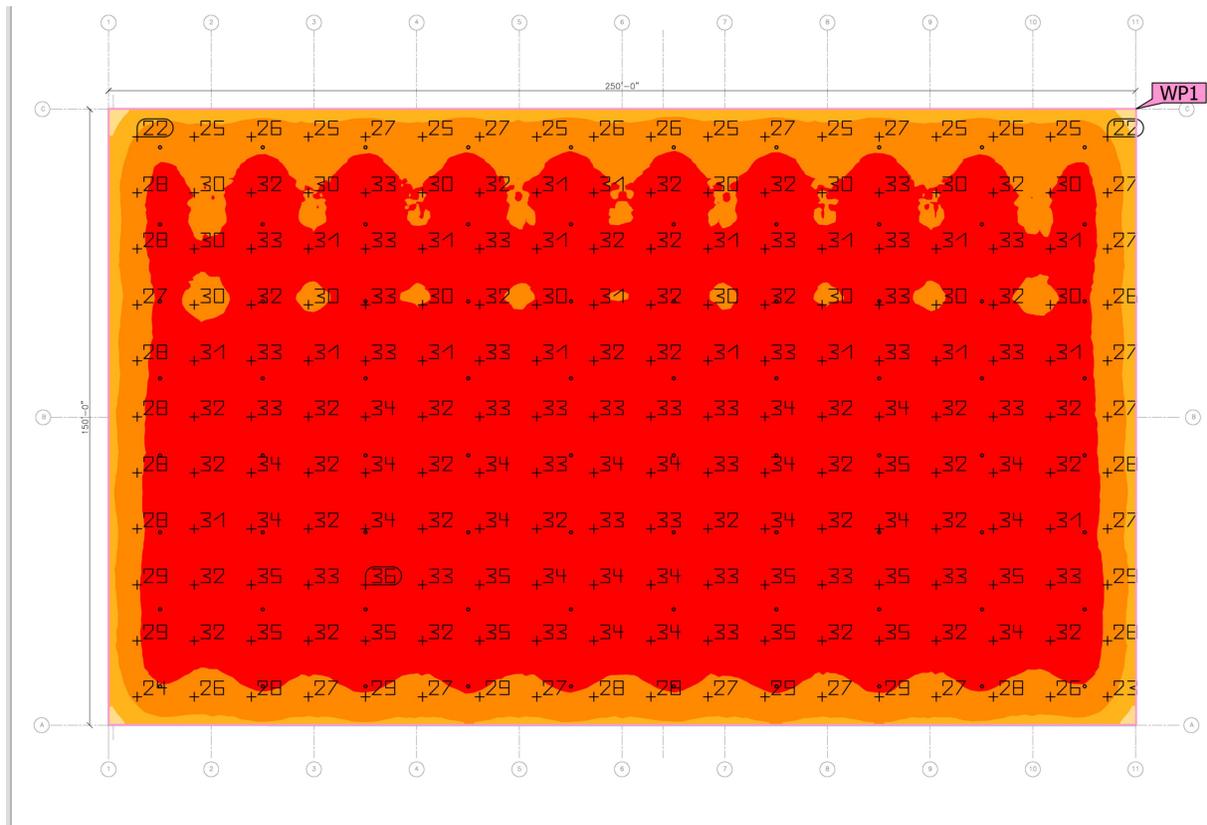
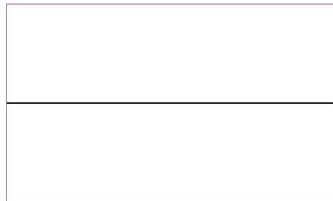


Site 1 · Building 1 · Storey 1
Luminaire layout plan

X	Y	Mounting height	Housing rotation	MF	Luminaire
187.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	68
212.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	69
237.500 ft	28.125 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	70
12.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	71
37.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	72
62.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	73
87.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	74
112.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	75
137.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	76
162.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	77
187.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	78
212.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	79
237.500 ft	9.375 ft	20.000 ft	0.0° / -0.0° / -0.0°	0.80	80



Site 1 · Building 1 · Storey 1 (Light scene 1)
 Working plane (Room 1)



Properties		E _{min}	E _{max}	/E _{min}	E _{max} /E _{min}	Index
Working plane (Room 1)	30.7 fc	12.5 fc	36.0 fc	2.45	2.87	WP1
Perpendicular illuminance (adaptive)						
Height: 0.000 ft, Wall zone: 0.000 ft						

Notes on planning:
 E = AVG (Average lighting level)



LED UFO HIGH BAY WITH Q-BASE

► **DESIGN** - LED UFO HIGH BAY WITH Q-BASE is extremely efficient with a 170lm/W output. The built-in motion sensor base allows you to install the microwave motion or PIR sensor. Die-cast aluminum housing with excellent heat dissipation along with an anti-glare PC lens provide many years of use. It can operate in temperatures ranging from -40 to 140°F. With 6kV surge protection, it runs on 120-277V or 277-480V circuits with a 0-10V dimmable driver.

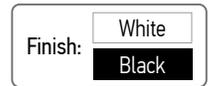
► **IP69K** - Rating provides protection against ingress of dust and high temperature, high pressure water.

► **COLOR AND POWER SELECTABLE** - You can choose either a 3,000K warm white, 4,000K cool white or 5,000K daylight color temperature, and change the power with a simple switch.

► **INSTALLATION** - This fixture has three different mounting options: suspended, surface, and pendant. It comes with 4 ft cord. Perfect commercial or industrial solution for warehouses, supermarkets, retail stores, gyms, and many other applications.

► **ADVANTAGES** - With calculated lifespan up to 153,000 hours, these fixtures are made to last decades under normal operation! ASD provides a 5-year limited warranty along with UL and DLC Premium certifications to guarantee top quality products and safety!

Catalog number	
Notes	
Type	



Model	Watts	Voltage	Dimmable	Lumens	CCT	Finish	Dimensions (LxWxH)	Cord	
UHB5-PRO									
ASD-UHB5-PRO-100BK	60/80/100W	120-277 V	0-10 V	up to 17,580 lm	3CCT (3,000/4,000/5,000 K)	Black	9-1/16" x 9-1/16" x 4-5/8"	4 ft	
ASD-UHB5-PRO-150WH	100/120/150W	120-277 V	0-10 V	up to 26,331 lm	3CCT (3,000/4,000/5,000 K)	White	9-1/16" x 9-1/16" x 4-11/16"	4 ft	
ASD-UHB5-PRO-150BK	100/120/150W	120-277 V	0-10 V	up to 26,331 lm	3CCT (3,000/4,000/5,000 K)	Black	9-1/16" x 9-1/16" x 4-11/16"	4 ft	
ASD-UHB5-PRO-200WH	100/150/200W	120-277 V	0-10 V	up to 33,575 lm	3CCT (3,000/4,000/5,000 K)	White	12-3/16" x 12-3/16" x 5-3/8"	4 ft	
ASD-UHB5-PRO-200BK	100/150/200W	120-277 V	0-10 V	up to 33,575 lm	3CCT (3,000/4,000/5,000 K)	Black	12-3/16" x 12-3/16" x 5-3/8"	4 ft	
ASD-UHB5-PRO-240BK	150/200/240W	120-277 V	0-10 V	up to 40,557 lm	3CCT (3,000/4,000/5,000 K)	Black	12-3/16" x 12-3/16" x 5-7/16"	4 ft	
ASD-UHB5-PRO-300BK	200/240/300W	120-277 V	0-10 V	up to 49,914 lm	3CCT (3,000/4,000/5,000 K)	Black	13" x 13" x 5-11/16"	4 ft	
ASD-UHB5-PRO-500BK	300/400/500W	120-277 V	0-10 V	up to 82,551 lm	3CCT (3,000/4,000/5,000 K)	Black	16-9/16" x 16-9/16" x 6-15/16"	4 ft	
UHB5-HV-PRO HIGH VOLTAGE									
ASD-UHB5-HV-PRO-150BK	100/120/150W	277-480 V	0-10 V	up to 25,842 lm	3CCT (3,000/4,000/5,000 K)	Black	9-1/16" x 9-1/16" x 4-3/4"	4 ft	
ASD-UHB5-HV-PRO-200BK	100/150/200W	277-480 V	0-10 V	up to 34,126 lm	3CCT (3,000/4,000/5,000 K)	Black	12-3/16" x 12-3/16" x 5-7/16"	4 ft	
ASD-UHB5-HV-PRO-240BK	150/200/240W	277-480 V	0-10 V	up to 41,331 lm	3CCT (3,000/4,000/5,000 K)	Black	12-3/16" x 12-3/16" x 5-7/16"	4 ft	
ASD-UHB5-HV-PRO-300BK	200/240/300W	277-480 V	0-10 V	up to 51,514 lm	3CCT (3,000/4,000/5,000 K)	Black	13" x 13" x 5-3/4"	4 ft	
ASD-UHB5-HV-PRO-500BK	300/400/500W	277-480 V	0-10 V	up to 82,905 lm	3CCT (3,000/4,000/5,000 K)	Black	16-9/16" x 16-9/16" x 7-13/16"	4 ft	
SENSORS AND REMOTE									
ASD-09MW-WH	Microwave motion sensor 3pin white							2-1/8" x 2-1/8" x 1-5/16"	-
ASD-09MW-BK	Microwave motion sensor 3pin black							2-1/8" x 2-1/8" x 1-5/16"	-
ASD-09IR-WH	Infrared motion sensor 3pin white							2-1/8" x 2-1/8" x 1-11/16"	-
ASD-09IR-BK	Infrared motion sensor 3pin black							2-1/8" x 2-1/8" x 1-11/16"	-
ASD-09IR50-WH	Infrared motion sensor 3pin 50ft white							2-1/8" x 2-1/8" x 1-11/16"	-
ASD-06RC	Remote control for motion sensor							5-11/16" x 1-3/4" x 13/16"	-
ASD-09MW-NLS-WH	Microwave motion sensor smart 3pin white							2-1/8" x 2-1/8" x 1-3/8"	-
ASD-09IR-NLS-WH	Infrared motion sensor smart 3pin white							2-1/8" x 2-1/8" x 1-11/16"	-
ASD-06RC-NLS	Remote control for NLS devices							5-11/16" x 1-3/4" x 13/16"	-

For detailed luminous flux information please refer to Annex, page 11.

