



STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

**Division of Facilities Construction and Management**

**DFCM**

**MULTI-STEP BIDDING PROCESS  
FOR  
CONTRACTORS**

**Request For Solicitation For  
Construction Services**

**Stage II – Paving Contractors Bidders List FY09**

**September 11, 2008**

**JORDAN CAMPUS PARKING LOT EXPANSION**

**SALT LAKE COMMUNITY COLLEGE**

**SALT LAKE CITY, UTAH**

**DFCM Project No. 08079680**

**King Engineering, Inc.  
2825 East Cottonwood Parkway  
Salt Lake City, Utah 84121**

## TABLE OF CONTENTS

	<b>Page #</b>
Title Sheet	1
Table of Contents	2
Invitation to Bid	3
Stage II – Multi-Step Bidding Process	4
Stage II - Project Schedule	8
Bid Form	9
Bid Bond	11
Instructions and Subcontractors List Form	12
Contractor's Agreement	15
Performance Bond	20
Payment Bond	21
Certificate of Substantial Completion	22
General Contractor Performance Rating Form	

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at <http://dfcm.utah.gov> or are available upon request from DFCM:

DFCM Supplemental General Conditions dated July 15, 2008  
DFCM General Conditions dated May 25, 2005  
DFCM Application and Certificate for Payment dated May 25, 2005

Technical Specifications:  
Drawings:

**The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at <http://dfcm.utah.gov>**

## **INVITATION TO BID**

**ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT**

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

**Project Name: Jordan Campus Parking Lot Expansion**  
**Salt Lake Community College - Salt Lake City, Utah**  
**DFCM Project No: 08079680**

**Project Description: This project includes the supply and installation of concrete, asphalt and landscape improvements for the expansion of Parking Lot J-C at the Jordan Campus of Salt Lake Community College as detailed in the plans and specifications. Construction Cost Estimate: \$700,000.00**

<b>Company</b>	<b>Contact</b>	<b>Fax</b>
Acme Construction	Mr. Buster Hafen	(801) 280-6423
Consolidated Paving & Concrete	Mr. Gene Sase	(801) 622-1103
DRD Paving, LLC	Mr. David O. Harrison	(801) 288-1001
Edge Excavation, Inc.	Mr. Jay Pitcher	(435) 753-0787
Geneva Rock Products, Inc.	Mr. Albert T. Schellenberg	(801) 281-7939
Granite Construction Company	Mr. R.G. Milles	(801) 526-6091
Le Grand Johnson Construction	Mr. Larry L. Jardine	(435) 752-2968
Miller Paving, Inc.	Mr. Frank Burns	(801) 262-3254
Morgan Asphalt, Inc	Mr. Thomas W. Morgan	(801) 595-0020
Post Asphalt Paving	Mr. Jeff Post	(801) 732-0206
Preferred Paving	Mr. Bill Panunzio	(801) 908-6644
Savage Asphalt	Mr. Ben Savage	(801) 280-2889
Staker and Parson Companie	Mr. Brad Hansen	(801) 409-2687

The bid documents will be available on **Thursday, September 11, 2008** in electronic format only on CDs from DFCM at 4110 State Office Building, Salt Lake City, Utah 84114, telephone (801)538-3018 and on the DFCM web page at <http://dfcm.utah.gov>. For questions regarding this project, please contact **Brent Lloyd**, Project Manager, DFCM, at (801)538-3471. No others are to be contacted regarding this project.

A **MANDATORY** pre-bid meeting and site visit will be held at **10:00 AM on Monday, September 15, 2008 in Parking Lot H, northwest of the main building at Salt Lake Community College Jordan Campus, located at 3491 West 9000 South, West Jordan, Utah.** All pre-qualified prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by **3:30 PM on Monday, September 22, 2008** to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. Note: Bids must be received at 4110 State Office Building by the specified time. The contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT  
JOANNA REESE, CONTRACT COORDINATOR  
4110 State Office Bldg., Salt Lake City, Utah 84114

## **STAGE II - MULTI-STEP BIDDING PROCESS**

**ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT**

### **1. Invitational Bid Procedures**

The following is an overview of the invitational bid process. More detailed information is contained throughout the document. Contractors are responsible for reading and complying with all information contained in this document.

Notification: DFCM will notify each registered pre-qualified firm (via fax or e-mail) when a project is ready for Construction Services and invite them to bid on the project.

Description of Work: A description of work or plans/specifications will be given to each contractor. If required, the plans and specifications will be available on the DFCM web page at <http://dfcm.utah.gov> and on CDs from DFCM, at 4110 State Office Building, Salt Lake City, Utah 84114.

Schedule: The Stage II Schedule shows critical dates including the mandatory pre-bid site meeting (if required), the question and answer period, the bid submittal deadline, the subcontractor list submittal deadline, etc. Contractors are responsible for meeting all deadlines shown on the schedule.

Mandatory Pre-Bid Site Meeting: If a firm fails to attend a pre-bid site meeting labeled “Mandatory” they will not be allowed to bid on the project. At the mandatory meeting, contractors may have an opportunity to inspect the site, receive additional instructions and ask questions about project. The schedule contains information on the date, time, and place of the mandatory pre-bid site meeting.

Written Questions: All questions must be in writing and directed to DFCM’s project manager assigned to this project. No others are to be contacted regarding this project. The schedule contains information on the deadline for submitting questions.

Addendum: All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM’s web site at <http://dfcm.utah.gov>. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

Submitting Bids: Bids must be submitted to DFCM 4110 State Office Building, Salt Lake City, Utah 84114 by the deadline indicated on the schedule. Bids submitted after the deadline will not be accepted. Bids will be opened at DFCM on the date, time, and place indicated on the schedule.

Subcontractors List: The firm selected for the project must submit a list of all subcontractors by the deadline indicated on the schedule contained in this document.

Pre-qualified List of Contractors: Contractors shall remain on DFCM’s list of pre-qualified contractors provided: (a) they maintain a performance rating of 3.5 or greater on each project, (b) they are not suspended for failure to comply with requirements of their contract, (c) the firm has not undergone a significant reorganization involving the loss of key personnel (site superintendents, project managers, owners, etc.) to a degree such that the firm no longer meets the pre-qualification requirements outlined in Stage I, (d) the financial viability of the firm has not significantly changed, and (e) the firm is not otherwise disqualified by DFCM. Note: If a contractor fails to comply with items (a) through (e) above,

they may be removed from DFCM's list of pre-qualified contractors following an evaluation by a review committee. Contractors will be given the opportunity to address the review committee before a decision is made. Pre-qualified contractors are ONLY authorized to bid on projects within the discipline that they were originally pre-qualified under.

**2. Drawings and Specifications and Interpretations**

Drawings, specifications and other contract documents may be obtained as stated in the Invitation to Bid. If any firm is in doubt as to the meaning or interpretation of any part of the drawings, specifications, scope of work or contract documents, they shall submit, in writing, a request for interpretation to the authorized DFCM representative by the deadline identified in the schedule. Answers to questions and interpretations will be made via addenda issued by DFCM. Neither DFCM or the designer shall be responsible for incorrect information obtained by contractors from sources other than the official drawings/specifications and addenda issued by DFCM.

**3. Product Approvals**

Where reference is made to one or more proprietary products in the contract documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the contract documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Designer. Such written approval must occur prior to the deadline established for the last scheduled addendum to be issued. The Designer's written approval will be included as part of the addendum issued by DFCM. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the Designer.

**4. Addenda**

All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM's web site at <http://dfcm.utah.gov>. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda shall result in disqualification from bidding. DFCM shall not be responsible for incorrect information obtained by contractors from sources other than official addenda issued by DFCM.

**5. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors**

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor. Failure to respond may result in suspension from DFCM's list of pre-qualified contractors.

**6. Licensure**

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

**7. Permits**

In concurrence with the requirements for permitting in the general conditions, it is the responsibility of the contractor to obtain the fugitive dust plan requirements from the Utah Division of Air Quality and the SWPPP requirements from the Utah Department of Environmental Quality and submit the completed forms and pay any permit fee that may be required for this specific project. Failure to obtain the required permit may result in work stoppage and/or fines from the regulating authority that will be the sole responsibility of the contractor. Any delay to the project as a result of any such failure to obtain the permit or noncompliance with the permit shall not be eligible for any extension in the Contract Time.

**8. Time is of the Essence**

Time is of the essence in regard to all the requirements of the contract documents.

**9. Bids**

Before submitting a bid, each bidder shall carefully examine the contract documents; shall visit the site of the work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the contract documents including those added via addenda. If the bidder observes that portions of the contract documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Project Manager prior to the bidding deadline. Changes necessary to correct these issues will be made via addenda issued by DFCM.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the published deadline for the submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. **THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.**

If the bid bond security is submitted on a form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **A cashier's check cannot be used as a substitute for a bid bond.**

**10. Listing of Subcontractors**

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", included as part of the contract documents. The subcontractors list shall be delivered to DFCM or faxed to DFCM at (801) 538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the contract documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements may be suspended from DFCM's list of pre-qualified contractors.

**11. Contract and Bond**

The Contractor's Agreement will be in the form provided in this document. The duration of the contract shall be for the time indicated by the project completion deadline shown on the schedule. The successful bidder, simultaneously with the execution of the Contractor's Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents.

The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

**12. Award of Contract**

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of DFCM to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc. Alternates will be selected in prioritized order up to the construction cost estimate.

**13. Right to Reject Bids**

DFCM reserves the right to reject any or all Bids.

**14. Withdrawal of Bids**

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

**15. DFCM Contractor Performance Rating**

As a contractor completes each project, DFCM will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project may affect the firm's "pre-qualified" status and their ability to obtain future work with DFCM.



## Stage II PROJECT SCHEDULE

<b>PROJECT NAME: Jordan Campus Parking Lot Expansion</b>				
<b>Salt Lake Community College – Salt Lake City, Utah</b>				
<b>DFCM PROJECT #: 08079680</b>				
<b>Event</b>	<b>Day</b>	<b>Date</b>	<b>Time</b>	<b>Place</b>
Stage II Bidding Documents Available	Thursday	September 11, 2008	10:00 AM	DFCM 4110 State Office Building SLC, UT and the DFCM web site*
Mandatory Pre-bid Site Meeting	Monday	September 15, 2008	10:00 AM	Salt Lake Community College Jordan Campus, 3491 West 9000 South, West Jordan, Utah
Deadline for Submitting Questions	Wednesday	September 17, 2008	10:00 AM	<u>Project Manager</u> – DFCM E-mail – <a href="mailto:brentlloyd@utah.gov">brentlloyd@utah.gov</a> Fax (801)-538-3267
Addendum Deadline (exception for bid delays)	Thursday	September 18, 2008	2:00 PM	DFCM web site*
Prime Contractors Turn in Bid and Bid Bond	Monday	September 22, 2008	3:30 PM	DFCM 4110 State Office Building SLC, UT
Subcontractors List Due	Tuesday	September 23, 2008	3:30 PM	DFCM 4110 State Office Building SLC, UT Fax 801-538-3677
Substantial Completion Date		May 15, 2008		

\* **NOTE: DFCM's web site address is <http://dfcm.utah.gov>**



Division of Facilities Construction and Management

BID FORM

NAME OF BIDDER \_\_\_\_\_ DATE \_\_\_\_\_

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Invitation to Bid" and in accordance with the Request for Bids for the Jordan Campus Parking Lot Expansion - Salt Lake Community College - Salt Lake City, Utah - DFCM PROJECT NO. 08079680 and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: \_\_\_\_\_

UNIT PRICE PROPOSAL-SALT LAKE COMMUNITY COLLEGE JORDAN CAMPUS NEW PARKING LOT J-C

Table with 5 columns: Item No., Work or Materials, Approximate Quantities/Units, Unit Price \$\$, Amount \$\$. Rows 1-15 detailing construction items like Saw Cut Asphalt, Concrete, Earthwork, etc.

16	Furnish and Install 8' of Compacted Road Base	83,962 SF		
17	Furnish and Install 3' of Compacted Asphalt	83,962 SF		
18	Furnish and Install Precast Concrete Bumper Blocks	6 Each		
19	Landscaping and Irrigation Modifications Complete, Including Moving Valves, Heads, Mains, Boxes, Etc.	1 LS		
20	Furnish and Install Paint Striping and Signing	1 LS		
21	Furnish and Install Lighting/Electrical Improvements	1 LS		

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

\_\_\_\_\_ DOLLARS (\$\_\_\_\_\_)  
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by May 15, 2008, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **\$250.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of \_\_\_\_\_

The undersigned Contractor's License Number for Utah is \_\_\_\_\_.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable 100% Performance and Payment bonds are not delivered within time set forth.

