

June 2016

SPECIFICATIONS

**PASS CHRISTIAN
SITE DEMOLITION AND SITE WORK (REBID)**

For
Department of Marine Resources
1141 Bayview Avenue
Biloxi, Mississippi 39530

JOB NO. 2014-13

BID DATE: July 12, 2016
2:00 p.m., local time



628 WASHINGTON AVENUE - SUITE C
OCEAN SPRINGS, MISSISSIPPI 39564

I N D E X T O S P E C I F I C A T I O N S

ADVERTISEMENT FOR BIDS

DIVISION 0 BIDDING REQUIREMENTS

00100 Instructions to Bidders
00300 Proposal Form
00500 Standard Form of Agreement Between the Owner and the Contractor
00600 Contract Bond
00650 Certificate of Insurance
00700 General Conditions
00800 Supplementary Conditions
00820 Labor Requirements
00900 Addenda

DIVISION 1 GENERAL REQUIREMENTS

01010 Summary of Work
01020 Allowances
01025 Schedule of Values
01027 Applications for Payment
01028 Change Order Procedures
01030 Alternates
01041 Project Coordination
01045 Cutting and Patching
01200 Project Meetings
01310 Progress Schedules
01311 Network Analysis Schedule
01340 Shop Drawings, Product Data and Samples
01410 Testing Laboratory Services
01500 Construction Facilities and Temporary Controls
01630 Substitutions and Product Options
01650 Starting of Systems
01700 Contract Closeout
01710 Cleaning
01720 Project Record Documents
01900 Supplement
 Part 1 - Summary of Work Supplement
 Part 2 - Allowance Supplement
 Part 3 - Alternate Supplement
 Part 4 - Project Sequence
 Part 5 - Rain Days Allowance
 Exhibit A
 Exhibit B

DIVISION 2 SITE WORK

02000	DEMOLITION	02000-1/3
02231	TREE PROTECTION AND TRIMMING	02231-1/9
02300	EARTHWORK	02300-1/16
02518	INTERLOCKING CONCRETE PAVERS	02518-1/8
02360	STORM DRAINAGE	02630-1/6
02751	CEMENT CONCRETE PAVEMENT	02751-1/17
02764	PAVEMENT JOINT SEALANTS	02764-1/7
02805	HARDSCAPE	02805-1/3
02810	LANDSCAPE IRRIGATION	02810-1/17
02900	LANDSCAPE, PLANTING, & SODDING	02900-1/20

DIVISION 16 ELECTRICAL

16010	BASIC ELECTRICAL REQUIREMENTS	16010-1/8
16050	BASIC ELECTRICAL MATERIALS AND METHODS	16050-1/4
16060	GROUNDING AND BONDING	16060-1/3
16120	LOW VOLTAGE CONDUCTORS (600 VOLT AC)	16120-1/3
16130	RACEWAYS, FITTINGS, AND SUPPORTS	16130-1/4
16140	WIRING DEVICES	16140-1/3
16445	PANELBOARDS AND SAFETY SWITCHES	16445-1/3
16500	LIGHTING	16500-1/3

ADVERTISEMENT FOR BIDS
SECTION 00000

Sealed bids will be received at the office of the
The Department of Marine Resources, 1141 Bayview Avenue, Biloxi, Mississippi
39530, in the 2nd Floor Coastal Restoration and Resiliency Conference Room,
Bolton State Office Building, , until 2:00:00 p.m. on Tuesday, July 12, 2016.
(Day) (Date)

Pass Christian – Site Demolition and Site Work (REBID) (Project Title)
Department of Marine Resources (Using Agency)
Pass Christian (Location)

at which time they will be publicly opened and read. Contract Documents
may be obtained from:

Allred Architectural Group, PA
628 Washington Avenue, Suite C
Ocean Springs, MS 39564
Phone: (228) 762-1975

Or the MDMR website: <http://www.dmr.ms.gov/index.php/dmr-information/bids-main>

A deposit of \$ 50.00 is required. Bid preparation will be in
accordance with *Instructions to Bidders* bound in the Project Manual.
The Owner reserves the right to waive irregularities and to reject any or
all bids. **NOTE: Telephones and desks will not be available for bidders
use at the bid site.**

Erin Gallagher, Director of Procurement
Mississippi Department of Marine Resources

Dates of Publication:
June 8, 2016
June 15, 2016

INSTRUCTIONS TO BIDDERS
SECTION 00100

PART 1 - GENERAL

- 1.01 **QUESTIONS:** Questions should be directed to the Professional. Should a Bidder find discrepancies in, or omissions from, the Drawings or Project Manual, or be in doubt as to their meaning, the Bidder should immediately notify the Professional. The Professional will send written instruction(s) or interpretation(s) to all known holders of the documents. Neither the Owner, nor the Professional, will be responsible for any oral instruction or interpretation.
- 1.02 **BIDDER'S QUALIFICATIONS:**
- A. **Certificate of Responsibility:** The Mississippi State Board of Contractors is responsible for issuing Certificates of Responsibility to Contractors. To be awarded a Contract for public work, Sections 31-3-15 and 31-3-21 of the **Mississippi Code 1972, Annotated** requires a Contractor to have a current Certificate of Responsibility at bid time and during the entire length of the job. The Certificate of Responsibility number issued becomes a significant item in all public bidding.
 - B. **Bid Under \$50,000:** If a Bidder submits a bid not exceeding \$50,000, no Certificate of Responsibility number is required; however, a notation stating the *bid does not exceed \$50,000* must appear on the face of the envelope, or a Certificate of Responsibility number.
 - C. **Bid Over \$50,000:** Each Bidder submitting a bid in excess of \$50,000 must show its Certificate of Responsibility number on the bid and on the face of the envelope containing the bid.
 - D. **Joint Venture Bid:** When multiple Contractors submit a joint venture bid in excess of \$50,000, a *joint venture* Certificate of Responsibility number must be shown on the bid and on the face of the envelope containing the bid. If the Multiple-Contractor joint venture has no *joint venture* Certificate of Responsibility number, each of the Contractors participating in the bid must indicate their individual Certificate of Responsibility numbers on the bid and on the face of the envelope.
- 1.03 **NON-RESIDENT BIDDER:** When a non-resident Bidder (a Contractor whose principal place of business is outside the State of Mississippi) submits a bid for a Mississippi public works project, one of the following is required and shall be submitted with the Proposal Form:
- A. **Copy of Law:** If the non-resident Bidder's state has a resident Bidder preference law, a copy of that law shall be submitted with the Proposal Form.
 - B. **Statement:** If the state has no such law then a statement indicating *the State of (Name of State) has no resident Contractor preference law* shall be submitted with the Proposal Form.
- 1.04 **DISQUALIFICATION OF BIDDER:** A Bidder may be disqualified for any of the following reasons: (see 600.53)
- A. Failure to comply with the bid requirements.
 - B. Bidder is in arrears on existing Contracts with the Owner or another state agency.
 - C. Bidder is, or anticipates being, in litigation or arbitration with the Owner or another state agency.
 - D. Bidder has defaulted on a previous Contract.
- 1.05 **CONDITIONS OF WORK:** Each Bidder must fully inform himself of all conditions relating to the construction of the Project and employment of labor thereon. Failure to do so will not relieve a successful Bidder of obligations to furnish all material and labor necessary to carry out the provisions of the Contract. Insofar as possible, the Bidder must employ methods, or means, which will not cause interruption of, or interference with, the work of any other Bidder, or Contractor.
- 1.06 **EXAMINATION OF SITE:** All Bidders, including the general Contractor and Subcontractors, shall visit the building site, compare the Drawings and Project Manual with any work in place and be informed of all conditions. Failure to visit the site will in no way relieve the successful Bidder from furnishing any materials or performing any work required to complete work in accordance with Drawings and Project Manual without additional cost to the Owner.
- 1.07 **LAWS AND REGULATIONS:** The Bidder's attention is directed to the fact that all applicable Mississippi state laws, rules and regulations of all authorities having jurisdiction over construction of the Project apply to the Contract.

1.08 **OBLIGATION OF BIDDER:** At the bid opening, each Bidder will be presumed to have inspected the site, read and become thoroughly familiar with the Drawings and the Project Manual, including all addenda.

1.09 **BID DOCUMENT DEPOSIT AND RETURN:** The deposit amount is indicated in the Advertisement for Bids. Upon returning the documents to the Professional within ten (10) days of the bid date and in good condition, all document holders will be refunded one-half (1/2) of the deposit. Further, any general contractor submitting a bid and all mechanical and/or electrical Subcontractors will be refunded one hundred percent (100%) of the deposit on one (1) set and fifty percent (50%) for each additional set. No partial sets of documents will be issued. Selected plan rooms will be issued one (1) set of documents without charge.

PART 2 - PROPOSAL FORM

2.01 **METHOD OF BIDDING:** Lump sum, single bids received on a general contract will include general, mechanical and electrical construction and all work shown on Drawings or specified in the Project Manual.

2.02 **PROPOSAL FORMS:** The Bidder shall make all proposals on forms provided and shall fill all applicable blank spaces without interlineations or alteration and must not contain recapitulation of the work to be done. No oral or telegraphic proposals will be considered.

2.03 **TIME OF COMPLETION:** The Bidder shall agree to commence work on, or before, a date specified in a written *Notice to Proceed* and fully complete the Project within the calendar days indicated on the Proposal Form.

2.04 **BASE BID AND ALTERNATES:**

A. On the Proposal Form, the Bidder shall write out the Base Bid amount in words and include the numerical amount. The written word shall govern.

B. The Proposal Form shall contain a brief description of each alternate modifying the scope. The Bidder shall write out the amount in words and include the numerical amount for each alternate. The written word shall govern. Refer to Section 01030 entitled *Alternates* for additional information.

2.05 **SUBSTITUTIONS:** No substitutions, qualifications or redefining of the Specification requirements are allowed to be marked on the Proposal Form, unless specifically required by the Bid Documents. Refer to Section 01630 entitled *Substitutions and Product Options* which covers procedures after the award of Contract.

2.06 **ADDENDA:** Any addenda to the Drawings or Project Manual issued before or during the time of bidding shall be included in the proposal and become a part of the Contract. The Proposal Form will have ample space to indicate the receipt of addenda. When completing the Proposal Form, the Bidder shall list the Addendum number and the date received in spaces provided.

2.07 **BIDDER IDENTIFICATION:**

A. **Signature:** The Proposal Form shall be signed by any individual authorized to enter into a binding agreement for the Business making the bid proposal.

B. **Name of Business:** The name appearing on the Proposal Form should be the complete spelling of bidder's name - exact as recorded at the Secretary of State [<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp>] which should be the same as you applied for at the Mississippi State Board of Contractors [<http://www.msdoc.us/Search2.CFM>] (see 2.07, 3.01, 5.01, proposal form)

C. **Legal Address:** The address appearing on the Proposal Form should be the same address exact as recorded at the Secretary of State [<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp>] which should be the same as you applied for at the Mississippi State Board of Contractors [<http://www.msdoc.us/Search2.CFM>]

D. **Certificate of Responsibility Number(s):** The Certificate of Responsibility Number(s) appearing on the Proposal Form should be the same number appearing in the current Mississippi State Board of Contractors Roster.

2.08 **BID SECURITY:** The Bid Security shall be in the form of a Bid Bond, or a Certified Check: (modified Dec 2013) (see also 4.07 herein)

A. **Bid Bond:** The Bidder may submit a Bid Bond by a Surety licensed in Mississippi in the amount of five percent (5%) of the base bid. The Bid Bond shall be duly executed by the Bidder, a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department OR signed by the Surety AND countersigned by a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department. http://www.mid.state.ms.us/licapp/search_main.aspx (No standard form is required for the Bid Bond.)

B. **Certified Check:** The Bidder may submit a certified check made out to the Owner in the amount of five percent (5%) of the base bid. All checks received from Bidders will be returned upon request, unless a Bidder is one (1) of the three (3) apparent low Bidders. The three (3) apparent low Bidder's checks will be held for forty-five (45) days, unless a Contract is awarded and executed in less time.

2.09 **POWER OF ATTORNEY:** Each bid security must be accompanied by an appropriate Power of Attorney. No Power of Attorney is necessary with a certified check.

PART 3 - SUBMITTING THE PROPOSAL FORM

3.01 **SUBMITTAL:** A bid must be delivered to the address indicated on the Advertisement for Bids prior to the time and date stated. Only one original of Bid Proposal shall be submitted which should be sealed in an opaque envelope marked, mailed or hand-delivered as follows: (beginning 1/1/09 and for a reasonable time period, a duplicate copy will not disqualify your bid, but the second copy, without comparison, will be destroyed in the bid opening, not read aloud nor used thereafter, in order to prevent inadvertent differences in the duplicate forms): (also see 600.42)

<p><i>(In upper left hand corner)</i></p> <p>Name of Firm (complete spelling of bidder's name and address – exact as recorded at the Secretary of State which should be the same as you applied for at the Mississippi State Board of Contractors – see 2.07, 3.01, 5.01)</p> <p style="text-align: right;"><i>(Bid shall be addressed and delivered to)</i> Owner</p> <p><i>(In lower left hand corner)</i></p> <p>Bid for Project # _____</p> <p>Title _____</p> <p>Using Agency _____</p> <p>Certificate of Responsibility # _____ (for over \$50,000.00) Under \$50,000.00 (add statement)</p>

If the Bid is mailed, the bid envelope shall be placed inside a second envelope to prevent inadvertent premature opening of the Proposal.

3.02 **MODIFICATION TO BID:** A bidder may modify the bid prior to the scheduled closing time indicated in the Advertisement for Bids in the following manner:

- A. **Notification on Envelope:** A modification may be written on the outside of the sealed envelope containing the bid.
- B. **Facsimile:** A facsimile (fax) will not be acceptable.

3.03 **WITHDRAWAL OF BID:** Any bid may be withdrawn prior to the scheduled time for opening of bids. However, bids may not be withdrawn until forty-five (45) days after bid opening.

PART 4 - BID OPENING AND AWARD OF CONTRACT

4.01 **OPENING OF BIDS:** Bids will be publicly opened shortly after the time stated in the Advertisement for Bids. Bidder representatives are invited; however, attendance is not mandatory.

Closure of agency preventing the opening of bids at the advertised date and time due to Force Majeure Event reasons will result in bids being publicly opened . . . on the next business day that the agency shall be open and at the previously advertised time . . . (added Jan 2015)

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- 4.02 **IRREGULARITIES:** The omission of any information requested on the Proposal Form may be considered as an informality, or irregularity, by the awarding public body when in their opinion the omitted information does not alter the amounts contained in the submitted bid proposal, or place other Bidders at a disadvantage.
- 4.03 **PROTEST:** Any protest must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening.
- 4.04 **ERRORS:** Any claim of error and request for release from bid must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening. The Bidder shall provide sufficient documentation with the written request clearly proving an error was made.
- 4.05 **AWARD OF CONTRACT:** The Owner reserves the right to reject any, or all bids. A Contract will be awarded on the basis of the low base bid, or low combination of base bid and those alternates selected by the Owner in any order determined to be in the best interest of the Using Agency and which produces a total within available funds.
- 4.06 **FAILURE TO ENTER INTO A CONTRACT:** The Bidder shall forfeit the Bid Security to the Owner as liquidated damages for failure, or refusal, to execute and deliver the Contract, Bond and Certificate of Insurance within ten (10) working days after notice of the acceptance of the bid/receipt of Contracts from the Professional. (*“working” days added 11/3/10 (modified Jan 2015)*)
- 4.07 **SECURITY FOR FAITHFUL PERFORMANCE:** (modified Dec 2013) (see also 2.08)
Simultaneously, with delivery of the executed Contract, the Contractor will furnish a Surety Bond, or Bonds, as security for faithful performance, the payment of all persons performing labor on the project, and furnishing materials in connection with this Contract. The Surety on such Bond, or Bonds, will be a duly authorized surety company satisfactory to the Owner and meeting all of the following requirements:
- A. Licensed at the time of award by the State of Mississippi's Commissioner of Insurance for the purpose of providing surety. . http://www.mid.state.ms.us/licapp/search_main.aspx
 - B. Listed at the time of award in the Department of the Treasury's **Federal Register** as a company holding certificates of authority as acceptable sureties on Federal Bonds, commonly referred to as the Treasury List.
 - C. All Bonds shall be executed on the form provided in the Project Manual under Section 00600 entitled *Contract Bond*.
 - D. The Contract Bond shall be duly executed by the Bidder, a Surety licensed in Mississippi signed by a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department OR signed by the Surety AND countersigned by a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department with the name and address typed, or lettered legibly. (with embossed seal). http://www.mid.state.ms.us/licapp/search_main.aspx
 - E. All Bonds must be accompanied by an appropriate Power of Attorney dated same as Contract Bond.

X PART 5 - BIDDER'S CHECKLIST

The following checklist is for the Bidder's assistance only. It is not inclusive and **is not a part of the bid documents**; therefore, this checklist does not have to be included with the Proposal Form when submitting a bid proposal.

5.01 PROPOSAL FORM: (only one original proposal form to be submitted) (also see 3.01 and 600.42 of Manual)
Base Bid

Write in the amount of the base bid in words and numbers. The written word shall govern.

Alternates

Write in each alternates amount in words and numbers. The written word shall govern.

Addenda

Acknowledge the receipt of each addendum by writing in the number of the addendum and the date received.

Acceptance

Proposal is signed by authorized person

Name of Business - complete spelling of bidder's name and address - exact as recorded at the Secretary of State [<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp>] which should be the same as you applied for at the Mississippi State Board of Contractors [<http://www.msbc.us/Search2.CFM>] (see 2.07, 3.01, 5.01, proposal form)

Legal address of the business listed above (at SOS and Contractor's Board)

Correct Certificate of Responsibility Number(s) as it appears in the current Mississippi State Board of Contractors Roster

Certificate of Responsibility Number(s) on envelope (see below for on proposal form)

Base Bid is under \$50,000 and no number is required

Base Bid is under \$50,000 and the statement "bid does not exceed \$50,000" is on the outside of the sealed envelope

Base Bid is over \$50,000 and number is required

Joint Venture and *joint venture* number is required

OR Joint Venture participants' numbers are required

5.02 BID SECURITY:

Included Bid Bond

OR Included Certified Check

5.03 POWER OF ATTORNEY:

Included Power of Attorney

5.04 NON-RESIDENT BIDDER:

Attached a Copy of Non-Resident Bidder's Preference Law

OR Attached a Statement

5.05 SUB-CONTRACTORS NAME Refer to 1.04 for responsiveness (modified Dec 2013)

List any Mechanical, Plumbing, and/or Electrical Sub-Contractors regardless of cost. * List name even for under \$50,000

* Fire Protection Sprinkler Contractors do not have to be listed

* If there is a separate HVAC/Plumbing Sub-Contractor, so notate as mentioned herein

* If Mechanical, Plumbing, and/or Electrical Sub-Contractor is performed by the General, be sure the General has a COR for said discipline

* If there is no Mechanical, Plumbing, and/or Electrical Sub-Contractor listed, then use of Sub-Contractor to perform such scope will not be permitted.

5.06 SUB-CONTRACTORS' COR NUMBER Refer to 1.04 for responsiveness (modified Dec 2013)

* List Certificate of Responsibility Number for any listed Sub-Contractor over \$50,000.00

* If under \$50,000 – so notate on the COR line "under \$50,000" (or can still show COR#)

***** END OF SECTION *****

**PROPOSAL FORM
SECTION 00300**

To: Department of Marine Resources
1141 Bayview Avenue
Biloxi, MS

Re: Project # _____
Project Title PASS CHRISTIAN - SITE DEMOLITION AND SITE WORK (REBID)
Location PASS CHRISTIAN, MS

I propose to complete all work in accordance with the Project Manual and Drawings within 90 consecutive calendar days for the sum of: (Professional must specify number of days)

BASE BID: (Write in the amount of the base bid in words and numbers. The written word shall govern.)

_____ Dollars (\$_____)

ALTERNATES: (Write in the amount of all of the alternates in words and numbers. The written word shall govern.)

Alternate #1 (X) Adds () Deducts

_____ Dollars (\$_____)

Description Landscape Lighting

Alternate #2 (X) Adds () Deducts

_____ Dollars (\$_____)

Description Landscape Planting (as per plans)

Alternate #3 (X) Adds () Deducts

_____ Dollars (\$_____)

Description Maintenance Access Area

ADDENDA ACKNOWLEDGMENT: (date below can be the date Addendum was issued OR the date Addendum was received by Bidder)

No. _____ Date _____ No. _____ Date _____

No. _____ Date _____ No. _____ Date _____

↑Complete all lines including #1↑

ACCEPTANCE:

I certify that I am authorized to enter into a binding contract, if this Proposal is accepted.

Signature _____ Date _____

Name and Title _____

Name of Business _____

Complete spelling of bidder's name and address - **exact as recorded at the Secretary of State** [<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp>] which should be the same as you applied for at the Mississippi State Board of Contractors [<http://www.msbc.org/Search2.CFM>] (see 2.07, 3.01, 5.01) **PLEASE LOOK IT UP at SoS. SoS rules when the 2 are different.**

Address _____ (mailing)

Address _____ (physical)

City/State/Zip Code _____ County _____

Phone _____ Fax _____ Email _____

■ Bidder's Certificate of Responsibility Numbers(s): _____

■ MINORITY BUSINESS ENTERPRISE? Yes _____ No _____ (to assist with Code 57-1-57)

■ Attach copy of Non-Resident Bidder's Preference Law (5.04 of Bidder's Checklist)

■ **Mechanical / Plumbing / Electrical Contractors:** (modified Dec 2013

Regarding said Divisions of the Specifications of the BoB Standard Form of Agreement Between The Owner and The Contractor

List any Mechanical/Plumbing and/or Electrical Sub-Contractors that will perform work of this contract. COR must be included where sub-contract exceeds \$50,000.00. If no sub-contractor is listed, and such work is within scope of contract, bidder's own COR classification(s) must be sufficient to self-perform any such work. If no sub-contractor is listed, then use of sub-contractor to perform such scope will not be permitted. This is in accordance with 5.05 and 5.06 of the Bidder's Checklist revised below.

Mechanical Contractor: _____ Certificate of Responsibility No. _____

Plumbing Contractor: _____ Certificate of Responsibility No. _____

Electrical Contractor: _____ Certificate of Responsibility No. _____

■ Mississippi Department of Agriculture & Commerce
Bureau of Plant Industry
Landscape License Number _____ MS Code 69-19-1 - 69-19-15

↑Complete for prime landscaping projects

**STANDARD FORM OF AGREEMENT BETWEEN
THE OWNER AND THE CONTRACTOR
SECTION 00500**

This Agreement made the _____ day of _____, 20____ between the Owner,

Owner

created by _____ et seq., **Mississippi Code of 1972, Annotated**, and acting for the State of Mississippi;

and between the Contractor:

Business Name _____
Address _____
City/State/Zip _____ Fax: _____ Email: _____

The Contractor is a (check and complete one of the following):

_____ CORPORATION or LLC solely organized and existing under the laws of the State of _____ and having its principal office in _____, _____,

(City) (County) (State)

_____ PARTNERSHIP of the following (list all partners):

_____ SOLE PROPRIETORSHIP

For the following Project:
Pass Christian
Site Demolition and Site Work (REBID)
Department of Marine Resources

This Agreement entered into as of the day and year first written above:

OWNER: OWNER

CONTRACTOR:

By: _____
(Signature)

By: _____
(Signature)

(Name and Title)

(Name and Title)

APPROVED AS TO FORM:

By: _____
(Signature of Attorney)

THE OWNER AND THE CONTRACTOR AGREE AS SET FORTH IN PAGES ONE THROUGH THREE, ARTICLES ONE THROUGH FIVE, AS FOLLOWS:

ARTICLE 1: THE WORK AND CONTRACT DOCUMENTS
THE WORK

1.1.1 The Contractor will perform all the work required by the Contract Documents for the Project indicated above.

1.2 THE CONTRACT DOCUMENTS

1.2.1 The Contract Documents which constitute the entire Agreement between the Owner and the Contractor, are enumerated as follows:

1.2.2 Project Manual dated June 2016

BIDDING REQUIREMENTS

- Advertisement for Bids
- Instructions to Bidders
- Proposal Form

STANDARD FORM OF AGREEMENT BETWEEN THE OWNER AND THE CONTRACTOR

CONTRACT BOND

POWER OF ATTORNEY

CERTIFICATE OF INSURANCE

CONDITIONS OF THE CONTRACT

- General Conditions
- Supplementary Conditions
- Labor Requirements
- Addenda

SPECIFICATIONS (check the specs listed on the contents and included in the manual)

- Division One: General Requirements
- Division One Supplements
- Division Two: Site Work
- Division Three: Concrete
- Division Four: Masonry
- Division Five: Metals
- Division Six: Wood and Plastics
- Division Seven: Thermal and Moisture Protection
- Division Eight: Doors and Windows
- Division Nine: Finishes
- Division Ten: Specialties
- Division Eleven: Equipment
- Division Twelve: Furnishings
- Division Thirteen: Special Construction
- Division Fourteen: Conveying Systems
- Division Fifteen: Mechanical
- Division Sixteen: Electrical
- Division Seventeen: Commissioning

1.2.3 Addenda

- Addendum No. 1, dated _____
- Addendum No. 2, dated _____
- Addendum No. 3, dated _____
- Addendum No. 4, dated _____
- Addendum No. 5, dated _____

1.2.4 Drawings dated _____

- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____

- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____
- Sheets No. _____ through _____

1.2.5.1 Other documents, dated

ARTICLE 2: CONTRACT SUM

2.1 CONTRACT SUM

2.1.1 The Owner will pay the Contractor in current funds for the performance of the work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract sum of _____ Dollars

(\$ _____). The Contract sum is determined as follows:

Base Bid		\$ _____
Modifications () Adds () Deducts		\$ _____
Negotiations		\$ _____
Alternate No. _____ () Adds () Deducts		\$ _____
Alternate No. _____ () Adds () Deducts		\$ _____
Alternate No. _____ () Adds () Deducts		\$ _____
Alternate No. _____ () Adds () Deducts		\$ _____
Alternate No. _____ () Adds () Deducts		\$ _____
Total Contract Sum		\$ _____

2.2 LIQUIDATED DAMAGES

2.2.1 The stipulated liquidated damages described in Paragraph 9.11 of the *Supplementary Conditions* are in the amount of Two Hundred Fifty Dollars (\$ 250.00) for each calendar day.

ARTICLE 3: CONTRACT TIME

3.1 TIME

3.1.1 The work to be performed under this Contract shall be commenced upon the date stated in the *Notice to Proceed*. The work is to be substantially complete, subject to approved Change Orders, no later than _____ calendar days from the date stated in the *Notice to Proceed*.