For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE

PRODUCT SPECIFICATIONS:

Construction & Materials						
Housing	Aluminum					
Lens	PC					
Finish	White, Black					
Weight	ASD-UHB5-PRO-100BK	4.1 lbs (1.9 kg)	ASD-UHB5-PRO-200BK	6.3 lbs (2.9 kg)	ASD-UHB5-HV-PRO-150BK	5.2 lbs (2.4 kg)
	ASD-UHB5-PRO-150WH	4.4 lbs (2 kg)	ASD-UHB5-PRO-240BK		ASD-UHB5-HV-PRO-200BK	6.6 lbs (3 kg)
	ASD-UHB5-PRO-150BK		ASD-UHB5-PRO-300BK	ASD-UHB5-HV-PRO-240BK		
	ASD-UHB5-PRO-200WH	6.3 lbs (2.9 kg)	ASD-UHB5-PRO-500BK	18.1 lbs (8.2 kg)	ASD-UHB5-HV-PRO-300BK	7.3 lbs (3.3 kg)
					ASD-UHB5-HV-PRO-500BK	20.7 lbs (9.4 kg)
Environmental system						
Work environment	Suitable for Wet Locations, IP69K					
Operating temperature	-40°F to 140°F (-40°C to 60°C)					
L-70 Life	R > 54,000 hrs; C > 153,000 hrs					
Optical system						
Color temperature	3CCT switch (3,000/4,000/5,000 K), 5,000 K by default					
CRI	> 70					
Electrical system						
Input voltage	Regular voltage: 120-277 V					
	High voltage: 277-480 V					
Max input current	ASD-UHB5-PRO-100BK	1.6 A	ASD-UHB5-PRO-200BK	2.6 A	ASD-UHB5-HV-PRO-150BK	0.7 A
	ASD-UHB5-PRO-150WH	2 A	ASD-UHB5-PRO-240BK	3 A	ASD-UHB5-HV-PRO-200BK	1.06 A
	ASD-UHB5-PRO-150BK		ASD-UHB5-PRO-300BK	3.5 A	ASD-UHB5-HV-PRO-240BK	1.15 A
	ASD-UHB5-PRO-200WH	2.6 A	ASD-UHB5-PRO-500BK	5.8 A	ASD-UHB5-HV-PRO-300BK	1.8 A
				ASD-UHB5-HV-PRO-500BK	1.2 A	
Inrush current (Action time)	ASD-UHB5-PRO-100BK	80 A (0.35 S)	ASD-UHB5-PRO-200BK	80 A (0.35 S)	ASD-UHB5-HV-PRO-150BK	120 A (0.36 S)
	ASD-UHB5-PRO-150WH		ASD-UHB5-PRO-240BK		ASD-UHB5-HV-PRO-200BK	90 A (0.36 S)
	ASD-UHB5-PRO-150BK		ASD-UHB5-PRO-300BK	ASD-UHB5-HV-PRO-240BK	90 A (0.25 S)	
	ASD-UHB5-PRO-200WH		ASD-UHB5-PRO-500BK	ASD-UHB5-HV-PRO-300BK	90 A (0.31 S)	
				ASD-UHB5-HV-PRO-500BK	450 A (0.5 S)	
Off state power	0W					
Power consumption	ASD-UHB5-PRO-100BK	60/80/100W	ASD-UHB5-PRO-200BK	100/150/200W	ASD-UHB5-HV-PRO-150BK	100/120/150W
	ASD-UHB5-PRO-150WH	100/120/150W	ASD-UHB5-PRO-240BK	150/200/240W	ASD-UHB5-HV-PRO-200BK	100/150/200W
	ASD-UHB5-PRO-150BK		ASD-UHB5-PRO-300BK	ASD-UHB5-HV-PRO-240BK	150/200/240W	
	ASD-UHB5-PRO-200WH	100/150/200W	ASD-UHB5-PRO-500BK	300/400/500W	ASD-UHB5-HV-PRO-300BK	200/240/300W
				ASD-UHB5-HV-PRO-500BK	300/400/500W	
Power factor	> 0.9					
Output voltage	180-260 V	for ASD-UHB5-PRO-500BK model: 114-228 V				
Max output current	ASD-UHB5-PRO-100BK	0.3-0.5 A	ASD-UHB5-PRO-200BK	0.5-0.83 A	ASD-UHB5-HV-PRO-150BK	0.3-0.75 A
	ASD-UHB5-PRO-150WH	0.37-0.62 A	ASD-UHB5-PRO-240BK	0.6-1 A	ASD-UHB5-HV-PRO-200BK	0.46-1 A
	ASD-UHB5-PRO-150BK		ASD-UHB5-PRO-300BK	ASD-UHB5-HV-PRO-240BK	0.57-1.2 A	
	ASD-UHB5-PRO-200WH	0.5-0.83 A	ASD-UHB5-PRO-500BK	1.4-2.8 A	ASD-UHB5-HV-PRO-300BK	0.77-1.5 A
				ASD-UHB5-HV-PRO-500BK	0.75-1.1 A	
Surge protection DM/CM	6 kV / 6 kV					
Dimming compatible controls						
Brand	Lutron	Leviton				
Models	DVSTV-453P	IP710-LFZ				
Regular and voluntary certifications						
5-year limited warranty						
DesignLights Consortium (DLC) listed (classification: Premium)						
UL listed E473804						

PACKAGE CONTENTS:

Description	Q-ty
LED UFO High Bay with Q-Base	1
Mounting ring (A)	1
Box	1

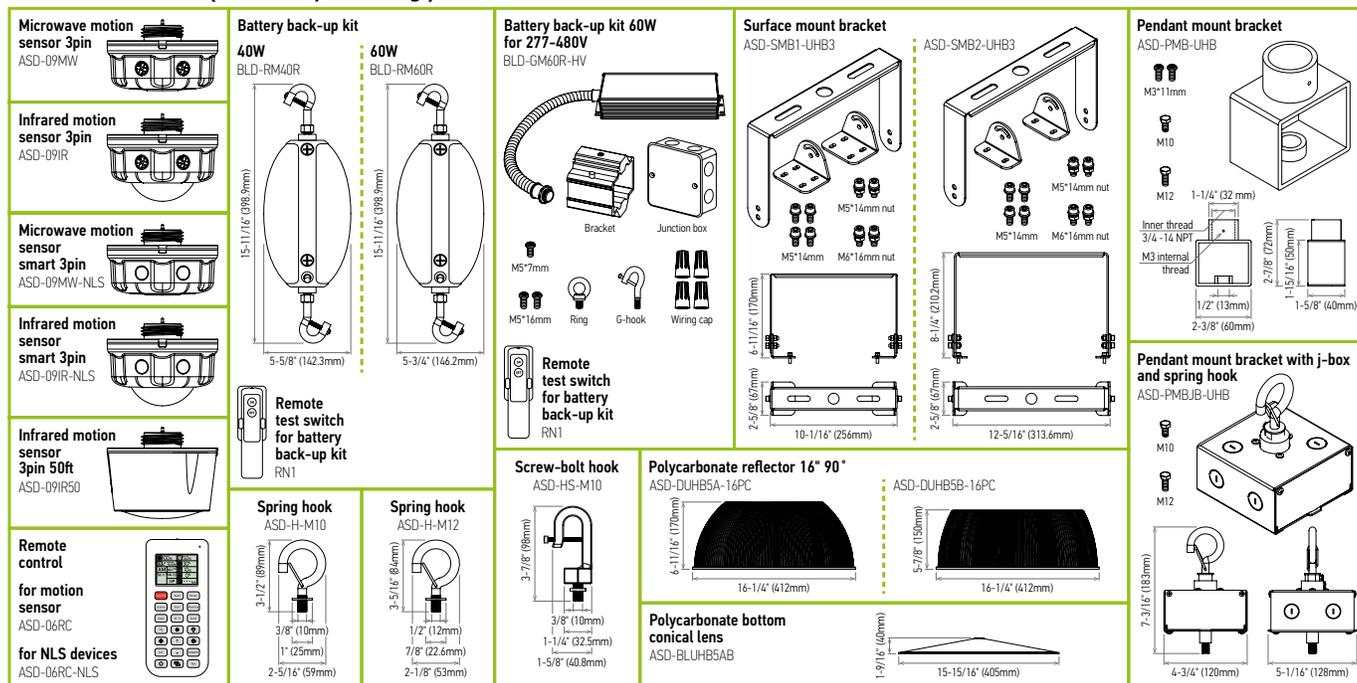


For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE

ACCESSORIES (sold separately):