Type of Organization: \_\_\_\_\_  
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

\_\_\_\_\_

Respectfully submitted,

\_\_\_\_\_  
Name of Bidder

ADDRESS:  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Authorized Signature

**BID BOND**

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

**KNOW ALL PERSONS BY THESE PRESENTS:**

That \_\_\_\_\_ hereinafter referred to as the "Principal," and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal office in the City of \_\_\_\_\_ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of \$ \_\_\_\_\_ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION IS SUCH** that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the \_\_\_\_\_ Project.

**NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH**, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

**PROVIDED, HOWEVER**, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

**IN WITNESS WHEREOF**, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

**DATED** this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**Principal's name and address (if other than a corporation):**

\_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

**Principal's name and address (if a corporation):**

\_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_  
(Affix Corporate Seal)

**Surety's name and address:**

\_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_  
Attorney-in-Fact (Affix Corporate Seal)

STATE OF \_\_\_\_\_ )  
 ) ss.  
COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared before me \_\_\_\_\_, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
My Commission Expires: \_\_\_\_\_  
Resides at: \_\_\_\_\_

\_\_\_\_\_  
NOTARY PUBLIC

**Agency:** \_\_\_\_\_  
**Agent:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Phone:** \_\_\_\_\_

Approved As To Form: May 25, 2005  
By Alan S. Bachman, Asst Attorney General

**Division of Facilities Construction and Management****INSTRUCTION AND SUBCONTRACTORS LIST FORM**

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, based on the following:

**DOLLAR AMOUNTS FOR LISTING**

**PROJECTS UNDER \$500,000: ALL FIRST-TIER SUBS \$20,000 OR OVER MUST BE LISTED**  
**PROJECTS \$500,000 OR MORE: ALL FIRST-TIER SUBS \$35,000 OR OVER MUST BE LISTED**

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- If there are no subcontractors for the job that are required to be reported by State law (either because there are no subcontractors that will be used on the project or because there are no first-tier subcontractors over the dollar amounts referred to above), then you do not need to submit a sublist. If you do not submit a sublist, it will be deemed to be a representation by you that there are no subcontractors on the job that are required to be reported under State law. At any time, DFCM reserves the right to inquire, for security purposes, as to the identification of the subcontractors at any tier that will be on the worksite.

**LICENSURE:**

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

**'SPECIAL EXCEPTION':**

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A. Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

**GROUNDS FOR DISQUALIFICATION:**

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such

**INSTRUCTIONS AND SUBCONTRACTORS LIST FORM**  
**Page No. 2**

other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

**CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:**

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

- (1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
- (2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
- (3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
- (4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
- (5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
- (6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

**EXAMPLE:**

Example of a list where there are only four subcontractors:

<b>TYPE OF WORK</b>	<b>SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"</b>	<b>SUBCONTRACTOR BID AMOUNT</b>	<b>CONTRACTOR LICENSE #</b>
ELECTRICAL	ABCD Electric Inc.	\$350,000.00	123456789000
LANDSCAPING	"Self" *	\$300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	\$298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: \$350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

\* Bidders may list "self", but it is not required.

**PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.**



SUBCONTRACTORS LIST
FAX TO 801-538-3677

PROJECT TITLE: \_\_\_\_\_

Caution: You must read and comply fully with instructions.

Table with 4 columns: TYPE OF WORK, SUBCONTRACTOR, 'SELF' OR 'SPECIAL EXCEPTION', SUBCONTRACTOR BID AMOUNT, CONT. LICENSE #

We certify that:

- 1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed 'Self' or 'Special Exception' in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: \_\_\_\_\_

DATE: \_\_\_\_\_

SIGNED BY: \_\_\_\_\_

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR OWNER'S REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY OWNER. ATTACH A SECOND PAGE IF NECESSARY.

## CONTRACTOR'S AGREEMENT

FOR:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THIS CONTRACTOR'S AGREEMENT, made and entered into this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and \_\_\_\_\_, incorporated in the State of \_\_\_\_\_ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is \_\_\_\_\_.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at \_\_\_\_\_  
\_\_\_\_\_.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

**ARTICLE 1. SCOPE OF WORK.** The Work to be performed shall be in accordance with the Contract Documents prepared by \_\_\_\_\_ and entitled "\_\_\_\_\_  
\_\_\_\_\_."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 and Supplemental General Conditions dated July 15, 2008 ("also referred to as General Conditions") and on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

**ARTICLE 2. CONTRACT SUM.** The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of \_\_\_\_\_  
\_\_\_\_\_ DOLLARS AND NO CENTS (\$\_\_\_\_\_.00), which is the base bid, and which sum also includes the cost of a 100%

CONTRACTOR'S AGREEMENT  
PAGE NO. 2

Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

**ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY.** The Work shall be Substantially Complete by \_\_\_\_\_. Contractor agrees to pay liquidated damages in the amount of \$\_\_\_\_\_ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

**ARTICLE 4. CONTRACT DOCUMENTS.** The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

**ARTICLE 5. PAYMENT.** The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

**ARTICLE 6. INDEBTEDNESS.** Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

**ARTICLE 7. ADDITIONAL WORK.** It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

**ARTICLE 8. INSPECTIONS.** The Work shall be inspected for acceptance in accordance with the General Conditions.

**ARTICLE 9. DISPUTES.** Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

**ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT.** This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

**ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF.** The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

**ARTICLE 12. INDEMNIFICATION.** The Contractor shall comply with the indemnification provisions of the General Conditions.

**ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT.** The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

**ARTICLE 14. RELATIONSHIP OF THE PARTIES.** The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

**ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT.** Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

**ARTICLE 16. ATTORNEY FEES AND COSTS.** Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.



**PERFORMANCE BOND**

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That \_\_\_\_\_ hereinafter referred to as the "Principal" and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal office in the City of \_\_\_\_\_ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee," in the amount of \_\_\_\_\_ DOLLARS (\$) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal has entered into a certain written Contract with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, to construct \_\_\_\_\_ in the County of \_\_\_\_\_, State of Utah, Project No. \_\_\_\_\_, for the approximate sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), which Contract is hereby incorporated by reference herein.

**NOW, THEREFORE**, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

**PROVIDED, HOWEVER**, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

**IN WITNESS WHEREOF**, the said Principal and Surety have signed and sealed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

**WITNESS OR ATTESTATION:**

\_\_\_\_\_

**PRINCIPAL:**

\_\_\_\_\_

By: \_\_\_\_\_

(Seal)

Title: \_\_\_\_\_

**WITNESS OR ATTESTATION:**

\_\_\_\_\_

**SURETY:**

\_\_\_\_\_

By: \_\_\_\_\_

Attorney-in-Fact (Seal)

STATE OF \_\_\_\_\_ )  
 ) ss.  
COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared before me \_\_\_\_\_, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

My commission expires: \_\_\_\_\_

Resides at: \_\_\_\_\_

\_\_\_\_\_  
NOTARY PUBLIC

**Agency:** \_\_\_\_\_  
**Agent:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Phone:** \_\_\_\_\_

Approved As To Form: May 25, 2005  
By Alan S. Bachman, Asst Attorney General

**PAYMENT BOND**

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

**KNOW ALL PERSONS BY THESE PRESENTS:**

That \_\_\_\_\_ hereinafter referred to as the "Principal," and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_ authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of \_\_\_\_\_, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal has entered into a certain written Contract with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, to construct \_\_\_\_\_ in the County of \_\_\_\_\_, State of Utah, Project No. \_\_\_\_\_ for the approximate sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), which contract is hereby incorporated by reference herein.

**NOW, THEREFORE**, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, 1953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

**PROVIDED, HOWEVER**, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

**IN WITNESS WHEREOF**, the said Principal and Surety have signed and sealed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**WITNESS OR ATTESTATION:**

\_\_\_\_\_

**PRINCIPAL:**

\_\_\_\_\_

By: \_\_\_\_\_ (Seal)  
Title: \_\_\_\_\_

**WITNESS OR ATTESTATION:**

\_\_\_\_\_

**SURETY:**

\_\_\_\_\_

By: \_\_\_\_\_ (Seal)  
Attorney-in-Fact

STATE OF \_\_\_\_\_ )  
 ) ss.  
COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared before me \_\_\_\_\_, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

My commission expires: \_\_\_\_\_

Resides at: \_\_\_\_\_

NOTARY PUBLIC

**Agency:** \_\_\_\_\_  
**Agent:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**Phone:** \_\_\_\_\_

Approved As To Form: May 25, 2005  
By Alan S. Bachman, Asst Attorney General



Division of Facilities Construction and Management

DFCM

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT \_\_\_\_\_ PROJECT NO: \_\_\_\_\_

AGENCY/INSTITUTION \_\_\_\_\_

AREA ACCEPTED \_\_\_\_\_

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at \_\_\_\_\_ (time) on \_\_\_\_\_ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

\_\_\_\_\_  
\_\_\_\_\_

The Owner acknowledges receipt of the following closeout and transition materials:

- Record Drawings
- O & M Manuals
- Warranty Documents
- Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of \_\_\_\_\_. (Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within \_\_\_\_\_ calendar days from the above date of issuance of this Certificate. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

\_\_\_\_\_  
CONTRACTOR (include name of firm) by: \_\_\_\_\_  
(Signature) DATE

\_\_\_\_\_  
A/E (include name of firm) by: \_\_\_\_\_  
(Signature) DATE

\_\_\_\_\_  
USING INSTITUTION OR AGENCY by: \_\_\_\_\_  
(Signature) DATE

\_\_\_\_\_  
DFCM (Owner) by: \_\_\_\_\_  
(Signature) DATE

4110 State Office Building, Salt Lake City, Utah 84114  
telephone 801-538-3018 • facsimile 801-538-3267 • <http://dfcm.utah.gov>

cc: Parties Noted  
DFCM, Director

**General Contractor Performance Rating Form**

Project Name:		DFCM Project#	
Contractor:  (ABC Construction, John Doe, 111-111-1111)	A/E:  (ABC Architects, Jane Doe, 222-222-2222)	Original Contract Amount:	Final Contract Amount:
DFCM Project Manager:		Contract Date:	
Completion Date:		Date of Rating:	

Rating Guideline	QUALITY OF PRODUCT OR SERVICES	COST CONTROL	TIMELINESS OF PERFORMANCE	BUSINESS RELATIONS
<b>5-Exceptional</b>	Contractor has demonstrated an exceptional performance level in any of the above four categories that justifies adding a point to the score. Contractor performance clearly exceeds the performance levels described as "Very Good"			
<b>4-Very Good</b>	Contractor is in compliance with contract requirements and/or delivers quality product/service.	Contractor is effective in managing costs and submits current, accurate, and complete billings	Contractor is effective in meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is effective
<b>3-Satisfactory</b>	Minor inefficiencies/errors have been identified	Contractor is usually effective in managing cost	Contractor is usually effective in meeting milestones and delivery schedules	Response to inquires technical/service/administrative issues is somewhat effective
<b>2-Marginal</b>	Major problems have been encountered	Contractor is having major difficulty managing cost effectively	Contractor is having major difficulty meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is marginally effective
<b>1-Unsatisfactory</b>	Contractor is not in compliance and is jeopardizing achievement of contract objectives	Contractor is unable to manage costs effectively	Contractor delays are jeopardizing performance of contract objectives	Response to inquiries, technical/service/administrative issues is not effective

<b>1. Rate Contractors quality of workmanship, management of sub contractor performance, project cleanliness, organization and safety requirement.</b>	<b>Score</b>
<u>Agency Comments:</u>	
<u>A &amp; E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

<b>2. Rate Contractor administration of project costs, change orders and financial management of the project budget.</b>	<b>Score</b>
<u>Agency Comments:</u>	
<u>A &amp; E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

<b>3. Rate Contractor's performance and adherence to Project Schedule, delay procedures and requirements of substantial completion, inspection and punch-list performance.</b>	<b>Score</b>
<u>Agency Comments:</u>	
<u>A &amp; E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

<b>4. Evaluate performance of contractor management team including project manager, engineer and superintendent also include in the rating team's ability to work well with owner, user agency and consultants.</b>	<b>Score</b>
<u>Agency Comments:</u>	
<u>A &amp; E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

5. Rate success of Contractor's management plan, completion of the plans mitigation of project risks and performance of value engineering concepts.	Score
<u>Agency Comments:</u>	
<u>A &amp; E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

<b>Signed by:</b>	<b>Date:</b>	<b>Mean Score</b>
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**Additional Comments:**

## INDEX TO TECHNICAL SPECIFICATIONS

### **Civil Specifications**

02061 Select Aggregate  
02075 Geotextiles  
02100 Site Preparation  
02230 Base Course  
02511 Asphaltic Concrete Paving  
02525 New Concrete  
02720 Storm Sewage Systems  
02763 Pavement Marking and Signing  
03100 Concrete Formwork  
03200 Concrete Reinforcement  
03300 Cast In Place Concrete

### **Landscape Specifications**

02810 Irrigation System  
02900 Landscaping

### **Electrical Specifications**

16000 General Provisions, Electrical  
16020 Contractor Allowances  
16110 Raceways  
16120 Conductors  
16130 Electrical Boxes  
16140 Outlets and Wiring Devices  
16190 Supporting Devices  
16195 Electrical Identification  
16400 Secondary Service and Distribution  
16450 Secondary Grounding  
16500 Lighting

## **CIVIL SPECIFICATIONS**

**SECTION 02061**  
**SELECT AGGREGATE**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Select fill materials and procedures.