ARTICLE 4: PAYMENTS AND FINAL PAYMENTS

4.1 PROGRESS PAYMENTS

4.1.1 Based upon applications for payment submitted to the Professional by the Contractor and *Certificates for Payment* issued by the Professional, the Owner will make progress payments on account of the Contract sum to the Contractor as provided in the Contract Documents.

4.2 FINAL PAYMENT

4.2.1 Final payment constituting the entire balance of the Contract sum will be paid by the Owner to the Contractor when the work has been completed, the Contract fully performed and a final Certificate for Payment has been issued by the Professional and approved by the Owner.

ARTICLE 5: MISCELLANEOUS PROVISION

5.1 DEFINITION OF TERMS

5.1.1 Terms used in this Agreement which are defined in the Conditions of the Contract will have the meanings designated in those Conditions.

5.2 CONTRACTOR'S INTEREST IN AGREEMENT

5.2.1 The Contractor will not assign, sublet, or transfer the interest in this Contract agreement without the written consent of the Owner. The Owner and Contractor hereby agree to the full performance of the covenants contained herein.

5.3 **PROFESSIONAL**

5.3.1 The Professional assigned to this Project is as follows:

Name Allred Architectural Group, PA

Address 628 Washington Avenue - Suite C, Ocean Springs, MS 39564

Telephone (228) 762-1975 Fax Number (228) 769-9545 E-Mail Address hopyy@allredarchitecturalgroup.com

***** END OF SECTION *****

**CONTRACT BOND
SECTION 00600**

I. PREAMBLE

KNOW ALL MEN BY THESE PRESENTS: THAT _____,
Principal, a _____, residing at
_____, authorized to do business in the State of Mississippi
under the laws thereof, and _____ Surety, a corporation of the State of
_____, authorized to do business in the State of Mississippi under the laws thereof, are held and firmly
bound unto the Owner of the State of Mississippi, Obligee, hereinafter referred to as "Owner," for the use and benefit of the Owner and those
claimants and others set forth herein below and described in Sections 31-5-51 and 31-5-3, **Mississippi Code of 1972, Annotated**, as amended,
in the amount of _____ Dollars (\$ _____), lawful
money of the United States, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors
and assigns, jointly and severally, firmly by these present.

WHEREAS, Principal has by written agreement dated _____, 20_____, entered into a Contract with
the Owner for the following:

as provided in said Contract and in accordance with the Contract Documents. All of the terms and provisions of the above mentioned Contract,
drawings, Project Manual, and addenda are by reference made a part hereof and fully incorporated herein, and are hereinafter referred to as
"the Contract." All of the terms and provisions of Sections 31-5-51, 31-5-3, supra, Section 31-5-53 of the **Mississippi Code of 1972, Annotated**,
as amended, and all other code sections cited herein are also by reference made a part hereof and fully incorporated herein.

II. PERFORMANCE BOND

NOW, THEREFORE, the condition of this Performance Bond is such that if Principal shall promptly and faithfully perform said Contract, then
this obligation shall be null and void; otherwise, it shall remain in full force and effect, subject however, to the following conditions:

Whenever the Owner has performed its obligation but the Principal has defaulted under the terms of the Contract, or any portion thereof, and
the Owner has declared the Principal to be in default, the Surety shall promptly:

1. Remedy the default, or
2. Complete the Contract in accordance with its terms and conditions, or
3. Procure the completion of the Contract in accordance with its terms and conditions.

Even if there should be a succession of defaults, the Surety is responsible for completion of the Contract. The Surety shall provide sufficient
funds to pay the cost of completion of the Contract in its entirety including other costs and damages for which the Surety may be liable
thereunder, less the balance of the Contract price. The term "balance of the Contract price," as used in this paragraph, shall mean the total
amount payable by Owner to Principal under the Contract and any Change Orders thereto, less the amount paid by Owner to Principal.

III. LABOR AND MATERIAL PAYMENT BOND

NOW, THEREFORE, the condition of this Labor and Material Payment Bond is such that if Principal shall promptly make payments to all
persons supplying labor or material used in the prosecution of the work under said Contract, then this obligation shall be null and void;
otherwise, it shall remain in full force and effect; however, the Owner shall not be liable for the payment of any costs or expenses of any suit
described in Subsection (2) of Section 31-5-51, supra.

IV. BOND FOR PAYMENT OF TAXES AND OTHER ASSESSMENTS

NOW THEREFORE, the condition of this Bond for Payment of Taxes and Other Assessments is such that if Principal shall promptly make payment of all taxes, licenses, assignments, contributions, damages, penalties, and interest thereon, when and as the same may lawfully be due the State of Mississippi, or any County, Municipality, Board, Department, Commission, or political subdivision thereof, by reason of and directly connected with the performance of said Contract or any part thereof as provided by Sections 27-65-1, 27-65-21, 27-67-1, and 31-5-3, **Mississippi Code 1972, Annotated**, or any other applicable statute or other authority, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

V. GENERAL CONDITIONS

The following conditions apply to all three (3) of the above-mentioned Bonds:

1. The Performance Bond is for an amount equal to the full amount of said Contract.
2. The Labor and Material Payment Bond is for an amount equal to the full amount of said Contract.
3. If any changes are made in the work, or any extensions of time are granted, or any increases in the total dollar amount of the Contract are made, such changes, extensions, increases, or other forbearance on the part of either the Owner or the Principal will not, in any way, release the Principal and Surety, or either of them, from their liability hereunder, or any portion thereof, notice to the Surety of any such change, extension, increase, or forbearance being expressly waived.
4. These Bonds are governed by and shall be construed in accordance with Mississippi law. Any inconsistency with these Bonds and any provision of Mississippi law shall be remedied by deleting the inconsistent portion of these Bonds and leaving the remaining consistent portions in full force and effect.

Signed and sealed this _____ day of _____, 20_____.

SURETY _____

By: _____
(Signature)

Attorney-in-Fact
(Typed Name) (Title)

(Surety Address)

(Surety City/State/Zip/Phone)

COUNTERSIGNED:

MISSISSIPPI LICENSED AGENT COMPANY NAME

(Signature)

Licensed Mississippi Agent
(Typed Name) (Title)

(MS Licensed Agent Address)

(MS Licensed Agent City/State/Zip/Phone)

PRINCIPAL _____

By: _____
(Signature)

(Typed Name and Title)

(Address)

(City/State/Zip/Phone)

Surety Company, Surety Agent's Name, Address, etc. should be typed and with seal (preferably embossed seal) on Bond and P/A. The P/A should be for the Attorney-in-Fact with seal (preferably embossed seal).

The Contract Bond shall be duly executed by the Bidder AND a MS Licensed Agent said Surety approved by the MS Ins Dept
OR
signed by the Surety's Agent AND countersigned by a MS Licensed Agent for said Surety approved by the MS Ins Dept.

Countersignature can be the same as the Attorney-in-Fact when the Attorney-in-Fact is licensed in Mississippi. Countersignature will be different when the Attorney-in-Fact is "not" licensed in Mississippi. P/A will be for the Attorney-in-Fact.

Check the Surety Company AND the Surety Agent AND/OR the Countersignature at MS Ins Dept web:
http://www.mid.ms.gov/licapp/search_main.aspx

Easier to locate Agent at MID when name agrees with MID licensed name.)

SECTION 00650

**STANDARD CONSTRUCTION CONTRACT
CERTIFICATE OF INSURANCE**

This certificate of insurance neither affirmatively nor negatively amends, extends, or alters the coverage afforded by the policies below.

INSURED: (Contractor's Name & Address)				COMPANIES PROVIDING COVERAGE w/ MID Lic or NAIC #		
				A		
PROJECT: (Number, Name & Location)				B		
				C		
				D		
OWNER: Owner				E		
				F		
				Companies above must be approved by the MS Ins Dept at http://www.mid.ms.gov/licapp/search_main.aspx per Code & WComp at http://www.mwcc.ms.gov/		
Type Insurance	Co	Policy Number	Policy Period	Coverage and Minimum Amount		
General Liability Commercial General Liability				General Aggregate		
				\$ 1,000,000		
				Products Comp/Ops (Aggregate)		
				\$ 1,000,000		
				Personal Injury (Per Occurrence)		
				\$ 500,000		
				BI & PD (Per Occurrence)		
				\$ 500,000		
				Fire Damage (Per Fire)		
				\$ 50,000		
				Medical Expense (Per Person)		
				\$ 5,000		
Owners/Contractors Protective Liability				General Aggregate		
				\$ 1,000,000		
				Per Occurrence		
				\$ 500,000		
Automobile Liability				Bodily Injury/Property Damage Combined Single Limit (Per Occurrence)		
				\$ 500,000		
				OR	Bodily Injury (Per Person)	
					\$ 250,000	
Bodily Injury (Per Accident)						
		\$ 500,000				
		Property Damage (Per Occurrence)				
		\$ 100,000				
* Excess Liability (Umbrella on projects over \$500,000)				Aggregate		
				\$ 1,000,000		
				Per Occurrence		
				\$ 1,000,000		
Workers' Compensation (As required by Statute) Employers' Liability				Accident (Per Occurrence)		
				\$ 100,000		
				Disease-Policy Limit		
				\$ 500,000		
				Disease-Per Employee		
				\$ 100,000		
Property Insurance (not required when project is demolition ONLY - required for ALL other projects including paving)				OR	Builders' Risk	
					Installation Floater	
				Must be equal to Value of Work		
Other						
Certification: I certify that these policies (subject to their terms, conditions and exclusions) have been (1) issued to the Insured for the coverages and at least the amounts as indicated by companies licensed in Mississippi; (2) countersigned by a Mississippi Licensed Agent; and (3) endorsed to require the company to give thirty (30) days written notice to the Owner prior to cancellation or non-renewal of above.						
Producing Agent: (Name, Address and Telephone)				(Signature) _____ (Date) _____		
				(Name and Title of Authorized Representative) (typed)		
				Agent must be approved by the MS Ins Dept http://www.mid.ms.gov/licapp/search_main.aspx		

Check if Mississippi Licensed Agent
OR Countersign by Mississippi Licensed Agent MID Lic # _____

Division 0

June 2011

CERTIFICATE OF INSURANCE INSTRUCTIONS
SECTION 00650

1. The *Certificate of Insurance* is a tabulation of insurance required for this Project as specified in Article 11 entitled *Insurance and Bonds* in the General Conditions (AIA Document A201, Sixteenth Edition, 2007).
2. The *Certificate of Insurance* must be completed, certified by the original signature of a Mississippi Licensed Insurance Agent and/or countersignature, dated, and bound in each set of the Contract Documents. Insurance Companies providing coverage and Agent and/or Countersignature Agent must be approved by the Mississippi Insurance Department on their web at http://www.mid.ms.gov/licapp/search_main.aspx. (Agent does not have to be on the MID web "for providers necessarily" – but must be an approved Agent on MID web. Easier to locate Agent at MID when name agrees with MID licensed name.)
3. Indicate Insured, Project, Companies providing coverage, policy numbers and policy periods in the blanks as applicable.
4. If the "OWNERS/CONTRACTORS PROTECTIVE LIABILITY" insurance is part of the Commercial General Liability Insurance Policy, or included by endorsement, indicate the policy number and period of the CGL policy in the "OWNERS/CONTRACTORS PROTECTIVE LIABILITY" blank spaces.
5. Automobile Liability Insurance may be provided which covers Bodily Injury and Property Damage in one (1) Combined Single Limit, or may be provided with separate minimum limits as shown on the Certificate of Insurance and specified in Article 11 of the Supplementary Conditions. The person signing the Certificate of Insurance should show which option the Contractor has selected by marking out the coverage that is not provided under the policies indicated.
6. OTHER INSURANCE (if required) will be indicated by typing in the "OTHER" block and detailed in Article 11 of the Supplementary Conditions.
7. CERTIFICATION wording may not be changed without specific written approval from the Owner.
8. "Riders", Binders, TBA, TBD, or other unsolicited attachments, are not allowed as part of the *Certificate of Insurance* unless specifically requested in writing by the Owner, or specified as part of the requirements for this Project.
9. CAUTION: The *Certificate of Insurance* is intended to be used for all Projects. The Contractor must provide all insurance specified in the Contract Documents for this Project, whether indicated on this form, or not. The Contractor must verify all insurance has been provided as required.
10. In accepting the Insurance Certificate by Owner, it would be helpful if some indication is given when, and if, the Provider is a Surplus Line Carrier, a Broker, or Self Insured (because they may not be on the MID web list referenced herein). (The Owner will have to ask MID (or know) at some point.)
11. The Workers Comp insurance provider must be approved and show up on the Workers Comp web at <http://www.mwcc.state.ms.us/Services/ProofofCoverageInquiry/accept/> etc. and at the last step – enter the "contractor's name".

Note: Regarding #2 and #11. At the MID web – you enter the Surety Company / Provider / Agent. At the MWCC web – you enter the Vendor's name, then click on the policy number to see the MWCC Ins Provider.

*** END OF SECTION ***

GENERAL CONDITIONS

Division 0

June 2011

SECTION 00700

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **SCOPE:** The **General Conditions of the Contract for Construction**, AIA Document A201, Sixteenth Edition, 2007, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated herein.
- B. **BIDDING COPY:** For the purpose of bidding, Contractors are presumed to be familiar with AIA Document A201, a copy of which may be obtained from the Professional, or examined in the Professional's office.

***** END OF SECTION *****

**SUMMARY OF WORK
SECTION 01010**

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. **Work Covered:** Work covered by the Contract Documents is as shown in drawings and described in words in the Project Manual. The Project Title and location is indicated on the first page of this Project Manual.
- B. **Start of Work:** Work shall be started immediately upon issuance of a *Notice to Proceed*. Prior to this, all Contracts and beginning documents will have been executed and insurance in force.
- C. **Time of Completion:** The completion of this Work is to be on, or before, the time indicated in the *Standard Form of Agreement Between the Owner and the Contractor*.
- D. **Contractor's Duties:**
1. Except as specifically noted, provide and pay for:
 - a. Labor, materials and equipment.
 - b. Tools, construction equipment and machinery.
 - c. Water, heat and utilities required for construction.
 - d. Other facilities and services necessary for proper execution and completion of the Work.
 2. Pay legally required sales, consumer, use, payroll, privilege and other taxes.
 3. Secure and pay for, as necessary for proper execution and completion of work, and as applicable at the time of the receipt of the bids:
 - a. Permits.
 - b. Government fees.
 - c. Licenses.
 4. Give required notices.
 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work.
 6. Promptly submit written notice to Professional of observed variance of Contract Documents from legal requirements. It is not the Contractor's responsibility to make certain that drawings and specifications comply with codes and regulations. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for work known to be contrary to such requirements, without notice.
 7. Enforce strict discipline and good order among employees. Do not employ or work unfit persons, or persons, not skilled in assigned task.
 8. Provide a written safety plan.
- E. **Hazardous Materials:** The Prime General Contractor is responsible for the removal and disposal of any hazardous materials encountered in the performance of the Contract requirements. Hazardous Containing Materials [HCM] include, but are not limited to, Asbestos and Lead Paint and should be identified and removed as a part of the Contract. The absence of details does not relieve the Prime General Contractor from the responsibility of removal and disposal; but, a Change Order could be executed in the absence of identified HCM in the documents.
- F. **Subcontractor's List:** The Prime General Contractor will submit to the Owner a list of all Subcontractors, including disciplines and COR #'s, over Fifty Thousand Dollars (\$50,000.00) to be used on the Project prior to contract award by the Owner. Any Sub-Contractor listed must be acceptable to the Owner. Additionally, include any Mechanical, Plumbing, or Electrical Sub-Contractor listed on Proposal Form regardless of amount. (Modified Jan 2015)
The Prime General Contractor will submit to the Owner within seven (7) days from the Notice to Proceed, a completed *Minority Tracking Form* (attached as Exhibit "A" at the end of Division 1 Section 01900) outlining the use of minority subcontractors that will be used on the project.
- G. **Coordination:** The Prime General Contractor is responsible for the coordination of the total project. All other Prime Contractors and all Subcontractors will cooperate with the Prime General Contractor so as to facilitate the general progress of the Work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work. Refer to Section 01041 entitled *Project Coordination*.

1.02 **CONTRACTS**

- A. **Contracts:** Construct work under a single Prime General Contract. Refer to Section 00500 entitled *Standard Form of Agreement Between the Owner and the Contractor*.

1.03 **WORK BY OTHERS**

Work by Others shall be described in each appropriate Project Manual section and noted on the Drawings.

1.04 **OWNER-FURNISHED PRODUCTS**

- A. **Products Furnished By Owner:** Products furnished by Owner shall be described in each appropriate Project Manual section and noted on the Drawings.
- B. **Products:** Delivered and unloaded at site.
- C. **Owner's Duties:**
1. Schedule delivery date with Supplier in accordance with construction schedule.
 2. Obtain installation drawings and instructions.
 3. Submit claims for transportation damages.
 4. Arrange Guarantees, Warranties, etc.
- D. **Contractor's Duties:**
1. Designate required delivery date for each product in construction schedule.
 2. Promptly inspect delivered products, report missing, damaged, or defective items.
 3. Handle at site, including uncrating and storage.
 4. Protect from exposure to elements and from damage.
 5. Repair or replace damaged items resulting from Contractor's operations.
 6. Install and make final connections.

1.05 **CONTRACTOR'S USE OF PREMISES**

- A. Confine operations at site to areas permitted by:
1. Law.
 2. Ordinances.
 3. Permits.
 4. Contract Documents.
 5. Owner.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products which interfere with operations of Owner or other Contractors.
- F. Obtain and pay for use of additional storage or work areas needed for operations.
- G. Limit use of site for work and storage to the area indicated in the drawings.

1.06 **SUMMARY OF WORK SUPPLEMENT**

- A. Refer to Section 01900 entitled *Division One Supplement* for Project specific summary of work requirements.

**ALLOWANCES
SECTION 01020**

1.01 DESCRIPTION

- A. **Related Work Specified Elsewhere:** Sections of Specifications as listed under Schedule of Allowances.
- B. **Allowances for Products:**
 - 1. Purchase products under each allowance as directed by the Professional.
 - 2. Amount of each allowance includes:
 - a. Net cost of product.
 - b. Delivery and unloading at site.
 - c. Applicable taxes.
 - 3. In addition to amounts of allowances, include in bid, for inclusion in Contract sum, Contractor's costs for:
 - a. Handling at site, including uncrating and storage.
 - b. Protection from elements and damage.
 - c. Labor, installation and finishing.
 - d. Other expenses required to complete installation.
 - e. Overhead and profit.
- C. **Selection of Products:**
 - 1. **Architect's Duties:** Consult with Contractor in consideration of products and Suppliers; make selections, designate products to be used; and, notify Contractor in writing.
 - 2. **Contractor's Duties:** Assist Professional in determining qualified Suppliers; obtain proposals from Suppliers when requested by the Professional; and, make appropriate recommendations for consideration of the Professional. Upon notification of selection, enter into Purchase Agreement with designated Supplier.
- D. **Delivery:** The Contractor is responsible for arranging all delivery and unloading and should promptly inspect products for damage or defects and submit claims for transportation damage.
- E. **Installation:** Comply with requirements of referenced specification section.
- F. **Adjustment of Costs:** Should actual purchase cost be more, or less, than the specified allowance amount, the Contract Sum will be adjusted by Change Order equal to the amount of the difference.

1.02 SCHEDULE OF ALLOWANCES

- A. Refer to Section 01900 entitled *Division One Supplement* for Project specific Schedule of Allowances.

**SCHEDULE OF VALUES
SECTION 01025**

1.01 DESCRIPTION

- A. **Scope:** Submit a *Schedule of Values* to the Professional at least ten (10) days prior to submitting the first Application for Payment. Upon the Professional's request, the Contractor will provide supportive data substantiating their correctness. Use *Schedule of Values* only as basis for Contractor's Application for Payment.
- B. **Form of Submittal:** Submit Schedule of Values on AIA Document G703, or computer generated form containing similar style, using Table of Contents of these Specifications as basis for format for listing costs of work for sections under Divisions 2-16. Identify each line item with number and title as listed in Table of Contents in these Specifications.

-
- C. **Preparing Schedule of Values:**
 - 1. Itemize separate line item cost for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, temporary facilities and controls.
 - 2. Itemize separate line item cost for work required by each Section of these Specifications. Break down installed cost with overhead and profit.
 - 3. For each line item which has installed value of more than \$20,000, break down costs to list major products for operations under each item, rounding figures to nearest dollar. Make sum of total costs of all items listed in Schedule equal to total Contract sum.

 - D. **Preparing Schedule of Unit Material Values:**
 - 1. Submit separate Schedule of unit prices for materials to be stored on which progress payments will be made. Make form of submittal parallel to Schedule of Values with each line item identified same as line item in Schedule of Values. Include in unit prices only: cost of material, delivery, unloading at site, and sales tax.
 - 2. Make sure unit prices multiplied by quantities equal material cost of that item in Schedule of Values.

 - E. **Review and Resubmittal:** After Professional's review, if requested, revise and resubmit Schedule of Values in same manner.

**APPLICATIONS FOR PAYMENT
SECTION 01027**

1.01 **SCOPE**

- A. This Section describes procedures for preparing and submitting Applications for Payment by the Contractor.

1.02 **APPLICATIONS FOR PAYMENT**

- A. **Format:**
 - 1. Applications for Payments will be prepared on AIA forms G702 - *Application and Certificate for Payment* and G703 - *Continuation Sheet*; or, a computer generated form containing similar data may be used.

- B. **Preparation of Application:**
 - 1. Present required information in typewritten form
 - 2. Execute certification by signature of authorized officer
 - 3. Use data from approved *Schedule of Values*. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
 - 4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original Item of Work.
 - 5. Prepare Application for Final Payment as specified in Section 01700 entitled *Contract Closeout*.

- C. **Submittal Procedures**
 - 1. Submit original and one (1) copy of each Application for Payment
 - 2. Submit an updated construction schedule with each Application for Payment as described in Section 01310 entitled *Progress Schedule* or Section 01311 entitled *Network Analysis Schedules*.
 - 3. Submit requests for payment at intervals agreed upon by the Professional, Owner and Contractor.
 - 4. Submit requests to the Professional at agreed upon times, or as may be directed otherwise.

- D. **Substantiating Data:**
 - 1. Submit data justifying dollar amounts in question when such information is needed.
 - 2. Provide one (1) copy of the data with a cover letter for each submittal.
 - 3. Indicate the Application number, date and line item number and description.

**CHANGE ORDER PROCEDURES
SECTION 01028**

1.01 SCOPE

- A. This Section describes the procedures for processing Change Orders by the Professional and the Contractor.

1.02 CHANGE ORDER PROCEDURES

- A. **Change Proposed by Professional:** The Professional may issue a Proposal Request to the Contractor which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. The Contractor will prepare and submit an estimate within ten (10) days.
- B. **Change Proposed by Contractor:** The Contractor may propose a change by submitting a request for change to the Professional, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01630 entitled *Substitutions and Product Options*.
- C. **Contractor's Documentation:**
1. Maintain detailed records of Work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and substantiate costs of changes in the Work.
 2. Document each quotation for a change in cost or time with sufficient data allowing evaluation of the quotation.
 3. On request, provide additional data to support computations:
 - a. Quantities of products, labor, and equipment
 - b. Taxes, insurance and bonds
 - c. Overhead and profit
 - d. Justification for any change in Contract Time
 - e. Credit for deletions from Contract, similarly documented
 4. Support each claim for additional costs, and for Work completed on a time and material basis, with additional information:
 - a. Origin and date of claim
 - b. Dates and times work was performed and by whom
 - c. Time records and wage rates paid
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- D. **Construction Change Directive:** The Professional may issue a document, approved by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time. The change in Work will be promptly executed.
- E. **Format:** The Professional will prepare five (5) originals of the Change Order using the Owner's *Change Order Form*. (see also 700.20)
- F. **Types of Change Orders:**
1. **Stipulated Sum Change Order:** Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by the Professional.
 2. **Unit Price Change Order:** For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Time and Material Change Order.

-
- 3. **Time and Material Change Order:** Submit itemized account and supporting data after completion of change, within time limits indicated in the *Standard Form of Agreement Between the Owner and the Contractor*. The Professional will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents. The Contractor shall maintain detailed records of Work accomplished on Time and Material basis and shall provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
 - G. **Execution of Change Order:** The Professional will issue Change Orders for signatures of parties as provided in the *Standard Form of Agreement Between the Owner and the Contractor*. Final execution of all Change Orders requires approval by the Owner.
 - H. **Correlation of Contractor Submittals:** The Contract shall promptly revise *Schedule of Values* and the *Application for Payment* forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit. Promptly enter changes in Project Record Documents.

**ALTERNATES
SECTION 01030**

1.01 **DESCRIPTION**

- A. **Scope:** This section describes the changes to be made under each alternate.
- B. **General:** The referenced Specification sections contain the pertinent requirements for materials and methods to achieve the work described herein. Coordinate related work and modify surrounding work, as required, to complete the Project under each alternate designated in the Contract.

1.02 **DESCRIPTION OF ALTERNATES**

- A. Refer to Section 01900 entitled *Division One Supplement* for Project specific description of project Alternates.

**PROJECT COORDINATION
SECTION 01041**

1.01 **DESCRIPTION**

- A. **Scope:** To set forth procedures, conditions and responsibility for coordination of the total project.
- B. **Project Coordinator:** The General Contractor will designate one (1) individual as Project Coordinator or Superintendent, as referred to in the General Conditions. Prior to beginning the Work, the name and qualifications will be submitted, in writing, to the Professional. Upon the approval of the Professional and the Owner, the Project Coordinator will remain until the Project is completed and cannot be removed during construction without the written consent of the Owner and the Professional.

1.02 **DUTIES OF PROJECT COORDINATOR**

- A. **General:**
 - 1. **Coordination:** Coordinate the work of all Subcontractors and Material Suppliers.
 - 2. **Supervision:** Supervise the activities of every phase of work taking place on the Project.
 - 3. **Mechanical/Electrical:** Take special care to coordinate and supervise the work of the plumbing, heating and cooling and electrical Subcontractors.
 - 4. **Communication:** Establish lines of authority and communication at the job site.
 - 5. **Location:** The Project Coordinator must be present on the job all of the time.
 - 6. **Permits:** Assist in obtaining building and special permits required for construction.