Microwave motion sensor 3pin
ASD-09MW

Infrared motion sensor 3pin
ASD-09IR

Microwave motion sensor smart 3pin
ASD-09MW-NLS

Infrared motion sensor smart 3pin
ASD-09IR-NLS

Infrared motion sensor 3pin 50ft
ASD-09IR50

Remote control for motion sensor
ASD-06RC

Remote control for NLS devices
ASD-06RC-NLS

Battery back-up kit 40W
BLD-RM40R

Battery back-up kit 60W
BLD-RM60R

Battery back-up kit 60W for 277-480V
BLD-GM60R-HV

Surface mount bracket ASD-SMB1-UHB3

Surface mount bracket ASD-SMB2-UHB3

Pendant mount bracket ASD-PMB-UHB

Pendant mount bracket with j-box and spring hook ASD-PMBJB-UHB

Remote test switch for battery back-up kit RN1

Spring hook ASD-H-M10

Spring hook ASD-H-M12

Screw-bolt hook ASD-HS-M10

Polycarbonate reflector 16° 90° ASD-DUHB5A-16PC

Polycarbonate reflector 16° 90° ASD-DUHB5B-16PC

Polycarbonate bottom conical lens ASD-BLUHBSAB

ACCESSORY COMPATIBILITY LIST:

Models	Accessories	Microwave motion sensor 3pin ASD-09MW	Infrared motion sensor 3pin ASD-09IR	Microwave motion sensor smart 3pin ASD-09MW-NLS-WH	Infrared motion sensor smart 3pin ASD-09IR-NLS-WH	Battery back-up kit 40W BLD-RM40R	Battery back-up kit 60W BLD-RM60R	Battery back-up kit 60W for 277-480V BLD-GM60R-HV	Spring hook M10 ASD-H-M10	Spring hook M12 ASD-H-M12	Screw-bolt hook M10 ASD-HS-M10	Pendant mount bracket ASD-PMB-UHB	Pendant mount bracket with j-box and spring hook ASD-PMBJB-UHB	Surface mount bracket ASD-SMB1-UHB3	Surface mount bracket ASD-SMB2-UHB3-BK	Polycarbonate bottom lens ASD-BLUHBSAB	Polycarbonate reflector 16° 90° ASD-DUHB5A-16PC	Polycarbonate reflector 16° 90° ASD-DUHB5B-16PC
ASD-UHB5-PRO-100BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-150WH		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-150BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-200WH		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-200BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-240BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-300BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-PRO-500BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-HV-PRO-150BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-HV-PRO-200BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-HV-PRO-240BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-HV-PRO-300BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ASD-UHB5-HV-PRO-500BK		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Note: Battery back-up kit and the motion sensor cannot be installed on the same fixture.

For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE

MOTION SENSOR INFORMATION

REMOTE CONTROL **ASD-06RC** **ASD-06RC-NLS** sold separately:



Button	Remarks	Button	Remarks	Button	Remarks
ON/OFF	ON/OFF Turn the sensor ON/OFF.	M H	Mounting height Adjust detection area/sensitivity levels according to real installation situations, higher or lower.	↑	Up The main functional buttons to adjust the factors to desired level.
Auto	Auto Enter "sensor mode" and perform previous settings.	Send	Send Memorize and send out the previous setting of individual parameters.	↓	Down Press + - button to dim light directly in non-detection mode.
Reset	Reset Enter "sensor mode" and perform the default settings.	100%	Detection range Also known as "sensitivity", 100 % means the highest sensitivity and longest distance. Use this button and the + - buttons to adjust.	CCT	CCT Selectable Not applicable to this product.
Scenes	Scenes Shows current settings saved in remote.	Light	Daylight sensor The preset lux level at which motion will be detected. Use this button and the + - buttons to adjust.	POWER	Power Adjust brightness in both ON/OFF mode & sensor mode, minimum 10%, max 100%, each time this button is pressed it changes by 5%.
Start	Start Press this to begin scene setup.	Light	Stand-by dimming After hold time, the light will dim from 100 % to optional standby dimming levels. Use this button and the + - buttons to adjust.	○	Reserved Button Not applicable to this product.
Memory	Memory Saves the scene settings.	Light	Hold time The period that light will stay illuminated 100 % after no motion is detected. Use this button and the + - buttons to adjust.	Light	Daylight Harvesting Daylight harvesting function enabled or disabled.
Apply	Apply Applies current scene settings to the fixture.	Light	Stand-by period The period after holdtime, during which the light keeps standby dimming level. Use this button and the + - buttons to adjust.	Test	Test button Press this button to test the sensor; it will temporarily change the hold time to 2s. This setting cannot be saved.



ASD-09MW
Microwave motion sensor 3pin



ASD-06RC
Remote control



ASD-09IR
Infrared motion sensor 3pin



ASD-06RC
Remote control



ASD-09IR50
Infrared motion sensor 3pin 50ft



ASD-06RC
Remote control



ASD-09MW-NLS
Microwave motion sensor smart 3pin



ASD-06RC-NLS
Remote control or smartphone

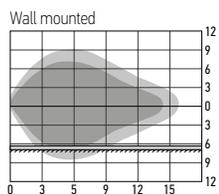
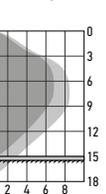
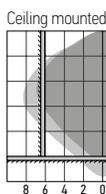


ASD-09IR-NLS
Infrared motion sensor smart 3pin



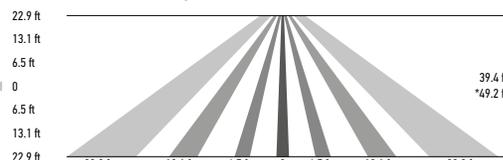
ASD-06RC-NLS
Remote control or smartphone

ASD-09MW, ASD-09MW-NLS:



- Highest mounting height is 49.2 ft (15 m)
- This figure indicates the maximum distance at the highest mounting height with 100 % sensitivity.

ASD-09IR, ASD-09IR50, ASD-09IR-NLS:



Mounting height < 39.4 ft (12 m) ceiling mounting
* for ASD-09IR50 < 49.2 ft (15 m)

User notes:

- Microwaves can penetrate walls or glass thinner than 0.8" but will be impaired if thicker than 0.8".
- The driver voltage shall be stable and float within 10 %.
- Detection area will be affected by speed of motion, mounting height and movement volume.
- Conduct testing with adequate ambient lighting for best results.
- Dimming performance differs when connected to different drivers; if the driver can't completely turn OFF, sensor can't either.
- The first time powering ON the sensor, light will be ON 100% for about 10S then dims to standby level or OFF.

Installation precautions:

- Designed for ceiling mount installation. If installing on a side wall, adjust the sensitivity settings accordingly, as it will become more sensitive.
- Make sure the microwave module is completely exposed.
- The detection surface of the sensor module should be installed facing the detection area.

Application environment:

- Suitable for indoor application, partial/completely outdoor environment conditions might trigger the sensor.
- Shall be mounted securely, to avoid any false triggers caused by movement of the fixture itself.
- Keep the sensor module away from AC input and DC output to avoid high/low frequency signal interference.

User notes:

- The driver voltage shall be stable and float within 10%.
- Detection area options may not function as expected because they depend on the Fresnel lens, which physically determines their operation.
- Detection distance performance works better when moving parallel to the sensor as opposed to towards it.
- Conduct testing with adequate ambient lighting for best results.
- Dimming performance differs when connected to different drivers; if the driver can't completely turn OFF, sensor can't either.
- The first time powering ON the sensor, light will be ON 100% for about 45S then dims to standby level or OFF.

Installation precautions:

- PIR sensor can't be placed inside any material, fresnel lens must be completely exposed in air.
- Fresnel lens of the PIR sensor must be lower than the lighting fixture.
- Designed for ceiling mount installation. If installing on a side wall, adjust the sensitivity settings accordingly, as it will become more sensitive.

Application environment:

- Suitable for indoor application, partial/completely outdoor environment conditions might trigger the sensor.
- The PIR sensor is not suitable for environments with sudden changes in temperature or airflow.
- Not suitable environment if there's shelves between the sensor and target area.
- Shall be mounted securely, to avoid any false triggers caused by movement of the fixture itself.

Specifications	Models: ASD-09MW, ASD-09MW-NLS	Models: ASD-09IR, ASD-09IR-NLS	Models: ASD-09IR50
Operating voltage	10-15 V		
Operating current	< 30 mA	< 15 mA	< 30 mA
Detection area	25 %/50 %/75 %/100 %		
Hold time	Remote control: 5 s/30 s/1 min/3 min/5 min/10 min/20 min/30 min	Built-in switch: 5 s/1 min/5 min/10 min	
Daylight threshold	2 lux (0.2 fc)/10 lux (0.9 fc)/30 lux (2.8 fc)/50 lux (4.7 fc)/80 lux (7.4 fc)/120 lux (11.2 fc)/200 lux (18.6 fc)/250 lux (23.2 fc)/300 lux (27.9 fc)/350 lux (32.5 fc)/400 lux (37.2 fc)/disable		
Standby period	0 s/10 s/30 s/1 min/5 min/10 min/30 min/60 min/+ ∞		
Standby dimming level	Remote control: 10 %/20 %/30 %/50 %	Built-in switch: 0 %/10 %/30 %/50 %	
Mounting height	max 49.2 ft (15 m)	≤ 39.4 ft (12 m)	max 49.2 ft (15 m)
Detection range	≥ 9 ft (3 m)		
Operating frequency	5.8 GHz ± 75 MHz	-	-
Transmitting power	< 0.3 mW	-	-

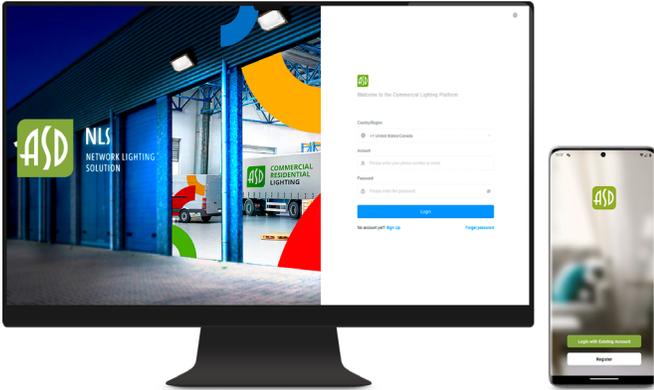
DEFAULT SETTING:

Specifications	Value
Detection area	100 %
Hold time	10 min
Daylight threshold	Disable
Stand-by period	0 s
Stand-by dimming level	10 %

For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE



ASD NLS is a professional-grade smart control application designed to manage and control lighting fixtures in commercial properties. With ASD NLS, you can conveniently control your lights from your smartphone or PC, anytime and anywhere.