1.2 RELATED SECTIONS

- A. Section 02075: Geotextiles
- B. Section 02511: Asphalt Paving

1.3 DEFINITIONS

- A. Select fill: Aggregate materials meeting requirements of this Section.

1.4 QUALITY ASSURANCE

- A. Remove products found defective after installation and install acceptable products at no additional cost to the State.

1.05 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. **Furnish and Install 2' of Compacted Select Fill and Ground Stabilization Fabric.** Measurement and payment will be based upon the in-place square footage of select fill furnished and placed and compacted to a 2' depth and woven geotextile fabric furnished and installed in accordance with the plans and these specifications. Payment shall include the cost for all materials, labor, tools, equipment, etc. to complete this work.

PART 2 PRODUCTS

2.1 STRUCTURAL FILL FOR PAVED AREAS

- A. Shall be untreated natural stone
  - 1. Shall not be lumpy or frozen.
  - 2. Shall be free from noticeable concentrations of alkali, salt, shale, and petroleum products, all roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that, in the opinion of the Engineer, is objectionable or deleterious.
  - 3. Shall be graded within the following limits: Use the following gradations:

TABLE 2

Paved Area Select Fill	
Sieve Size	Percent passing
4"	100
2"	70-95
3/4"	45-95
#4	28-75
#10	20-62
#40	5-40
#200	0-15

PART 3 EXECUTION

3.1 INSTALLATION

A. Select Fill:

1. Overexcavate area under future pavement to a 2' depth beneath bottom of pavement section (asphalt and roadbase).
2. Place woven ground stabilization geotextile fabric in accordance with manufacturers recommendations. See Section 02075 Geotextiles.
3. Place and compact select fill in 4 - 6 inch lifts above fabric for a total of 2' of compacted select fill.
4. Compact backfill material in 6 inch layers to a 96 percent density when placing the fill under paved areas.

END OF SECTION

## SECTION 02075

### GEOTEXTILES

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Materials and procedures for installing geotextiles of the type(s) shown on the drawings, and at other locations as directed by the Engineer.

##### 1.2 RELATED SECTIONS

- A. Section 02061: Select Aggregate

##### 1.3 REFERENCES

- A. AASHTO M 288: Geotextile Specifications for Highway Applications.
- B. ASTM D 4791: Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

##### 1.4 SUBMITTALS

- A. Submit prior to use: Manufacturer's certificate that each fabric complies with requirements of this Section.

##### 1.5 SAMPLING AND TESTING

- A. Not Used

##### 1.6 PACKAGING, SHIPPING, AND STORING

- A. Protect the geotextile from direct sunlight, chemicals, mud, dirt and debris during shipment and storage. Replace at the Contractor's sole expense, any geotextile damaged or deteriorated during shipping, storage or construction.
- B. Labeling and Tagging:
  - 1. Identify each package by a tag or label securely affixed to the outside of the roll on at least one end.
  - 2. Provide the following required information on the tag:
    - a. Name of the geotextile manufacturer
    - b. Brand name of the product, width, length, and package weight of geotextile

##### 1.7 ACCEPTANCE

- A. DFCM will reject geotextile at installation if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transport, handling or storage.

#### PART 2 PRODUCTS

##### 2.1 STABILIZATION GEOTEXTILE

- A. Furnish a non-woven geotextile material as approved by Engineer.

#### PART 3 EXECUTION

##### 3.1 GENERAL

- A. Place geotextile on areas that are smooth, and free of projections or depressions. Do not drag the geotextile across the subgrade.
- B. Do not operate construction equipment or traffic directly on geotextile.
- C. When placed for construction, cover the geotextile with indicated cover material as soon as possible. Do not leave uncovered for more than 5 days.
- D. Place cover material on the geotextile in a manner that the geotextile is not torn, punctured, or shifted.
- E. Limit construction vehicles in size and mass so rutting in the initial layer above the geotextile is not more than 3 inches deep, or half the layer thickness, whichever is the lesser. Turning of vehicles on the first layer is not permitted.

### 3.2 INSTALLING STABILIZATION GEOTEXTILE FABRIC

- A. Install Stabilization Geotextile under all structural fill as required by the drawings and specifications.
- B. Unless otherwise specified, overlap the geotextile a minimum of 2 feet at all longitudinal and transverse joints.
- C. For placement on slopes, overlap each sheet over the next downhill sheet.
- D. Repair: Place patch over damaged area and extend 3 feet beyond the perimeter of the tear or damage.
- E. Place fill, beginning with the sheet(s) overlapped above subsequent sheet(s), to hold geotextile in place.
- F. Pins, usually 18 inches long, may be helpful in securing the geotextile during installation.

END OF SECTION

**SECTION 02100**  
**SITE PREPARATION**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Preparation
- B. Asphaltic concrete pavement removal
- C. Portland cement concrete removal
- D. Disposal of waste materials

1.02 QUALITY ASSURANCE

- A. Not Applicable

1.03 MEASUREMENT AND PAYMENT

- A. **Remove and Dispose of Existing Asphalt Off Site.** Measurement and payment for this bid item will be based upon the in-place square footage of asphalt surface course and base course removed and disposed of at an approved facility off-site. Payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work.
- B. **Remove and Dispose of Concrete Curb and Gutter.** Measurement and payment for this bid item will be based upon the in-place lineal footage of concrete curb and gutter removed and disposed of at an approved facility off-site. Payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work.
- C. **Saw Cut Asphalt.** Measurement and payment shall be based upon the total lineal footage of existing asphalt pavement saw cut to a one inch depth. Such payment shall include all labor, tools, equipment and material needed to complete this work.
- D. **Saw Cut Concrete.** Measurement and payment shall be based upon the total lineal footage of existing concrete curb and gutter saw cut to a one inch depth. Such payment shall include all labor, tools, equipment and material needed to complete this work.
- E. **Remove and Dispose of Existing Sod and Native Material Off Site.** Measurement and Payment for this bid item shall be based upon the lump sum item bid amount and shall include all costs associated with excavating and removing excess sod and/or native material in accordance with the plans and disposed of off site. Such payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work.
- F. **Furnish and Install Soil Stearilent.** Measurement and payment for this bid item shall be based upon the in-place square footage of water soluble herbicide for non-selective control of annual and perennial weeds in strict accordance with manufacturers instructions and all laws and regulations. Payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work.

- G. **Clear and Grubb.** Measurement and payment for this bid item shall be based upon the in-place square footage of existing ground cleared and grubbed of organic material, refuse, garbage and any other existing deleterious materials and dispose of same off site. Payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work.
- H. **Erosion Control.** Measurement and Payment for this bid item shall be based upon the lump sum item bid amount and shall include all costs associated with erosion control including all erosion control tasks and requirements shown on the plans. Such payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work
- I. **Earthwork.** Measurement and Payment for this bid item shall be based upon the lump sum item bid amount and shall include all costs associated with moving and grading the existing material to the design subgrade elevations and compacting said material as specified in the plans. Such payment shall include the cost of all labor, materials, tools, machinery, permits, etc. to complete this work

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. No clearing, demolition, or removal of any kind shall proceed until all existing trees, improvements, etc. to be removed have been established and are inspected and documented by the Owner.
- B. Establish necessary clearing limits within the construction limits. Mark all trees, shrubs, structures, fences, concrete, and other improvements to be removed.
- C. Trees, shrubs and lawn, areas to receive planting, rock outcroppings, fences, sprinklers and other improvements that are not to be removed shall be protected from damage or injury. If damaged or removed, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Trees, shrubs, and improvements not to be removed shall be marked in field by Owner and/or shown on the Drawings.
- D. Give reasonable notice to Owner to permit him to salvage plants, trees, fences, sprinklers and other improvements within the construction limits that may be destroyed because of the work.
- E. Notify all utility companies to be present if disturbing ground in the vicinity of utilities. Contractor shall pot hole and verify the locations and bury depths of all utilities including water, storm drain, telephone, gas and electrical before digging. All Utility relocations shall be done in accordance with the owners and operators standards and requirements.
- G. Protect active utility systems adjacent to or uncovered by any excavation during site preparation.
- H. Maintain benchmarks, monuments and other reference points and construction stakes.

### 3.02 ASPHALTIC CONCRETE PAVEMENT REMOVAL

- A. Sawing shall be used to ensure the breakage of pavement along straight lines.

3.03 DISPOSAL OF WASTE MATERIALS

- A. Where salvage is not required as otherwise specified herein or as shown on the drawings, dispose of all removed materials at a suitable off-site location in accordance with applicable laws and ordinances.
- B. No burning shall be allowed.

END OF SECTION

**SECTION 02230**  
**BASE COURSE**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Subgrade preparation to lines and grades shown on the plan.
- B. Place, grade and compact base and sub-base course materials.
- C. Dust and surface water control.

1.02 RELATED WORK

- A. Section 02511 - Asphaltic Concrete Paving

1.03 REFERENCES

- A. American Society for Testing Materials (ASTM).
- B. American Association of Safety and Highway Transportation Officials (AASHTO)

1.04 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

- A. **Furnish and Install 8" of Compacted Road Base.** Measurement and payment shall be based upon the total square footage of 8" of compacted road base furnished and installed according to the plans and specifications. Such payment shall include all labor, tools, equipment and material needed to complete this work.

PART 2 PRODUCTS

2.01 BASE COURSE MATERIAL

- A. Road Base for Pavement Preparation:
  - 1. Shall be untreated natural stone
  - 2. Shall not be lumpy or frozen.
  - 3. Shall be free from noticeable concentrations of alkali, salt, shale, and petroleum products, all roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that, in the opinion of the Engineer, is objectional or deleterious.
  - 4. Shall be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1"	100
1/2"	70-100
No. 4	41-68
No. 16	21-41
No. 40	10-27
No. 200	4-13

## PART 3 EXECUTION

### 3.01 PREPARATION OF SUBGRADE

- A. Prior to placing base course materials, the subgrade shall be scarified to a depth of not less than 6", moistened or dried to optimum moisture content, and compacted to at least 95% maximum Modified Proctor Density as determined in accordance with ASTM D1557 (AASHTO T-180), and shall be within 2% of optimum moisture content.
- B. The subgrade shall then be proof rolled.
- C. If excessively soft, loose, or disturbed soils are encountered, they shall be removed as directed by the Engineer to a maximum depth of two feet (2') and replaced and recompact to 96% maximum Modified Proctor Density using approved subgrade stabilizing material.
- D. Ensure subgrade is to required lines and elevations.