-
- B. **Interpretations of Contract Documents:**
 - 1. **Consultation:** Consult with Architects and Engineers to obtain interpretations.
 - 2. **Assistance:** Assist in resolution of any questions.
 - 3. **Transmission:** Transmit written interpretations to concerned parties.
 - C. **Cessation of Work:** Stop all work not in accordance with the requirements of the Contract Documents.
 - D. **Division One:** Coordinate and assist in the preparation of all requirements of Division One and specifically as follows:
 - 1. **Cutting and Patching:** Supervise and control all cutting and patching of other trades' work.
 - 2. **Project Meetings:** Schedule and preside at all project meetings.
 - 3. **Construction Schedules:** Prepare and submit all construction schedules; supervise work to monitor compliance with schedules.
 - 4. **Shop Drawings, Product Data and Samples:** Administer the processing of all submittals required by the Project Manual.
 - 5. **Schedule of Values:** Assist in preparation and be knowledgeable of each entry in the Schedule of Values.
 - 6. **Testing:** Coordinate all required testing.
 - 7. **Temporary Facilities and Controls:** Allocate, maintain and monitor all temporary facilities.
 - 8. **Substitutions and Product Options:** Administer the processing of all substitutions.
 - 9. **Project Closeout:** Conduct final inspections and assist in collection and preparation of closeout documents.
 - 10. **Cleaning:** Direct and execute a continuing cleaning program throughout construction, requiring each trade to dispose their own debris.
 - 11. **Project Record Documents:** Maintain up-to-date project record documents.
 - 12. **Safety Measures:** Plan and enforce all safety requirements.
 - E. **Changes:** Recommend and assist in the preparation of requests to the Professional for any changes in the Contract.
 - F. **Application for Payment:** Assist in the preparation and be knowledgeable of each entry in the Application and Certificate for Payment.

1.03 SUBCONTRACTOR'S DUTIES

- A. **General:** The Subcontractor is responsible for coordinating and supervising employees in the work to be accomplished under their part of the Contract.
- B. **Schedules:** Conduct work to assure compliance with construction schedules.
- C. **Suppliers:** Transmit all instructions to Material Suppliers.
- D. **Cooperation:** Cooperate with the Project Coordinator and other Subcontractors.

1.04 OWNER-PURCHASED PRODUCTS

- A. **General:** Cooperate, accept delivery, arrange storage and protect Owner-purchased products until installation, or final acceptance.

**CUTTING AND PATCHING
SECTION 01045**

1.01 GENERAL DESCRIPTION

- A. **Scope:** To set forth broad, general conditions covering cutting and patching that applies to everyone and everything on the job.
- B. Execute cutting including excavating, fitting, or patching of work required to:
 - 1. Make several parts fit properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract requirements.
 - 5. Install specified work in existing construction.
- C. In addition to Contract requirements, upon Professional's written instructions:
 - 1. Uncover work for observation of covered work.
 - 2. Remove samples of installed materials for testing.
 - 3. Remove work to provide alteration of existing work.
- D. Do not cut or alter work of another Contractor without permission.
- E. **Payment of Costs:** Costs caused by ill-timed, or defective work, or work not conforming to Contract Documents will be borne by party responsible for ill-timed, defective work, or non-conforming work.

1.02 MATERIALS/PRODUCTS

- A. **Materials for Replacement or Work Removed:** Comply with Specifications for type of work to be accomplished.

1.03 EXECUTION

- A. **Inspection:** Inspect existing conditions of work, including elements subject to movement, or damage during cutting and patching.
- B. **Preparation Prior to Cutting:** Provide shoring, bracing and support, as required, to maintain structural integrity of the building. Provide protection for other portions of work and protection from the elements.
- C. **Performance:**
 - 1. Execute cutting and demolition by methods which prevent damage to other work and will provide surfaces to receive installation of repairs and new work.
 - 2. Execute excavating and backfilling by methods which prevent damage to other work and prevent settlement.
 - 3. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
 - 4. Refinish entire surfaces, as necessary, to provide an even finish. Refinish continuous surfaces to the nearest intersection and assemblies entirely.

**PROJECT MEETINGS
SECTION 01200**

1.01

DESCRIPTION

- A. **Contractor's Responsibilities:** The General Contractor will administer all progress meetings which include the following:
1. Prepare agenda
 2. Distribute written notice of meetings seven (7) days in advance
 3. Make physical arrangements for and presiding at the meetings
 4. Record minutes
 5. Distribute copies of the minutes to participants within four (4) days
- B. **Pre-Construction Meeting:** The Owner will schedule a pre-construction meeting as soon as possible after the award of Contract and the issuance of a *Notice to Proceed*.
1. **Attendance:**
 - a. Owner
 - b. Professional and Consultants
 - c. General Contractor
 - d. Major Subcontractors, including mechanical and electrical
 - e. Representatives of governmental, or other regulatory agencies
 - f. Commissioning Authority Professional (if Cx on project)
 2. **Minimum Agenda:** (prepared by the General Contractor)
 - a. Distribute and discuss list of major Subcontractors and construction schedule
 - b. Critical work sequencing
 - c. Designation of responsible personnel
 - d. Procedures for maintaining record documents
 - e. Use of premises, including office and storage areas
 - f. Owner's requirements
 - g. Security procedures
 - h. Housekeeping procedures
 - i. Commissioning issues (if Cx on project)
 3. **Utilities:** A written agreement must be reached on how all utilities will be furnished and the rates the Contractor will be charged. This agreement should be resolved at this meeting. Refer to Section 1500 entitled *Construction Facilities and Temporary Controls* of this Project Manual for additional utility requirements.
- C. **Progress Meetings:**
1. The Owner will schedule regular meetings at the time of the pre-construction conference
 2. Hold all meetings as progress of work dictates
 3. **Attendance:**
 - a. Owner
 - b. Professional and Consultants
 - c. General Contractor
 - d. Subcontractors, as pertinent to the agenda
 - e. Commissioning Authority Professional (if Cx on project)
 4. **Minimum Agenda:**
 - a. Review, approve minutes of the previous meeting
 - b. Review work progress since last meeting
 - c. Note field inspections, problems and decisions
 - d. Identify problems which impede planned progress
 - e. Review off-site fabrication problems
 - f. Revise construction schedule, as indicated
 - g. Plan progress during the next work period
 - h. Review proposed changes
 - i. Complete other current business
 - j. Commissioning issues (if Cx on project)
- D. **Commissioning Meetings:** (if Cx on project) The Owner will schedule a commissioning scoping meeting at the pre-construction conference. Regular Commissioning Meetings will coincide with regularly scheduled Progress Meetings until such time that the Commissioning Process requires additional meetings. The Commissioning Authority Professional will chair, facilitate and document Commissioning Meetings.
1. **Attendance:**

- a. Owner
 - b. Commissioning Authority Professional
 - c. Professional and Consultants
 - d. General Contractor
 - e. Subcontractors, as pertinent to unresolved issues identified in current Issues Log
 - f. Testing, Adjusting and Balancing Contractor
 - g. Using Agency's Building Operator/Physical Plant Representative
2. Minimum Agenda:
- a. Review, approve minutes of the previous meeting
 - b. Review Issues Log

**PROGRESS SCHEDULES
SECTION 01310**

1.01 DESCRIPTION

- A. **Scope:** Provide projected construction schedules for entire work and revise periodically. The following is a minimum requirement and other type schedules are acceptable with Owner's approval. This type of schedule is acceptable for any Project whose initial Contract award amount if **less than** one (1) million dollars (\$1,000,000).
- B. **Form of Schedules:** Prepare in form of horizontal bar chart.
1. Provide separate horizontal bar column for each trade or operation.
 2. Place in order of the Table of Contents of Specifications.
 3. Identify each column by major Specification section number.
 4. Identify the first work day of each week by horizontal time scale.
 5. Scale and space to allow for updating.
- C. **Contents of Schedule:**
1. Provide complete sequence of construction by activity.
 2. Indicate dates for beginning and completion of each stage of construction.
 3. Identify work of separate floors, separate phases, or other logically grouped activities.
 4. Show projected percentage of completion for each item of work as of first day of month.
- D. **Updating:**
1. Show all changes occurring since previous submission of updated schedule.
 2. Indicate progress of each activity and completion dates.
- E. **Submittals:**
1. Submit initial schedules to the Professional within fifteen (15) days after date of Notice to Proceed.
 2. Submit to Professional periodically updated schedules accurately depicting progress to first day of each month.
 3. Submit two (2) copies, one (1) to be retained by the Professional and the other forwarded to the Owner.

**NETWORK ANALYSIS SCHEDULE
SECTION 01311**

1.01 DESCRIPTION

- A. **Scope:** Provide projected network analysis schedules for the entire Work and revise periodically. This type of schedule is acceptable for any Project whose initial Contract award amount is one million dollars (\$1,000,000), **or greater**.

1.02 REFERENCES

- A. **CPM in Construction:** The latest edition of the Manual entitled **The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry**, published by the Associated General Contractors of America (AGC) - Washington, D.C. shall be used.

1.03 QUALITY ASSURANCE

- A. **Contractor's Administrative Personnel:** Two (2) years minimum experience in using and monitoring CPM schedules on comparable Projects is required.

1.04 **FORMAT**

- A. **Listings:** Reading from left to right, in ascending order for each activity, identify each activity with the applicable specification section number.
- B. **Diagram Sheet Size:** Height and width as required.
- C. **Scale and Spacing:** To allow for notations and revisions.

1.05 **SCHEDULES**

- A. **Critical Path Methods:** Prepare network analysis diagrams and supporting mathematical analyses using the *Critical Path Method* under *Concepts and Methods* as outlined in the AGC's **The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry**.
- B. **Order of Work:** Illustrate order and interdependence of activities and sequence of Work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. **Complete Sequence of Construction:** Illustrate complete sequence of construction by activity, identifying work of separate stages. Provide dates for submittals and return of submittals; dates for procurement and delivery of products; and dates for installation and provision for testing. Provide legend for symbols and abbreviations used.
- D. **Mathematical Analysis:** Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers
 - 2. Activity description
 - 3. Estimated duration of activity, in maximum thirty (30) day intervals
 - 4. Earliest start date
 - 5. Earliest finish date
 - 6. Actual start date
 - 7. Actual finish date
 - 8. Latest start date
 - 9. Latest finish date
 - 10. Total and free float
 - 11. Monetary value of activity (keyed to *Schedule of Values*)
 - 12. Percentage of activity completed
 - 13. Responsibility
- E. **Analysis Program:** Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and recomputation of all dates and floats.
- F. **Required Sorts:** List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest
 - 2. By amount of float, then in order of early start
 - 3. By responsibility in order of earliest possible start date
 - 4. In order of latest allowable start dates
 - 5. In order of latest allowable finish dates
 - 6. Contractor's periodic payment request sorted by *Schedule of Values* listings, Specifications section
 - 7. Listing of basic input data which generates the report
 - 8. Listing of activities on the critical path
 - 9. Monthly cash flow
- G. **Schedule of Values:** Coordinate contents with *Schedule of Values* in Section 01300.

1.06 **SUBMITTALS FOR REVIEW**

- A. **Preliminary Network Diagram:** Within fifteen (15) days after the date established in the *Notice to Proceed* submit proposed preliminary network diagram defining planned operations for the first sixty (60) days of Work, with a general outline for the remaining Work.
- B. **Review:** Participate in review of preliminary and complete network diagrams jointly with the Professional.

-
- C. **Proposed Complete Network Diagram:** Within twenty (20) days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that mechanical and electrical Subcontractors have reviewed and accepted proposed schedule.
 - D. **Complete Network Diagram:** Within ten (10) days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
 - E. **Updated Network Schedules:** Submit updated network schedules with each Application for Payment.
 - F. **Copies:** Submit the number of opaque reproductions the Contractor requires, plus two (2) copies which will be retained by the Professional and the Owner.

1.07 **REVIEW AND EVALUATION**

- A. **Review:** Participate in joint review and evaluation of network diagrams and analysis with the Professional at each submittal.
- B. **Evaluate:** Evaluate Project status to determine Work behind schedule and Work ahead of schedule.
- C. **Revisions:** After review and approval of the Professional, revise as necessary as a result of the review and resubmit within ten (10) days.

1.08 **UPDATING SCHEDULES**

- A. **Schedules:** Maintain schedules to record actual start and finish dates of completed activities.
- B. **Progress:** Indicate progress of each activity to date of revision, with projected completion date of each activity. Update diagrams to graphically depict current status of Work.
- C. **Modifications:** Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. **Changes:** Indicate changes required to maintain Date of Substantial or Total Completion. These changes will be made only with the approval of the Professional.
- E. **Extensions:** Contract completion time will be adjusted only for causes specified in the Contract. Requests for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the Owner may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the Contract. Submission of proof based on revised activity logic duration and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in the request. The Owner's determination as to the total number of days of contract extension shall be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information. Actual delays in activities which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Owner will, within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Owner's decision. The Contractor shall submit each request for a change in the contract completion date to the Owner. The Contractor shall include as a part of each change order proposal, a sketch showing all CPM revisions, duration changes, and cost changes, for the work in question and its relationship to other activities on the approved arrow diagram.
- F. **Substantiate:** Submit sorts required to support recommended changes.
- G. **Report:** Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

1.09 **DISTRIBUTION**

- A. **Distribution of Copies:** Following joint review, distribute copies of updated schedules to Contractor's Project site, to Subcontractors, Suppliers, Professional and Owner.
- B. **Reporting Problems:** Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

**SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
SECTION 01340**

1.01

DESCRIPTION

- A. **Scope:** Submit to the Professional shop drawings, product data and samples required by Specification sections. Submit an additional copy of shop drawings, product data and samples related to items/systems identified to be commissioned to the Commissioning Authority Professional to be reviewed concurrently with the Professional. (if Cx on project).
- B. **Shop Drawings:** Original drawings prepared by Contractor, Subcontractor, Supplier, or Distributor which illustrate some portion of the Work; showing fabrication, layout, setting, or erection details.
1. Prepared by a qualified detailer.
 2. Identify details by reference to sheet and detail numbers shown on Contract drawings.
 3. Minimum sheet size: 8 1/2" x 11"
 4. Reproductions for submittals: Opaque diazo prints.
- C. **Product Data:**
1. **Manufacturer's Standard Schematic Drawings:** Modify drawings to delete information which is not applicable to the Project. Supplement standard information to provide additional information applicable to the Project.
 2. **Manufacturer's Catalog Sheets, Brochures, Diagrams, Schedules, Performance Charts, Illustrations and Other Standard Descriptive Data:** Clearly mark each copy to identify pertinent materials, products, or models. Show dimensions and clearances required. Show performance characteristics and capacities, wiring diagrams and controls.
- D. **Samples:** Physical examples to illustrate materials, equipment or workmanship and to establish standard by which completed work is judged.
1. **Office Samples:** Of sufficient size and quantity to clearly illustrate functional characteristics of products or material with integrally related parts and attachment devices and full range of color samples. After review, samples remain the property of the Professional until completion of the construction project.
 2. **Field Samples and Mock-ups:** Erect on project site at location acceptable to Professional. Construct each sample, or mock-up, completely including work of all trades required in finished work.
- E. **Contractor's Responsibilities:**
1. Review shop drawings, product data and samples prior to submission.
 2. Verify field measurements, field construction criteria, catalog numbers and similar data.
 3. Coordinate each submittal with requirements of work and of Contract Documents.
 4. Contractor's responsibility for errors and omissions in submittals is not relieved by the Professional's review of submittals.
 5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Professional's review of submittals unless Professional gives written acceptance of specific deviations.
 6. Notify Professional in writing at the time of submission of deviations in submittals from requirements of Contract Documents.
 7. Begin no work requiring submittals until the return of submittals bearing Professional's stamp and initials, or signature indicating review.
 8. After Professional's review, distribute copies.
- F. **Submission Requirements:**
1. Schedule submission with ample time before dates reviewed submittals will be needed.
 2. Submit number of copies of shop drawings and product data which Contractor requires for distribution, plus one (1) copy to be retained by the Professional.
 3. Submit number of samples specified in each Specification section.
 4. Accompany submittals with transmittal letter, in duplicate, containing date, Project title and number; Contractor's name and address; the number of each shop drawings, product data and samples submitted; notification of deviations from Contract Documents; and, other pertinent data.
 5. Submittals shall include:
 - a. Date and revision dates.
 - b. Project title and number.
 - c. The names of the Professional, Contractor, Supplier, Manufacturer and separate detailer, when pertinent.
 - d. Identification of product, or material.
 - e. Relation to adjacent structure, or materials.

- f. Field dimensions clearly identified as such.
 - g. Specification section number.
 - h. Applicable standards such as ASTM number, or federal specifications.
 - i. A blank space (2" x 3") for the Professional's stamp.
 - j. Identification of deviations from Contract Documents.
 - k. Contractor's stamp, initialed or signed, certifying the review of submittal, verification of field measurements and compliance with Contract Documents.
- G. **Resubmission Requirements:**
- 1. **Shop Drawings:** Revise initial drawings, as required, and resubmit as specified for initial submittal. Indicate on the drawings any changes which have been made other than those required by the Professional.
 - 2. **Product Data and Samples:** Submit new data and samples, as required, for initial submittal.
- H. **Distribution of Submittals After Review:**
- 1. Distribute copies of shop drawings and product data which carry Professional's stamp to Contractor's file, job site file, Subcontractor, Supplier and Fabricator.
 - 2. Distribute samples as directed.
- I. **Professional's Duties:**
- 1. Review submittals with reasonable promptness.
 - 2. Review for design concept of Project and information given in Contract Documents.
 - 3. Review of separate item does not constitute review of an assembly in which item functions.
 - 4. Affix stamp and initials, or signature, certifying the review of submittal.
 - 5. Return submittals to Contractor for distribution.

**TESTING LABORATORY SERVICES
SECTION 01410**

1.01 **DESCRIPTION**

- A. **Scope:** The Contractor will employ and pay for the services of an independent laboratory to perform specified services. Employment of a testing laboratory shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract.
- B. **Inspection, Sampling and Testing:** Refer to each individual specification section for specific inspection, sampling and testing requirements.
- C. **Qualification of Laboratory:**
- 1. Meet the *Recommended Requirements for Independent Laboratory Qualification* published by the American Council of Independent Laboratories.
 - 2. Meet the basic requirements of ASTM E 329-70, *Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction*.
 - 3. **Responsible Engineer:** Perform all testing under the direct supervision of a registered Professional engineer employed full time by the testing laboratory.
 - 4. **Submittals:** Submit a copy of the inspection report of the facilities made by materials reference laboratory of National Bureau of Standards of any deficiencies reported by the inspection.
 - 5. **Approval:** The Professional must approve the testing laboratory.
- D. **Laboratory's Duties:**
- 1. Upon notice, cooperate with the Professional and the Contractor to promptly provide qualified personnel. Perform specified inspections, sampling and testing of materials and methods of construction to ascertain compliance with requirements of Contract Documents. Promptly notify the Professional and the Contractor of irregularities or deficiencies of work observed during performance of services.
 - 2. Reports of inspections and tests will include:
 - a. Date issued
 - b. Project title and number
 - c. Testing laboratory's name and address
 - d. Name and signature of inspector
 - e. Date of inspection, or sampling
 - f. Record of temperature and weather
 - g. Date of test
 - h. Identification of product and Specification section

- i. Location of Project
- j. Type of inspection, or test
- k. Observations regarding compliance with Contract Documents
- 3. Prompt distribution of copies of the inspection reports and tests to:
 - a. Owner
 - b. Professional
 - c. General Contractor
 - d. Consulting Engineer, when pertinent
 - e. Subcontractor, when pertinent

E. Contractor's Responsibilities:

- 1. Cooperate with laboratory personnel to provide access to work and to manufacturer's operation. Provide the laboratory with the required quantities of preliminary samples representative of materials to be tested and required quantities. When required, furnish copies of mill test reports. Furnish laboratory casual labor to obtain and handle samples at the site and to facilitate inspections and tests. Provide facilities for laboratory's exclusive use for storage and curing of test samples. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- 2. Arrange and pay for additional samples and tests required for Contractor's convenience. When initial tests indicate work does not comply with Contract Documents, the Contractor may employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing.

**CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
SECTION 01500**

1.01 DESCRIPTION

- A. **Scope:** Work required under this section consists of all temporary construction facilities, services and related items to complete the work indicated on the drawings and described in the Project Manual.
- B. **Standards:**
 - 1. Conform to or exceed all temporary construction requirements stated in the current edition of the **Standard Building Code** [Chapter entitled *Safeguards During Construction*].
 - 2. Refer to Article 10.1.1 in Section 00700 entitled *General Conditions*.
- C. **Materials:** All materials required by the Work of this section shall be as specified in the respective sections.

1.02 FACILITIES AND CONTROLS

- A. **Access:** The Prime General Contractor shall provide an adequate access and/or roads to the site of the structure, if required for the prosecution of work; and, should also provide and maintain at least one (1) temporary, or permanent, access to each working elevation to be permanently occupied.
- B. **Hoisting Facilities:** The Prime General Contractor shall be responsible for providing suitable capacity and hoisting facilities for all people and materials. The use of the hoisting facilities shall be by mutual agreement of the Prime General Contractor and the individual Contractor.
- C. **Field Office and Sheds:** At all times, the Prime General Contractor shall provide and maintain a weatherproof office with telephone, which may also be used by Subcontractors, the Owner and the Professional. Office location will be approved by the Owner. Each general and individual Contractor shall provide suitable watertight/dampproof sheds to house their construction materials.
- D. **Sanitation Facilities:** The Prime General Contractor is responsible for furnishing adequate temporary toilet facilities on the job site.
- E. **Drinking Water:** The Prime General Contractor shall provide at all times sanitary drinking water facilities for all workmen on the job including ice, when required, and paper cups, etc.
- F. **Fire Protection:** The Prime General Contractor shall provide general temporary fire protection. Subcontractors will be responsible for their own.
- G. **Storage:** The Prime General Contractor shall coordinate the allocation of storage areas to the various Subcontractors.

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- H. **Temporary Heat:** The Prime General Contractor shall provide heat, fuel and services, as necessary, to protect all work from dampness and cold until final acceptance. If in the late stages of the construction, mechanical and electrical installations will permit, the mechanical and electrical facilities may be used to provide heat and ventilation. However, the Owner is saved harmless of any costs of operation or responsibility as to acceptance of mechanical and/or electrical installations.
 - I. **Utilities:** The Prime General Contractor shall make arrangements for and furnish all water, electricity (lighting and power) and other utilities necessary for construction purposes. A written agreement must be reached on how all utilities (water and electricity) will be furnished and the rates the Contractor will be charged. A copy of the final agreement signed by the Contractor and the Institution or Agency must be forwarded to the Owner. If the written agreement is not filed with the Owner, the Contractor and the Institution or Agency waives all rights as to the rates charged. The Owner will then determine all utility rates and assess the charges before final payment is rendered.
 - J. **Project Sign:**) (new State Seal per Legislature July 1, 2014)
 - 1. The Prime General Contractor will erect on adequate supports and maintain one (1) neatly constructed and painted 3/4" thick plywood sign of size, color, layout, and location as indicated in the Contract Documents. (example attached as Exhibit "B" at the end of Division 1 Section 01900)
 - 2. No other signs will be displayed on the job site without permission of the Professional. The displaying of sign advertisements is strictly prohibited.

**SUBSTITUTIONS AND PRODUCT OPTIONS
SECTION 01630**

1.01 DESCRIPTION

- A. **Scope:** To set forth the procedure and conditions for substitutions and to give the product options available to the Contractor.

1.02 PRODUCTS LIST

- A. Within thirty (30) days after the Contract has been signed, the Contractor will submit to the Professional five (5) copies of a complete list of all products proposed for installation.
- B. Tabulate the list by Specification sections.
- C. For products specified under reference standards, include with listing of each product:
 - 1. Name and address of Manufacturer.
 - 2. Trade name.
 - 3. Model, or catalog designation.
 - 4. Manufacturer's data.
 - 5. Performance and test data.
 - 6. Reference standards.

1.03 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standards, select any product meeting product standards by any Manufacturer.
- B. For products specified by naming a minimum of three (3) products or Manufacturers, select any product and Manufacturer named.
- C. For product specified by naming one (1) or more products, but indicating the option of selecting equivalent products by stating "or equal" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.
- D. For products specified by naming only one (1) product and Manufacturer, an equivalent product will always be accepted if it is equal in all respects. The Contractor must submit a request for substitution as set forth in this Section.
- E. For products specified by naming only one (1) product and Manufacturer and stating no substitutions will be accepted, there is no option and no substitutions will be allowed. This option must have written approval by the Owner before bidding.

1.04

SUBSTITUTIONS

- A. Professional will not consider requests for substitutions during bidding.
- B. Within thirty (30) days after the Contract has been signed, the Professional will consider formal requests from the Contractor for substitution of products in place of those specified. Submit five (5) copies of the request for substitutions. Include in the request:
 - 1. Complete data substantiating compliance of proposed substitutions with Contract Documents.
 - 2. For products:
 - a. Product identification including Manufacturer's name and address.
 - b. Manufacturer's literature: Product description, performance and test data and reference standards.
 - c. Samples.
 - d. Name and address of similar products on which product was used and date of installation.
 - 3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
 - 4. Itemized comparison of proposed substitutions with product or method specified.
 - 5. Data relating to changes in construction schedule.
 - 6. Accurate cost data on proposed substitution in comparison with product or method specified.
- C. In making request for substitution, Contractor represents:
 - 1. Proposed product, or method, has been investigated and determined that it is equal or superior in all respects to that specified.
 - 2. The same guarantee will be provided for substitutions as for product or method specified.
 - 3. Installation of accepted substitutions will be coordinated into the Work, making such changes required of work to be complete in all respects.
 - 4. All claims for additional costs related to substitution which consequently become apparent will be waived.
 - 5. Cost data is complete and includes all related costs under the Contract.
- D. Substitutions will not be considered if:
 - 1. Indicated, or implied, on shop drawings or product data submittals without formal request submitted in accordance with this Section.
 - 2. Acceptance will require substantial revision of Contract Documents.
 - 3. In the Professional's judgment, the product, or material, is not equal.

**STARTING OF SYSTEMS
SECTION 01650**

1.01

GENERAL

- A. **Scope:** This Section describes the procedures for start up of all building equipment and systems including necessary demonstration and instructions.

1.02

STARTING SYSTEMS

- A. Coordinate Schedule for start-up of various equipment and systems.
- B. Notify Professional and Owner seven (7) days prior to start-up of each system.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.

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- G. When specified in individual specification Sections, require Manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
 - H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

1.03 **DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of Substantial Completion.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

**CONTRACT CLOSEOUT
SECTION 01700**

1.01 **DESCRIPTION**

- A. **Scope:** The work required in this Section consists of the final inspections and the submission of all closeout documents and related items to complete the Work indicated on the Drawings and described in the Project Manual.