You can group fixtures by rooms, floors and objects, and create schedules based on day and time. You can also grant permanent or temporary permissions to employees and guests with different access levels. Our smart platform enables you to monitor energy usage statistics, view the status of each fixture, and much more.

► For **ASD-NLS sensors** download ASD NLS app and add the fixture to it according to the manual (download manuals and app from the links or scan the QR codes on the right).



[Desktop manual](#)



[Smartphone manual](#)



[ASD NLS app download Android](#)



[ASD NLS app download iOS](#)



ASD-09MW-NLS
Microwave motion sensor smart 3pin



ASD-09IR-NLS
Infrared motion sensor smart 3pin 39ft



FIXTURE CONTROL

Set brightness, standby time and dimming level, or apply scenes and schedules.



SCHEDULING

Set a variety of customizable start / end actions based on time of day and days of the week.



ADVANCED AREA MANAGEMENT

Create and customize projects for different types of areas, buildings, floors and zones.



CONTROL PERMISSIONS

Give your staff or installers control over the lighting.



ADVANCED ENERGY CONSUMPTION

Monitor equipment status and receive daily reports.



PROJECT OVERVIEW

Monitor device status and daily reports.



For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE

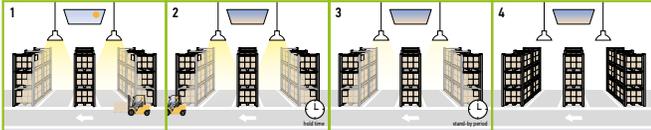
WITH DUSK/DAWN FUNCTION:

1. With insufficient ambient brightness, sensor turns on light and keeps it at standby dimming level even if there is no motion or presence.
2. When sensor detects motion or presence it will bring the light level up to 100 %.
3. After motion is no longer detected, fixture remains at 100 % for hold time.
4. After the preset hold time period, it will dim to the standby dimming level and maintain it indefinitely.
5. With sufficient ambient brightness, sensor will turn OFF light automatically.



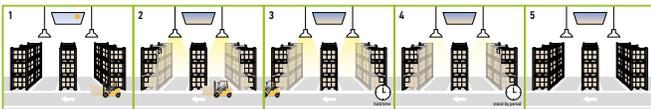
WITH DAYLIGHT DISABLED:

1. Sensor turns ON light when motion is detected.
2. Light will stay on after detecting motion for the desired hold time.
3. Sensor dims light to standby dimming level after hold time if there is still no motion.
4. Sensor turns OFF light after standby period.



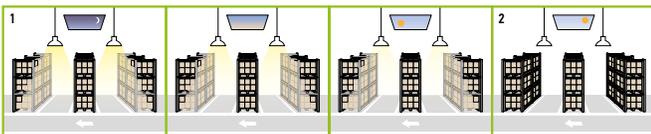
WITH DAYLIGHT THRESHOLD:

1. With sufficient daylight, the light remains OFF even after motion is detected.
2. With insufficient daylight, the sensor turns ON light when motion is detected.
3. After there's no motion detected, the sensor keeps light ON 100 % for holdtime.
4. After holdtime, sensor dims light to standby dimming level for standby period. If the standby period has been set as 0s, sensor turns light OFF automatically after holdtime.
5. The sensor turns OFF light automatically after the standby period when there's no motion detected.



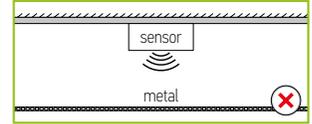
DAYLIGHT HARVESTING:

1. When the ambient brightness is lower than the preset lux level, the sensor will automatically turn on the light and adjust the dimming according to changes in ambient brightness. As it gets darker outside, the fixtures will brighten, and as it gets brighter outside, the fixtures will dim.
2. When the ambient brightness exceeds the preset lux level, the light will turn OFF.

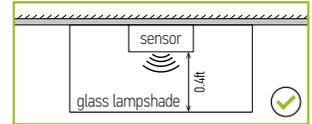


MICROWAVE MOTION SENSOR:

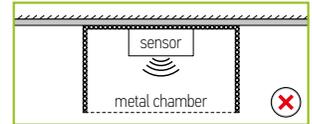
To avoid blocking the microwave emission, the microwave sensor can not be covered with metal materials, be sprayed with a coating of metal components, or have attached metal material or stickers etc.



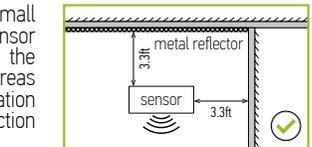
The distance between the antenna and the glass (dielectric material) should be no less than 0.4 ft when the sensor is within the glass lampshade. Otherwise, the microwave motion sensor will not penetrate the glass easily.



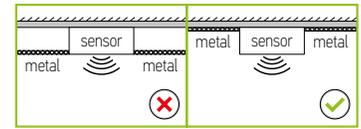
Avoid placing the sensor inside a metal chamber, this may cause a mis-trigger.



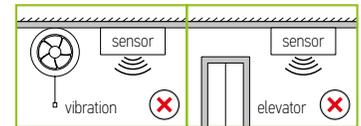
The sensor should not be placed in a small confined space. To avoid increasing the sensor detection range or abnormal operation, the sensor should be kept away from large areas of metal and glass reflectors (separation distance at least 3.3 ft). Reduce the detection area setting.



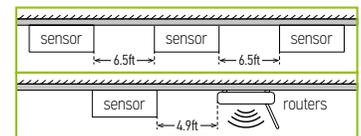
To avoid affecting the microwave signal transmission, the microwave antenna should be higher than the surrounding metal surface.



Any vibration or movement may trigger the sensor. Ensure the sensor is far from any constant movement.

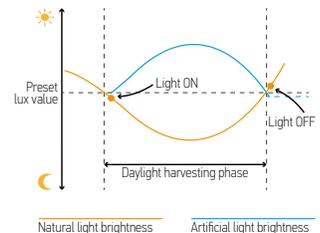


There must be at least 6.5ft between microwave sensors; There must be at least 4.9ft between the sensor and other wireless devices such as routers to avoid possible radio interference.



DAYLIGHT HARVESTING SETTING:

1. Adjust "daylight" value higher than 50lux.
2. Preset "standby period" 0S.
3. Press "daylight harvesting" button on remote control to activate.



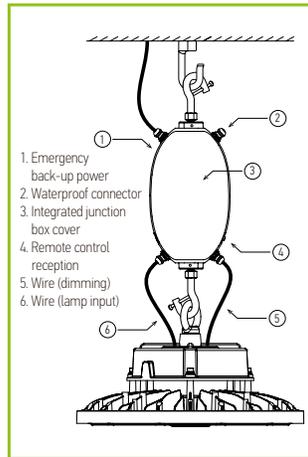


LED UFO HIGH BAY WITH Q-BASE

BATTERY BACK-UP KIT INFORMATION

BLD-RM40R **BLD-RM60R** sold separately:

BLD-RM40R, BLD-RM60R listed for field and factory installation, provides constant power output to the load during emergency mode operation. They maintain illumination in emergency mode for a minimum of 90 minutes. It is an ideal emergency solution for UFO LED highbay lights.



REMOTE TEST SWITCH

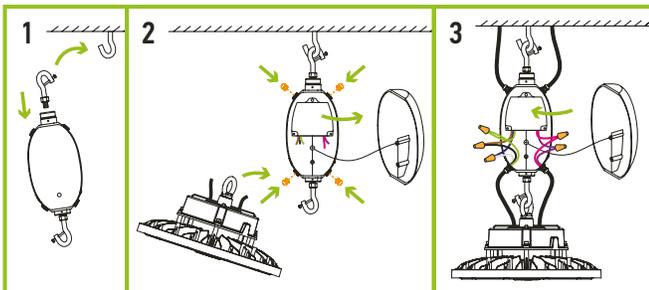
RN1 sold separately:

Button	Remarks
ON	Press this button to switch battery to the back-up mode. The indicator light will turn off and fixture will decrease light output.
OFF	Press this button to switch the fixture to normal operation mode.