### 3.02 PLACEMENT OF BASE COURSE

- A. Protect against "pumping" moisture to surface by limiting travel on exposed subgrade. Where it is determined by the Owner that construction vehicle traffic (other than proof rolling) has caused subgrade instability, remove disturbed soils and replace with sand backfill at no additional cost to the Owner.
- B. Apply water soluble herbicide for nonselective control of annual and perennial weeds in strict accordance with manufacturers instructions and all laws and regulations.
- C. Place base course material on the prepared and accepted subgrade. The material shall be back-dumped and spread in a uniform lift thickness.
- D. Handle and spread materials in a manner that will prevent segregation of sizes. When vibrating or other acceptable types of compaction equipment are used, the entire course shall be compacted in 2-4" lifts.
- E. When base course is constructed in more than one layer, the previously placed layer shall be cleaned of loose and foreign matter. Upper layer of base course shall not be less than 1-1/2", nor shall fine materials be added to reach final grade.
- F. Overstressing the subgrade soil and base course shall be avoided by utilizing equipment in spreading and dumping that exerts only moderate pressures on the soil. Avoid excessive travel on lower base course lifts. Severe rutting, cracking or yielding is an indication of overstressing the soil. Any ruts or cracks which develop in the base course during spreading or compacting shall be repaired as directed at no additional cost to Owner.
- G. Base course shall be compacted to no less than 95% maximum Modified Proctor Density, as determined by ASTM D1557 (AASHTO T-180). Moisture content shall be maintained to within 1.5% of optimum throughout placing and compaction operations.
  - 1. Compaction shall always be commenced along the edge of the area to be compacted and the roller shall gradually advance toward the center of the area to be compacted.

2. Compaction equipment shall be operated along lines parallel or concentric with the centerline of the road being constructed, and no material variation therefrom will be permitted.
- H. Base course shall be substantially true to line and grade as indicated on the drawings. The surface shall be within 1/2" of required grade. Completed thickness of base course shall be within 1/2" of indicated thickness, with average thickness not less than that indicated.
- I. The top surface of compacted base course shall be finished by blading or rolled with equipment designed for that purpose.
- J. Temporary Graded Surface
1. When allowed by the local jurisdiction having authority, where trenches are excavated in paved traffic lanes, the surface course may be temporarily replaced by a surface consisting of base course material. The base course shall be removed and replaced with pavement as soon as conditions permit, or as required by local jurisdiction having authority.
  2. The surface shall be maintained to provide for a smooth flow of traffic without holes, bumps, etc., until final acceptance of the work.

### 3.03 DUST AND SURFACE WATER CONTROL

- A. Dust control measures shall be implemented by application of water to all work areas, storage areas, haul and access roads, or other areas affected by work.
- B. All work shall be in compliance with the Federal, State and local air pollution standards, and not cause a hazard or nuisance to personnel and the public in the vicinity of the work.
- C. Provide and operate at least one (1) mobile tank sprinkling unit during the contract period.
- D. Other methods of dust control for haul and access roads may include chemical treatment, light bituminous treatment or other method as approved by the Owner.
- E. Surface water shall be controlled to the extent that the areas to receive pavement, walks or slabs are not allowed to become wet from runoff from adjacent areas. Surface water shall be directed away from these areas but not directed toward adjacent property, buildings, or any improvement that may be damaged by water. Surface water shall not be allowed to enter sanitary sewers.

### 3.04 FIELD QUALITY CONTROL

- A. Testing and inspection of placed Base Course will be provided by the Owner. Tests provided by the Owner are as follows:

<u>Item</u>	<u>Type</u>	<u>Frequency</u>
Base Course Aggregate Sampling	ASTM D75	Each day or 1 test/500 sq. yd., or as required.
Atterberg Limits	ASTM D2419, D423, and D424	As required

Sieve Analysis	ASTM C136	As required
Bearing Ratio	ASTM D1883	As required
Maximum Density	ASTM D1557, Method D	As required
In-place Density	ASTM D2167, D2922 and D3017	As required

- B. If tests indicate that sub-base and/or base course do not meet specified requirements, remove defective work, replace and retest at no cost to Owner.

END OF SECTION

**SECTION 02511**

**ASPHALTIC CONCRETE PAVING**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Proof roll base course to reveal soft and yielding spots.
- B. Place and compact asphaltic concrete paving.
- C. Protection of newly placed pavement.

**1.02 RELATED WORK**

- A. Section 02230 - Base Course

**1.03 QUALITY ASSURANCE**

- A. Do not place asphaltic concrete paving when the air temperature in the shade and/or the roadbed temperature are below 50° F, or during rain, when the base course surface is wet, or during other adverse weather conditions.
- B. Do not place tack coat when air temperature in the shade and the roadbed temperature are below 50° F, or during rain, fog, or other adverse weather conditions.
- C. All work shall be performed by experienced and qualified workmen with equipment standard with the industry.
- D. Approval by Engineer of sources of supply of materials shall be obtained prior to delivery of materials.
- E. Comply with federal, state and/or local codes and regulations.

**1.04 REFERENCES**

- A. American Society for Testing Materials (ASTM):
  - 1. D1557, "Tests for Moisture - Density Relationship of Soils using 10 lb (4.5 kg) Rammer in 18 inch (457 mm) Drop".
  - 2. D1559, "Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus".
  - 3. D2041, "Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures".
  - 4. D2170, "Kinematic Viscosity of Asphalts (Bitumens)".
- B. THE ASPHALT INSTITUTE (A.I.) Specification Series No. 2 (SS-2).
- C. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. Materials and compaction tests.
    - a. AASHTO T-180

D. State of Utah Standard Specifications for Road and Bridge Construction, latest edition including Supplement #2.

1. Section 704.03 Asphaltic Cement.

1.05 SUBMITTALS

A. An asphaltic concrete paving mix design prepared by a certified laboratory and materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall be submitted for review and approval at least two weeks prior to commencement of the work.

B. Written certification of compliance for pavement marking paint.

1.06 WARRANTY

A. See General Conditions.

1.07 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

A. **Furnish and Install 3" of compacted Asphalt.** Measurement and payment shall be based upon the square footage of actual asphalt installed and compacted to a 3" thickness according to the plans and specifications. Such payment shall include all labor, tools, equipment and material needed to complete this work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphaltic cement:

1. Viscosity Graded original, AC-10, conforming to requirements of ASTM D-3381 (AASHTO M-226, Table 2), and Section 704.03 - State of Utah Standard Specifications for Road and Bridge Construction.

2. Shall not foam when heated to 350° F.

B. Mineral aggregate:

1. Shall consist of crushed stone, crushed gravel, or crushed slag, or a combination thereof; free of clay, silt, organic matter or other deleterious materials.

2. Gradation shall be in accordance with the following:

a. Asphaltic concrete surface course:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1/2"	100
#4	55 - 85
#16	24 - 38
#50	9 - 21
#200	4 - 8

3. Course aggregate, retained on the No. 4 sieve shall consist of clean, hard, rough, durable and sound fragments, with not less than 50 percent of particles by weight with at least one mechanically fractured face or clean angular face.
4. Fine aggregate passing the No. 4 sieve may be either a natural or manufactured product. The aggregate shall be clean, hard grained and moderately sharp, and shall contain not more than 2 percent by weight of vegetable matter or other deleterious substances.
5. That portion of the fine aggregate passing the No. 40 sieve shall be nonplastic when tested in accordance with ASTM D-424.
6. The weight of minus 200 mesh material retained in the aggregate, as determined by the difference in percent passing a No. 200 sieve by washing and dry sieving without washing, shall not exceed 6 percent of the total sample weight. That portion of fine aggregate passing the No. 200 sieve shall be determined by washing with water in accordance with ASTM C-117.
7. The aggregate shall be of uniform density and quality and shall have a rodded weight of not less than 100 pounds per cubic foot when tested in accordance with ASTM C-29.
8. The aggregate shall have a percentage of wear not exceeding forty when tested in accordance with ASTM C-131 and C-535.
9. The aggregate shall have a weighted loss not exceeding 12 percent by weight when subject to five cycles of sodium sulfate and tested in accordance with ASTM C-88, D-1073, and D-692.

## 2.02 ASPHALTIC CONCRETE PAVING MIXTURE

- A. Combine mineral constituents and asphalt cement in proportions per mix design at a central plant to produce an asphaltic concrete pavement mix.
- B. The asphaltic cement shall be heated at the mixing plant to a temperature at which it can be applied uniformly to the aggregate.
- C. Coarse and fine aggregate shall be stored separately at the mixing plant in a manner that will prevent intermingling.
- D. When it is necessary to blend aggregates from one or more sources to produce the combined gradation, each source or size of aggregate shall be stockpiled individually. Aggregate from the individual stockpiles shall be fed through separate bins to the cold elevator feeders. They shall not be blended in the stockpile.
- E. Cold aggregates shall be fed carefully to the plant so that surpluses and shortages will not occur and cause breaks in the continuous operation.
- F. The aggregate shall be dried and heated to provide a paving mixture temperature in conformance with placing conditions, but not to exceed 163°C (325°F).
- G. The heated and dried aggregates shall not contain enough moisture to cause the mixture to slump, the asphalt to foam, or the aggregate to segregate during hauling and placing.

- H. The shortest mixing time consistent with satisfactory coating of the aggregate shall be used. The mineral aggregate shall be considered satisfactorily coated with asphaltic cement when all of the particles passing the No. 4 sieve and 96 percent of the particles retained on the No. 4 sieve are coated with asphaltic cement. The required mixing time, as determined above, shall be in accordance with ASTM D-2489.
- I. If a dryer drum mixing process is used, the mineral aggregate shall be considered satisfactorily coated with asphaltic cement when all of the particles passing the No. 4 sieve and 98 percent of the particles retained on the No. 4 sieve are coated with asphaltic cement. The moisture content of the asphaltic cement sampled behind the laydown machine prior to compaction shall not exceed 1 percent by weight.

#### 2.03 TACK COAT

- A. Emulsified asphalt CSS-1H or SS-1H.

#### 2.04 SUBGRADE STABILIZING MATERIALS

- A. Shall be select aggregate material as specified in Section 02061.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Proofroll base course surface. Replace wet, spongy, soft, uncompactable or other unsuitable material with new base course material at no additional cost. Finish and compact repaired area as specified in Section 02230 - Base Course.
- B. Ensure base course surface is to required elevation. Remove loose material from base course surface.
- C. Do not place prime coat or asphaltic concrete paving until base course installation has been approved by the Construction Manager.

#### 3.02 TRANSPORTING THE ASPHALTIC CONCRETE PAVEMENT

- A. Transport time from the mixing plant to the job site shall not exceed 1 hour.
- B. Hauling truck shall have no direct frame contact with the paver or bear down on the paver during dumping operations.

#### 3.03 TACK COAT

- A. Prior to placing pavement, tack coat shall be applied to the vertical edges of concrete and "cold" pavement (over 1/2 hour old) which will be in contact with new pavement. Tack coat shall extend 12 inches onto adjacent base course material. The tack coat shall be carefully applied at a rate of 0.15 gal/SY. Tack coat shall also be applied uniformly at the same rate to the horizontal top surface of each lift of bituminous pavement prior to placing the next lift of bituminous pavement to promote a bond between the two courses of pavement. None of the material shall penetrate into the pavement and for this reason the application should be limited.
- B. Prior to applying the material, the surface to be treated shall be swept or flushed free of dust or other foreign material.

- C. Protect all surfaces not required to receive tack coat from any inadvertent application.
- D. The temperature range of the tack coat at the time of application shall be such that the viscosity will be between 50 and 100 centistokes as determined in accordance with ASTM Designation D-2170.
- E. Under no circumstances shall traffic be permitted to travel over the tacked surface. If detours cannot be provided, restrict operation to a width that will permit at least one-way traffic over the remaining portion of the roadbed. If one-way traffic is provided, the traffic shall be controlled in accordance with governing authority.
- F. After application of tack coat, sufficient time shall be given to allow for complete separation of asphalt and water before paving operations begin. The tack coat shall be applied on only as many surfaces as will be paved against in the same day.

#### 3.04 PLACEMENT OF ASPHALTIC CONCRETE PAVEMENT

- A. Place asphalt pavement to provide a compacted depth as indicated on the plans. Placing the pavement shall be a continuous operation. The machine shall spread mixture and shall strike a finish that is smooth, true to cross section, uniform in density and texture, and free from hollows and other irregularities. If any irregularities occur, they shall be corrected before final compaction of the mixture. The paving machine shall be self-propelled, equipped with hoppers, distributing screws, adjustable screeds and equalizing devices, capable of spreading hot asphaltic concrete paving mixtures without tearing, shoving or gouging, and of producing a finished surface of specified quality. Place inaccessible and small areas by hand.
- B. Ensure joints made during paving operations are straight, clean, vertical and free of broken or loose material. Carefully make joints to insure a continuous bond between old and new pavement, or between successive day's work. A continuous bond between adjoining work is required.
- C. If more than 1/2 hour elapses between adjacent paving passes, the "cold joint" shall have tack coat applied to the "cold" pavement prior to placing the adjacent pass.