1.02 **FINAL INSPECTIONS**

- A. **Professional's Inspection:** The Contractor shall make written request for a final inspection to the Professional; notice to be given ten (10) days prior to the inspection. A list of any deficiencies, compiled by the Professional, will be corrected by the Contractor. If, in the Professional's judgement, the Project is not ready for a final inspection, the Professional may schedule another inspection
- B. **Owner's Inspection:** After the Professional has ascertained the Project to be ready, an Owner's inspection will be scheduled within ten (10) days thereafter. The Contractor will have ten (10) days after the Owner's acceptance to make any corrections of punch list items and to submit closeout documents.
- C. **Correction of Work Before Final Payment:** The Contractor shall promptly remove from the Owner's premises all materials condemned for failure to conform to the Contract, whether incorporated in the Work or not, and the Contractor shall, at his own expense, replace such condemned materials with those conforming to the requirements of the Contract. Failure to remedy such defects after ten (10) days written notice will allow the Owner to make good such defects and such costs shall be deducted from the balance due the Contractor, or charged to the Contractor in the event no payment is due.

1.03 **CLOSEOUT DOCUMENTS**

Unless otherwise notified, the Contractor shall submit to the Owner through the Professional, three (3) copies of the following before final payment is made:

- A. **Request for Final Payment:** AIA Document G702, current edition, completed in full or a computer generated form having similar data.
- B. **Consent of Surety Company to Final Payment:** AIA Document G707, current edition, completed in full by the Bonding company.
- C. **Power of Attorney:** Closeout documents should be accompanied by an appropriate Power of Attorney.
- D. **Release of Liens and Certification that All Bills Have Been Paid:** AIA Document G706A, current edition, completed in full or a sworn statement and affidavit from the Contractor to the Owner stating that all bills for this job have been paid and that the Owner is released from any and all claims and/or damages.

-
- E. **Contractor's Affidavit of Payment of Debts and Claims:** AIA Document G706, current edition, completed in full.
- F. **Guarantee of Work:** Sworn statement that all work is guaranteed against defects in materials and workmanship for one (1) year from date of Owner's acceptance, except where specified for longer periods.
1. Word the Guarantee as follows, or in a similar manner:
We hereby guarantee all work performed by us on the above captioned Project to be free from defective materials and workmanship for a period of one (1) year or such longer period of time as may be called for in the Contract Documents for such portions of the Work.
 2. All guarantees and warranties shall be obtained in the Owner's name.
 3. Within the Guaranty period, if repairs or changes are requested in connection with guaranteed work which, in the opinion of the Owner, are rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition building, site, equipment or contents thereof. The Contractor shall make good any work, materials, equipment or contents of said buildings or site which may be disturbed by fulfilling any such Guaranty.
 4. If, after notice, the Contractor fails to proceed promptly to comply with the terms of the Guaranty, the Owner may have the defects corrected and the Contractor and his Sureties shall be liable for all expense incurred.
 5. All special guarantees applicable to definite parts of the work stipulated in the Project Manual or other documents forming part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guaranty.
- G. **Project Record Document:** Furnish all other record documents as set forth in Section 01720 entitled *Project Record Documents*.
- H. **Additional Documents Specified Within the Project Manual:** Provide all additional certificates, warranties, guarantees, bonds or documents as called for in the individual sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements.

**CLEANING
SECTION 01710**

1.01 **DESCRIPTION**

- A. **Scope:** Maintain premises and public properties from accumulations of waste, debris and rubbish caused by operations. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

1.02 **PRODUCTS**

- A. **Materials:** Use only cleaning materials recommended by Manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by the cleaning materials Manufacturer.

1.03 **EXECUTION**

- A. **During Construction:** Execute cleaning to insure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish. Wet down dry materials and rubbish to lay dust and prevent blowing dust. At reasonable intervals during progress of work, clean site and public properties and dispose of waste materials, debris and rubbish. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust or other contaminants resulting from cleaning process will not fall on wet or newly painted surfaces.
- B. **Final Cleaning:** Employ experienced workmen, or professional cleaners, for final cleaning. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and concealed spaces. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed finishes. Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces. Broom clean paved surfaces; rake clean other surfaces of grounds. Replace air conditioning filters, if units were operated during construction. Clean ducts, blowers and coils if air conditioning units were operated without filters during construction. Maintain cleaning until Project, or respective portions thereof, is occupied by Owner.

**PROJECT RECORD DOCUMENTS
SECTION 01720**

1.01 DESCRIPTION

- A. **Scope:** To set forth the procedure and requirements for keeping project record documents.
- B. **Maintenance Documents:** (modified Dec 2013)
1. Throughout the Contract, maintain one (1) copy of all of the following: Contract Drawings, Project Manual, Addenda, Change Order(s), reviewed shop drawings, reviewed submittals, hardware schedules, field, and laboratory test records, equipment brochures, parts lists, operating instructions and other modifications to the Contract.
 2. Store documents on site apart from documents used for construction.
 3. Maintain documents in clean, dry, legible condition. Do not use record documents for construction purposes.
 4. Make documents available, at all times, for inspection by the Professional, Commissioning Authority Professional, and the Owner.
 5. Keep documents in 8 ½" x 11" loose leaf binders. Clearly label each binder on the spine. Sub-divide with permanently marked tabs of card stock. Provide a main tab for each specification section. Provide sub-tabs for each major piece of equipment or component.
 6. Format for information behind each tabbed piece of equipment/component shall be:
 - a. Contractor/Installer Information: Include address, phone number and contact name. Include emergency service contact information as applicable.
 - b. Manufacturer Information: Include address, phone number and contact name.
 - c. Shop Drawings and Product Data
 - d. Operation and Maintenance Instructions
 - e. Control Drawings
- C. **Recording:**
1. **General:** Mark all modifications in red pencil. Keep record documents current. Do not permanently conceal any work until required information has been recorded.
 2. **Contract Drawings:** Legibly mark to record actual construction.
 - a. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - b. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - c. Field changes in dimension and detail.
 - d. Changes made by change order(s) or field order(s).
 3. **Project Manual and Addenda:** Legibly mark up each section to record Manufacturer, trade name, catalog number and Supplier of each product and item of equipment actually installed.
 4. **Shop Drawings:** Maintain as record documents. Legibly mark drawings to record changes made after review.
- D. **Submittal:** At completion of Project, deliver two (2) copies of each record document to the Professional, who will transmit both sets to the Institution or Agency. Additionally, provide to Owner updated As-Built Contract Documents in electronic format utilizing electronic format copy of Contract Documents furnished by Professional or by scanning of marked-up contract Documents. (see also 600.57 and 700.40 regarding electronic As-Built Documents) (modified Dec 2013)

**DIVISION ONE SUPPLEMENT
SECTION 01900**

PART 1 - SUMMARY OF WORK SUPPLEMENT

1.01 WORK SEQUENCE

- A. Owner will occupy the building during construction, coordinate with Owner's Representative in scheduling work to vacate the areas as the Contractor requires.
- B. Construct work in stages as follows:
 - 1. _____
 - 2. _____
 - 3. _____

1.02 PARTIAL OWNER OCCUPANCY

- A. Schedule early completion of designated areas for Owner's usage prior to substantial completion of entire Project.
 - 1. _____
 - 2. _____
 - 3. _____
- B. Owner will occupy areas for purpose of _____
- C. Contractor will provide:
 - 1. Access for Owner's personnel
 - 2. Operation of heating, ventilating, air conditioning and electrical systems
 - 3. _____
- D. Prior to occupancy, execute a *Certificate of Substantial Completion* for designated areas.
- E. Upon occupancy, Owner shall provide:
 - 1. _____
 - 2. _____

PART 2 - ALLOWANCE SUPPLEMENT

2.01 SCHEDULE OF ALLOWANCES

- A. Include in the Bid, for inclusion in the Contract Sum, the amount of \$_____ for purchase of _____
(Refer to Section _____, _____)
- B. Include in the Bid, for inclusion in the Contract Sum, the amount of \$_____ for purchase of _____
(Refer to Section _____, _____)

PART 3 - ALTERNATE SUPPLEMENT

3.01 DESCRIPTION OF ALTERNATES

- A. Additive Alternate Number One. An Additive Proposal is required for all labor, material and equipment necessary to furnish and install landscape lighting; complete as indicated on the drawings and in accordance with the specifications.
- B. Additive Alternate Number Two. An Additive Proposal is required for all labor, material and equipment necessary to furnish and install landscape planting; complete as indicated on the drawings and in accordance with the specifications.
- C. Additive Alternate Number Three. An Additive Proposal is required for all labor, material and equipment necessary to furnish and install the maintenance access area (off Clarence Avenue, near US Hwy 90); complete as indicated on the drawings and in accordance with the specifications. Base bid shall be sod over typical subgrade.

PART 4 - PROJECT SEQUENCE

4.01 COORDINATION

Standard working hours are from 8 a.m. to 5 p.m., Monday thru Friday.

4.02 SEQUENCE

N/A

PART 5- RAIN DAYS ALLOWANCE

5.01 As included in Article 8- Time of the General Conditions, weather delays will be allowed as follows:

A. Rain Days

- 1. The contractor shall figure the following number of rain days for each month listed below in his schedule. These are based on a seven year average from data obtained from NOAA.

January - 4 days	February- 3 days	March - 3 days	April - 2 days
May- 3 days	June- 3 days	July- 4 days	August - 2 days
September - 3 days	October - 2 days	November- 3 days	December - 2 days

- 2. Request for rain days shall not be made unless the number of days per month when the rain precipitation amounting to 1/10" or more exceeds the number of days on the above chart.
- 3. For an extension of time for rain days to be considered, the Contractor must document that the exterior work was delayed due to inclement weather conditions. In addition, the Contractor shall provide the Professional with independent verification of the quality of days when rainfall exceeded 1/10" during each billing period.

Minority Tracking or Participation Form
February 2003

This document will serve as a tracking instrument for minority participation in publicly funded construction projects managed by the Owner. This document will aid DFA/BOB in its commitment to encourage minority participation during the bidding process. Your conscientious effort and commitment to help establish good business relations with minority subcontractors, consultants, suppliers, partners and/or joint ventures is greatly appreciated.

Any responses will be deemed public information and may be incorporated into reporting information compiled by the Owner in the following manner: Contractors that listed minority participation, Contractors that did not list minority participation and Contractors that submitted an incomplete (partially filled-out or blank) form.

Division One

Section 01010 SUMMARY OF WORK

1.01 Work Covered by Contract Documents

F. Subcontractors List

F.1 The Prime General Contractor will submit to the Owner within seven (7) days from the Notice to Proceed, a completed *Minority Tracking Form* (as follows) outlining the use of minority subcontractors that will be used on the project.

Minority - A person who is a citizen or lawful permanent resident of the United States and who is the following: **African American, Hispanic American, Asian American, American Indian or Female**

Project Name and Number: _____

General Contractor: (Name) _____

Check the Following Appropriate Box

There are NO minority participants included in this bid proposal.

There are minority participants included in this bid proposal. The minority participants may be defined as: Subcontractor(s)/Consultant(s)/ Supplier(s) / Partner(s) / Joint Ventures(s).

List minority participants and their discipline/responsibility per the above or per Construction Specification Institution (CSI) sixteen (16) divisions.

Page 2 of 3
Owner
Minority Participation Form

Name: _____

Division: _____

Amount \$ _____

Owner

Minority Participation Form

Name: _____

Division: _____

Amount \$ _____

Name: _____

Division: _____

Amount \$ _____

Name: _____

Division: _____

Amount \$ _____

End of Form

Division One

Section 01500 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.02 Facilities and Controls

J. Project Sign

1. The Contractor will erect on adequate supports and maintain one (1) neatly constructed and painted 3/4" thick plywood sign approximately four feet by eight feet (4' x 8'). The Professional will provide the colors, letters, layout and location of the sign. No other signs will be displayed on the job site without permission of the Professional. The displaying of sign advertisements is strictly prohibited
2. Sign to be white background with black lettering/seal. Text style to be Times New Roman. Color of rectangular field at bottom to be selected by Owner. Provide custom Using Agency logo at circular white field of up to three additional colors. No corporate logos for Architect or Contractor shall be permitted. Where additional rendered signage is specified elsewhere, it shall consist of (1) or (2) additional 4'x8' panels, contiguous to the right side of primary project sign.

700.19

PROJECT SIGN

The contractor will erect on adequate supports and maintain one (1) neatly constructed and painted 3/4" thick plywood sign approximately four feet by eight feet (4' x 8'). The Professional will provide the colors, letters, layout and location of the sign. No other signs will be displayed on the job site without permission of the Professional. The displaying of sign advertisements is strictly prohibited.

Sign to be white background with black lettering/seal. Text style to be Times New Roman. Color of rectangular field at bottom to be selected by Owner. Provide custom Using Agency logo at circular white field of up to three additional colors. No corporate logos for Architect or Contractor shall be permitted. Where additional rendered signage is specified elsewhere, it shall consist of (1) or (2) additional 4'x8' panels, contiguous to the right side of primary project sign.



THIS PROJECT IS FUNDED BY THE TAXPAYERS OF MISSISSIPPI

GOVERNOR PHIL BRYANT

PROJECT NAME

GS# 111-111
HB1111 or SB1111, LAWS OF 1111

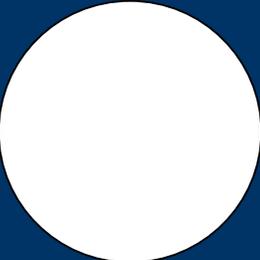
Governing Board

ARCHITECT

ARCHITECT NAME

CONTRACTOR

CONTRACTOR NAME
MISSISSIPPI C.O.R. #11111



USING AGENCY NAME
HEAD OF USING AGENCY NAME

SECTION 02000 DEMOLITION

PART 1 GENERAL

1.01 Section Includes:

- A. Demolition of designated building slabs, site structures, foundations, etc.
- B. Partial demolition as noted or indicated.
- C. Disconnecting, capping and removal of indicated utilities, underground piping, conduits, ductbanks, etc.
- D. Filling voids in subgrade created as a result of removals or demolition.
- E. Disposal of demolished materials.
- F. Breaking up concrete and asphalt as needed to keep debris size manageable.

1.02 EXISTING CONDITIONS AND SCOPE

- A. All contractors shall visit the site to determine the existing conditions and review the items of work required to be removed for the planned and specified new construction work. Field verify all measurements, surfaces, substrates and conditions as required.
- B. Structures indicated for demolition are discontinued in use and have been vacated.

1.03 NOTIFICATION

- A. The Contractor shall coordinate demolition work to insure total safety and to insure uninterrupted services to adjacent buildings.
- B. The Contractor shall notify the Mississippi Department of Environmental Quality and other appropriate State agencies of the buildings to be demolished, sufficiently in advance to not delay the project.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Not Applicable.

PART 3 EXECUTION

3.01 DEMOLITION

- A. Contractor shall be responsible for the removal of all materials required for the proper completion of the Work.
- B. The Contractor shall be solely responsible for the safety of personnel and existing structure, and shall conform to all applicable Federal, State and local codes.
- C. Demolish buildings, structures, and pavements completely or as indicated.

3.02 FILLING VOIDS

- A. Completely fill below grade areas and voids existing or resulting from demolition or removal of structures (foundations, pits, wells, paving, etc.) using approved select fill materials consisting of stone, gravel, and sand which is free from debris, trash, frozen materials, roots, and other organic matter.
- B. Remove standing water, frost, frozen, or unsuitable material, trash, and debris from areas to be filled before fill placement.
- C. Place fill materials in horizontal layers and compact each layer at optimum moisture content of fill material to proposed density as specified in the Earthwork Section.
- D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction. Provide limestone base course cover.

3.03 PROTECTION OF MATERIALS AND EXISTING BUILDING

- A. Protect the work and all materials that is not to be demolished.
- B. Protect all existing work to remain, including any paving, sidewalks, piers, mechanical and electrical. Where existing work is damaged because of new work, the area so damaged shall be restored to its original condition at no additional expense to the Owner, using new materials of like nature.
- C. The Contractor shall provide protection for all work where necessary and he will be responsible for all damage done to any adjacent properties during the construction.

DEMOLITION

02000-2/3

D. Provide, erect, and maintain erosion control devices, dust control measures, etc. as needed. Sprinkle soil and demolition work area with water to minimize dust.

3.04 EXISTING UTILITIES

A. Contractor shall disconnect utilities to buildings and site. Contractor shall remove utilities back to designated points and cap, terminate or end utilities as directed. Contractor shall coordinate all work with local governing authorities.

3.05 REMOVAL OF DEBRIS

A. Contractor shall coordinate the removal of debris from the site before any significant accumulation appears. Debris shall be wetted, if necessary, to prevent raising dust.

3.06 ASBESTOS CONTAINING MATERIAL (ACM): (Not Applicable)

END OF SECTION

SECTION 02231 - TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
 - 1. Section 01500 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 02230 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:

1. Organic Mulch: 1-pint (0.5-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
1. Species and size of tree.
 2. Location on site plan. Include unique identifier for each.
 3. Reason for pruning.
 4. Description of pruning to be performed.
 5. Description of maintenance following pruning.
- D. Qualification Data: For qualified arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
1. Use sufficiently detailed photographs or videotape.
 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- 1.5 QUALITY ASSURANCE
- A. Arborist Qualifications: Certified Arborist as certified by ISA.

- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcing requirements for protection zones.
 - c. Arborist's responsibilities.
 - d. Field quality control.

1.6 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: Stockpiled topsoil from the site.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 - 1. Type: Wood and bark chips.
 - 2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
 - 3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.
 - 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and supported by Constructed of two 2-by-4-inch horizontal rails, with 4-by-4-inch preservative-treated wood posts spaced not more than 8 feet apart. High-visibility orange color, nonfading.
 - 2. Height of Fencing: 4 feet.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
 - 1. Size and Text: 12"x18" with "WARNING TREE PROTECTION ZONE".
 - 2. Lettering: 3-inch- (75-mm-) high minimum, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1-inch (25-mm) blue-vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
 - 1. Apply 4-inch (100-mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

3.3 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 - 1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to the Engineer.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by the Engineer. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.

- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by the Engineer.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to the Engineer and remove when construction operations are complete and equipment has been removed from the site.
 - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 02300 "Earthwork."
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect

roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Do not paint cut root ends.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 02300 "Earthwork."

B. Root Pruning at Edge of Protection Zone: Prune roots flush with the edge of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
3. Cut branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.7 REGRADING

- A. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- B. Minor Fill within Protection Zone: Where existing grade is 6 inches (150 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by the Engineer.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.
 - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 - 4. Perform repairs within 24 hours.
 - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by the Engineer.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that the Engineer

determines are incapable of restoring to normal growth pattern.

1. Provide new trees of per municipal requirements.

a. Species: Species selected by the Engineer.

2. Plant and maintain new trees as specified in Section 02930 "Exterior Plants."

C. Soil Aeration: Where directed by the Engineer, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 02231

SECTION 02300 - EARTHWORK

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. Section Includes:

1. Preparing subgrades for walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for structures.
3. Subbase course for concrete walks and pavements.
4. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Sections:

1. Section 01320 "Construction Progress Documentation" and Section 01322 "Photographic Documentation" for recording preexcavation and earth moving progress.
2. Section 01500 "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
3. Section 02230 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
4. Section 02900 "Landscape Planting, Soils, & Sod" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
5. Section 03300 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.

1.3 UNIT PRICES (Not Used)

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Bulk Excavation: Excavation more than 10 feet (3 m) in width and more than 30 feet (9 m) in length.
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- E. Fill: Soil materials used to raise existing grades.
- F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- G. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

- H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Geotextiles.
 - 2. Controlled low-strength material, including design mixture.
 - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Geotextile: 12 by 12 inches (300 by 300 mm).
 - 2. Warning Tape: 12 inches (300 mm) long; of each color.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.
- C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.7 QUALITY ASSURANCE

- A. Preexcavation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify "One Call" for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Section 02230 "Site Clearing," are in place.
- D. Do not commence earth moving operations until plant-protection measures specified in Section 02231 "Tree Protection and Trimming" are in place.
- E. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - 1. Liquid Limit: 40% max.
 - 2. Plasticity Index: 2-12.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Per Mississippi Department of Transportation's Specifications.
- E. Base Course: Per Mississippi Department of Transportation's Specifications.
- F. Engineered Fill (Structural Fill): Structural fill required within the "controlled areas" can include clean, non-organic, non-saturated soil material from on-site cuts or excavations. Structural fill required from an off-site borrow source should include a silty sand (SM or SP-SM), a silty-clayey sand (SC-SM) or clayey sand (SC) material and should exhibit the following properties:
 - 1. Gradation

Weight (ASTM C-136)	Percent	Passing	by
2"	100		
No. 4	80 min.		
No. 200	10-35		
 - 2. Unified Soil Classification: SP-SM, SM SC-SM, SC
 - 3. Liquid Limit (LL): 40 max.
 - 4. Plasticity Index (PI): 2-12.
 - 5. Standard Proctor maximum dry density: ≥105pcf.

- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Sand: ASTM C 33; fine aggregate.
- I. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 157 lbf (700 N); ASTM D 4632.
 - 3. Sewn Seam Strength: 142 lbf (630 N); ASTM D 4632.
 - 4. Tear Strength: 56 lbf (250 N); ASTM D 4533.
 - 5. Puncture Strength: 56 lbf (250 N); ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 (0.250-mm) sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 247 lbf (1100 N); ASTM D 4632.
 - 3. Sewn Seam Strength: 222 lbf (990 N); ASTM D 4632.
 - 4. Tear Strength: 90 lbf (400 N); ASTM D 4533.
 - 5. Puncture Strength: 90 lbf (400 N); ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 (0.250-mm) sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:
1. Portland Cement: ASTM C 150, Type I.
 2. Fly Ash: ASTM C 618, Class C or F.
 3. Normal-Weight Aggregate: ASTM C 33, 3/4-inch (19-mm) nominal maximum aggregate size.
 4. Water: ASTM C 94/C 94M.
 5. Air-Entraining Admixture: ASTM C 260.
- B. Produce conventional-weight, controlled low-strength material with 80-psi (550-kPa) compressive strength when tested according to ASTM C 495.

2.4 GEOFOAM (Not Used)

2.5 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete

reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch (25 mm). Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 02231 "Tree Protection and Trimming."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: As indicated.

- C. Trench Bottoms: Excavate trenches 6 inches (100 mm) deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches deeper per geotechnical engineer's recommendation in areas of rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 02231 "Tree Protection and Trimming."

3.8 EXCAVATION FOR ELEVATOR CYLINDER (Not Used)

3.9 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes) to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 1500 psi, may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.11 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03300 "Cast-in-Place Concrete".
- D. Backfill voids with satisfactory soil while removing shoring and bracing.
- E. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.14 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use satisfactory soil material.
 3. Under steps and ramps, use engineered fill.
 4. Utility Trenches under pavements, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.
- 3.15 GEOFOAM FILL (Not Used)
- 3.16 SOIL MOISTURE CONTROL
- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
- 3.17 COMPACTION OF SOIL BACKFILLS AND FILLS
- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
1. Under structures, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 98 percent.
 2. Under walkways and pavements, scarify and recompact top 12 inches (300 mm) below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 3. Six (6) inches directly below pavements at 98 percent.

4. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
5. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.18 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
 2. Walks: Plus or minus 1 inch (25 mm).
 3. Pavements: Plus or minus 1/2 inch (13 mm).

3.19 SUBSURFACE DRAINAGE (Not Used)

3.20 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 1. Place base course material over subbase course under hot-mix asphalt pavement.
 2. Shape subbase course and base course to required crown elevations and cross-slope grades.
 3. Place subbase course and base course 6 inches (150 mm) or less in compacted thickness in a single layer.
 4. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.

5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 and 100 percent of maximum dry unit weight according to ASTM D 698 respectfully.

3.21 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE (Not Used)

3.22 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 1. Pavement Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 3,000 sq. ft. or less of paved area, but in no case fewer than three tests.
 2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 100 feet (46 m) or less of trench length, but no fewer than two tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.23 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become

eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.24 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 02300

SECTION 02518: INTERLOCKING CONCRETE PAVERS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interlocking Concrete Paver Units (manually installed).
 - 2. Bedding and Joint Sand.
 - 3. Edge Restraints.
- B. Related Sections:
 - 1. Section: Cement Treated Base.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 33, Standard Specification for Concrete Aggregates.
 - 2. C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile, Section 8, Freezing and Thawing.
 - 3. ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 4. ASTM C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 5. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
 - 6. ASTM C 936, Standard Specification for Solid Concrete Interlocking Paving Units.
 - 7. ASTM C 979, Standard Specification for Pigments for Integrally Colored Concrete.
 - 8. ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft³ (600 kN-m/m³)).
 - 9. ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 10. ASTM C 1645, Standard Test Method for Freeze-thaw and De-icing Durability of Solid Concrete Interlocking Paving Units.
 - 11. ASTM D 2940, Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.
- B. Interlocking Concrete Pavement Institute (ICPI):
 - 1. ICPI Tech Spec Technical Bulletins

1.03 SUBMITTALS

- A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Manufacturer's drawings and details: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, concrete paver layout, patterns, color arrangement, installation and setting details.

- C. Sieve analysis grading of bedding and joint sand.
- D. Concrete pavers:
 - 1. Four representative full-size samples of each paver type, thickness, color, finish that indicate the range of color variation and texture expected in the finished installation. Color(s) selected by Landscape Architect, Architect, and Owner from manufacturer's available colors.
 - 2. Accepted samples become the standard of acceptance for the work.
 - 3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.
 - 4. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.
- E. Paver Installation Subcontractor:
 - 1. A copy of Subcontractor's current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
 - 2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.

1.04 QUALITY ASSURANCE

- A. Paving Subcontractor Qualifications:
 - 1. Utilize an installer having successfully completed concrete paver installation similar in design, material, and extent indicated on this project.
 - 2. Utilize an installer holding a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
- B. Regulatory Requirements and Approvals: Specify applicable licensing, bonding or other requirements of regulatory agencies.
- C. Mock-Ups:
 - 1. Install a 7 ft x 7 ft (2 x 2 m) paver area.
 - 2. Use this area to determine surcharge of the bedding sand layer, joint sizes, lines, laying pattern(s), color(s) and texture of the job.
 - 3. This area will be used as the standard by which the work will be judged.
 - 4. Subject to acceptance by owner, mock-up may be retained as part of finished work.
 - 5. If mock-up is not retained, remove and properly dispose of mock-up.

1.05 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
 - 1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
 - 2. Deliver concrete pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
 - 3. Unload pavers at job site in such a manner that no damage occurs to the product.
- D. Storage and Protection: Store materials protected such that they are kept free from mud, dirt, and other foreign materials. Store concrete paver cleaners and sealers per manufacturer's instructions.
 - 1. Cover bedding sand and joint sand with waterproof covering if needed to prevent exposure to rainfall or removal by wind. Secure the covering in place.