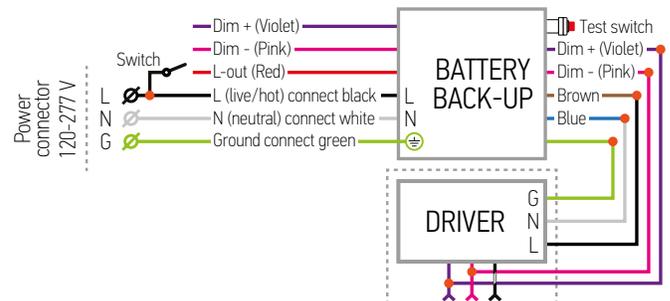
INSTALLATION STEPS:

1. Install the G-hook to the top thread hole of the battery back-up and secure with the screw. Attach the battery back-up with G-hook to the ceiling hook.
2. Loosen the screw on the enclosed hook at the bottom of the emergency back-up, attach the ring on the fixture to the hook, and tighten screw back. Open the cover, remove the plastic covers, and install the five waterproof connectors.
3. Pull all wires through the waterproof connectors into the chamber of emergency driver. Connect wires: Brown, Blue, Green with AC input wires of the fixture. Connect dimming wires Purple and Pink with LED driver input dimming wires. Connect Black, White and Red wires of the battery back-up with AC main Power cord. Secure connection with wire nuts and close the cover of junction box.



Specifications	BLD-RM40R	BLD-RM60R
Input voltage	100-347 V	
Input current	≤ 200 mA	
Input power	max 15W	
Standby input power	< 0.8W (finished charging)	
Maximum standby time between recharges	6 months	
Driver type	Constant power	
Output power (emergency mode)	40W	60W
Output voltage range	≤ 170 Vdc	
Lumens	6,000 lm	
Maximum load power	300W (when dimming to a minimum, the power needs to be less than 36W)	
Peak output power (emergency mode)	100W (lasts for 10 seconds)	
Number of output channels	1 channel	
RFI/EMI	FCC part 15 class B	
Output type	LED class 1	
Battery type	Li-ion	
Battery capacity available	2600 mAh (9% WH)	
Battery recharge time	24 hours	
Battery discharge time	90 min	
Maximum lighting fixture weight	44.1 lbs (20 kg)	
Self-diagnostic test system	<p>In the normal charging mode, the system performs a self-diagnostic test every 30 days, the system switches to emergency mode for 30S, and then automatically switches back to the normal charging mode.</p> <p>In the normal charging mode, the system switches to emergency mode every 360 days (after 11 monthly self-diagnostic test) and works until the end of discharge. Automatically switches back to normal charging mode after discharge.</p>	
Operating temperature	40°F to 122°F (5°C to 50°C)	
Service life	50,000 hours	
Input surge protection	2 kV	
Protections	Battery over discharge protection, output short circuit protection	
Approvals/class	RoHS, UL924 listed, CEC title 20 Dry/Wet Locations, IP65	

ELECTRICAL SCHEMATIC DIAGRAM:



For most up-to-date spec sheets please refer to asd-lighting.com

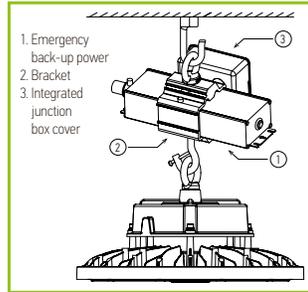
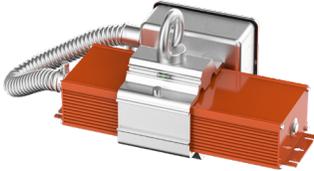


LED UFO HIGH BAY WITH Q-BASE

BATTERY BACK-UP HIGH VOLTAGE KIT INFORMATION

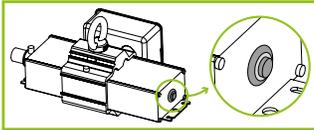
BLD-GM60R-HV sold separately:

BLD-GM60R-HV listed for field and factory installation, provides constant power output to the load during emergency mode operation. It maintains illumination in emergency mode for a minimum of 90 minutes. It is an ideal emergency solution for UFO LED highbay lights.



Specifications	BLD-GM60R-HV
Input voltage	277-480 V
Input current	max 100 mA
Input power	max 20W
Standby input power	< 6W (finished charging)
Maximum standby time between recharges	6 months
Driver type	Constant power
Output power (emergency mode)	60W
Output voltage range	400 Vdc
Lumens	6,000 lm
Maximum load power	300W (when dimming to a minimum, the power needs to be less than 36W)
Peak output power (emergency mode)	65W
Number of output channels	1 channel
RFI/EMI	FCC part 15 class B
Output type	LED class 1
Battery type	Li-ion
Battery capacity available	4000 mAh (115 WH)
Battery recharge time	24 hours
Battery discharge time	90 min
Maximum lighting fixture weight	44.1 lbs (20 kg)
Self-diagnostic test system	In the normal charging mode, the system performs a self-diagnostic test every 30 days, the system switches to emergency mode for 30S, and then automatically switches back to the normal charging mode. In the normal charging mode, the system switches to emergency mode every 360 days (after 11 monthly self-diagnostic test) and works until the end of discharge. Automatically switches back to normal charging mode after discharge.
Operating temperature	40°F to 122°F (5°C to 50°C)
Service life	50,000 hours
Input surge protection	2 kV
Protections	Battery over discharge protection, output short circuit protection
Approvals/class	RoHS, UL924 listed, CEC title 20 Dry/Wet Locations, IP65

STANDARD OPERATION DISPLAY STATUS:



AC operation: AC power is present. The AC driver operates the LED load as designed. The emergency driver is charging in standby mode. The charging indicator will be lit, showing that the battery is charging.

Emergency operation: When the AC power goes out, the emergency driver detects the AC power outage and automatically switches to emergency mode. When red LED light is OFF, that means driver is discharging. When the AC power is restored, the emergency driver goes back to AC power and starts recharging.

Charging	
Emergency mode	

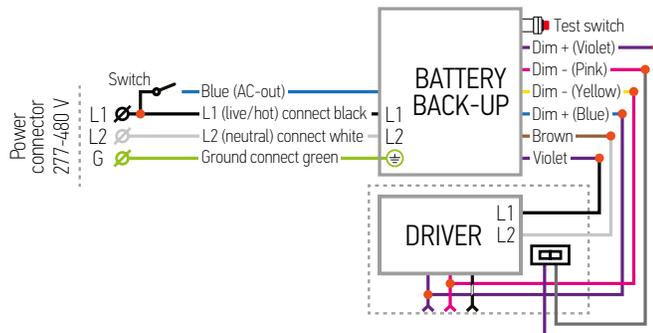
REMOTE TEST SWITCH

RN1 sold separately:

Button	Remarks
	ON Press this button to switch battery to the back-up mode. The indicator light will turn off and fixture will decrease light output.
	OFF Press this button to switch the fixture to normal operation mode.

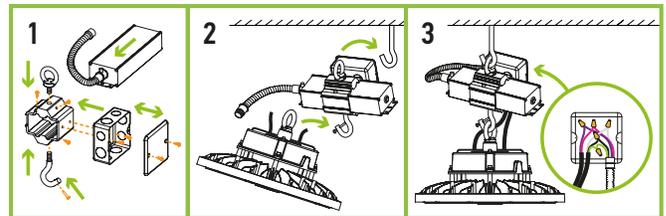


ELECTRICAL SCHEMATIC DIAGRAM:



INSTALLATION STEPS:

1. Insert battery back-up into the bracket and secure it with three screws. Attach junction box to the side of the bracket with two screws. Screw the mounting ring into the top and the mounting hook into the bottom of the bracket, securing them at a 45° angle.
2. Attach bracket with battery to the ceiling using mounting ring. Attach lighting fixture to the mounting hook on the bottom of the bracket and secure it with screw.
3. Plug the fixture's power cable and circuit cable into the junction box. Wire according to the wiring diagram inside the junction box. Close junction box with cover and secure it with two screws.



For most up-to-date spec sheets please refer to asd-lighting.com

ASD LIGHTING CORP

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LED UFO HIGH BAY WITH Q-BASE

INSTALLATION GUIDE

IMPORTANT SAFETY INFORMATION:

Please read all the instructions below before installation.

- ▶ Make sure that the supply voltage corresponds to the rated product voltage.
- ▶ The product must be installed by a qualified electrician in accordance with the National Electrical Code and corresponding local codes.
- ▶ If the product is damaged, do not use it.

⚠ WARNING

Risk of personal injury – read and follow all warnings and installation instructions. Keep or give to the owner for future reference.

Risk of cuts: Wear gloves to prevent cuts or abrasions when removing from carton, handling, installing, and maintaining this product.

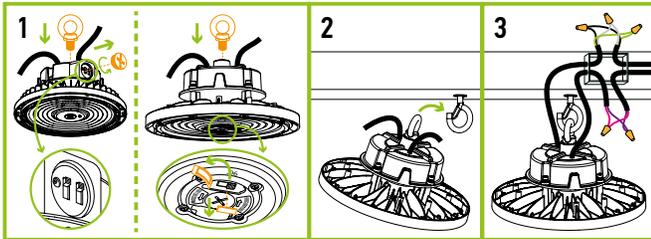
Risk of electric shock: This product must be installed in accordance with the applicable installation code by a person familiar with the construction and operation of the product and the hazards involved.

Risk of Fire: Minimum 194°F supply conductors. Consult a qualified electrician to ensure correct branch circuit conductor.

ASD® assumes no responsibility for claims arising out of improper or careless installation or handling of this product.

INSTALLATION STEPS:

1. Screw on the mounting ring (included) and tighten it.
For 100-300W models, unscrew the knockout on the driver box and adjust color temperature and/or power using the simple switch.
For 500W models, open the rubber caps in the middle of the lens, remove the inner caps, and adjust color temperature and/or power using the simple switch.
2. Clip the fixture on the hook in the ceiling using the mounting ring.
3. Connect the wires: Black to Black, White to White, Green to Green. Secure the connection with wire nuts.