#### 3.05 COMPACTION

- A. Roll and compact to specified density before temperature of the mixture drops below 180°F.
- B. Compact asphalt paving course to required density, with a steelwheeled tandem roller, steel three-wheeled roller, vibratory roller, or a pneumatic-tired roller, weighing not less than five tons. Start compaction as soon as pavement will bear equipment without checking or undue displacement. Speed of roller shall be slow enough to avoid displacement of hot mixture, and any displacements occurring as a result of changing the direction of the roller, or from any other cause, shall at once be corrected by the use of rakes and of fresh mixture where required. Ensure each pass of roller overlaps previous passes by at least 1/2 of the roller width to ensure smooth surface free of roller marks. Keep roller wheels sufficiently moist so as not to pick up material. Rolling shall continue until roller marks are eliminated and no further compression is possible. The finished compacted pavement shall have a density of 96% minimum, (no test less than 93% of the density determined in accordance with ASTM D-2041), as determined by ASTM D1557.

- C. Leave pavement with a uniform, dense surface.
- D. Perform hand tamping in areas not accessible to rolling equipment. Thorough compaction must be achieved, and joints between curbs, headers, manholes and similar structures must be effectively sealed.
- E. Do not allow vehicular traffic on newly paved areas until surface has cooled to atmospheric temperature.

END OF SECTION

**SECTION 02525**  
**NEW CONCRETE**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide all equipment, materials, labor, tools, and transportation and other items required to provide and install subgrade preparation, drainage course placement, formwork, and placement and finishing of portland cement concrete curbs, gutters, walks and drive aprons.
- B. Protection of newly constructed curbs, gutters, drive aprons and walks.
- C. Curing provisions.

1.02 RELATED WORK

- A. Section 02230 - Base Course
- B. Section 03200 - Concrete Formwork
- C. Section 03300 - Cast in Place Concrete

1.03 QUALITY ASSURANCE

- A. Use workmen thoroughly trained and experienced in placing and finishing the type of work specified.
- B. Comply with applicable federal, state, and local codes and regulation.
- C. Comply with hot or cold weather requirements.
- D. Concrete work shall be warranted against defects in materials or workmanship for a period of two (2) years, subject to applicable laws and regulations. In no case shall the Work be warranted for less than one (1) year.

1.04 REFERENCES

- A. American Concrete Institute (ACI)
  - 1. Manual of Concrete Practice, 1985, Part 2:
    - a. ACI 305R-77- Hot Weather Concreting
    - b. ACI 306R-78 - Cold Weather Concreting
    - c. ACI 318 - Building Code Requirements
- B. American Society for Testing and Materials (ASTM)
  - 1. D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction
  - 2. C150 - Portland Cement
  - 3. C33 - Concrete Aggregates
  - 4. C94 - Ready Mixed Concrete

- C. American Association of State Highway and Transportation Officials (AASHTO)
- D. Federal Standard (FS)

#### 1.05 SUBMITTALS

- A. Submit concrete trip tickets to Owner's representative at the time of delivery to the site.
- B. Submit mix design in accordance with Section 03300.
- C. Submit construction, expansion, and contraction joint layout plan for approval.
- D. Submit manufacturers data for all products proposed.

#### 1.06 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

- A. **Furnish and Install High Back Concrete Curb and Gutter and Base.** Measurement and payment will be based upon the in-place lineal footage of high back concrete curb and gutter installed with 4" of compacted untreated base course. Such payment shall include the costs of compacted road base material, fiber mesh reinforcement, and all labor, materials, tools and equipment needed to complete this work.
- B. **Furnish and Install 3' Wide Concrete Waterway and Base.** Measurement and payment will be based upon the in-place lineal footage of 3' wide Concrete waterway installed with 4" of compacted base course and steel reinforcement. Such payment shall include the costs of compacted road base material, fiber mesh reinforcement, and all labor, materials, tools and equipment needed to complete this work.
- C. **Furnish and Install Low Profile Concrete Curb and Gutter and Base.** Measurement and payment will be based upon the in-place lineal footage of Receiving Concrete curb and gutter installed with 4" of compacted base course. Such payment shall include the costs of compacted road base material, fiber mesh reinforcement, and all labor, materials, tools and equipment needed to complete this work.
- D. **Furnish and Install Precast Concrete Bumper Blocks.** Measurement and payment will be based upon each Precast Concrete Bumper Block installed in accordance with the plans and these specifications. Such payment shall include the costs of compacted road base material, fiber mesh reinforcement, and all labor, materials, tools and equipment needed to complete this work.

#### 1.07 DELIVERY AND HANDLING

- A. Ready mixed concrete shall be delivered to the site only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be not more than ninety (90) minutes when ambient temperatures are below 80° F and not more than sixty (60) minutes when ambient temperatures are above 80° F.
- B. Concrete which has reached initial set prior to placement, or retempered concrete is not acceptable, shall not be used in the Work, and shall be promptly removed from the project site.

#### 1.08 PROJECT CONDITIONS

- A. Concreting operations shall not be performed when air temperature at the project site falls below 40° F.

- B. Concreting operations shall not be performed when air temperature at the project site rises above 105° F.

## PART 2 PRODUCTS

### 2.01 CONCRETE MATERIALS AND MIXTURE

- A. Shall be in accordance with Section 03300.
- B. Cement shall comply with the requirements of ASTM C150, Type II.
- C. Coarse Aggregate shall comply with the requirements of ASTM C33 and Section 03300 of these specifications.
- D. Fine Aggregate shall comply with the requirements of ASTM C33 and Section 03300 of these specifications.
- E. Admixtures shall not be allowed in portland cement concrete with the following exceptions:
  - 1. Air Entraining Admixture shall comply with the requirements of ASTM C260.
- F. Concrete curing compound shall comply with ASTM C309, Type II, Class A and shall restrict moisture loss to 0.055 gr./sq.cm when applied at a rate of 200 sq.ft./gal.
- G. Mix design shall comply with Section 03300 of these specifications.

### 2.02 JOINT MATERIALS

- A. Filler material shall be pre-formed, non-extruding resilient type conforming to the requirements of ASTM D544 of appropriate thickness to fill joint.
- B. Joint sealant shall be polyurethane based, self leveling, one part elastomeric sealant complying with the requirements of FS-TT-S00230 Class A, Type I unless Type II is recommended for the intended application by the sealant manufacturer.
- C. Select joint materials of sufficient strength, hardness and durability to withstand stiletto heel traffic without damage or deterioration.

### 2.03 REINFORCEMENT

- A. Reinforcement shall comply with the requirements of Section 03100 of these specifications.

### 2.04 FORMWORK

- A. Formwork shall comply with the requirements of Section 03200 of these specifications.

### 2.05 EQUIPMENT

- A. Equipment for placing concrete shall comply with the requirements of Section 03300 of these specifications.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Remove all wood scraps, ice, snow, frost and debris from the areas in which concrete will be placed. Concrete shall not be placed on frozen ground or in standing water.
- B. Thoroughly clean the areas to ensure proper placement and bonding of concrete.
- C. Thoroughly wet the forms (except in freezing weather), or oil them; remove all standing water.
- D. Thoroughly clean all transporting and handling equipment.
- E. Notify the Owner at least 24 hours before placing concrete.
- F. Obtain the Engineer's approval of location of construction, expansion, or control joints prior to the start of concrete placement.
- G. Verify that reinforcement is free of loose mill scale, mud, paint, oil, grease, or other materials which may hinder proper bonding of concrete to reinforcement.

### 3.02 PLACING STEEL REINFORCEMENT

- A. Steel reinforcement shall be placed in accordance with the requirements of Section 03100 of these specifications.

### 3.03 PLACING CONCRETE

- A. Concrete shall be placed in accordance with the requirements of Section 03300 of these specifications.

### 3.04 WATERWAY AND CURB AND GUTTER JOINTS

- A. Make all joints perpendicular and straight.
- B. Joints for existing structures or paving removed or damaged as a result of the Work shall be replaced, matching joints in original structure as closely as possible.
- C. Expansion Joints
  - 1. Expansion joints in sidewalks shall be one half inch ( $\frac{1}{2}$ " ) in thickness and shall be placed where sidewalk joins existing walks, fixed objects, and at curbs at all handicap ramps using premolded expansion joint filler. Expansion joints shall not be spaced greater than 50' on center. Dowel bars are not required at expansion joints unless indicated on the drawings.
  - 2. Expansion joints in curb and gutter shall be one half inch ( $\frac{1}{2}$ " ) in thickness and shall be placed between curb and gutter and storm drain structures, at changes in direction, or at intervals not exceeding 50' using premolded expansion joint filler.
  - 3. Joint sealant shall be installed over all expansion joints. Provide and install bond breaker per the manufacturer's recommendations.
- D. Contraction Joints
  - 1. Curb and Gutter and Waterway
    - a. Contraction joints shall be installed according to the approved joint plan using steel templates not less than 1/8" nor more than 3/16" in thickness.

- b. Remove steel templates once concrete has reached initial set.
  - c. Curb and gutter placed by slipform methods shall have joints installed every 10' by cutting into fresh concrete to a depth not less than 1-1/2". Round such joints to provide a neat workmanlike appearance.
- E. Inspect joints upon removal of forms to verify that concrete or mortar has not sealed across the joint. Cut neatly and remove any such concrete or mortar in the joint.

### 3.05 HOT WEATHER CONCRETING

- A. Hot weather concreting shall be performed in accordance with Section 03300 of these specifications.

### 3.06 COLD WEATHER CONCRETING

- A. Cold weather concreting shall be performed in accordance with Section 03300 of these specifications.

### 3.07 FINISHING

- A. Concrete surfaces shall be finished smooth and true to grade by float. The finishing shall commence immediately after the concrete is placed and shall progress at a rate equal to the paving operation. Any delay in excess of thirty minutes in performing the preliminary finishing shall constitute cause for shutting down the mixing operations until the finishing is resumed.
- B. Hand methods of strike off and consolidation will only be permitted when the width of pavement to be constructed is less than 10 feet or at rounded intersection where the use of machine finishing is impractical.
- C. While the concrete is still plastic the entire slab surface shall be tested by the Contractor for trueness with an accurate 10 foot straightedge. Any depressions found shall be immediately filled with fresh concrete, struck off, reconsolidated, and finished. High spots shall be struck off and refinished.
- D. In advance of curing operations the pavement shall be textured by brooming. Owner shall be notified 24 hours in advance of placing and brooming operations in order to be present to review and recommend modifications to placement and finishing.
- E. Finished Surface
1. The finished surface shall be true to grade and cross section, free from ruts, humps, depressions or other irregularities. The surface shall not deviate from line and grade by more than 1/8" in 10'. The determination of compliance with smoothness may be made with a straightedge or string line at the option of the Engineer. Any irregularities found shall be corrected by the Contractor using suitable grinding or grooving tools and equipment.
  2. The grinding tool shall consist of a machine equipped with cutting wheels mounted on a horizontal shaft. The grinding action shall be conducted parallel to the centerline. Grinding operations may be deferred, as directed by the Engineer, whenever tearing of aggregate with the surface occurs and shall not be resumed until the concrete has hardened sufficiently to avoid tearing.
  3. The finished surface across contact joints shall not deviate from a straight line by more than 1/8" in 12" when tested with a straightedge. The Contractor shall take the necessary precautions to prevent slumping of the edge of the concrete at contact joints.

4. Line and Grade Control:
  - a. Contractor shall establish references at suitable intervals for line and grade control of the placing operations.
  - j. Contractor shall furnish, place and maintain such supports, wire devices and materials that may be required to provide continuous line and grade reference controls to the placing machine, trimmers, or paver.

### 3.07 CURING

- A. Protect placed concrete from the effects of hot or cold weather as required under Section 03300 of these specifications.
- B. Membrane Curing Compound
  1. Surfaces of newly placed or exposed concrete shall be kept moist or wet until the curing compound is applied. The curing compound shall be applied immediately after all patching or surface finishing has been completed.
  2. The curing compound shall be delivered to the work in ready mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.
  3. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100° F, unless otherwise specified by the manufacturer's recommendations.
  4. The curing compound shall be applied to the exposed surface at a uniform rate of 1 gallon per 100 square feet, unless otherwise specified by the manufacturer's recommendations.
  5. In the event that the application of curing compound is delayed, the application of water spray, ponding, or soaked tarps shall be started immediately and shall be continued until application of the compound is started or resumed.

### 3.08 PROTECTION

- A. Contractor shall protect the concrete against all damage and markings.
- B. Erect and maintain suitable barricades and barriers to protect the finished surface. Any sections damaged from traffic or other causes prior to final acceptance shall be removed, replaced, or repaired to the Owner's satisfaction at no additional expense to the Owner.
- C. Concrete surface shall be protected against pitting or damage due to rain.