1.06 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install sand or pavers during heavy rain or snowfall.
 - 2. Do not install sand and pavers over frozen base materials.
 - 3. Do not install frozen sand or saturated sand.
 - 4. Do not install concrete pavers on frozen or saturated sand.

1.07 MAINTENANCE

- A. Extra Materials: Provide 5% additional material for use by owner for maintenance and repair.
- B. Pavers shall be from the same production run as installed materials.

PART 2 PRODUCTS

2.01 INTERLOCKING CONCRETE PAVERS

- A. Manufacturer: BELGARD (or approved equal)
 - 1. Contact: Chris Wilson 850-527-1724
- B. Interlocking Concrete Pavers:
 - 1. Paver Type: Ref. Plans for Specific Areas

INTERLOCKING CONCRETE PAVERS

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- a. Material Standard: Comply with material standards set forth in ASTM C 936.
- b. Color: Submit samples for approval
- c. Color Pigment Material Standard: Comply with ASTM C 979.
- d. Size: Varies
- e. Average Compressive Strength (C140): 80MM in Vehicular Areas
- f. Average Water Absorption (ASTM C 140): 5% with no unit greater than 7%.
- g. Freeze/Thaw Resistance (ASTM C 1645): 25 freeze-thaw cycles with no greater loss than 200 g/m² of paver surface area or no greater loss than 500 g/m² of paver surface area after 50 freeze-thaw cycles. Freeze-thaw testing requirements shall be waived for applications not exposed to freezing conditions.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: Product substitutions shall be submitted and approved 10 days prior to bid date.

2.03 BEDDINGSAND

- A. Provide bedding sand as follows:
 - 1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
 - 2. Do not use limestone screenings, stone dust, or sand for the bedding sand material that does not conform to conform to the grading requirements of ASTM C 33.
 - 3. Do not use mason sand or sand conforming to ASTM C 144 for the bedding sand.
 - 4. Where concrete pavers are subject to vehicular traffic, utilize sands that are as hard as practically available.
 - 5. Sieve according to ASTM C 136.
 - 6. Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 1.

Table 1

Grading Requirements for Bedding Sand ASTM C 33

Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075 mm)	0 to 1

7. Joint Sand Material Requirements for Pedestrian Paver Areas shall be Gator Sand or Techniseal product. Submit cut sheets for approval.

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- A. Design Pavers – 1-601-528-3152 Julie Bond

3.02 EXAMINATION

- A. Acceptance of Site Verification of Conditions:
 1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.
 - a. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
 - b. Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
 - c. Verify that base materials, thickness, compacted density, surface tolerances and elevations conform to specified requirements.
 - d. Provide written density test results for soil subgrade, and base materials to the Owner, General Contractor and paver installation subcontractor.
 - e. Verify location, type, and elevations of edge restraints, utility structures, and drainage inlets.
 2. Do not proceed with installation of bedding sand and interlocking concrete pavers until subgrade soil and base conditions are corrected by the General Contractor or designated subcontractor.

3.03 PREPARATION

- A. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.
- B. Verify that base is ready to support sand, and pavers and imposed loads.

3.04 INSTALLATION

- A. Spread bedding sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1 1/2 in. (40 mm) thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. (25 mm) thickness, allowing for specified variation in the base surface.

1. Do not disturb screeded sand.
 2. Screened area shall not substantially exceed that which is covered by pavers in one day.
 3. Do not use bedding sand to fill depressions in the base surface.
- B. Lay pavers in pattern(s) shown on drawings. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid pavers with rubber hammers and pry bars as required.
- C. Provide joints between pavers between [1/16 in. and 3/16 in. (2 and 5 mm)] wide. No more than 5% of the joints shall exceed [1/4 in. (6 mm)] wide to achieve straight bond lines.
- D. Joint (bond) lines shall not deviate more than $\pm 1/2$ in. (± 15 mm) over 50 ft. (15 m) from string lines.
- E. Fill gaps at the edges of the paved area with cut pavers or edge units.
- F. Cut pavers to be placed along the edge with a [double blade paver splitter or] masonry saw.
- G. Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized. All cut pavers exposed to vehicular tires shall be no smaller than one-third of a whole paver. Cut pavers at edges as indicated on the drawings.
- H. Keep skid steer and forklift equipment off newly laid pavers that have not received initial compaction and joint sand.
- I. Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz to vibrate the pavers into the sand. Remove any cracked or damaged pavers and replace with new units.
- J. Simultaneously spread, sweep and compact dry joint sand into joints continuously until full. This will require at least 4 to 6 passes with a plate compactor. Do not compact within 6 ft (2 m) of unrestrained edges of paving units.
- K. All work within 6 ft. (2 m) of the laying face must shall be left fully compacted with sand-filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.
- L. Remove excess sand from surface when installation is complete.

- M. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by Landscape Architect or Engineer. Do not allow vehicular traffic on pavers with sand on top of the surface.
- N. Surface shall be broom clean after removal of excess joint sand.

3.05 FIELD QUALITY CONTROL

- A. The final surface tolerance from grade elevations shall not deviate more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge.
- B. Check final surface elevations for conformance to drawings.
- C. The surface elevation of pavers shall be $1/8$ in. to $1/4$ in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.
- D. Lippage: No greater than $1/8$ in. (3 mm) difference in height between adjacent pavers.

3.06 CLEANING, SEALING, JOINT SAND STABILIZATION

- A. Clean, Seal, Apply joint sand stabilization materials between concrete pavers in accordance with the manufacturer's written recommendations.

3.07 PROTECTION

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

3.07 WARRANTY

- A. All Work for a period of one year, starting on Date of Substantial Completion, against defects in material, workmanship and any repair required resulting from settling or breaking of pavers.
- B. Repair unsatisfactory conditions promptly at no cost to Owner.
- C. Emergency repairs may be made by Owner without relieving the Contractor of this warranty obligation.

PART 4.0 METHOD OF MEASUREMENT

4.01 METHOD OF MEASUREMENT

- A. The interlocking concrete pavers shall be measured per these specifications and plans as per the specified unit below.

PART 5.0 PAYMENT

6.01 PAYMENT

- A. The Pay Item listed below shall be considered complete and shall include all material (including base material, weeps, filter cloth, bedding/joint sand, pavers, etc. as represented in the drawings and specifications. Unit cost shall also include equipment, labor, installation costs, overhead and profit related to the installation of this item. Bidder shall verify quantities by his own take-off from the Drawings and notify the Landscape Architect and Engineer of discrepancies before submitting his Bid.

END OF SECTION 02518

SECTION 02630 - STORM DRAINAGE

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. Section Includes:
 - 1. Pipe and fittings.
 - 2. Drop inlets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 - 1. Drop inlets: Include plans, elevations, sections, details, frames, covers, and grates.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

- A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10 (DN 80 to DN 250): AASHTO M 252M, Type S, with smooth waterway for coupling joints.
 - 1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
 - 2. Solid Pipe
- B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60 (DN 300 to DN 1500): AASHTO M 294M, Type S, with smooth waterway for coupling joints.
 - 1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.2 CONCRETE PIPE AND FITTINGS (Not Used)

2.3 CLEANOUTS (Not Used)

2.4 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R (ACI 350M/350RM), and the following:
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- B. Portland Cement Design Mix: 3000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.5 MANHOLES (Not Used)

2.6 DROP INLETS

- A. Designed PVC Structure by Nyloplast or approved equal.
- B. Frames and Grates: ASTM A 536, Grade 70-50-05, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.
 - 1. Size: 24 inch (610) diameter minimum unless otherwise indicated.
 - 2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.7 CATCH BASIN (Not Used)

2.8 OUTLET CONTROL STRUCTURE (Not Used)

2.9 PIPE OUTLETS (Not Used)

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Section 02300 "Earthwork."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to

manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

- C. Install storm structures for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install PE corrugated sewer piping according to ASTM D 2321.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.

3.4 CLEANOUT INSTALLATION (Not Used)

3.5 CATCH BASIN INSTALLATION (Not Used)

3.6 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.7 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Make branch connections to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches (150 mm) of concrete

for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.

- a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi (20.7 MPa) unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
2. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.8 IDENTIFICATION

A. Materials and their installation are specified in Section 02300 "Earthwork." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use warning tape over ferrous piping.

3.9 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of MDOT.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- 3.10 CLEANING
- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 02630

SECTION 02751 - 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. Section Includes:

- 1. Driveways.
- 2. Parking lots.
- 3. Curbs and gutters.
- 4. Walks.

- B. Related Sections:

- 1. Section 02764 "Pavement Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

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.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Other Action Submittals:

- 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified ready-mix concrete manufacturer.
- B. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing compounds.
 - 5. Applied finish materials.
 - 6. Epoxy adhesive.
 - 7. Joint fillers.
- C. Material Test Reports: For each of the following:
 - 1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
 - 2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Engineer and not less than 96 inches (2400 mm) by 96 inches (2400 mm).
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in

mockups unless Engineer specifically approves such deviations in writing.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:

- a. Concrete mixture design.
- b. Quality control of concrete materials and concrete paving construction practices.

2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:

- a. Contractor's superintendent.
- b. Independent testing agency responsible for concrete design mixtures.
- c. Concrete paving subcontractor.

1.7 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 (30.5 m) or less. Do not use notched and bent forms.

- 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 Reinforcement: ASTM A 185/A 185M, fabricated from galvanized-steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- C. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars.
- D. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars.
- E. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.
- F. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars.
- G. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- H. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

- J. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.
- K. Zinc Repair Material: ASTM A 780.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, gray portland cement Type I. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or Class F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.4 FIBER REINFORCEMENT (Not Used)

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, 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. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Anti-Hydro International, Inc.; A-H Curing Compound #2 DR WB.
 - b. ChemMasters; Safe-Cure Clear.
 - c. Conspec by Dayton Superior; [D.O.T. Resin Cure] [DSSCC Clear Resin Cure].
 - d. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
 - e. Edoco by Dayton Superior; [DSSCC Clear Resin Cure] [Resin Emulsion Cure V.O.C. (Type I)].
 - f. Euclid Chemical Company (The), an RPM company; Kurez W VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; AQUA KURE - CLEAR.
 - i. L&M Construction Chemicals, Inc.; L&M CURE R.
 - j. Meadows, W. R., Inc.; 1100-CLEAR SERIES.
 - k. Nox-Crete Products Group; Resin Cure E.
 - l. SpecChem, LLC; PaveCure Rez.
 - m. Symons by Dayton Superior; Resi-Chem Clear.
 - n. Tamms Industries, Inc., Euclid Chemical Company (The); TAMMSCURE WB 30C.
 - o. TK Products, Division of Sierra Corporation; [TK-2519 WB] [TK-2519 DC WB].
 - p. Vexcon Chemicals Inc.; Certi-Vex Enviocure 100.

2.6 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.
- B. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): Concrete Paving - 4000 psi, Curbs and Sidewalks - 3000 psi
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: General Use - 4 inches, Concrete Paving - 2 inches, Curbs and Sidewalks - 2 inches. Tolerance of plus or minus 1 inch.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 3-1/2 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 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 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph (5 km/h).
 - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes), with a maximum weight of 45 tons (40.8 tonnes).
 - 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) according to requirements in Section 02300 "Earthwork."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides 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.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting 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 reinforcement 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.
- E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
- F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap of adjacent mats.

3.5 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 paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 2. Provide tie bars at sides of paving strips where indicated.
 3. Butt Joints: Use epoxy bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet (15.25 m) unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface for joint sealant.
 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 5. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

- a. Tolerance: Ensure that sawed joints are within 3 inches (75 mm) either way from centers of dowels.
2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/8-inch (3-mm) radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. 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.
- D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. 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.
- G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 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.

- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart 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 surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 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.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- L. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) 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.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- 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-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. 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.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. 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 (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or 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. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch (19 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/2 inch (13 mm).
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
6. Vertical Alignment of Dowels: 1/4 inch (6 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- 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 at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if 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 Engineer, 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 mixture 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 Engineer 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 Engineer.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.
- B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving 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 paving 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 paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02764 - PAVEMENT JOINT SEALANTS

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. Section Includes:

- 1. Cold-applied joint sealants.

- B. Related Sections:

- 1. Section 02751 "Cement Concrete Pavement" for constructing joints in concrete pavement.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, Samples of materials that will contact or affect joint sealants.

- 1. Use manufacturer's standard test method to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

- 2. Submit no fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

- 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

- 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

- 5. Testing will not be required if joint-sealant manufacturers submit joint-preparation data that are

based on previous testing, not older than 24 months, of sealant products for compatibility with and adhesion to joint substrates and other materials matching those submitted.

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Pavement-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of joint sealant and accessory, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for joint sealants.
- D. Preconstruction Compatibility and Adhesion Test Reports: From joint-sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility with and adhesion to joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each type of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- D. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: Light Grey.

2.2 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant for Concrete: ASTM D 5893, Type NS.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Crafco Inc., an ERGON company; RoadSaver Silicone.
 - b. Dow Corning Corporation; 888.
 - c. Pecora Corporation; 301 NS.

2.3 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.4 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backings.

2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place joint sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
1. Remove excess joint sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so

sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.6 PAVEMENT-JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Joints within cement concrete pavement.

1. Joint Location:

- a. Expansion and isolation joints.
- b. Contraction joints.
- c. Other joints as indicated.

2. Silicone Joint Sealant for Concrete: Single component, nonsag.

3. Urethane Joint Sealant for Concrete: Multicomponent, pourable, traffic-grade.

4. Joint-Sealant Color: Light Grey

END OF SECTION 02764

SECTION 02805 - HARDSCAPE

PART 1 HARDSCAPE

1.1 SUMMARY

- A. Specific requirements concerning the various materials, structures, and arrangements which are safe to be installed are shown on drawings.

1.2 DO NOT MAKE SUBSTITUTIONS

- A. If Contractor desires to make substitutions of materials, sufficient descriptive literature and material samples must be furnished to establish the material as an equal substitute. In addition, Contractor must state his reasons for desiring substitute materials. Submit this request and information to Landscape Architect.

1.3 APPROVAL AND SELECTION OF MATERIALS AND WORK

- A. The selection of all materials and execution of all operations required under the Drawings and Specifications is subject to the approval of Owner and Landscape Architect. They have the right to reject any and all materials and any and all Work which, in their opinion, does not meet requirements of the Contract Documents at any state of operations. The Contractor is to remove rejected work and or materials from Project Site and replace promptly.
- B. Delivery, Storage and Handling: Deliver material and equipment in such a manner as to not damage parts or decrease the useful life of equipment.
- C. Store materials away from detrimental elements.
- D. Handle, load, unload, stack and transport materials carefully to avoid damage.

1.4 QUALITY AND SIZE

- A. Material specified by name and/or model number in the Specifications, on the site or detailed drawings are used for the purpose of identification of materials and to insure specific use of that material in the construction of the system. No substitutions will be permitted without approval.
- B. Any products not specifically identified on the drawing with a make and/or model number in the Specifications or on the site or detailed drawings shall be submitted in a shop drawing format to the Landscape Architect for approval.

PART 2 ACCEPTANCE AND GUARANTEE

2.1 SUMMARY

- A. Substantial Completion: Submit written requests for inspection for Substantial Completion to Landscape Architect at least three calendar days prior to anticipated Date of Inspection and Testing. Substantial Completion cannot be granted and at the same time no further applications

for payment shall be approved for more than 85% of contract until there has first been a walk-thru for head coverage at which time a "punch list" will be written consisting of items to be addressed and corrected by Contractor immediately. Depending on the extent of the Work on the "punch list", the Landscape Architect will determine the job to be Substantially Complete or pending the completion of the "punch list".

- B. Review "punch list" Work jointly with Owner and Landscape Architect for Substantial Completion of total (contract) Work.

2.2 DATE OF SUBSTANTIAL COMPLETION

- A. Date of Substantial Completion will constitute beginning Date of One-Year Guarantee. This Date also constitutes the beginning of the warranty responsibilities and acceptance by Owner and Landscape Architect.

2.3 GUARANTEE

- A. All Work, products, equipment and materials for one year, beginning at Date of Substantial Completion as per (AIA Certificate of Substantial Completion/written letter of notification).
- B. Make good any damage, loss, destruction or failure. Repairs and replacements shall be done promptly and at no additional cost to Owner.
- C. Repair damage to grade, plants and other Work or property as necessary.
- D. If work is not acceptable during or at end of Guarantee Period Owner may elect either subsequent replacement or credit. Replacement products shall have a similar one-year guarantee from time of replacement.

PART 3.0 METHOD OF MEASUREMENT

3.1 METHOD OF MEASUREMENT

- A. All items to be installed or replaced are indentified in the plans and details.

PART 4.0 PAYMENT

4.1 PAYMENT

- A. The Pay Items listed below shall determine the value of extra work or changes in the work, as applicable. They shall be considered complete and shall include all material, equipment, labor, installation costs, overhead and profit. Pay items shall be used uniformly for additions or deductions. The final amount paid for the work done will be the sum of the actual quantities of installed work, as approved in writing by the Owner. Bidder shall verify quantities of installed work, as approved in writing by the Owner. Bidder shall verify quantities by his own take-off from the Drawings and notify the Landscape Architect of discrepancies before submitting his Bid.

END OF SECTION 02805

SECTION 02810 - LANDSCAPE IRRIGATION

PART 1 GENERAL

1.1 SUMMARY

- A. Extent of underground irrigation system is shown on Drawings and in the schedules.
- B. Provide all labor, materials and equipment required by or inferred from Drawings and Specifications to complete the Work of the Section.
- C. Provide additional Work and materials required by local authorities at no extra cost to Owner.
- D. Contractor shall provide all permits, applications, licenses and other qualifications to complete work at no additional cost to owner.
- E. Reference Standards: American Society for Testing and Materials, Annual Book of ASTM Standards, latest edition.
- F. Related work: Section 02900 - Landscape Planting & Sodding

1.2 CONTRACTS

- A. Irrigation Work to a single firm specializing in irrigation installation, acceptable to Landscape Architect.

1.3 CODES AND STANDARDS

- A. Perform Irrigation Work in compliance with applicable requirements of governing authorities having jurisdiction. County regulations supersede these specifications. Notify Landscape Architect in writing of all discrepancies immediately.

1.4 DO NOT MAKE SUBSTITUTIONS

- A. If Contractor desires to make substitutions of materials, sufficient descriptive literature and material samples must be furnished to establish the material as an equal substitute. In addition,

Contractor must state his reasons for desiring substitute materials. Submit this request and information to Landscape Architect.

1.5 APPROVAL AND SELECTION MATERIALS AND WORK

- A. The selection of all materials and execution of all operations required under the Drawings and Specifications is subject to the approval of Owner and Landscape Architect. They have the right to reject any and all materials and any and all Work which, in their opinion, does not meet requirements of the Contract Documents at any state of operations. Contractor to remove rejected Work and or materials from Project Site and replace promptly.
- B. "As-Built" Drawings: Any changes in layout and/or arrangements of the proposed irrigation system, or any other differences between proposed system and actual installed conditions are to be recorded by Irrigation Contractor in the form of an "As-Built" Drawings are to be clearly and neatly drawn on a mylar sepia base of original design provided by Landscape Architect. Provide Owner and Landscape Architect with a reproducible copy of the "As-Built" Drawings before Work under this Contract will be considered for acceptance. All automatic and manual valves, hose bibs or quick couplers and wire splice shall be shown with actual dimensions to reference points so they may be located easily in the field. Submittal of approved "As-Built" Drawings will preclude any Application for Final Payment by Contractor.
- C. Delivery, Storage and Handling: Deliver material and equipment in such a manner as to not damage parts or decrease the useful life of equipment.
- D. Store materials away from detrimental elements. Coordinate with General Contractor to secure a safe staging area.
- E. Handle, load, unload, stack and transport materials for irrigation system carefully to avoid damage. Handle pipe in accordance with Manufacturer recommendations.

1.6 VERIFY TAP

- A. Test water conditions as they exist immediately down stream from tap: If they do not meet design demands, notify Landscape Architect immediately of existing conditions.
- B. The irrigation system is designed to operate under the following conditions; a minimum of 60 psi of water pressure at tap and at least 45gpm available water supply tap & meter by Irrigation Contractor.
- C. Job Conditions: Insurance on irrigation materials or equipment stored or installed as the responsibility of Irrigation Contractor. Such insurance shall cover fire, theft and vandalism. Should Contractor elect not to provide for such insurance, he will in no way hold Owner responsible for any losses incurred by the aforementioned acts. The Contractor is responsible for all costs incurred in replacing damaged or stolen materials.
- D. Obtain all required permits and pay all required fees, at no additional cost to Owner. Any penalties imposed due to failure to obtain permits or pay fees are the responsibility of the Contractor.
- E. Provide and maintain all passageways, guard fences, warning lights and other protection devices required by local authorities.
- F. Existing site improvements shall be performed in a manner which will avoid possible damage. The Contractor is responsible for any damage of a mechanical nature as well as damage resulting from leaks in irrigation system whether due to negligence or otherwise.
- G. Damages resulting from irrigation installation to Work of other trades must be repaired at the expense of Contractor in a timely fashion.
- H. Make adjustments to system layout as may be required and requested to provide complete coverage at no additional cost to Owner.
- I. Keep project site clean and orderly at all times during construction.

1.7 WARRANTY

- A. All Work for a period of one year, starting on Date of Substantial Completion, against defects in material, equipment, Workmanship and any repair required resulting from leaks or other defects of workmanship, material or equipment.
- B. Repair unsatisfactory conditions promptly at no cost to Owner.
- C. Emergency repairs may be made by Owner without relieving the Contractor of this warranty obligation.
- D. Contractor to repair settling of backfilled trenches occurring during warranty period, including restoration of damaged plantings, paving or improvements resulting from settling of trenches or repair operations.
- E. Respond to Owner's request for repair Work within ten days. If not, Owner may proceed with such necessary repairs at Contractor's expense. In addition, Contractor shall be held responsible for replacement of any plant material (tree, shrubs, sod or seed) which becomes damaged or dies due to a lack of water during periods in which irrigation system is inoperable.

PART 2 PRODUCTS

2.1 SUMMARY

- A. Specific requirements concerning the various materials and arrangements which are safe to be installed are shown on drawings.

2.2 QUALITY AND SIZE

- A. Material specified by name and/or model number in the Specifications, on the site or detailed drawings are used for the purpose of identification of materials and to insure specific use of that material in the

construction of the system. No substitutions will be permitted without approval. (See Substitutions).

- B. Plastic pipe for all main lines is schedule 40 PVC while laterals 1 ½" size and over is Class 200 PVC Type 1120 or 1220 as manufactured Cabot, John-Mansville (or approved equal) unless otherwise specified herein or on the drawings. All pipe, 1" size and less, is Class 160.
- C. PVC pipe is to be continuously marked with Manufacturer's identification, type, class and size and installed with these markings on the top of the pipe.
- D. All fittings should be Schedule 40 PVC Type 1, of domestic manufacture and identified as to pressure rating or schedule.
- E. Solvent Weld: Solvent weld for PVC pipe over 20' length must be installed with standard 20' length sections. Unnecessary joints or couplings are not acceptable.
- F. Risers: Provide threaded Schedule 80 PVC risers. All risers above grade to be either dark gray or black PVC pipe.
- G. Electric Wiring: All 110 volt AC wiring to controller must consist of three wires: one black, one white and one ground. Electrical service to be provided by General Contractor unless otherwise directed by Owner.
- H. All splices in controller wiring shall be waterproofed by using Rainbird "Snap-Tite" wire connectors.
- I. All control wiring shall be 24 volt solid wire U>L> approved for direct burial in ground. Minimum wire size: 14 gauge.
- J. All control wiring and wiring connections from controller to valves shall be included in this contract.
- K. Sprinkler Heads: Provide as indicated on the plan. Heads perform to Manufacturer's specifications concerning radius of throw and gallon at given pressure.

- L. Automatic Controller: Is to be installed in the location schematically shown on drawings, but identified by owner's representative in the field. The controller location will be accessible as shown on drawing for maintenance. Provide for the possibility of making minor timing adjustments to the controller in the field.
- M. Provide controller specified on drawing; fully automatic capability as well as manual operation of the system.
- N. Provide controller specified on drawing which operates on a minimum of 110 volts AC power input and is capable of operation of 24 volt AC electric remote control valves, with a reset circuit breaker to protect from overload. Contractor is responsible for connection to 100V AC power to controller.

2.3 STATIONS

- A. Each station shall have a time setting knob which can be set for variable timing in increments from 6 to 60 minutes, or set to omit the station from irrigation cycle.

2.4 THE CONTROLLER

- A. The irrigation system shall be as specified on the drawings.

2.5 WATER METER

- A. Type approved by City where shown on drawing. Size as required to serve the requirements of the system. Verify location with owner's representative in the field.

2.6 BACKFLOW PREVENTER

- A. Submit Double Check Assembly Backflow Preventer cut sheets for approval. The backflow preventer is a double check valve assembly type, capable of having a flow rate of 80 gpm, with a pressure loss not to exceed 5 psi and suitable for supply up to 150 psi. The backflow preventer body to be bronze, internal parts stainless steel and check valve assemblies with

tight seating rubber. The backflow preventer assembly must include two gauge valves for isolating unit and two ball valve test clocks for testing unit to insure proper operation.

2.7 PRESSURE REGULATOR

- A. Provide Wilkins #600 or equal. Install outside of the building for easy access and adjustment.
- B. Mastervalue: Rainbird # electric remote control valve w/brass body and bonnet. Valve shall be wired to open and close with each circuit valve. Size based on mainline.

2.8 VALVE BOXES

- A. Ametek 12" rectangular valve box with cover or jumbo mechanical box with cover and Ametec 10" round valve box with cover as indicated on drawings. Place a minimum of 6" depth of gravel under each valve box, meter, pressure regular and backflow preventer box.

2.9 SLEEVES

- A. Size and type as indicated on drawings.

2.10 HOSE BIBS

- A. Hose bibs shall have an all cast brass or bronze body. Hose bibs to be $\frac{3}{4}$ " inside diameter and shall be installed below grade in Ametek 12" x 18" valve boxes. The cover over hose bib boxes shall be clearly marked with "non-potable water".

2.11 CONTROL VALVES

- A. Provide Rainbird Electric Remote Control Valve (size as indicated on Plan). Valve to conform to Manufacturer's Specifications concerning performance and at a given pressure.

2.12 SURGE PROTECTION

- A. Provide General Electric Lightning Arrestor #GL 15 CC B 007 for controllers not equipped with primary surge protection.

- B. Provide secondary surge protection installed on the 24V AC valve control wiring for systems controlling 24V AC solenoid operated valves.
- F. The Irrigation Contractor is responsible for determining whether the above mentioned surge protection equipment is provided for in controller as a "built-in" unit or if it must be supplied and installed separately.