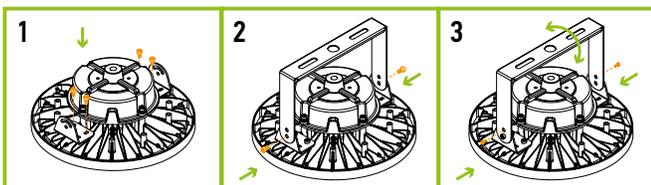


SURFACE MOUNT BRACKET INSTALLATION

ASD-SMB1-UHB3 ASD-SMB2-UHB3

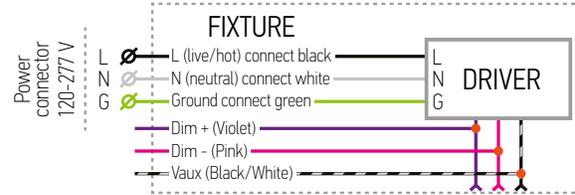
sold separately:

1. Use four M5x9/16" screws (included) to install bracket swivel on the top of the fixture's body.
2. Use two M6x5/8" screws (included) to secure the bracket to the swivels.
3. Adjust the light direction and secure it using two M5x9/16" screws with screw-nuts (included).

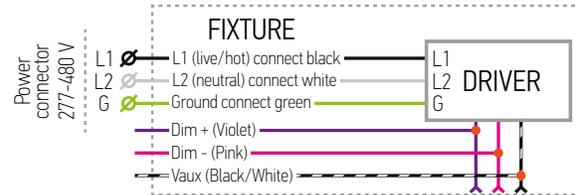


ELECTRICAL SCHEMATIC DIAGRAM:

UHB5



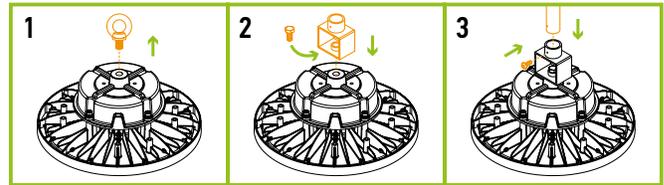
UHB5-HV



PENDANT MOUNT BRACKET INSTALLATION

ASD-PMB-UHB sold separately:

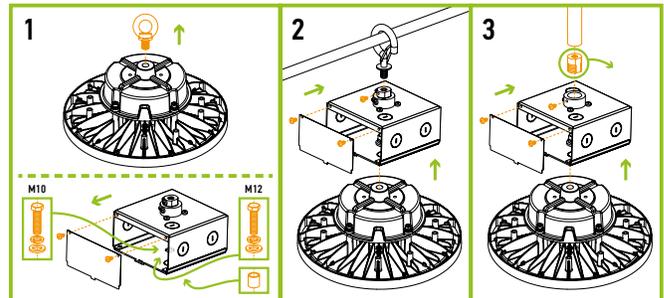
1. Remove the original ring from the driver.
2. Install the bracket and secure it to the driver using an M10 or M12 screw (included with the bracket).
3. Screw the bracket with the fixture onto a pole and secure it with an M3 screw (included with the bracket).



PENDANT MOUNT BRACKET WITH J-BOX AND SPRING HOOK INSTALLATION

ASD-PMBJB-UHB sold separately:

1. Uninstall the mounting ring from the fixture. Unscrew the two screws and open the side plate on the Pendant Junction box. Install M10 or M12 Mounting screw depending on the fixture's thread size.
2. **Mounting hook installation:** Loosen security screw and install the spring hook into the upper installation hole of the Pendant J-Box, then secure it with screw. Secure Pendant J-box to the fixture, and then to the ceiling. Close and secure side plate back into place.
3. **Pendant installation:** Uninstall adapter from pole mounting hole. Secure the Pendant J-box and fixture to the pole. Secure fixture to the Pendant J-box. Close and secure side plate back into place.



For most up-to-date spec sheets please refer to asd-lighting.com



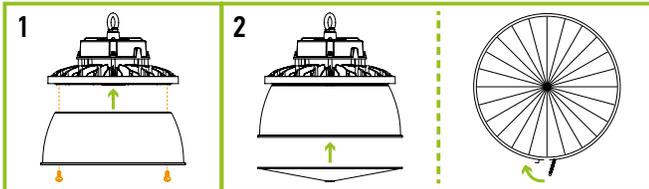
LED UFO HIGH BAY WITH Q-BASE

DIFFUSER AND LENS INSTALLATION

ASD-DUHB5A-16PC ASD-DUHB5B-16PC

ASD-BLUHB5AB sold separately:

1. Install the diffuser, tighten the screws.
2. Attach the conical lens to the included clamp.



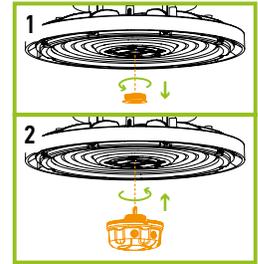
MOTION SENSOR INSTALLATION

ASD-09MW ASD-09MW-NLS

ASD-09IR ASD-09IR-NLS

ASD-09IR50 sold separately:

1. Unscrew the microwave sensor base cap.
2. Insert and twist the sensor until it is tight on the base surface.



ORDERING INFORMATION

Model	UPC	Pcs. per carton	Carton size	Carton weight
UHB5-PRO				
ASD-UHB5-PRO-100BK	810128113564	1	9.7" x 9.7" x 5.3"	4.8 lbs
ASD-UHB5-PRO-150WH	810128114813	1	9.7" x 9.7" x 5.3"	5 lbs
ASD-UHB5-PRO-150BK	810128113571	1	9.7" x 9.7" x 5.3"	5 lbs
ASD-UHB5-PRO-200WH	810128114806	1	12.8" x 12.8" x 6.1"	7.2 lbs
ASD-UHB5-PRO-200BK	810128113588	1	12.8" x 12.8" x 6.1"	7.2 lbs
ASD-UHB5-PRO-240BK	810128113595	1	12.8" x 12.8" x 6.1"	7.2 lbs
ASD-UHB5-PRO-300BK	810128113601	1	13.6" x 13.6" x 6.5"	8 lbs
ASD-UHB5-PRO-500BK	810128113618	1	18.7" x 18.7" x 8.4"	20.3 lbs
UHB5-HV-PRO HIGH VOLTAGE				
ASD-UHB5-HV-PRO-150BK	810128113519	1	9.7" x 9.7" x 5.3"	5.9 lbs
ASD-UHB5-HV-PRO-200BK	810128113526	1	12.8" x 12.8" x 6.1"	7.5 lbs
ASD-UHB5-HV-PRO-240BK	810128113533	1	12.8" x 12.8" x 6.1"	7.5 lbs
ASD-UHB5-HV-PRO-300BK	810128113540	1	13.6" x 13.6" x 6.5"	8.4 lbs
ASD-UHB5-HV-PRO-500BK	810128113557	1	18.7" x 18.7" x 9.5"	23.1 lbs

ACCESSORIES:

Model	Description	UPC	Pcs. in middle box	Middle box size	Middle box weight	GTIN 14 in middle box	Pcs. per carton	Carton size	Carton weight	GTIN 14
ASD-09MW-WH	Microwave motion sensor 3pin white	810128113700	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128113704	120	17.3" x 11.8" x 11"	12.1 lbs	30810128113701
ASD-09MW-BK	Microwave motion sensor 3pin black	810128113717	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128113711	120	17.3" x 11.8" x 11"	12.1 lbs	30810128113718
ASD-09IR-WH	Infrared motion sensor 3pin white	810128113694	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128113698	120	17.3" x 11.8" x 11"	12.1 lbs	30810128113695
ASD-09IR-BK	Infrared motion sensor 3pin black	810128114349	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128114343	120	17.3" x 11.8" x 11"	12.1 lbs	30810128114340
ASD-09IR50-WH	Infrared motion sensor 3pin 50ft white	810128116794	10	5.5" x 2.6" x 11.4"	0.9 lbs	10810128116791	120	17.3" x 11.8" x 11"	10.7 lbs	20810128116798
ASD-06RC	Remote control for motion sensor	810128114370	10	6.3" x 2.9" x 11.4"	0.5 lbs	30810128114371	60	15.8" x 11.8" x 9.3"	24.7 lbs	40810128114378
ASD-09MW-NLS-WH	Microwave motion sensor smart 3pin white	810128113762	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128113766	120	17.3" x 11.8" x 11"	12.1 lbs	30810128113763
ASD-09IR-NLS-WH	Infrared motion sensor smart 3pin white	810128113755	10	5.5" x 2.6" x 11.4"	1.2 lbs	20810128113759	120	17.3" x 11.8" x 11"	12.1 lbs	30810128113756
ASD-06RC-NLS	Remote control for NLS devices	810128114387	10	6.3" x 2.9" x 11.4"	0.5 lbs	20810128114381	60	15.8" x 11.8" x 9.3"	24.7 lbs	30810128114388
BLD-RM40R	Battery back-up kit 40W	810050738507	-	-	-	-	4	23.6" x 13.8" x 7.9"	32.5 lbs	20810050738501
BLD-RM60R	Battery back-up kit 60W	810128112154	-	-	-	-	4	23.6" x 13.8" x 7.9"	37.7 lbs	20810128112158
BLD-GM60R-HV	Battery back-up kit 60W for 277-480V	810128112147	-	-	-	-	5	20.5" x 10.8" x 16.7"	41.9 lbs	10810128112144
RN1	Remote test switch for battery back-up kit	810050735223	-	-	-	-	50	13" x 9.8" x 6.5"	8.3 lbs	20810050735227
ASD-H-M10	Spring hook M10	819201025312	-	-	-	-	50	12.6" x 7.7" x 6.9"	12.1 lbs	20819201025316
ASD-H-M12	Spring hook M12	810050730556	-	-	-	-	50	12.6" x 7.7" x 6.9"	17.6 lbs	10810050730553
ASD-HS-M10	Screw-bolt hook M10	810050731164	-	-	-	-	50	11.4" x 11.4" x 8.3"	12.6 lbs	10810050731161
ASD-PMB-UHB	Pendant mount bracket	810050731522	-	-	-	-	50	13.9" x 9.7" x 7.1"	33.7 lbs	10810050731529
ASD-PMBJB-UHB	Pendant mount bracket with J-box and spring hook	810050736992	-	-	-	-	40	17.7" x 11.4" x 21.3"	34.4 lbs	20810050736996
ASD-SMB1-UHB3-WH	Surface mount bracket white for 100-300W	810128111652	-	-	-	-	20	22.1" x 14.6" x 16.5"	32 lbs	10810128111659
ASD-SMB1-UHB3-BK	Surface mount bracket black for 100-300W	810050739818	-	-	-	-	20	22.1" x 14.6" x 16.5"	32 lbs	10810050739815
ASD-SMB2-UHB3-BK	Surface mount bracket black for 400-500W	810128110785	-	-	-	-	20	26" x 17.7" x 15.4"	59.5 lbs	10810128110782
ASD-BLUHB5AB	Polycarbonate bottom lens	810128114448	-	-	-	-	10	18.5" x 18.5" x 7.1"	9.3 lbs	10810128114445
ASD-DUHB5A-16PC	Polycarbonate reflector 16" 90° for 100-150W	810128114424	-	-	-	-	10	18.5" x 18.5" x 21.7"	14.8 lbs	10810128114421
ASD-DUHB5B-16PC	Polycarbonate reflector 16" 90° for 200-240W	810128114431	-	-	-	-	10	18.5" x 18.5" x 19.3"	17.6 lbs	10810128114438