END OF SECTION

**SECTION 02720**  
**STORM SEWAGE SYSTEMS**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Storm sewage piping
- B. Sump Drains

1.02 RELATED WORK

- A. Section 03100 - Concrete Formwork
- B. Section 03200 - Concrete Reinforcement
- C. Section 03300 - Cast-In-Place-Concrete

1.03 QUALITY ASSURANCE

- A. Workmanship and methods employed in the handling, transportation, storage, bedding, and laying of pipe, fittings, associated structures and accessories shall conform to the appropriate manufacturers' recommendations and/or ASTM recommendations.
- B. All products shall be inspected by Contractor, prior to installation, for damage. No damaged products will be used.

1.04 REFERENCES

- A. "Manual of Standard Practices", Concrete Reinforcing Steel Institute (CRSI)
- B. American Society for Testing and Materials (ASTM):
  - 1. A-615, "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement"

1.05 SUBMITTALS

- A. Submit manufacturer's specifications for all products.

1.06 DELIVERY AND HANDLING

- A. Load and unload pipe, fittings, and accessories in such a manner as to avoid shock or damage.

1.07 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

- A. **Furnish and Install 12" ADS Storm Drain Pipe.** Measurement and payment will be based upon the in-place lineal footage of 12" ADS storm drain pipe installed and shall include all costs associated with removing existing native material, trenching, shoring, excavating, compacting, backfilling, etc. in accordance with the plans and specifications. Such payment shall include the costs of all materials, labor, tools, equipment, etc. to complete this work.

- B. **Furnish and Install Curb Opening Concrete Catch Basin and Grate.**  
Measurement and payment will be based upon each curb opening concrete catch basin and grate installed and shall include all costs associated with excavating, shoring, forming, compacting, backfilling, etc. in accordance with the plans and specifications. Such payment shall include the costs of all materials, labor, tools, equipment, etc. to complete this work..

## PART 2 PRODUCTS

### 2.01 INLET AND CLEANOUT BOX MATERIALS

- A. Concrete, forms and reinforcement: Shall be as specified in Section 03300, 03100 and 03200, respectively.
- B. Rings, Lids and Grates shall be as specified on the Drawings.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. When connections are to be made to any existing pipe, conduit, or other improvement, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for and expose the existing improvement before laying any pipe or conduit.

### 3.02 PIPE INSTALLATION

- A. Bedding:
  - 1. Bedding shall be prepared in accordance with the Drawings.
  - 2. Lay all pipes on a firm bed, true to the line and grade, and abutt the end and shoulder of each pipe against the other in such a manner that there is no unevenness of any kind along the bottom half of the pipe line.
- B. During all phases of pipe installation, dewater trench to prevent floating of pipe.
- C. Manufacturers' Recommendations: Perform all work in strict accordance with the manufacturer's recommendations for the type of pipe being installed.
- D. Prevent contact between the pipe and compaction equipment. Compaction of bedding and backfill material should generally be done in such a way so that compaction equipment is not used directly above the pipe until sufficient backfill has been placed to assure that such compaction equipment will not have a damaging effect on the pipe.

### 3.03 INLET AND CLEANOUT BOXES

- A. Formwork: Shall be as specified in Section 03100.
- B. Reinforcement: Shall be as specified in Section 03200.

- C. Cast-in-place Concrete: Shall be as specified in Section 03300.

#### 3.04 CLEANING AND FLUSHING OF STORM SEWAGE PIPING

- A. Thoroughly clean all pipe lengths or units laid of all debris immediately after laying.
- B. Thoroughly clean by flushing and remove all debris from the pipeline and drainage structures prior to acceptance of the work by the Construction Manager.

#### 3.05 PROTECTION

- A. Protect all newly poured concrete from damage by placing barricades or enclosures in accordance with Section 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

END OF SECTION

## SECTION 02763

### PAVEMENT MARKING AND SIGNING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Includes But Not Limited To
- 1. Furnish material and apply pavement and curb markings as described in Contract Documents.

##### 1.2 QUALITY ASSURANCE

- A. Regulatory Requirements - Paint handicap spaces to conform to ADA Standards and local code requirements.

##### 1.3 PROJECT/SITE CONDITIONS

- A. Environmental Requirements
  - 1. Apply only on dry surfaces and during favorable weather, and when damage by rain, fog, or condensation not anticipated.

##### 1.4 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

- A. **Furnish and Install Paint Striping and Signing.** No measurement will be made and payment will be based upon the lump sum item amount. Such payment shall include the costs for furnishing and installing 2 coats of paint striping and signing in accordance with all requirements listed in the plans. Such payment shall include the costs of all posts, bases, materials, labor, equipment, fees, etc to complete this work.

#### PART 2 PRODUCTS

##### 2.1 MATERIAL

- A. Paint
  - 1. Non-reflectorized.
- 2. Types-
  - a. Acrylic Latex for uncured paving
  - b. Alkyd or chlorinted rubber for cured paving

#### PART 3 EXECUTION

##### 3.1 PREPARATION

- A. Contractor may apply paint striping immediately after installation and compaction of asphalt.
- B. Surfaces shall be fully vacuumed swept and dry and free of grease and loose dirt particles. Scrape and wire brush chipped or damaged paint on existing curbs.

- C. Perform layout with chalk or lumber crayon only.

### **3.2 APPLICATION**

- A. Site Tolerances

- 1. General - Make lines parallel, evenly spaced, and with sharply defined edges.

#### 2. Line Widths -

- a. Plus or minus 1/4 inch variance on straight segments.
  - b. Plus or minus 1/2 inch variance on curved alignments.

- B. Provide two coat application.

### **3.3 CLEANING**

- A. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Engineer prior to performance.

END OF SECTION

**SECTION 03100**  
**CONCRETE FORMWORK**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Concrete formwork for on-site cast-in-place concrete waterway, or other improvements removed or damaged during the work.

**1.02 RELATED WORK**

- A. Section 02525 - Concrete Waterways
- B. Section 03200 - Concrete Reinforcement
- C. Section 03300 - Cast-In-Place Concrete

**1.03 QUALITY ASSURANCE**

- A. Comply with federal, state, and/or local codes and regulations.
- B. All work shall be performed by experienced and qualified workmen.

**1.04 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT**

- A. No measurement will be made.
- B. Payment will be included in the lump sum contract amount.

**PART 2 PRODUCTS**

**2.01 UTILITY STRUCTURE FORM MATERIALS**

- A. Forms shall be of suitable material and of a type, size, shape, quality, and strength to insure construction as designed.
- B. Metal forms for exposed surfaces may be used when all bolt and rivet holes are countersunk so that a plane, smooth surface of the desired contour is obtained.
- C. Rough lumber may be used for forming surfaces that will be covered by earth in the finished structure.
- D. Forms for all surfaces that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood.

- E. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished structure. Any lumber or material which becomes badly checked or warped, prior to placing concrete, shall not be used.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. All forms shall be free of bulge and warp, and shall be cleaned thoroughly before being used.

### 3.02 FORM CONSTRUCTION

- A. Forms shall be so constructed that the finished concrete shall be of the form and dimensions shown on the plans and true to line and grade, and sufficiently rigid to resist deflection. Design of formwork and removal of forms and shores are to conform to ACI 318. The responsibility for their adequacy shall rest with the contractor.
- B. All forms shall be mortar tight and so designed and constructed that they may be removed without injuring the concrete.
- C. If, at any stage of the work, during or after placing the concrete, the forms sag or bulge to such an extent as to allow concrete to fall below the elevation shown on the plans, or outside the true line of the form, the concrete affected shall be removed.
- D. No concrete may be deposited against the earth as a side form.

END OF SECTION

**SECTION 03200**  
**CONCRETE REINFORCEMENT**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Placing of concrete reinforcing for cast-in-place concrete water, sanitary sewage and storm sewage system structures.

**1.02 RELATED WORK**

- A. Section 03100 - Concrete Formwork
- B. Section 03300 - Cast-In-Place Concrete

**1.03 QUALITY ASSURANCE**

- A. Comply with federal, state, and/or local codes and regulations.
- B. All work shall be performed by experienced and qualified workmen.

**1.04 REFERENCES**

- A. "Manual of Standard Practices", Concrete Reinforcing Steel Institute (CRSI)
- B. American Society for Testing and Materials (ASTM):
  - 1. A-615, "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement"

**1.05 METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

- A. No measurement will be made.
- B. Payment will be included in the lump sum contract amount.

**PART 2 PRODUCTS**

**2.01 STEEL MATERIALS**

- A. Reinforcing steel:
  - 1. All reinforcing bar material used for reinforcement of concrete shall be intermediate Grade 60 steel conforming to the requirements of ASTM A-615.
  - 2. All rods shall be deformed and round.
  - 3. All reinforcement shall be uncoated, free from rust, scale, form oil, etc.
  - 4. Welded wire fabric for concrete reinforcement shall conform to ASTM A-185.

- B. Accessories:
  - 1. All accessories, including such items as chairs, spacers, saddles, etc., shall be of steel formed in such a manner and with sufficient strength to perform the intended functions. Chairs, spacers, saddles, etc., which are set in contact with forms, are to be galvanized or provided with plastic tips or coating to prevent rust spots on finish concrete surface.
- C. Wire:
  - 1. All tying steel shall not be less than 18 gage annealed iron lacing wire. All wire tie ends shall point away from forms.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. All reinforcement shall be free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease, and shall present a clean surface.

### 3.02 PLACING STEEL REINFORCEMENT

- A. Reinforcing bars shall be accurately placed as shown on the plans and shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute, using concrete or metal chairs, spacers, metal hangers, supporting wires and other appropriate devices of sufficient strength to resist crushing under full load. Metal chairs which extend to the surface of the concrete (except where shown on the plans) and wooden supports, shall not be used.
- B. Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.
- C. Tack welding of reinforcing bars in place shall not be allowed.
- D. Splicing:
  - 1. Splices of bars shall be made only where shown on the Drawings or as approved by the Owner.
  - 2. Where bars are spliced, they shall be lapped at least 30 diameters, unless otherwise shown on the plans.
  - 3. Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.
- E. Bending reinforcement:
  - 1. Bends and hooks in bars shall be made in the manner prescribed in the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.
  - 2. Bars shall not be bent or straightened in a manner which will injure the material.
  - 3. Bars with kinks or unspecified bends shall not be used.

END OF SECTION

**SECTION 03300**  
**CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Inspection
- B. Preparation
- C. Placing Concrete
- D. Hot Weather Concreting
- E. Cold Weather Concreting
- F. Expansion, Contraction and Construction Joints
- G. Finishing
- H. Curing
- I. Field Quality Control
- J. Protection

1.02 RELATED WORK

- A. Section 03100 - Concrete Formwork
- B. Section 03200 - Concrete Reinforcement

1.03 QUALITY ASSURANCE

- A. Qualifications of Workmen:
  - 1. Use workmen thoroughly trained and experienced in placing and finishing the types of concrete specified.
- B. Comply with federal, state and local codes and regulations.
- C. Comply with hot or cold weather requirements as applicable.

1.04 REFERENCES

- A. The American Concrete Institute (ACI):
  - 1. 306R, "Cold Weather Concreting"
  - 2. 305R, "Hot Weather Concreting"

3. 318-83, "Building Code Requirements"

B. American Society for Testing and Materials (ASTM):

1. C-150, "Portland Cement"
2. C-33, "Concrete Aggregates"
3. C-94, "Ready-Mixed Concrete"

#### 1.05 SUBMITTALS

A. A mix design and information based on trial batch test results shall be submitted to Owner at least two weeks prior to commencement of the work.

B. Results from a reputable independent testing laboratory showing concrete aggregates comply with applicable sections of ASTM C-33. Contractor shall pay for necessary tests as directed by Engineer. A minimum of one test shall be made on the aggregate used for the first 5 cubic yards of concrete and for each 50 cubic yards thereafter. Should the Engineer deem that additional testing of aggregate is necessary, he may select samples from any of the aggregate to be used and have these samples tested by a recognized laboratory of his choice. Such material shall not be used in the work until the test reports are available. Should the material fail to meet the specified requirements, the aggregate will be rejected and the expense of testing shall be borne by the Contractor. Should the tests show the aggregate to be satisfactory, the cost of additional testing will be borne by the Owner.