2.13 ISOLATION VALVES

- A. Provide all BALL valves for isolation purposes allowing full diameter opening when in full open Position. See Contract Drawings.
- B. Manually operated valves shall be same size as mainline.

2.14 AUTOMATIC DRAIN VALVES

- A. Install at low point for each lateral line "Rainbird 16AP" drain valve in gravel sump 12" x 12" in size and with a minimum of 18" of cover over sump.
Miscellaneous System Components: Providerisers, reducers, couplings, adapters, fittings as necessary to complete irrigation system.

PART 3 EXECUTION

3.1 SUMMARY

- A. Provide a competent superintendent and necessary assistants on the job while Work is progress. The Superintendent represents Contractor in all functions, and directives given to him by Owner are binding as if given to Contractor in person.
- B. During the installation Landscape Architect may make regular site visits and reject any Work and materials which do not meet the Standards called for in Contract Documents. Rejected work must be promptly corrected and no time extension will be allowed for this reason.

3.2 INSPECTION

- A. Inspect project area prior to start of Work to determine that all site conditions are acceptable for

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irrigation Work to begin. Inform Landscape Architect of unsuitable conditions. Do not proceed with installation of irrigation system until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.3 PREPARATION

- A. Flag all existing underground utilities prior to trenching and/or boring operations. Obtain utility locations from Owner and/or General Contractor and Utilize utility locating services when necessary.

3.4 EXCAVATION

- A. All excavation is unclassified and includes all materials encountered.
- B. Prior to excavation, remove sod, preserve and replace after backfilling is completed.
- C. After excavation and backfilling is completed, regard trenched area consistent with surrounding area and re-establish with 100 percent pure of type grass existing. Maintain as necessary for establishment and survival of grass.
- D. Backfill material to be free from rock, large stones and other unsuitable substances which could damage the pipe or create unusual settling problems. Back fill in 6" layers and tamp after each layer to prevent excessive settling.
- E. Backfill trenches containing plastic pipe when pipe is cool to avoid excessive contraction in cold weather. Such backfilling can be done in early morning hours or pipe may be water cooled prior to backfilling procedures.
- F. Backfill material evenly in lifts not to exceed 6" and compact to 100 percent of maximum density.
- G. Contractor is responsible for establishing compaction in trenches equal to or exceeding overall compaction of paving base.

- H. Minimum depth of cover of all pipe is as follows:
 $\frac{3}{4}$ " - 1" pipe - minimum depth cover is 12"
 1 $\frac{1}{2}$ " - 1 $\frac{1}{2}$ " pipe - minimum depth cover is 18".

3.5 SLEEVING

- A. Location of sleeving shown on plans is schematic. Sleeving installation shall make adjustments necessary to accommodate existing vegetation, utilities and other existing conditions. Repair of damage to existing utilities, structures or other construction resulting from installation of sleeves is the responsibility of Contractor.
- B. Install PVC sleeves according to detail.

3.6 PIPE JOINTS

- A. Flow Manufacturer's Recommendation.
- B. Solvent weld PVC pipe, assemble according to Manufacturer's Recommendations, using appropriate PVC pipe cleaner/primer and solvent cement.
- C. PVC to metal connection, Work metal connection first then use Teflon pipe fitting tape on thread PVC to metal joints. Use only light wrench pressure.
- D. Main line shall be installed according to Manufacturer's Recommendations.

3.7 PIPE AND FITTINGS

- A. Install according to Manufacturer's Recommendations including snaking-in of PVC pipe to prevent excessive strain when contracting in cold weather. Solvent weld fittings must conform to Schedule 40 or Schedule 80 PVC dimensions and specifications for solvent weld fittings and as manufactured by Lasco, Inc.
- B. Lateral lines and risers shall be as follows:

Install according to Manufacturer's Recommendations using standard techniques.

Combine lateral lines and main supply lines in common trenches wherever possible with specified minimum depth of coverage over all pipe (see Backfilling).

Install riser such that no excessive movement occurs while sprinkler head is in operation. Height of risers to be in accordance with planned and existing plant material. Height of all risers is subject to approval of Landscape Architect. Exchange of 4" pop-up to 12" high pop-in field by Landscape Architect is incidental.

Plug lines immediately upon installation to minimize infiltration of foreign matter.

Flush lateral lines and risers prior to installation of sprinkler heads.

Above ground risers must be dark gray or black in color.

3.8 SPRINKLER HEADS

- A. Low pop-up sprinkler heads shall be installed in such a manner that tip is 1" above finished grade. Where finish grade has not been established, extend a riser a minimum of 12" above existing grade to mark location of head. After finish grade is established, install heads at specified height on trip elbow swing joint, no flex pipe will be accepted.
- B. High pop-up heads: High pop-up shrub heads shall have the finished height determined by Landscape Architect.
- C. Backfill around sprinkler head assembly in such a manner that sprinkler head is stabilized so that no lateral motion is exhibited during operation.
- D. Sprinkler Heads on Risers: Sprinkler heads on risers should be maintained on a schedule 80 PVC riser coupled by a Schedule 40 F.I.P.T. coupling (Lasco #420007) to polyethylene riser first out of lateral fitting. Height of all heads in bed areas to be determined in the field by Landscape Architect. (Riser heights may also be achieved by use of approved pvc extensions of head manufacturer)

- E. Install control wire in orderly fashion, locate in main line trench. Bundle wires together and tape at 10' intervals. Position wires under main line.
- F. Allow for contraction of wires by providing looped slack at directional changes in supply line.
- G. Keep wire splices to a minimum. All splices shall be waterproofed by using "Rainbird Snap-tite" wire connectors. All splice locations to be indicated on "as-built drawings".
- H. Pass Wires under existing or future paving, construction, etc. through PVC sleeves provided by (Irrigation Contractor/General Contractor).
- I. Control Equipment: Install automatic valves and controller according to Manufacturer's Recommendations. Appropriate locations are shown on the drawings.
- J. Valve Boxes: All valves are to be housed in valve boxes. Install according to Manufacturer's recommendations and according to details. Position boxes at a height that will not cause them to interfere with maintenance machinery (e.g., mowers) and such that soil and mulch do not wash into the box. Locate all valve boxes within plant bed areas where ever possible.
- K. Install surge protection equipment on primary (110 VAC) power lines. Connect each surge protect unit to at least on 5/8" diameter by 9' long copper clad grounding electrode driven into the soil to its full depth. Place electrodes no closer than 2' from controller cabinet or any control or power wire. Be consistent in locating ground rods throughout installation with respect to controller position and not locations on "As-Built" Drawings.
- L. Ground wire between surge protection device and grounding electrode to be single strand bare copper wire at least one size greater than wire supplying power to control unit. Route ground wire away from power and control wires where possible.
- M. When it is necessary to pass through controller cabinet wall, use two #L-70 copper grounding lugs and

brass bolt as noted in detailed drawings. Use #WE 5/8" ground rod clamp (single piece and bolt) to make connection between ground rod a minimum of 10". Cover the top of rod and clamp with a Toro #850-00 cover with lid at grade level.

- N. Balancing and Adjusting: Balance and adjust the various components of system so that overall operation of the system is most efficient. This includes synchronization of controllers, adjustment to pressure regulators, part circle sprinkler heads and individual station adjustments on controllers. The Contractor has the right to call in the Designer or Owner's Representative to aid in balancing and adjustment of system.

3.9 OPERATIONAL TESTING

- A. Upon completion of irrigation system and after head installation, test entire system for proper operation. Flush all air from system and check components for proper operation.

3.10 "AS-BUILT" DRAWINGS

- A. "As-Built" Drawings are to include locations of all wire splices, valves (automatic and manual) with triangulated measurements to each location as well as any deviations in location of piping and heads as represented by Contract Documents.

3.11 OWNER ORIENTATION

- A. Upon completion of Work and final acceptance by Owner and Landscape Architect, Contractor is responsible for orientation of maintenance personnel in the operation, maintenance and repair of system. Furnish copies of all available parts lists, trouble shooting lists and specification sheets to Owner prior to final payment.
- B. Set initial watering schedules and programming on automatic controllers at the direction of Landscape Architect. Changes in schedules and programming and instructions on how to make such changes is the responsibility of Landscape Architect.

3.12 WINTERIZING THE SYSTEM

- A. If Owner requires, irrigation piping must be winterized by first blowing system clear of water using compressed air (80 psi minimum) admitted into piping at a quick coupling valve or hose bib located at a higher elevation on the system piping. Activate individual zones, higher zones first, then proceed successively through the system towards lower elevations. Proceed through all zones twice. The air compressor used to winterize system must have an engine separate from compressor tanks to prevent high temperature air from being injected directly into PVC piping.

3.13 CLEAN-UP

- A. During Irrigation Work, keep project site clean and orderly.
Upon completion of Work, clear grounds of debris, superfluous materials and all equipment. Remove from site to the satisfaction of Landscape Architect and Owner.

3.14 PROTECTION

- A. Protect Irrigation Work and materials from damage due to irrigation operations, operations by other contractors, trades and trespassers. Maintain protection until Date of Substantial completion.
- B. Cover all openings into system as it is being installed to prevent obstructions in pipe and breakage, misuse or disfigurement of equipment.
- C. Contractor is responsible for theft of equipment and material at job site before, during and after installation, until Date of Substantial Completion of the Work in total.

3.15 INSPECTION AND ACCEPTANCE

- A. Upon completion of Work, notify Landscape Architect and Owner at least three days prior to requested Date of Inspection for Substantial Completion. Prior to contacting Landscape Architect for the purpose of demonstrating all or any part of the system, thoroughly test the system for proper operation and make adjustments and replace any defective parts prior

to inspection for Substantial Completion. Where inspected irrigation Work does not comply with requirements, replace rejected Work promptly, within two weeks of inspection. In unusual circumstances, a longer time period may be granted by Owner. If such replacements are not completed within time specified, Contractor may be considered to be in default of Contract and Owner may use Contract Retainage to hire other Contractors to finish the Work.

PART 4 ACCEPTANCE AND GUARANTEE

4.1 SUMMARY

- A. Substantial Completion: Submit written requests for inspection for Substantial Completion to Landscape Architect at least three calendar days prior to anticipated Date of Inspection and Testing. Substantial Completion cannot be granted and at the same time no further applications for payment shall be approved for more than 85% of contract until there has first been a walk-thru for head coverage at which time a "punch list" will be written consisting of items to be addressed and corrected by Contractor immediately. Depending on the extent of the Work on the "punch list", the Landscape Architect will determine the job to be Substantially Complete or pending the completion of the "punch list".
- B. Submit record drawings and maintenance manuals to Landscape Architect with written request for inspection.
- G. Review "punch list" Work jointly with Owner and Landscape Architect for Substantial Completion of total (contract) Work. (See "General Conditions", Article No. 9).
- H. Upon satisfactory completion of repairs and replacements and completion of "As-Built" drawings, Landscape Architect and Owner will verify system for Substantial Completion and issue AIA Certificate of Substantial Completion if all items on "punch list" have been completed. If necessary another "punch list" will be written to itemize any deficiencies still existing and will be attached to AIA Certificate. Contractor shall complete all "punch

list" items if possible within 30 days while continuing maintenance.

4.2 DATE OF SUBSTANTIAL COMPLETION

- A. Date of Substantial Completion will constitute beginning Date of One-Year Guarantee. This Date also constitutes the beginning of the warranty responsibilities and acceptance by Owner and Landscape Architect.

4.3 GUARANTEE

- A. All Work, products, equipment and materials for one year, beginning at Date of Substantial Completion as per (AIA Certificate of Substantial Completion/written letter of notification).
- B. Make good any damage, loss, destruction or failure. Repairs and replacements shall be done promptly and at no additional cost to Owner.
- C. Repair damage to grade, plants and other Work or property as necessary.
- D. If replacements are not acceptable during or at end of Guarantee Period, Owner may elect either subsequent replacement or credit. Replacement products shall have a similar one-year guarantee from time of replacement.
- E. Guarantee applies to all unacceptable conditions or losses with exception of Master Irrigation Specifications

PART 5.0 METHOD OF MEASUREMENT

5.1 METHOD OF MEASUREMENT

- A. The irrigation system shall be measured per these specifications and plans as a lump sum pay item.

PART 6.0 PAYMENT

6.1 PAYMENT

- A. The Pay Item listed below shall be considered complete and shall include all material, equipment, labor, installation costs, overhead and profit. Bidder shall verify quantities by his own take-off from the Drawings and notify the Landscape Architect of discrepancies before submitting a Bid.

END OF SECTION 02810

SECTION 02900 LANDSCAPE PLANTING & SODDING

PART 1 GENERAL

1.1 SUMMARY

- A. Extent of the planting is shown on the drawings and in the schedules.
- B. Provide all labor, materials, and equipment required by or referenced from the drawings and specifications to complete the work of this section.
- C. Verify plant count from plan, and provide and install all plant material on plan unless site conditions prohibit.
- D. All plants shall conform to or surpass minimum quality standards as defined by the American Association of Nurserymen, current edition of American Standards for Nursery Stock published by American Association of Nurserymen, Inc. and in addition shall conform to sizes and descriptions in the plant list.
- E. Related work: Section 02810 – Landscape Irrigation

1.2 SUBSTITUTION

- A. Substitution from the specified plant list will be accepted only when satisfactory evidence in writing is submitted to the Landscape architect, showing that the plant material is not available.
- B. Requests for approval of substitute plant material shall include common and botanical names and the size of substitute material.
- C. Only those substitutions of at least equivalent size and having essential characteristics similar to the originally specified material will be approved. Acceptance or rejection of substitute plant material will be issued in writing by the Landscape Architect.

1.3 APPROVAL AND SELECTION OF MATERIALS AND WORK

- A. The selection of all materials and the execution of all operations required under the Drawings and

Specifications are subject to the approval of the Owner and Landscape Architect. They have the right to reject any and all materials and any and all work, which in their opinion, does not meet the requirements of the Contract Documents at any stage of the operations. Remove rejected Work and or materials from Project Site and replace promptly at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

- A. The landscape installer shall be qualified with work resulting in successful plant establishment.
- B. The installer is required to maintain an experienced full-time supervisor on project site when planting is in progress.
- C. Topsoil analysis shall be furnished by Mississippi State University Extension Center (Mailing Address P.O. Drawer "Z", Gulfport, MS 39502-0045) Contact Information Phone 228-865-4227, Fax: 228-868-1470 Email: harrison@ext.msstate.edu (or an equal), stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; (sodium absorption ration;) deleterious material; pH; and mineral and plant-nutrient content of topsoil.
- D. A report of suitability of topsoil shall be furnished for lawn growth stating the recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- E. The following codes and standards shall be observed:
 - 1. State and Federal laws, including for disease and insect control.
 - 2. Requirements of authorities having jurisdiction.
- F. A Pre-installation Conference shall be conducted 30 days prior to construction. The General contractor shall schedule this meeting to include the landscape contractor, irrigation contractor, Landscape Architect, and any other parties participating in this contract.

1.5 WORKMANSHIP

- A. Install all plant materials neatly.
- B. Make minor adjustments to layout as may be required and requested by Landscape Architect at no additional cost to the Owner.
- C. Coordinate delivery of all plant material with time of installation to prevent any plant material from being stockpiled on site longer than 24 hours.
- D. Deliver materials in such manner as to not damage or decrease the health and vigor of the plant materials. Store materials away from detrimental elements. Coordinate with General Contractor to secure a safe staging area.
- E. Handle, load, unload, and transport materials carefully to avoid damage.
- F. Maintain and protect plant materials as necessary to insure health and vigor.

1.6 GUARANTEE

- A. Guarantee all plant materials and lawn areas for one year from the date of substantial completion. Contractor shall replace plants that fail to grow properly with plants as originally specified at the earliest practical date following plant failure, without additional charges to the Owner.
- B. Replacement materials will be guaranteed for one year from the date of replacement.
- C. The Contractor shall not be responsible for replacing plants which are damaged by abuse or improper maintenance by Owner as reported by Contractor outlined below or by acts of nature occurring after acceptance.
- D. Acts of nature may include, but may not be limited to high winds of hurricane or tornado force, sleet, hail, freezing rain and extreme cold (as determined by the Landscape Architect). Contractor agrees to replace

losses due to Acts of Nature at twenty percent (20%) less than the original contract price for the damaged work.

1.7 CONTRACTOR'S PERIODIC INSPECTION

- A. During guarantee period, Contractor shall make periodic inspections of the project to satisfy him that maintenance by the Owner is adequate.
- B. Any methods or products which he deems not normal or detrimental to good plant growth shall be reported to the Owner in writing.
- C. Failure to inspect and report shall be interpreted as approval and the Contractor shall be held responsible for any and all replacements.

1.8 SOIL TESTING

- A. Contractor shall have soil tested by suitable laboratory chosen by the Contractor and subject to written approval of the Landscape Architect.
- B. Soil test shall be completed in all planting areas to determine lime and fertilizer requirements. Submit test results to Landscape Architect for approval. Contractor shall adjust pH and fertility based upon results. No addition to or placement of soil is to be done prior to initial soil test report approval.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall be fertile, friable, sandy loam and a natural surface soil obtained from well areas reviewed by Landscape Architect and possessing characteristics of representative soils in the project vicinity that produce heavy growths of crops, grass, or other vegetation.
- B. Topsoil shall be free of subsoil, brush, organic litter, or objectionable weeds, clay, clots, stumps, stones, roots or other material harmful to plant growths or hindrance to planting or maintenance

operations. Should regenerative materials be present in the soil, Contractor shall eradicate and remove such growth, both surface and root, which may appear in the imported material within one year following acceptance of the work.

- C. Topsoil shall not be handled in a frozen muddy condition. The acidity range shall be between 5.0 and 7.0 inclusive. The mechanical analysis of the soil shall be as follows:

Sieve Size	Percent Passing
1 inch mesh	99 - 100 percent
1/4 inch mesh	97 - 99 percent
No. 100 mesh	40 - 60 percent
No. 200 mesh	20 - 40 percent

- D. Topsoil, regardless of the source, shall meet all requirements of the paragraph above.
- E. Stockpile material that does not meet the requirements may, at the option of the contractor, be improved by screening and the addition of organic matter and chemical admixtures.

2.2 PLANTING SOIL MIXTURE

- A. Provide soil mix amended as per laboratory recommendations. Some more specific descriptions may be given on the drawings for special planting of trees. Basic planting soil mix consists of:

- 25% topsoil (as described Above)
- 25% clean sand
- 50% Approved Organic Material (Submit Sample)

- B. The components shall be thoroughly mixed to uniform consistency by hand or machine methods.

2.6 TREES

- A. All large deciduous shade trees and ornamental trees are to be field grown from rooted cuttings true to variety and not grafted material. No grafted material will be accepted for the initial installation or as guarantee replacement material.

- B. Orders for Plant Materials - Submit to Landscape Architect within 30 days from date contract is awarded to the Contractor.
- C. Contractor will submit confirmed orders within ten days of tagging. Contractor is responsible for payment of deposits.

2.7 ORDERS FOR PLANT MATERIALS

- A. Submit to Landscape Architect within 30 days from date of contract is awarded to General contractor confirmed orders for material from approved growers (listed on plant schedule). Contractor is responsible for payment of deposits required by approved growers.

2.8 FERTILIZER

- A. Fertilizer for all trees, plants and ground covers shall be Milorganite delivered to the site in unopened containers.
- B. Fertilize all areas according to the manufacturer's recommended rates in accordance with the monthly maintenance guideline herein.
- C. Cultivate and water beds or pits thoroughly after application.
- D. Adjust fertilizer in accordance with interim soil test reports.

2.9 FERTILIZER FOR SOD

- A. Fertilizer for sod shall be Milorganite fertilizer as per manufacture's recommended rates.
- B. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened container, bearing the Manufacturer's guaranteed analysis. Fertilizer shall not have been exposed to weather prior to delivery to the site. After delivery until used, it shall be completely protected at all times. It shall not be stored in direct contact with the ground.

2.10 PLANTS

- A. All plants shall conform to or surpass minimum quality standards as defined by the American Association of Nurserymen (AAN), current edition of American Standard for Nursery Stock, published by the AAN, Inc. and in addition, shall conform to sizes and descriptions in the plant list.

2.11 CERTIFICATES OF INSPECTION FOR PLANT MATERIAL

- A. All necessary inspection certificates shall be supplied to the Landscape Architect's representative for each shipment of plant material, as required by law. Certificates showing source of origin shall be filed with Landscape Architect prior to acceptance of the material.

2.12 INSPECTION

- A. All plant materials shall be subject to inspection and approval. The Landscape Architect reserves the right to reject any and all plants which fail to meet this specification at any point during the installation of the job. All rejected materials shall be promptly removed from the site by the Contractor at no additional cost to the owner.

2.13 QUALITY AND SIZE

- A. All plant materials furnished shall be well branched, proportioned width to height, of normal habit, sound, healthy and vigorous in growth. The minimum acceptable sizes of plants shall be measured before pruning with branches in normal position and shall conform to measurements specified. Plants used where symmetry is required shall be matched as closely as possible. Plants shall meet all requirements as listed in the plant list.

2.14 SOURCE OF PLANTS

- A. Plants shall be field nursery, container grown or collected material subject to the requirements of the Specifications.

2.15 FIELD TAGGED PLANTS

- A. All trees are to be located and tagged by the Contractor. The Landscape Architect retains the right to refuse all plant material that does not meet the specifications identified on the drawing.

2.16 INSECTS, PESTS AND PLANT DISEASES

- A. All plants shall be of healthy stock, free from disease, insects, eggs, larvae and parasites of an objectionable or damaging nature.

2.17 SUBSTITUTIONS

- A. Substitution from the specified list will be accepted only when satisfactory evidence in writing is submitted to the Landscape Architect, showing that the plant specified is not available. Requests for approval of substitute material shall include common and botanical names and size of plant material. Only those substitutions of at least equivalent size and having the essential characteristics similar to the originally specified material will be approved. Acceptance or rejection of substitute plant material will be issued in writing by the Landscape Architect.
- B. Balled and burlapped plant materials are to be wrapped with organic wrapping burlap only. Synthetic material will not be accepted. Remove all nursery loading straps once plant material is placed in the pit.
- C. Stakes for supporting trees shall be sound timber, straight, sized as shown in planting details and of sufficient length to adequately support the plant. All visible surfaces shall be painted flat black.
- D. Deadmen or stakes for anchoring guy wires in the ground shall be of size, material and strength adequate to hold guy taut and maintain tree firmly in an upright position(see plan sections).
- E. Wire shall be as shown on plans applicable sections for guying.

2.18 MULCH

- A. Pine straw mulch shall be clean, fresh, free of noxious weed, seed, fire ants, Japanese beetles and/or fringed beetles. On slopes pine straw mulch shall be used.

2.19 EROSION-CONTROL MATERIALS

- A. Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended 6" steel wire staples.
- B. Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, 0.92 lb/sq yd minimum, with 50 to 65% open area. Include manufacturer's recommended 6" steel wire staples.

2.20 SOD

- A. Sod shall be 100% specified grass, free of weeds, freshly dug.

2.21 LIME

- A. Ground dolomitic limestone not less than 85% total carbonates and magnesium, ground so that 50% passes 100-mesh sieve and 90% 20-mesh sieve.

PART 3 EXECUTION

3.1 LAYOUT OF MAJOR PLANTS

- A. Before commencing planting operations, location of major plants and outlines of areas to be planted shall be marked out on the ground, by the Contractor for approval by the Landscape Architect. Contact the Landscape Architect a minimum of 48 hours in advance of the anticipated review of the layout.

3.2 TIME AND PLANTING

- A. Planting operations shall be during favorable weather in which conditions are neither extremely cold or hot

nor to the point that the risk of loss is too great. The Contractor shall inform the Landscape Architect of high risks due to weather.

3.3 PREPARATION OF PLANTING BEDS (See Planting Sections)

- A. Any planting bed that has an existing live oak in it shall not be tilled. Each hole is to be hand dug. No major roots are to be harmed during the planting. If the tree is harmed, the Contractor will be held responsible.
- B. Grade will be brought to the level of the finished grade by the Contractor. This is to include debris removal and any grading required to bring the landscaping finished grade to the proper level for planting trees, shrubs and ground covers. Contractor shall grade for proper drainage.
- C. Circular plant pits with vertical sides shall be dug by hand or machine methods for planting and transplanting of trees and shrubs.
- D. Shrub pit diameter shall be a minimum of one foot greater than the spread of the root mass.
- E. All transplanted material is to be replanted the same day it is dug or properly healed in and watered regularly to insure life.
- F. Test excavated plant pits to determine if sufficient drainage is present for proper plant survival.
- G. Fill the area between the pits, if the individual pits are arranged in a group, to the required grade with pine bark mulch 3" deep. Plant beds shall be neatly edged and kept free of weeds until the work is accepted.

3.4 EXCAVATION FOR PLANTING GROUND COVERS

- A. Ground cover beds shall be scarified by hand or machine method to a minimum depth of 18". Four inches of pine bark additive and 20 pounds per 1000 square feet of Trident Rootzone humus shall be uniformly

incorporated into the soil to the full 18" of minimum depth.

3.5 DRAINAGE TEST FOR TREES

- A. Tree pits shall be filled with water. If percolation is less than 100% within a period of twelve hours, drill an 8" auger to a depth of 2' below the bottom of the pit. Retest the pit. In case drainage is still unsatisfactory, notify the Landscape Architect in writing of the condition before planting the trees. Contractor is fully responsible for the warranty of the trees. If the tree is on a slope, provide a trench filled with stone and a 4" drain pipe to the point of nearest relief.
- B. Drainage Test for Plants and Ground Covers shall be spot tested to insure proper percolation.
- C. Balled and container plants shall be placed firmly upon scarified subgrade and backfilled with planting soil mixture. Remove all wire, cords, and burlap from the top of root ball. Hand tamp carefully around and under ball to fill all voids. Water during back filling. Form saucer from planting soil mixture in order to retain water.
- D. Gently loosen outer roots of container grown plants to encourage outward growth.
- E. Fertilizer shall be thoroughly mixed and soaked into the top 2" of soil for all plant pits.

3.6 TREE TRANSPORTATION

- A. The Contractor shall be responsible not only for the safe transportation of the plants to the site but also their condition upon arrival. Trees with abrasions of the bark, sun scalds, fresh cuts, or breaks of limbs which have not completely callused will be rejected. Trees which have been damaged during transit will be replaced by the Contractor at no additional cost. All plant unit costs will reflect all above listed specifications.

3.7 TREE TAGS

- A. All plants accepted at the nursery by the Landscape Architect shall be tagged with serialized self locking tags. Trees delivered to the site without these tags or with broken tags will be rejected. The tags shall remain on the trees until the Contractor has been given instructions by the Landscape Architect for removal.