For most up-to-date spec sheets please refer to asd-lighting.com



LED UFO HIGH BAY WITH Q-BASE

ANNEX 1

Model	Watts	3,000 K	4,000 K	5,000 K
ASD-UHB5-PRO-100BK	60W	10,533 lm	11,005 lm	10,797 lm
	80W	13,627 lm	14,310 lm	13,781 lm
	100W	16,639 lm	17,580 lm	16,814 lm
ASD-UHB5-PRO-150WH ASD-UHB5-PRO-150BK	100W	17,006 lm	18,083 lm	18,017 lm
	120W	20,221 lm	21,500 lm	20,930 lm
	150W	24,716 lm	26,331 lm	25,554 lm
ASD-UHB5-PRO-200WH ASD-UHB5-PRO-200BK	100W	16,677 lm	17,161 lm	17,234 lm
	150W	25,361 lm	26,446 lm	25,612 lm
	200W	31,963 lm	33,575 lm	32,325 lm
ASD-UHB5-PRO-240BK	150W	25,690 lm	27,225 lm	27,186 lm
	200W	32,852 lm	34,899 lm	34,133 lm
	240W	37,848 lm	40,557 lm	39,704 lm
ASD-UHB5-PRO-300BK	200W	34,263 lm	36,152 lm	35,848 lm
	240W	38,621 lm	41,235 lm	40,862 lm
	300W	46,406 lm	49,914 lm	48,993 lm
ASD-UHB5-PRO-500BK	300W	51,487 lm	53,485 lm	53,691 lm
	400W	65,394 lm	69,254 lm	69,507 lm
	500W	77,663 lm	82,551 lm	82,021 lm
ASD-UHB5-HV-PRO-150BK	100W	17,289 lm	18,332 lm	18,246 lm
	120W	20,509 lm	21,757 lm	21,293 lm
	150W	24,113 lm	25,842 lm	25,226 lm
ASD-UHB5-HV-PRO-200BK	100W	17,044 lm	17,668 lm	17,721 lm
	150W	25,158 lm	26,229 lm	25,611 lm
	200W	32,246 lm	34,126 lm	33,092 lm
ASD-UHB5-HV-PRO-240BK	150W	25,688 lm	27,079 lm	27,125 lm
	200W	33,252 lm	35,183 lm	34,472 lm
	240W	38,714 lm	41,331 lm	40,467 lm
ASD-UHB5-HV-PRO-300BK	200W	35,374 lm	37,704 lm	37,572 lm
	240W	41,191 lm	43,925 lm	43,126 lm
	300W	47,792 lm	51,514 lm	50,365 lm
ASD-UHB5-HV-PRO-500BK	300W	51,789 lm	54,021 lm	53,393 lm
	400W	68,164 lm	71,863 lm	70,393 lm
	500W	77,512 lm	82,905 lm	81,255 lm

For most up-to-date spec sheets please refer to asd-lighting.com

3.0 Pre-Engineering Metal Building Canopy (PEMB)

3.1 RELATED SECTIONS

- A. This section specifies a rigid-frame-type metal building system as detailed and dimensioned on the plans. Drawings and other specification sections may apply to this section.

3.2 APPLICABLE APPLICATIONS

- A. American Institute of Steel Construction (AISC): "Manual of Steel Construction."
- B. American Iron and Steel Institute (AISI): "Cold-Formed Steel Design Manual," 1986 edition.
- C. American Society for Testing and Materials (ASTM):
 - 1. A36-88 Structural Steel.
 - 2. A446-87 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dipped Process, Structural Quality
 - 3. A463-88 Steel Sheet, Cold Rolled, Aluminum Coated Type 2.
 - 4. A792-86 Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 5. A570-88 Steel, Sheet and Strip, Hot Rolled, Structural Quality.
 - 6. A572-88 High Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.
 - 7. A307-88 Carbon Steel Bolts.
 - 8. A325-88 High Strength Bolts for Structural Joints.
 - 9. Underwriters Laboratories (UL): "Tests for Wind-Uplift Resistance of Roof Assemblies - UL 580."
 - 10. American Welding Society (AWS): "Structural Welding Code - Steel," ANSI/AWS D1.1-90.
 - 11. Metal Building Manufacturers Association (MBMA): "Low Rise Building Systems Manual."

3.3 QUALITY ASSURANCE

- A. The Metal Building System shall be designed, engineered and fabricated by a Building Manufacturer who has been regularly engaged for at least five (5) years in the design, engineering and fabrication of the type and quality herein specified.
- B. Unless otherwise noted, all materials in this specification shall be furnished by the Building Manufacturer.
- C. The Building Manufacturer shall be certified for AISC's QUALITY CERTIFICATION, CATEGORY MB program. This project shall be engineered and fabricated to meet the requirements of this certification.
- D. All structural mill sections and welded plate sections shall be designed in accordance

with the AISC's "Manual of Steel Construction."

- E. All cold-formed steel structural members shall be designed in accordance with the 1986 edition AISI's "Cold-formed Steel Design Manual."
- F. All roof and wall panels shall be designed in accordance with the AISI's "Cold-formed Steel Design Manual."
- G. Welded connections shall comply with the American Welding Society's (AWS) "Standard Code for Arc and Gas Welding in Building Construction" for welding procedures.
- H. All materials shall be new and unused prior to fabrication. The Building Manufacturer shall warrant the materials manufactured by it, if properly erected in accordance with the plans, specifications and erection manual furnished by it, against defects in materials and workmanship for a period of one (1) year after delivery.

3.4 JOB SITE RECEIVING, STORAGE AND HANDLING OF MATERIALS

- A. All materials shall be unloaded, handled, hauled and delivered to storage by competent workmen in a manner which will prevent bends, dents, scratches or other damage. Damaged materials shall be rejected and promptly replaced. All materials shall be properly stored and protected from weather damage. All shipments must be thoroughly checked by the consignee. If shortage or damage is found, a notation must be placed on the bill of lading and must be confirmed by the carrier.
- B. Primed Materials: Upon receipt, all bundles of primed material shall be stored on blocking at an angle sufficient to allow any trapped water to drain and should be protected from the weather by covers allowing air circulation. Water, ice and snow should not be allowed to collect and remain thereon.
- C. Roof & Wall Panels: Bundles of panels shall be inspected for moisture upon receipt. If moisture is present, dry the panels and, if possible, store them in a warm, dry place. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain. Cover all bundles with a tarp or plastic, leaving air spaces for adequate air circulation.
- D. Skylights: Upon receipt, bundles of skylights shall be inspected for moisture. If moisture is present, dry the panels and store them in a shaded, dry place. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain. Cover all bundles with a tarp or plastic, leaving air spaces for adequate air circulation.