D. Submit manufacturer's information (catalog data) for all products.

#### 1.06 DELIVERY, STORAGE AND HANDLING

A. Ready-mixed concrete: Concrete shall be mixed only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80° F and sixty minutes for temperatures above 80° F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.

B. Materials shall be delivered, stored, and handled so as to prevent damage by water or inclusion of foreign materials. Packaged materials shall be delivered and stored in original package, marked with brand and maker's name, until ready for use. Packages of materials showing evidence of water or other damage shall be rejected. Bulk cement shall be identified by shipping and delivery statements.

C. Cement shall not be stored longer than 4 months before usage.

#### 1.07 WARRANTY

A. Shall be for two (2) years in accordance with applicable laws and regulation. See General Conditions.

1.08 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

- A. No measurement will be made.
- B. Payment will be included in the lump sum contract amount.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement:
  - 1. Portland cement shall be Type II, low alkali, complying with ASTM C-150, unless otherwise specified.
  - 2. Air-entrainment of cement is required.
- B. Coarse Aggregates:
  - 1. Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, air-cooled blast furnace slag, or crushed hydraulic-cement concrete, or a combination thereof, conforming to the requirements of ASTM C-33.
  - 2. The amount of deleterious substances included in the aggregate shall not exceed the amount specified in ASTM C33.
  - 3. Coarse aggregate size shall be graded within the following limits.

Coarse Aggregate Size (Nominal)	Percent Passing (by weight)					
	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4
3/4"	100	95-100	-	25-60	-	0-10

- C. Fine aggregate:
  - 1. Fine aggregate shall consist of natural sand, manufactured sand, or a combination thereof, conforming to the requirements of ASTM C-33.
  - 2. Shall not be used in the work until approval by the Engineer of the tests performed by the independent testing laboratory.
  - 3. The amount of deleterious substances included in the aggregate shall not exceed the amount specified in ASTM C33.
  - 4. Fine aggregate shall be uniformly graded from coarse to fine within the following gradation:

<u>Sieve Size</u>	<u>Percent Passing (by weight)</u>
3/8"	100
No. 4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10

- D. Water:

1. Water used in washing aggregate and mixing concrete shall be of a potable quality clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances.

E. Admixtures:

1. The air-entraining admixture shall conform to ASTM Designation C-260 and be added at the mixer, not the job site.
2. Flyash shall NOT be used in concrete.
3. Use Pro Mesh Fiber Mesh additive in concrete or approved equal. Follow manufacturer's recommendations. Add approximately 1.5 pounds of additive per cubic yard of mix. Mix well and wait for a minimum of 5 minutes before placing.
4. No other admixtures will be allowed unless approved by the Engineer.

F. Concrete curing compound:

1. Liquid membrane curing compound shall conform to all applicable sections of ASTM C-309.

2.02 CONCRETE MIX

- A. Concrete shall consist of a mixture of Portland Cement, water, fine and coarse aggregates, and an air entraining agent.
- B. The proportions of the concrete materials shall produce a mixture that will work readily into corners and angles of forms and around reinforcing steel. The mixture shall have a water content which does not exceed the maximum specified amount, and which shall have the required compressive strength.
- C. The methods of measuring concrete materials shall permit proportions to be accurately controlled and easily checked. Measurement of materials for ready-mixed concrete shall conform to ASTM C-94. Engineer shall have free access to the mixing plant at all times.
- D. Concrete mix shall be as follows (unless otherwise shown or specified). The proportions given below are intended to give the required strength and shall be carefully followed as to minimum quantity of cement per cubic yard of concrete and as to water/cement ratios and more cement per cubic yare of concrete will be required if tests indicate necessity for such increased quantity to achieve the design strength:

Intended Use	Coars e Aggregate Size (- inches )	Min. Cement Content (sacks/ CY)	Min. 28-Day Compre ssive Strength (psi)	Min. 14-Day Flexural Strength (psi)	Slump (inche s)	Air Entrain ment (percent )	Max. Water/ Cemen t Ratio
Concrete Pavement, Storm Drain Inlet Boxes, Curbs & Walks	3/4	6.5	4000	550	2.5-4.0	6.5 +/- 1%	0.45

## 2.04 EQUIPMENT

- A. Mixing equipment shall be subject to approval. Mixers may be of the stationary plant, paver, or truck mixer type.
- B. Each mixer shall be equipped with a device for accurately measuring and indicating the quantity of water entering the concrete, and the operating mechanism shall be such that leakage will not occur when the valves are closed.
- C. Adequate equipment and facilities shall be provided for accurate measurement and control of all materials, and for readily changing the proportions of the material. The batch plant shall be capable of controlling the delivery of all material to within 1% by weight of the individual material. If bulk cement is used, it shall be weighed on a separate visible scale which will accurately register the scale load at any stage of the weighing operation from zero to full capacity.
- D. Mixers shall be equipped with a device for automatically measuring and indicating the time required for mixing, which device shall be interlocked to prevent the discharge of concrete from the mixer before the expiration of the mixing period. Neither speed nor volume capacity of the mixers shall exceed manufacturer's recommendations. Excessive over-mixing, requiring additions of water to preserve the required consistency, will not be permitted.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Inspect subgrade surface and verify grade and adequacy of compaction.
- B. Correct grade and compaction deficiencies.
- C. Notify the Engineer in writing of readiness to place concrete in any portion of the work, This notification shall be given as far in advance of the placing of concrete as the Engineer deems necessary for him to make final inspection of the preparations at the location of the proposed concrete placing. All forms, steel, screeds, anchors, ties, and inserts shall be in place before the Contractor's notification of readiness is given to the Engineer.
- D. No concrete shall be placed until forms, reinforcement, etc. has been inspected by the Engineer.

### 3.02 PREPARATION

- A. Remove all water, wood scraps, ice, snow, frost and debris from the areas in which concrete will be placed.
- B. Thoroughly clean the areas to ensure proper placement and bonding of concrete.

- C. Thoroughly dampen the surfaces which will come into contact with the concrete (except in freezing weather), forms may be oiled instead; remove all standing water. Reinforcement shall be thoroughly cleaned of all ice and other coatings.
- D. Thoroughly clean all transporting and handling equipment.
- E. Erect and maintain suitable barriers to protect the finished surface. Any section damaged from traffic or other causes occurring prior to its official acceptance, shall be repaired or replaced by the Contractor at his own expense in a manner satisfactory to the Owner.
- F. The concrete surface must not be damaged or pitted by rain, hail or snow.
- G. Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position, and until the form ties at construction joints have been retightened, all sleeves, hangers, pipe, bolts and any other items required to be embedded in the concrete have been placed and anchored and the forms cleaned and coated as specified.

### 3.03 PLACING CONCRETE

- A. Except by specific written authorization, concreting operations shall not be continued when a descending air temperature, in the shade and away from artificial heat, falls below 40 F, nor shall operations be resumed until ascending air temperature, in the shade and away from artificial heat, reaches 35 F.
- B. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.
  - 1. The free fall of concrete from the end of the spout or chute, or from a transporting vehicle, shall not exceed 6 feet, except when beginning a wall pour, in which case the free fall shall not exceed 2 feet.
  - 2. When the distance through which concrete must be dropped vertically exceeds the maximums specified above, a tremie or flexible metal spout shall be used. Flexible metal spouts having sufficient strength to hold the weight of the concrete shall be composed of conical sections not more than 3 feet long, with the diameter of the outlet and taper of the various sections such that the concrete will fill the outlet and be retarded in its flow.
  - 3. Chutes, troughs, or pipes used as aids in placing concrete shall be arranged and used so that the ingredients of the concrete will not be separated. Chutes and troughs shall be of metal or metal-lined. When steep slopes are necessary, the chutes shall be equipped with baffle boards or a reversed section at the outlet. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in the forms; or the ends of such chutes shall terminate in vertical downspouts,
  - 4. Pumping: The equipment shall be so arranged that no vibrations result which might damage freshly placed concrete. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of

concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipe line, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. Before and after this operation, the entire equipment shall be thoroughly cleaned. Water shall not be added to the concrete in the pump hopper.

- C. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump.
- D. Place concrete at such a rate that concrete is at all times plastic and flows readily between bare bars. No segregation of coarse aggregate shall occur when placing or dropping between bars.
- E. When placing is once started, carry it on as a continuous operation until placement of the section is complete.
- F. Do not pour a greater area at one time than can be properly finished without checking; this is particularly important during hot or dry weather.
- G. Do not use retempered concrete that has been contaminated by foreign materials.
- H. Struts, stays, and braces serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached the elevation and strength rendering their service unnecessary. These temporary members shall be entirely removed from the forms.
- I. Build into concrete any nosings, inserts, anchors, structural members, ties and hangers required to secure abutting or adjacent materials. Waterstops shall be prevented from bending over or being moved out of position.
- J. Unless necessary materials and equipment are readily available to adequately protect the concrete in place, placing operations may be postponed by the Engineer when, in the opinion of the Engineer, impending conditions may result in rainfall or low temperatures which will impair the quality of the finished work. The Contractor shall pay for all delay related costs resulting from such postponements including costs for removing and replacing damaged concrete. In case rainfall should occur after placing operations are started, provide ample covering to protect the work.
- K. Whenever it is necessary to continue the mixing, placing, and finishing of concrete after daylight hours, the site of the work shall be adequately lighted so that all operations are plainly visible. Every effort shall be made to enable finishing to be done in daylight.
- L. Clean up all spilled concrete and washings thoroughly. Concrete trucks shall not be washed-out on job site. Wash trucks at off-site location in accordance with all applicable laws and ordinances.

### 3.04 HOT WEATHER CONCRETING

- A. Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in

abnormal properties. Hot weather concreting shall follow the guidelines of ACI 305R, latest edition.

- B. Undesirable hot weather effects on concrete in the plastic state may include:
1. Increased water demand.
  2. Increased rate of slump loss and corresponding tendency to add water at job site.
  3. Increased rate of setting resulting in greater difficulty with handling, finishing, and curing, and increasing the possibility of cold joints.
  4. Increased tendency for plastic cracking.
  5. Increased difficulty in controlling entrained air content.
- C. Undesirable hot weather effects on concrete in the hardened state may include:
1. Decreased strength resulting from higher water demand and increased temperature level.
  2. Increased tendency for drying shrinkage and differential thermal cracking.
  3. Decreased durability.
  4. Decreased uniformity of surface appearance.
- D. Placing and curing:
1. Concrete shall be handled and transported with a minimum of segregation and slump loss. Concrete temperature at time of placement shall be such that the rate of evaporation for the weather conditions shall not cause cracking.
  2. The aggregate shall be cooled by frequent spraying in such a manner as to utilize the cooling effect of evaporation. The placement schedule shall be arranged, as approved, in such a manner as to provide time for the temperature of the previously placed course to begin to recede. The mixing water shall be the coolest available at the site insofar as is practicable.
  3. Concrete shall be placed where it is to remain.
  4. Concrete shall be placed in layers shallow enough to assure vibration well into the layer below.
  5. Surfaces exposed to the drying wind shall be covered up immediately after finishing with polyethylene sheets and be water cured continuously as soon as the concrete has set up. Curing compounds, in lieu of water, may not be used.
  6. Joints shall be made on sound, clean concrete.
  7. Finishing operations and their timing shall be guided only by the readiness of the concrete for them, and nothing else.
  8. Curing shall be conducted in such a manner that at no time during the prescribed period will the concrete lack ample moisture and temperature control. Facilities must be ready to protect promptly all exposed

- surfaces from drying. All work determined by Engineer to be damaged from hot weather shall be removed and replaced at no cost to Owner.
9. All materials and workmanship required to meet the hot weather requirements shall be supplied at the Contractor's own expense.