3.8 PRUNING DECIDUOUS TREES

- A. Deciduous trees and shrubs shall be pruned only to thin out heavy growth.
- B. Do not top or remove terminal growing point or leader of any plant.

3.9 TREE STAKING & GUYING

- A. Space three guys equally about each tree, attached at approximately two-fifths up the trunk. Guy to trunks with wire loops and black rubber hose drawn snug in all directions. These guys shall be equally taut. All stakes to be painted black with nonleaded outdoor paint.
- B. Mulch all planting beds and other areas designated to be mulched, with three "settled" inches of pine straw mulch. Individual plants are to be mulched as detailed. Mulch is to be measured after settlement and maintained as specified.
- C. Guy trees as shown by plan applicable sections.

3.10 PREPARATION OF LAWN AREAS

- A. Grade will be brought to a level of 4" below finished grade by the General Contractor. The landscape contractor will spread 4" of topsoil, fine grading all lawn areas to finish grade. All areas shall have smooth and continual grade between the existing and fixed controls such as walks and curbs. Roll, scarify, rake and level as necessary to obtain true,

even and firm lawn surfaces. All finished grades shall meet approval of the Project Engineer before sodden or seeding operations begin.

3.11 AREAS TO RECEIVE SOD

- A. Grade will be brought to the level of the finished grade by the Landscape Contractor. The Landscape Contractor will be responsible for fine grading. This is to include debris removal and any grading required to bring the finished topsoil grade to the proper level for laying sod. Contractor shall fine grade as necessary for uniformity and drainage.
- B. On this grade spread specified fertilizer as per Manufacturer's recommendations and lime at a rate of 50 lbs. per 1000 square feet evenly over all areas to receive grass. A soil test shall be made prior to the beginning of fertilizing and liming and the quantities of the lime and fertilizer shall be adjusted, if necessary, to achieve a pH of 6.0 to 7.0.
- C. Scarify prepared grade to depth of 6 inches, thoroughly incorporating fertilizer and lime into the top 6" of existing soil in all areas to be grassed. Caution shall be exercised to avoid damage to underground utilities. All building debris, vegetation, sticks and stones over 1 inch in any dimension shall be removed and the surface leveled and smoothed.

3.12 SODDING OPERATIONS

- A. Delivery of sod shall be scheduled so as to allow laying of sod without delay. No sod shall remain stacked longer than 24 hours. In the event that sod cannot be laid immediately upon delivery, Contractor shall lay sod on as designated site, to be approved by the Landscape Architect. No sod shall overlap and it shall be lightly watered as necessary to keep moist.
- B. Lay sod when bed is not excessively wet or frozen, but when soil is moist for a depth of 4".
- C. Lay sod so that no voids occur. Sod shall be tamped and rolled by hand methods. The completed surface

shall be true to finish grade and even and firm at all points.

- D. Do not move heavy objects over areas to be sodded after the soil has been prepared.
- E. A satisfactory stand is defined as a cover of living grass of specified species, after true leaves are formed in which no gaps larger than five (5) inches square occur.
- F. Areas determined by the Landscape Architect to be solid rock will be exempt from this requirement.

3.13 REMOVAL OF EXISTING GRASS

- A. The Contractor is to remove existing grass and weeds from all areas for planting and resodding as designated on the plans. The existing stands are to be removed to a maximum depth of 1" so as to not disturb existing tree roots where present in those areas.
- B. Aerate with a tined tiller to break up the upper 3" lightly not to damage tree roots. Pick up solids for discarding and cut cleanly any roots damaged.
- C. Spread a light layer of topsoil not more than 1" in depth over the aerated area and fine grade to meet acceptance by the Landscape Architect. Apply fertilizer and lime to these areas as specified previously under "Areas to receive Sod" or "Preparation of Planting Beds" which ever the case may be.

PART 4 CLEANUP AND PROTECTION

4.1 SUMMARY

- A. Keep Project Site clean and orderly during planting operations.
- B. Clear grounds of debris, superfluous materials and all equipment upon completion

of Work. Remove from site to the satisfaction of the Landscape Architect and Owner.

- C. Protect all work and materials from damage due to landscape operations and operations by other contractors, trades and trespassers. Maintain protection until Date of Substantial Completion.
- D. Contractor is responsible for theft of equipment and material at the site before, during and after installation, until Date of Substantial Completion of Work in total.

PART 5 LANDSCAPE MAINTENANCE

5.1 SUMMARY

- A. Begin maintenance at commencement of Work of this Section and Continue until Substantial Completion, as part of Work of this section.
- B. Continue maintenance for a Maintenance Period of thirty calendar days after date of Substantial Completion.
- C. Provide labor, materials, equipment and means for proper maintenance of all materials and workmanship.

5.2 SUPERVISION

- A. Submit a written report and conduct joint inspection with Landscape Architect of maintenance program and procedures, at inspection for Substantial Completion.

5.3 MAINTENANCE OF TREES, SHRUBS, SOD, AND SEED

- A. Maintain all plants in a growing, well formed, healthy condition by watering, fertilizing, pruning, weeding, spraying, wrapping, straightening, replacement or by other necessary maintenance operations.

5.4 WATERING

- A. Monitor owner's automatic watering system and schedule for proper watering of all plant material.

- B. Advise Landscape Architect immediately in writing of recommended alterations due to weather or other conditions.
- C. Water landscaped (and sodded) areas not covered by automatic watering system as frequently as necessary to maintain proper moisture level, using the following schedule as a guide:
 - 1. Twice a week during March, April, May
 - 2. Three times a week during June, July, August, September
 - 3. No watering from October through February, except in drought conditions.

5.5 FERTILIZING

- A. Apply four (4) times a year to trees, shrubs, ground cover, and sod as per manufacturer's recommended application rate.

5.6 MOWING

- A. Mow grass to a height of 2 to 2.5" when it reaches a height of 3", or as directed by Landscape Architect. Seeded and sodded lawns shall have at least one mowing before receiving Substantial Completion.

5.7 RESODDING

- A. Rework and re-sod areas which fail to show a uniform stand of grass. Perform work with the same kind of sod applied and repeated until all areas are covered with a uniform stand of grass.

5.8 RESEEDING

- A. Rework and seed areas which fail to show a uniform stand of grass. Perform work with the same kind of seed applied and repeated until all areas are covered with a uniform stand of grass.

5.9 SITE ANNUAL PLANTING

- A. Replace annual plantings according to schedule in Drawings. Blooming plants shall be replaced as

necessary throughout specified Maintenance Period to maintain blooming condition.

5.10 PRUNING

- A. Remove dead wood as it becomes evident. Remove living portions of plants only at the direction of Landscape Architect.

5.11 WILT-PROOFING

- A. Apply approved anti-desiccant to all evergreen trees during last two weeks in October (except pines).

5.12 SPRAYING

- A. For each spraying combine approved insecticide and fungicide to provide maximum protection for all plant materials. Three sprays annually; in March, May, and August.

5.13 WEEDING

- A. Two applications (Spring and Fall) of chemical pre-emergent spray, approved. Two applications (during growing season) of chemical contact spray (Round-Up, by Monsanto, or approved equal). Two days per month (every two weeks) manual weeding (by hand) during the period from March 1 through September 30; remove all visible weeds.

5.14 MULCHING

- A. Keep planting areas neat and uniformly mulched to specified depth on a continuous basis. In addition to replacing and re spreading mulch as necessitated during the maintenance period completely replenish mulch in all planting areas one time (during the last month of the one-year Guarantee Period or as Directed by the Landscape Architect).

5.15 STRAIGHTENING

- A. Maintain plants in their stable upright position and at the proper grade by straightening and tightening

staking and guying apparatus and as approved by the Landscape Architect.

5.16 CLEAN-UP

- A. Keep all planting areas neat, weeded and uniformly mulched on a continuous basis. Clean up adjacent walks and pavement where lettered as a result of maintenance operations, on a continuous basis.
- B. The 30 day maintenance period following Substantial Completion will be considered a lump sum item to be addressed as an item included in the contract.

PART 6.0 ACCEPTANCE AND GUARANTEE

6.1 SUBSTANTIAL COMPLETION

- A. Submit written requests for inspection for Substantial Completion to the Landscape Architect at least three calendar days prior to anticipated date of inspection and testing.
- B. Substantial Completion cannot be granted and at the same time no further applications for payment shall be for more than 85% of the Contract until there has been a walk - thru for planting at which time a "punch list" will be written consisting of items to be addressed and corrected by the Contractor immediately. Depending on the extent of work on the "punch list", the Landscape Architect will determine the job to be "substantially complete" or pending the completion of the "punch list".
- C. Submit Record Drawings and Maintenance manuals to the Landscape Architect with written request for inspection.
- D. Review the "punch list" work jointly with the Owner and Landscape Architect for Substantial Completion of the total (contract) work.
- E. Upon completion of repairs and replacements found necessary at the time of review, the Owner and Landscape Architect will confirm the date of

Substantial Completion and issue the written notice of Substantial Completion if all items on the punch list have been completed. If necessary, another punch list will be written to itemize any deficiencies still existing and will be attached to the written notice of substantial completion. The contractor shall complete all "punch list" items if possible within 30 days while continuing maintenance.

- F. The date of Substantial Completion will constitute the beginning date of the One - Year Guarantee. This date also constitutes the beginning of warranty responsibilities and acceptance by the Owner and Landscape Architect.

6.2 GUARANTEE

- A. All work, products, equipment and materials for one year, beginning at the Date of Substantial Completion as per the written notice of Substantial Completion.
- B. Make good any damage, loss, destruction or failure. Repairs and replacements shall be done promptly and at no additional cost to the Owner.
- C. Repair damage to grade, plants, and other work as necessary.
- D. If the replacement is not acceptable during or at the end of the Guarantee Period, the Owner may elect either subsequent replacement or credit. Replacement products shall have a similar one year guarantee from the time of replacement.
- E. Guarantee applies to all unacceptable conditions or losses with exception of those due to acts of nature, vandalism or Owner neglect, as determined by Landscape Architect. Act of Nature includes, but may not be limited to, high winds of hurricane or tornado force, sleet, hail, freezing rain and extreme cold (as determined by Landscape Architect). Contractor agrees to replace losses due to Acts of Nature at (15%) less than original contract price for the damaged Work.

PART 7.0 METHOD OF MEASUREMENT

7.1 METHOD OF MEASUREMENT

- A. Plant material shall comply with these specifications and the plans in which each plant is listed. The plant material (excluding seeded areas) shall be priced as a lump sum.

- B. Sod shall comply with these specifications and quantified by the plans. The units of sod shall be measured in square yards.

PART 8.0 PAYMENT

8.1 PAYMENT

- A. The Pay Items listed below shall determine the value of extra work or changes in the work, as applicable. They shall be considered complete and shall include all material, equipment, labor, installation costs, overhead and profit. Bidder shall verify quantities by his own take-off from the Drawings and notify the Landscape Architect of discrepancies before submitting a Bid.

END OF SECTION 02900

SECTION 16010 BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes: This section provides basic electrical requirements.

1.02 BASIC ELECTRICAL REQUIREMENTS

- A. Quality Assurance:
 - 1. Workers possessing the skills and experience obtained in performing work of similar scope and complexity shall perform the Work of this Division.
 - 2. Refer to other sections of the Specifications for other qualification requirements.
- B. Drawings and Specifications Coordination:
 - 1. For purposes of clearness and legibility, Drawings are essentially diagrammatic and the size and location of equipment is indicated to scale whenever possible. Verify conditions, dimensions, indicated equipment sizes, and manufacturer's data and information as necessary to install the Work of this Division. Coordinate location and layout with other Work.
 - 2. Drawings indicate required size and points of termination of conduits, number and size of conductors, and diagrammatic routing of conduit. Install conduits with minimum number of bends to conform to structure, avoid obstructions, preserve headroom, keep openings and passageways clear, and comply with applicable code requirements.
 - 3. Routing of conduits may be changed provided that the length of any conduit run is not increased more than 10 percent of length indicated on the Drawings.
 - 4. Outlet locations shall be coordinated with architectural elements prior to start of construction. Locations indicated on the Drawings may be distorted for clarity.
 - 5. Coordinate electrical Work with all other Work.
 - 6. The scope of the electrical work includes furnishing, installing testing and warranty of all Electrical work and complete electrical systems shown on the electrical drawings and specified herein.
 - 7. The drawings and specifications complement each other and together complete the contract documents for the electrical work included in this project. Neither the drawings or the specifications are complete without the other. Any item

mentioned in either document is binding. Where conflicts arise between the drawings and the specifications, the more stringent requirement shall prevail.

8. The contractor shall provide and install all electrical systems to provide a complete package as indicated by the contract documents. The documents are intended to provide an outline for the required installations. The contractor shall ultimately provide a complete and operational system at the conclusion of the project.
9. Details are provided as they relate to the installation. Contractor shall provide and install all miscellaneous components, parts, materials, fasteners, splices, and any other incidental items necessary to provide a complete installation.

C. Terminology:

1. Low Voltage: Applies to signal systems operating at 120 volts and less, and power systems operating at less than 600 volts.
2. UL: Underwriter's Laboratories Inc, Nationally Recognized Testing Laboratory (NRTL), or equal.

D. Regulations: Work shall comply with the requirements of authorities having jurisdiction and the Electrical and Building Codes. Material shall conform to regulations of the National Board of Fire Underwriters for electrical wiring and apparatus. Materials shall be new and listed by UL, or another NRTL.

E. Structural Considerations for Conduit Routing:

1. Where conduits pass through or interfere with any structural member, or where notching, boring or cutting of the structure is necessary, or where special openings are required through walls, floors, footings, or other buildings elements, contractor shall submit shop drawings to the architect for approval.

F. Electrically Operated Equipment and Appliances:

1. Equipment and Appliances Furnished by Others:
 - a. Equipment and appliances indicated on Drawings as "not in contract" (NIC), "furnished by others," or "furnished by the Owner," will be delivered to the Project site. Required electrical connections shall be performed for such equipment and appliances. Motorized equipment will be furnished factory-wired to a control panel or junction box unless otherwise indicated. Appliances will be furnished equipped with portable cord and cap. Provide disconnect switches where required.
 - b. Connections to equipment furnished under this Division shall be part of the Work of this section. Work shall include internal wiring, installation,

connection and adjustment of bolted drive motors in which the motor is supplied as a separate unit, and connections only for equipment furnished with factory installed internal wiring, except as further limited by Drawings and this Specification. Work shall include furnishing and installing suitable outlets, disconnecting devices, controls, push-button stations, selector switches, conduit, junction boxes, and wiring necessary for a complete electrical installation.

- c. Electrical equipment furnished under other sections, for installation and connection under Work of this section, will be delivered to the Project site ready for installation.
- d. Equipment furnished under other sections, and requiring electrical connection under this section, will be set in place as part of the Work of the section furnishing such equipment unless noted otherwise. If electrical connections exceed the requirements of the specified equipment, it shall be the responsibility of the contractor or vendor supplying the equipment to compensate the electrical contractor for any and all work to make the electrical connections to the equipment being supplied. Any discrepancies shall immediately be brought to the engineers' attention for coordination between all other disciplines. All increased costs shall be the responsibility of the contractors, not the owner, architect, or engineer.
- e. Suitability and condition of equipment furnished under other sections shall be determined in advance of installation. Immediate notice of damage, unsuitability, or lack of parts shall be given to the entity providing such equipment.

G. Protection of Materials:

- 1. Protect materials and equipment from damage and provide adequate and proper storage facilities during progress of the Work. Damaged materials and/or equipment shall be replaced.

H. Cleaning:

- 1. Exposed parts of Work shall be left in a neat, clean, usable condition. Finished painted surfaces shall be unblemished and metal surfaces shall be polished.
- 2. Thoroughly clean parts of apparatus and equipment. Exposed parts to be painted shall be thoroughly cleaned of cement, plaster, and other materials. Remove grease and oil spots with solvent. Such surfaces shall be wiped and corners and cracks scraped out. Exposed rough metal shall be smooth, free of sharp edges, carefully steel brushed to remove rust

and other spots, and left in proper condition to receive finish painting.

3. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

I. Permits and Regulations:

1. Include payment of all permit and inspection fees applicable the work in this Division.
2. Work must conform to the National Electric Code, National Electrical Safety Code, and other applicable local, state, and federal laws, ordinances, and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. No work shall be installed which is less than minimum legal standards.
3. All work performed under this Division shall be inspected and approved by the Local Authority having Jurisdiction.

J. Site Inspection:

1. Each and all bidders shall inspect the project site prior to bidding.
2. Existing site conditions shall be compared with the information shown on the drawings. Immediately report any discrepancies to the Architect. After project bid date, no allowances will be made for failure to have made inspections.
3. During construction, the contractor shall exercise care and take appropriate precautionary measures to prevent any damage to the existing structures, sidewalks, utilities, communications, etc. during the project. The Contractor shall correct all damage caused by or during the project. Contractor shall provide not less than (2) and not more than (10) working days advance written, electronic, or telephonic notice of the commencement, extent, location and duration of the excavation work to Mississippi One-Call System, Inc. (1-800-227-6477) and any nonmembers operator(s) of any underground utility lines or underground facilities in and near the excavation area, so that Mississippi One-Call System, Inc operator(s) and any non-member operator(s) may locate and mark the location of underground utility lines and underground facilities in the excavation area.

K. Utility Company Coordination and Fees:

1. Contractor shall inspect and verify the existing utilities at the project site prior to bidding.
2. Where applicable, the contractor shall contact the local utility companies to verify service arrangements with each. Install all service entrance conduits, pads, duct banks, etc, to meet the requirements of the respective utility

company. In instances where contract documents' requirements are more stringent than utility company requirements, the drawings and specifications shall take precedence.

3. Where equipment and utilities are owned by the college, coordinate with maintenance and public works for access, switching, shut downs, tie-ins, etc. as required to complete installations.
4. The electrical contractor shall be responsible for and shall include in his bid any and all utility company fees required to provide connections for the project. The Architect or Owner shall not be responsible for any fees assessed by the utility companies.

L. Temporary Power for Construction:

1. The electrical contractor shall provide and install temporary power during the construction period as required to complete the project installation. Contractor shall coordinate with the general contractor, utility company, and/or owner to provide 120/240 volt power for the project. All devices shall be provided with ground fault circuit protection. Power shall be provided in central work area(s). This shall not include any remote power needs for any specific trades. For power requirements at voltages other than those listed above, the contractor shall coordinate connection requirements with the local utility company.
2. All temporary power installations shall meet local and national codes and be approved by the local authority having jurisdiction.

1.03 SUBMITTALS

- A. Where indicated submit to architect, (7) copies of Shop Drawings including control diagrams, list of materials, catalog cuts, technical data, manufacturer's specifications, and applicable installation details.

1.04 RECORD DRAWINGS

- A. The Electrical Contractor shall maintain, at the project site, a separate set of prints of the contract documents and shall show all changes and variations, in a neat and clearly discernible manner, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Architect. Provide the following as-built documents including all contract drawings regardless of whether corrections were necessary and include in the transmittal: "2 sets of CDs and prints for Owner's use, one set of CDs, prints for Architect / Engineers Records". Delivery of these as-built electronic files and prints are a condition of final acceptance.

1.05 OPERATION AND MAINTENANCE MANUALS

- A. The Electrical Contractor shall submit to architect (3) copies each of operating and maintenance manuals for each piece of equipment applicable to the project.
- B. All shop drawings, installation, operation, and maintenance manuals, wiring diagrams, parts lists, and other information including warranties and technical support, shall be obtained from each manufacturer.
- C. Assemble all information into three-ring binders or other suitable binding. Add an index and/or tabbed and labeled sections of all items submitted.
- D. The Electrical Contractor shall at all times, maintain a clean set of construction document plans on site. Any and all deviations from the construction documents shall be marked, and clearly noted in red ink. All changes shall exactly indicate the revisions or changes to the design documents. Upon completion of the project, (2) clean sets of "red-line" construction as-built documents shall be submitted to the architect. Unclear, illegible, or inaccurate plans will be returned to the contractor for correction and resubmission. As-built documents shall be corrected by the Electrical Contractor and resubmitted at no additional cost.

1.06 INSPECTIONS AND PUNCH LIST

- A. The Electrical Contractor shall survey and inspect his work and develop his own punch list to confirm that work is complete and finished. He shall then notify the General Contractor that work is complete and ready for inspection by the Architect. It is not the Architects or Engineers obligation to perform a final inspection until the contractor states his work has been inspected and is complete and ready for final inspection.
- B. Request to the Architect, Engineer, or Owner for final inspection may be accompanied by a limited list of known deficiencies with a brief explanation or status of deficiencies and schedule for completion of each. Correction of these items shall be completed within (30) days of inspection or before final acceptance of occupancy.

1.07 WARRANTY

- A. The Electrical Contractor shall warrant all workmanship, equipment, and materials installed under this contract for a period of (1) year minimum from the date of final acceptance as agreed between the Contractor and the Architect, unless indicated by other sections of these specifications.
- B. Any equipment, materials, etc. proving to be defective during the warranty period shall be corrected or replaced without any expense to the Owner or other parties. This provision shall not be construed to include general maintenance items or luminaire

lamps or correcting errors on the part of the owner, owner's personnel, or owner's representative.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and Equipment furnished under this contract shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more items of equal and similar materials and construction are required, they shall be of the same manufacturer.
- B. All electrical equipment and materials shall bear the Underwriters Laboratories, Inc. label, and shall comply with the NEC and NFPA requirements as applicable.

2.02 MATERIALS AND EQUIPMENT SELECTION

- A. Selection of Materials and Equipment furnished under this contract shall be determined by the following:
 - 1. Where trade names, brands, and manufacturer's part numbers are listed, the exact equipment listed shall be furnished. Where more than one name is used, the contractor shall have the option of selecting between those specified. All products used shall be equal to that specified and shall be of best quality.
 - 2. When the words "or equal" appear, specific approval must be obtained from the Architect during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.
 - 3. Alternate materials and/or equipment must be submitted for approval a minimum 2 weeks prior to project bid date.
- B. Before bidding, when preparing shop drawings, and prior to rough-in for installation, the contractor shall verify that adequate space is available for entry and installation of the item including any accessories. Also that adequate space is available for servicing equipment and required code clearances are satisfied.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Advise the general contractor or architect before starting the Work of this Division.
- B. Exposed conduits shall be painted to match the surfaces adjacent to installation. Refer to painting and coating section of specifications.

- C. Salvaged materials, if applicable, removed from buildings shall be removed from the Project site as required by the general contractor.
- D. Trenches outside of barricade limits shall be backfilled and paved within 24 hours after being inspected. Provide traffic plates during the time that trenches are open in traffic areas and in areas accessible to nonconstruction personnel.
- E. Where structural walls are cored for new conduit runs, separation between cored holes shall be 3 inches edge to edge, unless otherwise required by the Architect. All coring to be laid out and reviewed by Architect prior to drilling. Contractor to verify location of structural steel, rebar, stress cabling, or similar prior to lay out.
- F. Electrical equipment shall be braced and anchored as indicated on the Drawings.

3.02 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
 - 1. Boxes, enclosures, keys and locks.
 - 2. Identifications and signs.
- C. Related Sections:
 - 1. Section 16010: Basic Electrical Requirements.

PART 2 - PRODUCTS

2.01 BOXES, ENCLOSURES, KEYS AND LOCKS

- A. Outlet Boxes and Fittings:
 - 1. Outlet boxes installed in concealed Work shall be galvanized steel, pressed, or welded type, with knockouts.
 - 2. In exposed Work, where conduit runs change direction or size, outlet boxes and conduit fittings shall be metallic with threaded hubs integral with box or fitting.
 - 3. Fittings shall be cast metal and non-corrosive. Ferrous metal fittings shall be cadmium-plated or zinc galvanized. Castings shall be true to pattern, smooth, straight, with even edges and corners, of uniform thickness of metal, and shall be free of defects.
 - 4. Covers for fittings shall be galvanized steel or non-corrosive aluminum and shall be designed for particular fitting installed.
 - 5. Factory made knockout seals shall be installed to seal box knockouts, which are not intact.
 - 6. Where flexible conduit is extended from flush outlet boxes, provide and install weatherproof universal box extension adapters.
- B. Junction and Pull boxes:
 - 1. Junction and pull boxes, in addition to those indicated, shall only be used in compliance with codes, recognized standards, and Contract Documents.
 - 2. Interior and non-weatherproof boxes shall be constructed of blue or galvanized steel with ample laps, spot welded, and shall be rigid under torsion and deflecting forces. Boxes shall be furnished with auxiliary angle iron framing where necessary to ensure rigidity.

3. Covers shall be fastened to box with a sufficient number of brass machine screws to ensure continuous contact all around. Flush type boxes shall be drilled and tapped for cover screws if boxes are not installed plumb. Surfaces of pull and junction boxes and covers shall be labeled in black marker ink designating system, panelboard and circuit designation contained in box. In exposed Work, designation shall be installed on inside of pull box or junction box cover.
4. Weatherproof NEMA 3R pull and junction boxes shall conform to foregoing for interior boxes with following modifications:
 - a. Cover of flush mounting boxes shall be furnished with a weather-tight gasket cemented to, and trimmed even with, cover all around.
 - b. Surface or semi-flush mounting pull and junction boxes shall be UL, or another Nationally Recognized Testing Laboratory (NRTL) listed as rain-tight and shall be furnished complete with threaded conduit hubs.
 - c. Exposed portions of boxes shall be galvanized and finished with one prime coat and one coat of baked-on gray enamel, unless already furnished with factory baked-on finish.
5. Junction and pull boxes shall be rigidly fastened to structure and shall not depend on conduits for support.
6. Polymer Concrete Boxes:
 - a. Polymer concrete boxes are to be made from aggregates in combination with polymer resin, combined and processed by mixing, molding, and curing, and reinforced with fiberglass.
 - b. Boxes are to be high strength, impact resistant, corrosion resistant, nonflammable, and noncorrosive.
 - c. Enclosures, boxes and covers are required to conform to all test provisions of the most current ANSI/SCTE 77 "Specification For Underground Enclosure Integrity"
 - d. All components in an assembly (box & cover) are manufactured using matched surface tooling.
 - e. Covers shall be marked as electrical, power, communications, fiber, signal, etc. as required.
 - f. Bottom of box shall be filled with 6" of pea gravel.

C. Keys and Locks:

1. Provide 2 keys with furnished door locks, including cabinet door locks and panelboard locks, 2 keys for lock

switches on control panels, and 2 keys with interlocks or other furnished lock switches.