3.5 APPROVED MANUFACTURER'S

- A. Ideal Steel
- B. Other Approved Building

3.6 DESIGN CRITERIA AND LOADS (International Building Code, Applicable Edition)

-
- A. Design Criteria - All code references are to the International Building Code, Latest Edition.
- B. Combinations of loads shall follow SBC Section 1609.
- C. Roof Live Loads shall be applied in compliance with applicable SBC (Roof Live Loads) and SBC Section (Snow Loads), and shall not be less than:
1. Dead Load - Weight of all building components furnished by the metal building system manufacturer.
 2. Roof Snow Load shall be determined using site specific values based on the following formula:
 - a. $P_f = 0.7 * C_e * C_t * I * p_g$
 - b. Snow Exposure Factor, C_e (ASCE 7-88 Table 18)
 - c. Thermal Factor, C_t (ASCE 7-88 Table 19)
 - d. Snow Importance Factor, I (ASCE 7-88 Table 20)
 - e. Ground Snow Load (ASCE 7-88 Section 7.2)
- D. Collateral and Mechanical Loads include the weight of non-structural material and equipment supported by the structure, including (but not limited to) HVAC units, ductwork, conduit, sprinkler and utility piping, suspended ceilings, lighting and other building accessories. This load shall be added to Dead Load and combined with Roof Live Load, Roof Snow Load, Wind Load and Seismic Forces in compliance with SBC requirements.
- E. Wind Loads shall be determined using site specific values and applied in compliance with SBC requirements and shall not be less than:
1. Basic Wind Speed V
 2. Wind Importance Factor, I
 3. Structures distance from a hurricane coastline.
- F. Seismic Forces shall be determined and applied in compliance with SBC requirements.
1. The seismic hazard exposure group shall be Group I, II or III as determined by SBC Table.
 2. The effect peak velocity rated acceleration coefficient, A_a , shall be as determined from SBC.
 3. The peak acceleration coefficient (A_a) shall be as determined from SBC.

3.7 PRODUCTS

3.8 PRIMARY & SECONDARY FRAMING - BUILDING STRUCTURES

- A. Primary & secondary framing consisting of beams, columns, purlins, girts, eave struts, other structural members and clips shall be factory punched for easy and rapid erection by field bolting, except where shop connections are used.
- B. Field welding will not be permitted unless specified by the Building Manufacturer and allowed by the Engineer of Record or the Engineer of Record.

3.9 RIGID FRAMES

- A. Rigid Frames shall be complete with base plates and splice plates prepared for field-bolted connections. They shall consist of built-up sidewall columns of tapered or constant web depths (see drawings for allowable shape) and rafters with tapered or constant web depths as required by the Building Manufacturer's design. All Exposed Metal Framing shall be primed and painted a solid color Flat Black or other standard color as selected by the owner for a clean look on all visible surfaces.
- B. Interior columns will not be allowed. Building Must be Continuous Span.
- C. The rigid frames shall be designed as pinned base, with no moment transferred to the foundation, unless specified otherwise. Steel for all built-up sections shall meet as applicable the physical and chemical properties of:
 - 1. ASTM A 572 modified to 55,000 psi minimum yield and 70,000 psi minimum tensile strength, or ASTM A 607, Grade 55, or ASTM A 570, Grade 55 or
 - 2. ASTM A 572, Grade 50 or ASTM A 607, Grade 50 or ASTM A 570, Grade 50.
- D. Hot-rolled structural shapes shall comply with the requirements of ASTM A36. Pipes shall comply with the requirements of ASTM A500, ASTM A501, or ASTM A53.

3.10 ENDWALL FRAMING

- A. Endwall columns and beams shall consist of cold-formed "C" sections, hot-rolled sections or built-up sections meeting their respective material specifications.

3.11 SECONDARY FRAMING STEEL

- A. Steel used to form the "Z" and "C" shaped purlins, girts and eave struts shall be at least 8" deep and not less than 16-gauge, 55,000 psi minimum yield steel comparable to or exceeding the requirements of ASTM A570-88.
- B. When designed as continuous beams, the purlins and girts shall be checked for the combined bending and shear stresses at the frame centerline and at the end of their laps.

3.12 BRACING

- A. Bracing to be located as shown on the shop drawings to remove horizontal wind and seismic forces. The bracing may be either:
 - 1. Cables of ASTM A475, 7 strand, Extra-High-Strength material, 1/4" diameter minimum.
 - 2. ASTM A36 rods, 3/4" diameter minimum.
 - 3. ASTM A36 angle, pipe or tube.

B. If x-bracing cannot be used, portal frames or fixed-base endwall columns may be used.

3.13 STRUCTURAL PAINTING

- A. All structural steel and light gauge steel members shall be cleaned of loose mill scale, dirt and other foreign material by the procedures of SSPC-SP2 and then be given a one mil coat of red oxide primer meeting or exceeding the performance requirements of Specification SSPC 15-68T (replaces and is equivalent to Federal Specification TT-P-636D). The primer is not intended to be a finish coat.
- B. Abrasions caused by handling and erection shall be touched-up by the contractor performing field touch-up. Use the same primer used by the Building Manufacturer.

3.14 STRUCTURAL BOLTS

- A. All field connections shall be made with black, unpainted ASTM A325 or A307 bolts, nuts and washers as shown on the Building Manufacturer's erection drawings. All bolts shall be installed and tightened in accordance with the "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

3.15 ANCHOR BOLTS AND FOUNDATION DESIGN

- A. Anchor bolts shall be ASTM A307 and installed in accordance with the Anchor Bolt Plan furnished by the Building Manufacturer (Anchor Bolts not furnished by Building Manufacturer).
- B. The foundation shall be installed as per design plans provided for Bid; Anchor Bolts shall be coordinated with Foundation Plan.

3.16 ROOF AND SIDE PANELS & FINISH

- A. 24 Gage Long Span
- B. Roof Panel Description: Roof shall be trapezoidal standing seam Metal Roofing. Panels shall have a silicon polyester finish with color to be selected by the owner from the standard color choices. All panels shall be installed per manufacturers standard specifications.
- C. Side panels shall be 26-gauge steel R type panels with major ribs 12" o.c. 1 3/26" high and shall be painted manufacturers standard painting system (color to be determined by owner).

3.17 EXECUTION

3.18 ERECTION

- A. The erection of the metal building and the installation of accessories shall be performed in accordance with the Building Manufacturer's erection drawings and erection manuals

by a qualified erector using proper tools, equipment and safety practices.

- B. Erection practices shall conform to Section 6, Common Industry Practices found in the "Low Rise Building Systems Manual," latest edition.
- C. There shall be no field modifications to primary structural members except as authorized and specified by the Building Manufacturer.

3.19 FASTENING & ATTACHMENT

- A. All panels shall be attached to the secondary framing members by means of self-drilling, stainless steel capped, No. 12 x 1 1/4" screws assembled with 9/16" OD aluminum and bonded EPDM washer. The fasteners shall be suitable for use with fiberglass blanket insulation from 0" to 4" thick. All panel side laps shall be stitched by means of stainless-steel capped stitch screws assembled with 9/16" OD aluminum and bonded EPDM washer.

3.20 PANEL LENGTH AND ENDLAPS

- A. All roof panels shall be installed continuous from eave to ridge except where lengths become prohibitive for handling purposes. All end laps shall be at least 3".

3.21 CLOSURE STRIPS

- A. The corrugations of the roof panels shall be filled with a pre-formed closed cell non-shrinking, laminated polyethylene closures along the eaves, ridge, and rake when required for weather-tightness.

3.22 SEALANTS

- A. The roof side-laps and end-laps shall be sealed with a 1/2" x 1/8" tape mastic. The material shall be a butyl base elastic compound with a minimum solid content of 99%, SikaTape TC95 or equal. The sealer shall have good adhesion to metal and be non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic, and non-volatile. The service temperature shall be from (-60) degrees F to (+212) degrees F. The material shall meet or surpass the requirements of Federal Specification TT-C-1796A Type II, Class B and NAAMM SS-1C-68.

3.23 AZ55 Aluminum-zinc Alloy Coated Panels (Galvalume)

- A. Panel Finish: Panel material shall be aluminum-zinc alloy-coated steel, AZ 55 designation, conforming to the requirements of ASTM A792.

3.24 FINISH WARRANTY

- A. Aluminum-zinc alloy-coated panels shall be free of manufacturing defects and shall be warranted against perforation due to corrosion caused by normal atmospheric exposure, rupture or structural failure for a period of twenty (20) years from the effective date. The

contractor shall submit 2 sample copies of the warranty with its terms and conditions clearly stated. Owner shall select color from Standard Color selections as part of submittal.

3.25 TRIM & ACCESSORIES

A. Gutter, Downspouts, Rake & Wall Trim.

1. Exterior gutters shall be 24 gauge, G90 galvanized or aluminum-zinc alloy coated steel with the same finish as the wall panels. Exterior gutter color shall be selected from manufacturer's standards.
2. Downspouts shall be 28 gauge galvanized or aluminum-zinc alloy coated steel with a color coordinated pre-painted finish. Downspout color shall be selected from manufacturer's standards.
3. Rake trim shall be embossed 24 gauge, G90 galvanized or aluminum-zinc alloy coated steel with the same finish as the wall panels. Rake trim color shall be selected from manufacturer's standards. If the roof is a standing seam system, the rake trim shall be attached to the endwall material with a slip joint, allowing the rake to expand and contract with the roof system.
4. Wall trim shall be embossed 24 gauge (minimum), G90 galvanized or aluminum-zinc alloy coated steel with the same color and finish as the wall panels.

3.26 Skirt: PEMB shall have a fur down skirt as shown on the design plans. The PEMB shall include in the design all framing, beams, panels, and Trim pieces for complete skirt wall; Panels shall be standard Color as selected by the owner, during submittal.

3.27 All gutter and downspout joints, rake flashing laps, ridge flashing laps, doors, windows and louvers shall be sealed with caulk, Sika Sikaflex 201 caulk or equal. It shall meet or exceed the requirements of Federal Specification TT-S-00230C, Type II, Class A.