2.02 IDENTIFICATION AND SIGNS

A. Identification Plates:

1. Provide identification plates for the following unless otherwise specified, for panelboards, disconnects, and controllers.
2. Identification plates shall be of plastic stock and shall adequately describe function, voltage and phase of identified equipment. Where identification plates are detailed or described on Drawings, inscription and size of letters shall be as indicated. For lighting and power panels, identification plates shall indicate panel designation, voltage, and phase of panel. For terminal cabinets, identification plates shall indicate system contained in terminal cabinet.
3. Identification plates shall be black-and-white nameplate stock of bakelite with characters cut through black exposing white. Plates shall be furnished with beveled edges and shall be securely fastened in place with No. 4 Phillips-head, cadmium-plated steel, self-tapping screws. Characters shall be 3/16 inch high, unless otherwise indicated.

B. Markings:

1. Install identification markings to surface-mounted starters, switches, disconnect switches, contactors, and other devices controlling motors and appliances. Provide abbreviations required along with an identifying number. Markings to be provided with locking type stencils using paint of a contrasting color. Figures shall be 3/8 inch high unless otherwise indicated. Self-sticking plastic labels, with embossed characters made with a typewriter may be installed instead of stencils and paint; self adhesive plastic, or self sticking laminated plastic labels may be installed.

PART 3 - EXECUTION

3.01 INSTALLATION AND SUPPORT OF BOXES

- A. Install outlet boxes as noted.
- B. Install in ground boxes as required, with gravel in bottom of box.

3.02 IDENTIFICATION OF CIRCUITS AND EQUIPMENT

- A. Provide descriptive nameplates or tags permanently attached to panelboards, disconnects, and controllers.

- B. Provide circuit identification cards and cardholders in all panel boards. Cardholders shall consist of metal frame retaining a clear plastic cover permanently attached to inside of panel door. List of circuits shall be typewritten on a card. Circuit description shall include name or number of circuit, area and connected load.
- C. Junction and pull boxes shall have covers stenciled with box number when indicated on Drawings, or circuit numbers according to panel schedules. Data shall be lettered in a visible manner with a color contrasting with finish.
- D. Provide wire marker indicating circuit number for each conductor located within each electrical panel, disconnect, junction box, etc.

3.03 PROTECTION

- A. Protect Work of this section until Substantial Completion.

3.04 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes: Provide and install grounding system as indicated or required.
- C. Related Sections:
 - 1. Refer to related sections for their system grounding requirements.
 - 2. Section 16010: Basic Electrical Requirements.

1.02 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. IEEE 142 Green Book.
 - 2. Underwriter's Laboratories (UL).
 - 3. National Electrical Code.
 - 4. Building Industry Consultant Services International (BICSI) (Signal).
 - 5. EIA/TIA (Signal and power).
 - 6. Nationally Recognized Testing Laboratory (NRTL) or equal.

1.03 SYSTEM DESCRIPTION

- A. Metallic objects on the Project site that enclose electrical conductors, or that are likely to be energized by electrical currents, shall be effectively grounded.
- B. Metal equipment parts, such as enclosures, raceways, and equipment grounding conductors, and earth grounding electrodes shall be solidly joined together into a continuous electrically conductive system.
- C. Metallic systems shall be effectively bonded to the main grounding electrode system.
- D. A separately derived AC source shall be grounded to the equipment grounding conductor, and to separate "made" electrode of building grounding electrode system.
- E. Electrical continuity to ground metal raceways and enclosures, isolated from equipment ground by installation of non-metallic conduit or fittings, shall be provided by a green insulated grounding conductor of required size within each raceway connected to isolated metallic raceways, or enclosures at each end. Each flexible conduit over 6 feet in length shall be provided with a green insulated grounding conductor of required size.
- F. Neutral of service conductors shall be grounded as follows:

1. Neutral shall be grounded at only one point within the Project site for that particular service. Preferable location of grounding point shall be at the service switchboard or panelboard, or main switch.
2. Equipment and conduit grounding conductors shall be bonded to that grounding point.

1.04 SUBMITTALS

- A. None.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Electrodes shall be copper-clad steel ground rods, minimum 3/4 inch diameter by 10 feet long.
- B. Grounding conductors shall be copper, #12 minimum with green insulation, unless noted otherwise.
- C. Ground tails shall be copper, #12 minimum with green insulation, installed in all metallic junction boxes where devices are being installed. Branch circuit ground, junction box, and devices shall be bonded at each junction box.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All grounding shall be installed in accordance with details on drawings and per NEC 250.
- B. Bond panelboards and all electrical boxes and enclosures.
- C. All conduits shall have a grounding conductor, minimum #12 copper. Conductor size shall be increased based on ampacity and/or phase conductors of the circuit.
- D. Install grounding conductors at each panelboard location as noted on drawings.
- E. All branch circuit, device, and switch junction boxes shall contain a grounding conductor, minimum #12 copper with green insulation, to bond the one or more equipment grounding conductors and the metal box. Connections shall be made to splice the equipment grounding conductors, grounding pig-tail, and metal box by means of a grounding screw or listed grounding device.
- F. Grounding electrodes shall be installed in the nearest suitable planting area, where not otherwise indicated on Drawings.
- G. Grounding electrode conductors shall be installed in conduit from the service disconnecting means and extended to the connection point of the grounding electrode.
- H. Grounding rods shall be driven to a depth of not less than 10 feet. If necessary, permanent ground enhancement material, as manufactured by Erico Electrical Products, or equal, shall be

installed at each ground rod to improve grounding effectiveness. Install in accordance with manufacture's installation instructions.

- I. Grounding electrodes shall provide a resistance to ground of not more than 25 ohms.
- J. When installing grounding rods, if resistance to ground exceeds 25 ohms, 2 or more rods connected in parallel, or coupled together shall be provided to meet grounding resistance requirements.
- K. Ground rods shall be separated from one another by not less than 10 feet.
- L. Parallel grounding rods shall be connected together with recognized fittings and grounding conductors in galvanized rigid steel conduit, buried not less than 12 inches below finish grade.

3.02 TESTING

- A. Test grounding resistance of electrodes, ground rods. Tests shall be performed as follows:
 - 1. Visually and mechanically examine ground system connections for completeness and adequacy.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.04 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 16120 LOW-VOLTAGE CONDUCTORS (600 VOLT AC)

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes: Low-voltage wire, splices, terminations and installation.

1.02 SUBMITTALS

- A. None.

PART 2 - PRODUCTS

2.01 WIRES

- A. Wires shall be single conductor type THHN or THWN insulated with polyvinyl chloride and covered with a protective sheath of nylon, rated at 600 volts. Wires may be operated at 90 degrees C. maximum continuous conductor temperature in dry locations, and 75 degrees C. in wet locations and shall be listed by UL Standard 83 for thermoplastic insulated wires, listed by Underwriter's Laboratories (UL) for installation in accordance with Article 310 of the National Electrical Code (NEC). Conductors shall be solid or stranded copper for 12 AWG and smaller conductors, and stranded copper for 10 AWG and larger conductors. Conductors shall be insulated with PVC and sheathed with nylon. Wires shall be identified by surface markings indicating manufacturer's identification, conductor size and metal, voltage rating, UL symbol, type designations and optional rating. Indentations for lettering is not permitted. Wires shall be tested in accordance with the requirements of UL standard for types THWN, or THHN.
- B. Conductors shall be solid Class B or stranded Class C, annealed uncoated copper in accordance with UL standards, or another Nationally Recognized Testing Laboratory (NRTL).

2.02 STANDARDS

- A. THWN/THHN wires shall comply with the following standards:
 - 1. UL 83 for thermoplastic insulated wires.
 - 2. UL 1063 for machine tool wires and cables.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Wires shall not be installed until debris and moisture is removed from conduits, boxes, and cabinets. Wires stored at site shall be protected from physical damage until they are installed and walls are completed.

- B. Wire-pulling compounds furnished as lubricants for installation of conductors in raceways shall be compounds approved and listed by UL, NRTL, or equal. Oil, grease, graphite, or similar substances are not permitted. Pulling of 2 AWG or larger conductors shall be performed with a cable pull machine. Any runs shorter than 50 feet are exempt. When pulling conductors, do not exceed manufacturer's recommended values
- C. Connection of any bonding or grounding conductors shall be securely bolted together with corrosion-resistant plated carbon steel, minimum grade 5 machine screws secured with constant pressure-type locking devices.
- D. Wiring in panel cabinets, pull boxes, and other cabinets, shall be neatly grouped and tied in bundles with nylon ties at 10-inch intervals. In panels and terminal blocks, wires shall be fanned out to terminals. If bundles are longer than 24 inches, a maximum of 9 current carrying conductors may be bundled together.
- E. Install conductor lengths with a minimum length within the wiring space. Conductors must be long enough to reach the terminal location in a manner that avoids strain on the connecting lug.
- F. Maintain the conductor required bending radius.
- G. Neutral conductors larger than 6 gauge, which are not color identified throughout their entire length, shall be taped, painted white or natural gray, or taped white where they appear in panels, cabinet, gutters or pull boxes. Neutral conductors 6 gauge and smaller shall be white color identified throughout their entire length.
- H. Wiring systems shall be free from short circuits and grounds, other than required grounds.

3.02 COLOR CODES

A. General Wiring:

1. Color code conductor insulation as follows:

SYSTEM VOLTAGE	
Conductor	120/240
Phase A	Black
Phase B	Red
Neutral	White

Neutrals shall be colored-distinguished if circuits of two voltage systems are used in the same raceway.

2. For phase and neutral conductors 6 gauge or larger, permanent plastic-colored tape may be furnished to mark conductor end instead of coded insulation. Tape shall

cover not less than 2 inches of conductor insulation within enclosure.

3.03 FEEDER IDENTIFICATION

- A. Feeder wires and cables shall be identified at each point the conduit run is broken by a cabinet, box, gutter, etc. Where terminal ends are available, identification shall be by means of heat shrink wire markers, which provide terminal strain relief. Markers shall be Brady Perma-Sleeve, or equal. Identification in other areas shall be by means of wrap-around tape markers Brady Perma-Code or equal. Markers shall include feeder designation, size, and description.

3.04 TAPE AND SPLICE KITS

- A. Splices, joints, and connectors joining conductors in dry and wet locations shall be covered with insulation equivalent to that provided on conductors. Free ends of conductors connected to energized sources shall be taped. Voids in irregular connectors shall be filled with insulating compound before taping. Thermoplastic insulating tape approved by UL, NRTL, or equal for installation as sole insulation of splices shall be furnished and shall be installed according to manufacturer's printed specifications.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 16130 RACEWAYS, FITTINGS, AND SUPPORTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
 - 1. Raceways and wire ways
 - 2. Conduit installation.
 - 3. Underground requirements.
- C. Related Sections:
 - 1. Section 16010: Basic Electrical Requirements.
 - 2. Section 16050: Basic Electrical Materials and Methods
- D. Applicable Standards and Codes
 - 1. EIA/TIA 569 Standards.
 - 2. National American Standards Institute (ANSI)
 - 3. National Electrical Manufacturer's Association (NEMA)
 - 4. Nationally Recognized Testing Laboratory (NRTL)
 - 5. National Electrical Code (NEC)
 - 6. Underwriters Laboratory (UL)

1.02 SUBMITTALS

- A. None.

PART 2 - PRODUCTS

2.01 RACEWAYS

- A. Conduit Materials:
 - 1. Metallic conduit, and tubing shall be manufactured under the supervision of an UL, or another NRTL factory inspection and label service program. Each 10-foot length of conduit and tubing shall bear the UL or another NRTL label and manufacturer's name.
 - 2. Rigid metallic conduit shall be rigid steel, heavy wall, mild steel, zinc-coated, with an inside and outside protective coating manufactured in accordance with ANSI C 80.1. Couplings, elbows, bends, condulets, bushings and other fittings shall be the same materials and finish as the rigid metallic conduit. Fittings, connectors, and couplings shall be threaded type, manufactured in accordance with ANSI C 80.1 and UL 6.
 - 3. Flexible conduit shall be Nonmetallic with compatible fittings where required.

4. Non-metallic conduit shall be rigid PVC electrical conduit extruded to schedule 40 dimensions of Type II. Grade 1 high impact, polyvinyl chloride, sweeps, couplings, reducers and terminating fittings shall be listed under the UL, or another NRTL, and shall bear the manufacturer's listed marking.
 7. Conduit size shall be as noted on drawings.
 8. Metal Clad (MC) cable system is not allowed.
- B. Sleeves for Conduits: Sleeves shall be adjustable type, of 26 gage galvanized iron, Adjust-to-Create Co. Adjust-to-Create, or Jet Line Products Inc. Jet-Line, or equal.
- C. Pull Wires: Install 1/8 inch polypropylene cords in empty or spare conduits.

PART 3 - EXECUTION

3.01 CONDUIT INSTALLATION

A. General Requirements:

1. Provide complete and continuous systems of rigid metallic and nonmetallic conduit, outlet boxes, junction boxes, fittings and cabinets for systems of electrical wiring including lighting, power, and systems, except as otherwise specified.
2. EMT may be not be used on this project.
3. Exposed conduit shall be galvanized rigid.
4. Underground conduits for systems shall be non-metallic conduit with galvanized 90s coated with epoxy paint.
5. Conduit shall be concealed below grade unless otherwise indicated. Conduits exposed to view, shall be installed parallel or at right angles to structural members, walls, or lines of structure.
6. Running threads are not permitted. Provide conduit unions where union joints are necessary. Conduit shall be maintained at least 6 inches from covering of hot water and steam pipes and 18 inches from flues and breechings. Open ends of conduits shall be sealed with permitted conduit seals during construction of buildings and during installation of underground systems.
7. Where conduits are terminated in groups at panelboards, switchboards, and signal cabinets, etc., provide templates or spacers to fasten conduits in proper position and to preserve alignment.
8. Conduits shall be supported as required by code, but not to exceed 10 feet. Where applicable, conduit needs to be rigidly supported every 5 feet and supported within 3 feet of every junction box.

9. One inch and smaller exposed conduits shall be fastened with one-hole malleable iron straps. Perforated straps and plumber's tape is not permitted for the support of conduits. Do not fasten or support conduits with "tie-wire".
 10. Bushings and locknuts for rigid steel conduit shall be steel threaded insulating type. Setscrew bushings are not permitted.
 11. Flex conduits shall be cut square and not at an angle.
 12. Routing of conduits may be changed providing length of any conduit run is not increased more than 10 percent of the length indicated on Drawings.
- B. Underground Requirements:
1. Underground conduits and raceways shall be buried to a depth of not less than 24 inches below finished grade to top of the conduit envelope, unless otherwise specified.
 2. Assemble sections of conduit with required fittings. Cut ends of conduit shall be reamed to remove rough edges. Joints in conduits shall be provided liquid-tight. Bends at risers shall be completely below surface where possible.
 3. The architect or engineer will observe underground installations before and during conduit placement. A mandrel shall be drawn through each run of conduit in presence of the architect or engineer before and after placement. Mandrel shall be 6 inches in length minimum, and have a diameter that is within 1/4 inches of diameter of conduit to be tested.
 4. Non-metallic conduit installations shall comply with following additional requirements. Joints in PVC conduit shall be sealed by means of required solvent-weld cement supplied by conduit manufacturer. Non-metallic conduit bends and deflections shall comply with requirements of applicable electrical code, except that minimum radius of any bend or offset for conduits sized from 1/2 inch to 1-1/2 inches inclusive shall not be less than 24 inches. Bends at risers and risers shall be galvanized, rigid steel conduit. Conduits below slab shall be painted with epoxy, resin paint.
 5. Furnish and install a 6-inch wide, polyethylene, red underground barrier type 12 inches above full length of conduits reading, "CAUTION ELECTRIC LINE BURIED BELOW".
 6. Underground conduit systems provided for utility companies shall be furnished to meet the requirements of the utility companies requiring service.
 7. Protect inside of conduit and raceway from dirt and rubbish during construction by capping openings.

8. Add bell-end bushings for conduit stub-up including underground entries to pull boxes, and manholes. Under floor standing switchboards and motor control centers provide a 4" galvanized nipple with ground bushing.
9. Underground conduit for systems operating above 600 volts shall be a minimum size of 4 inches.
10. All underground conduits and raceways shall be swabbed prior to wire pull.

3.02 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
 - 1. Receptacles
 - 2. Coverplates
- C. Related Sections:
 - 1. Section 16010: Basic Electrical Requirements.
 - 2. Section 16050: Basic Electrical Materials and Methods

1.02 SUBMITTALS

- A. Provide in accordance with Division 01.
- B. Shop Drawings:
 - a. Include manufacturer's cut sheets for each type device being installed listing description, manufacturer, and part number.
 - b. Include manufacturer's cut sheets for each device coverplate being installed listing description, manufacturer, and part number.
- C. Installation Instructions: Submit manufacturer's written installation instructions including any warning labels and instruction manuals.

1.03 QUALITY ASSURANCE

- A. Receptacles shall comply with NEMA WD 1, NEMA WD 6, and UL 498.
- B. Switches shall comply with NEMA WD 1 and UL 20.

PART 2 - PRODUCTS

2.01 RECEPTACLES AND SWITCHES

- A. Receptacles:
 - 1. Color: Coordinate with architect
 - 2. Duplex receptacles shall be heavy-duty specification grade, grounding type. Terminal screws shall be back and side wired with internal screw pressure plates. Mounting strap shall feature heavy-duty brass construction. Receptacle back body shall be PVC. Receptacle face shall

be impact resistant nylon. Receptacles shall have triple wipe brass power contacts.

<u>NEMA #</u>	<u>Pass & Seymour</u>	<u>Hubbell</u>	<u>Leviton</u>
NEMA 5-20	PS5362	HBL5362	5362

3. Provide specification grade ground-fault circuit interrupter (GFCI) type receptacles in accordance with UL standards. GFCI receptacles shall have a trip indication light. Receptacle terminal screws shall be back and side wire with internal screw pressure plates. Test and reset buttons shall match device body in color. GFCI receptacles shall be manufactured in standard configuration for installation with stainless steel smooth plates. Exterior mounted receptacles shall be mounted inside weatherproof enclosure.

<u>NEMA #</u>	<u>Pass & Seymour</u>	<u>Hubbell</u>	<u>Leviton</u>
(20 amps) NEMA 5-20R	2094	GFR5352	8898

3. Provide weather resistant, weatherproof receptacles, except where otherwise indicated or specified, consisting of GFCI receptacles, as specified herein, and metal plates with die-cast hinged, "in-use" covers and weatherproof mats. Devices shall be factory stamped with "WR" on the face of the device.

PART 3 - EXECUTION

3.01 INSTALLATION OF DEVICES

- A. Installation shall be in accordance with the NEC and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also connected to the green equipment grounding conductor.
- C. Ensure that devices and their boxes are protected until completion of project.
- D. Do not strip insulation from wiring until devices are being installed.
- E. Replace any devices that have been damaged or show signs of use during construction phase of project before finishes were complete.
- F. Keep devices in their package or protected until time of installation.
- G. Connect devices using pigtail connections of not less than 6". Where conductors larger than #12 AWG have been installed, use #12 AWG for pigtail connections to devices.
- H. Remove fiber or plastic washers prior to installation to ensure metal-to-metal contact.

- I. Test wiring devices for damaged conductors, high circuit resistance, poor connections, inadequate fault current path, defective devices, or similar problems using a portable receptacle tester. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.
- J. Test GFCI devices for tripping values specified in UL 1436 and UL 943.

3.02 COVER PLATES

- A. Provide a plate on each outlet device as indicated or required. Plates shall be of stainless steel unless otherwise specified.

3.03 PROTECTION

- A. Protect Work of this section until Substantial Completion.

3.04 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes: Lighting and power distribution facilities, including panelboards.
- C. Related Sections:
 - 1. Section 16010: Basic Electrical Requirements.
 - 2. Section 16050: Basic Electrical Materials and Methods.
 - 3. Section 16500: Lighting.

1.02 SUBMITTALS

- A. Provide in accordance with Division 01.
- B. Shop Drawings: Include a front elevation indicating cabinet dimensions, make, location and capacity of equipment, size of gutters, type of mounting, finish, and catalog number. General layout of internal devices, wiring drawings with wire numbers and device connections, vendor cut sheets of devices in enclosure and bill of materials listing description, manufacturer, part number, and quantity of items shall be included.
- C. Installation Instructions: Submit manufacturer's written installation instructions.

1.03 DESIGN REQUIREMENTS

- A. Panelboards:
 - 1. Panelboards shall be wall-mounted, enclosed safety type with 120/240 volt, 3-wire, load center. Main Service Panel shall be a meter-combination panel, NEMA 3R. First panelboard of each building shall be provided with main or sub-feeder circuit breakers where indicated.
 - 2. Panelboard may be combined meter/power panel. Panel shall be constructed with bypass meter option to be coordinated with utility company.
 - 3. Specified circuit breaker spaces shall be furnished with hardware required for future installation of circuit breakers.
 - 4. Bussing shall be copper.
 - 5. Enclosure shall be NEMA 3R, stainless steel for all cabinets.

- B. Panelboard Schedule: Provide a neatly typewritten schedule with area, or load served by each panelboard circuit. Schedule shall also indicate panel designation, voltage and phase. Provide under plastic cover with typewritten information. If plastic cover not available, schedule shall be typewritten on self-adhesive paper and installed on inside of each panelboard door.
- C. Safety Switches:
 - 1. General Duty, 250 volt rated. Fused where indicated.
 - 2. Safety switches located outdoors and where indicated are to be NEMA 3R, stainless steel.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Panelboards shall be manufactured by General Electric, Cutler Hammer, Square D, Siemens, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Panelboards shall be located so they are readily accessible and not exposed to physical damage.
- B. Panelboards installed outdoors shall be specifically listed for wet locations and shall be weatherproof in NEMA Type 3R, stainless steel cabinets.
- C. Panelboard locations shall provide sufficient working space around panels to comply with the National Electrical Code.
- D. Panelboards shall be securely fastened to structure and mounted on surface by at least 4 points.
- E. Unused openings in cabinets and disconnects shall be effectively closed as required by the manufacturer.
- F. Cabinets shall be grounded as specified in Article 250 of the National Electrical Code.
- G. Conduits shall be installed so as to prevent moisture or water from entering and accumulating within the enclosure.
- H. Lugs shall be suitable and listed for installation with the conductor being connected.
- I. Conductor lengths shall be maintained to a minimum within the wiring gutter space. Conductors shall be long enough to reach the terminal location in a manner that avoids strain on the connecting lugs.
- J. Maintain the required bending radius of conductors inside the cabinet.

- K. Clean the cabinet of foreign material such as cement, plaster, and paint. Repaint to manufacturers original finish any blemishes that occur during construction.
- L. Distribute and arrange conductors neatly in the wiring gutters.
- M. Use the manufacturer's torque values to tighten lugs.
- N. Before energizing panelboards, the following steps shall be taken:
 - 1. Retighten connections to the manufacturer's torque specifications. Verify that required connections have been provided.
 - 2. Remove shipping blocks from component devices and panelboard interiors.
 - 3. Manually exercise circuit breakers to verify they operate freely.
 - 4. Remove debris from panelboard interior.
- O. Follow manufacturer's instructions for installation.
- P. Do not install in highly corrosive environments, unless rated for the application.

3.02 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 16500 LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of the General and Supplementary Conditions and Division 01 apply to this section.
- B. Section Includes: Furnishing and installing lighting fixtures, including lamps, ballasts, wiring, and lighting controls.
- C. Light fixtures model numbers were determined at the time this specification was written; model numbers may need to be modified, or may require the addition or deletion of options to fully meet specification requirements.
- D. Related Sections:
 - 1. Section 16010: Basic Electrical Requirements
 - 2. Section 16050: Basic Electrical Materials and Methods.

1.02 SUBMITTALS

- A. Provide in accordance with Division 01.
- B. List of Materials: Submit a complete list of materials proposed for this section.
- C. Shop Drawings: Provide detailed and dimensioned Shop Drawings or manufacturer's data sheet with specific model and part numbers indicating kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of sockets, size of lamps, and complete details of method of fitting and fastening fixtures in place.
- D. Submittals must comply with contract general provisions.

1.03 MOUNTING REQUIREMENTS

- A. Design of lighting fixtures, accessories, supports, and method of fixture installation shall comply with requirements of which fixture is installed.
- B. Provide stakes and supports as required for installations.

1.04 QUALITY ASSURANCE

- A. Components and fixtures shall be listed and approved for the intended application by Underwriter's Laboratories (UL), or other Nationally Recognized Testing Laboratory (NRTL).
- B. Owners approval shall be obtained for any equipment or materials substitutions.

1.05 GUARANTEE

- A. Provide a 1 year labor warranty.

- B. Provide material warranty as specified:
 - 1. Lamps: 1 years
 - 2. Ballasts: 5 years
- C. Warranty period begins at substantial completion or project acceptance for beneficial occupancy.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

- A. Lighting fixtures shall be the type indicated on Drawings and as specified. Fixtures of same type shall be of one manufacturer.
- B. Fixtures shall be of the types and manufacturers described in the Luminaire Schedule of the Drawings, with lamps, wattage and voltage as indicated. Alternate fixtures must be submitted for approval minimum 2 weeks prior to project bid date.

2.02 LAMPS AND BALLASTS

- A. LED lamps
 - 1. LED lamps shall be utilized as noted on drawings and schedules.
 - 2. Provide with flood optics, self ballasted where noted.
 - 3. LED Driver
 - a. Non-dimming driver accommodating 120 or 277 volts AC at 60 Hz.
 - b. Power factor 0.9 minimum.
 - c. Driver to accept 120 or 277 volts AC.

2.03 TIME CLOCK

- A. Furnish and install where shown a Time Switch as manufactured by TORK, or equal.
- B. Characteristics
 - 1. 24 hour dial and day-omitting device
 - 2. Powered by a self-starting synchronous motor
 - 3. Contacts shall be capable of switching 40 amperes per pole continuously at rated voltage.
 - 4. Time Switch shall be DPST.
 - 5. Removable ON-OFF trippers shall make possible automatic operation with a minimum ON period of 20 minutes and a minimum of 2 hours between one OFF period and the next.
 - 6. Enclosure shall be NEMA 1 surface type, finished in beige enamel, with combination 1/2", 3/4" knockouts on bottom, both sides and back.
 - 7. Provision shall be made for positive padlocking.

8. Terminals shall be capable of receiving #8 AWG wire.
9. Time Switch shall be equal to TORK Model 7200 for 120 volt systems or 7202 for 277 volt systems.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install a lighting fixture for each lighting outlet indicated and mark new ballasts with day of installation.
- B. Fixture voltage shall be as indicated on Drawings.

3.02 TESTING

- A. Check and adjust fixtures for required illumination.
- B. Replace defective lamps and ballasts.
- C. Test and adjust lighting control equipment for proper operation.

3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.04 CLEANUP

- A. Remove rubbish, debris, and waste materials from all areas of work each day.
- B. Clean fixture surfaces of dirt, cement, plaster and debris. Furnish cleansers compatible with material surfaces being cleaned.

END OF SECTION