### 3.05 COLD WEATHER CONCRETING

- A. Cold weather is generally defined as a period when for more than 3 successive days the mean daily temperature drops below 40 F. When temperatures above 50 F occur during more than half of any 24-hour period, the weather should no longer be regarded as "cold". The times and temperatures given for various conditions and situations are not exact values and should not be used as such. Weather conditions are variable and common sense must be used to protect the concrete. Cold weather concreting shall follow the guidelines of ACI 306R, latest edition.
- B. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor's own expense.
  1. Preparation:
    - a. When specific written authorization is given to permit concreting operations at temperatures below those specified in 3.03 PLACING CONCRETE, arrangements for covering, insulating, housing, or heating materials and/or newly placed concrete should be made in advance of placement and should be adequate to achieve the temperature and moisture conditions recommended herein in all parts of the concrete. All equipment and materials necessary should be at the work site before the first frosts are likely to occur, not after concrete has been placed and its temperature begins to approach the freezing point.
  2. Placement and protection:
    - a. During placement of concrete, tarpaulins, or other readily movable coverings supported on horses or framework should follow closely the placing of the concrete so that only a few feet of concrete are exposed to outside air at any time.
    - b. The housing, covering, or other protection used in curing shall remain intact at least 24 hours after artificial heating is discontinued.
    - c. All concrete placed in forms shall have a temperature between 55` and 90` after placement. Adequate means shall be provided for maintaining the surrounding air at 60 F for at least seventy-two hours after placing and at no less than 40 F for an additional four days. All methods and equipment for heating shall be subject to approval. Insulating blankets shall be used when required to maintain a satisfactory temperature during the curing period.
    - d. No dependence shall be placed on salt or other chemicals for the prevention of freezing.
    - e. If heating or other protective measures need to be taken to prevent concrete from freezing, the concrete may require special curing methods to prevent rapid drying, as described in ACI 306R-78.

### 3.06 EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS

- A. Shall be formed and sealed as shown on the drawings or as required in individual Specifications Sections.

### 3.07 FINISHING

- A. Surface preparation: Immediately after the removal of forms, all fins and irregular projections shall be removed from surfaces, whether or not they are to be covered with high tensile wire and shotcrete covercoats.
- B. The finishing shall commence immediately after the concrete is placed. Any delay in excess of thirty minutes in performing the preliminary finishing shall constitute cause for shutting down the placing operation.
- C. The finished surface shall be true to grade and cross section, free from ruts, humps, depression or other irregularities.
- D. Finish Types: Finish shall be as shown on the Drawings or as specified in individual specification sections in accordance with the following:
  - 1. Patched: Remove all fins and irregular projections. Clean form-tie holes thoroughly, coat with suitable epoxy and fill with mortar of dry consistency (see PART 2 - PRODUCTS).
  - 2. Rubbed: Use proper grout mix (see PART 2 - PRODUCTS) and point up voids with cement mortar. Thereafter, rub the entire surface with said grout mix and a carborundum stone to produce a relatively smooth, plane surface without defects and imperfections. Surface shall be properly cured. Use of plaster shall not be permitted. Upon completion of the rubbing, the surface shall be washed thoroughly with clean water.
  - 3. Float: This type of finish shall be an integral finish by float after screeding, to compact the surface evenly. Any excess surface water shall be removed before floating and no mortar shall be used for leveling.
  - 4. Steel Trowel: After striking off the wearing course to the established grade, it shall be compacted by rolling or tamping, and then floated with a wood or magnesium float or power floating machine. The surface shall be tested with a straightedge to detect high and low spots, which shall be eliminated. Floating shall be followed by steel troweling after the concrete has hardened sufficiently to prevent excess fine material from working to the surface. The finish shall be brought to a smooth surface, free from defects and blemishes. No dry cement nor mixture of dry cement and sand shall be sprinkled directly on the surface of the wearing course to absorb moisture or to stiffen the mix. After the concrete has further hardened, additional troweling may be required. This shall be done as may be directed by the Engineer. Troweling shall produce a dense, smooth, impervious surface, free from defects and blemishes.
  - 5. Sandblasting: Sandblasting shall be done using a sharp silica sand. Exterior surfaces of concrete walls shall be sandblasted with #16 silica sand, preferably by the dry sandblasting process before wire wrapping may be started. The concrete surface shall be heavily pitted, leaving no

traces of laitance, form-oil and original surface smoothness and surface color. The minimum sand consumption per 100 square feet of surface shall be 150 pounds of silica sand. Sandblasting shall not be started before the completion date of the curing period or before all tieholes have been dry-packed.

6. Formed: Immediately after the removal of forms, all fins and irregular projections shall be removed from surfaces, whether or not they are to be covered with high tensile wire and shotcrete covercoats.
- E. Final finishing:
1. When the concrete has hardened sufficiently, the surface shall be given a broom finish. The broom shall be of an approved type.
  2. The strokes shall be in a transverse direction with adjacent strokes slightly overlapped and shall be made by drawing the broom without tearing the concrete, but so as to produce regular corrugations not over 1/8 inch in depth.
  3. The surface, as thus finished, shall be free from porous spots, irregularities, depressions, and small pockets or rough spots such as may be caused by accidental disturbing during the final brooming of particles of coarse aggregate embedded near the surface.

### 3.09 CURING

- A. Protect the concrete from the effects of weather in accordance with HOT WEATHER CONCRETING AND COLD WEATHER CONCRETING in this section.
- B. Water for curing shall be as specified in PART 2 - PRODUCTS.
- C. Other curing requirements may be required in individual Specifications Sections.
- D. Membrane curing compound method:
  1. Surface of newly placed or exposed concrete shall be kept moist or wet until the curing compound is applied. The curing compound shall be applied immediately after all patching or surface finishing has been completed.
  2. The curing compound shall be delivered to the work in ready-mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.
  3. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100° F, unless otherwise specified by manufacturer's recommendations.
  4. The curing compound shall be applied to the exposed surface at a uniform rate of 1 gallon per 150 square feet of area, unless otherwise required by manufacturer's recommendations.
  5. In the event that the application of curing compound is delayed, the application of water as provided in this section shall be started

immediately and shall be continued until application of the compound is resumed or started.

3.10 FIELD QUALITY CONTROL

- A. Testing will be provided by a testing laboratory employed by the Owner. The Engineer shall select the testing agency from Owner's list of approved labs. Refer to individual Specifications Sections for other Field Quality Control requirements.
- B. All testing will be paid for by Owner, except for retesting of material which fails to meet these specifications. Such retesting shall be paid for by Contractor at no expense to Owner. Contractor shall pay for curing cylinders. Testing agency shall transport cylinders.
- C. Concrete sampled from a concrete pump shall be sampled from the hose after all of the priming grout has been wasted. The end of the hose shall be placed in a horizontal position before the concrete is discharged into the sampling pan. The concrete shall not be allowed to fall into the sampling pan.
- D. The Contractor, at his expense, shall furnish the concrete required for testing.
- E. Strength, slump and air tests shall be taken in accordance with the following unless otherwise specified in individual Specifications Sections:
  - 1. Strength, slump and air tests may be taken in accordance with the placement rate per day as shown below:

Rate/Day (C.Y.)	Air	Slump	Compress. Strength	Flexural Strength
0-8	1	1	Optional	Optional
8-50	1	1	1	1
For each 50 C.Y. or fraction thereof	1	1	1	1

Additional tests may be made at the discretion of the Owner.

- 2. Compressive strength test specimens shall be made and cured in accordance with ASTM C-31; Specimens shall be tested in accordance with ASTM C-39.
  - a. Three specimens shall be made by the Engineer for each test, and these shall be broken at 7 and at 28 days, with one held in reserve.
  - b. At least one test (3 specimens) shall be made for each class of concrete poured during one day.
- 3. Flexural strength test specimens shall be prepared in accordance with AASHTO Designation T-23 and tested for flexural strength in accordance with AASHTO Designation T-97.

- a. Four specimens shall be made by the Engineer for each test, and one shall be broken at 7 and two at 14 days, with one held in reserve.
  - b. At least one test (4 specimens) shall be made for each class of concrete placed during one day.
4. If a slump test does not meet the specification, a second slump test shall be made immediately on the same load. The concrete shall be accepted if the second slump test meets the specification or rejected and removed from the project if the second slump test does not meet the specification.
  5. If an air test does not meet the specification, a second air test shall be made immediately upon the same load. The concrete shall be accepted if the second air test meets the specification or rejected and removed from the project if the second air test does not meet the specification.
  6. Slump and air tests shall be made in accordance with ASTM C-143 and C-231, respectively.
  7. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80 F and sixty minutes for temperatures above 80 F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.
  8. If a compressive strength test is below the required specified strength, the Engineer shall immediately notify the Contractor or his authorized representative.
  9. All costs incurred in resampling and retesting shall be paid by the Contractor if the retested strength is below the specified strength, and shall be assumed by the Owner if the retested strength is above the specified strength.

### 3.11 PROTECTION

- A. Comply with applicable parts of Section 03300 for protection of concrete. Also comply with HOT WEATHER CONCRETING and COLD WEATHER CONCRETING requirements specified herein.
- B. Provide barricades and enclosures to prevent damage to newly placed concrete.
- C. Replace concrete curb, walls and exterior flatwork damaged by construction activities as directed, at no cost to Owner.
- D. Every reasonable precaution shall be taken to protect finished surfaces from abrasions or other damage. Concrete surfaces or edges likely to be injured during the construction period shall be protected by leaving the forms in place or by erecting satisfactory covers. No fire shall be permitted in direct contact with concrete at any time. Concrete shall be adequately protected from injurious drying action by sun and wind, and from pitting by rain.

END OF SECTION

## **LANDSCAPE SPECIFICATIONS**

**SECTION 02810**  
**IRRIGATION SYSTEM**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. It will be the contractor’s responsibility to examine the site prior to construction and as construction of the roadway is being completed to document what type of existing irrigation system is disturbed.

As demolition of the existing roadways and curb and gutters take place It will be the contractor’s responsibility to make repairs and cap existing lateral lines to ensure all areas away from the construction remain functional through-out the construction period.

**1.2 AS-BUILT IRRIGATION DRAWINGS**

- A. Prepare as-built drawings which show changes to the existing irrigation system during construction affecting the main line pipe, controller locations, remote control valves, manual drain valves, and all drip distribution and collection line locations. These shall be kept on a clean set of prints of the contract drawings.

**1.3 PERMITS AND FEES**

- A. Not Applicable.

**1.4 QUALITY ASSURANCE**

- A. This contract work is to be conducted primarily by and coordinated by a licensed Landscape Irrigation Contractor specializing in landscape irrigation work. All work that is irrigation related work shall be conducted by employees who have each had a minimum of one year of experience constructing landscape irrigation systems. The on site supervisor must have a minimum of three years experience constructing landscape irrigation systems and one year experience in a supervisory role.

**1.5 COORDINATION**

- A. Coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible.

**1.6 INSPECTION OF SITE**

- A. The contractor shall acquaint him/herself with all site conditions. Should utilities not shown on the plans be found during excavations notify the College. Failure to

do so will make the contractor liable for any and all damage thereto arising from his/her operations subsequent to discovery of such utilities not shown on plans.

### **1.7 EXISTING UTILITIES**

- A. Before any trenching, excavation or digging below the surface for any reason is begun, the contractor shall have the area "Blue Staked" in order to determine as close as possible the location of all underground utilities. The contractor will conduct his/her work in such a manner to protect all utilities from damage. It is the responsibility of the contractor to repair or replace any damage incurred by the contractor or the contractor's employees at no expense to the owner.

### **1.8 PROTECTION OF EXISTING SITE CONDITIONS**

- A. The contractor shall take necessary precautions to protect site conditions to remain. Should damage be incurred, the contractor shall repair the damage to its original condition at the contractor's own expense. Contractor shall be responsible for the continued watering of all areas affected by construction. This can be completed by handwatering, the use of tempoary irrigation systems or the continued operation of existing systems not disturbed by construction.

### **1.9 GUARANTEE**

- A. All work shall be guaranteed for a period of one year after the date of substantial completion. The contractor shall make good any deficiencies at the time he/she is notified of any faults, and place in satisfactory condition any damage to the buildings or grounds without cost to the owner.

### **1.10 SUBMITTALS**

- A. Submit three copies of manufacturer's technical data and installation instructions for landscape irrigation system.

## **PART 2 - MATERIALS**

### **2.1 GENERAL**

- A. All materials throughout the system shall be new and in perfect condition. No deviations from the specifications shall be allowed, except as provided for in these documents.

### **2.2 PIPING**

- A. All main line pipe shall be Schedule 40, Type 1120-1220 Polyvinyl Chloride (PVC) pipe and shall conform to CS-256-63. All lateral lines shall be Schedule 40, Type 1120-1220 Polyvinyl Chloride (PVC). All piping shall be free from cracks, holes, foreign material, blisters, inside bubbles, wrinkles and dents. Pipe ratings shall be printed on the pipe and no pipe shall be less than 3/4" diameter.

Any above ground mainline pipe shall be galvanized metal pipe.

- B. Pipe Joints: All joints shall be solvent welded as per manufacturer's recommendations, using both the proper primer and glue. All joints must be allowed to set for a minimum of 24 hours prior to pressure testing.

### **2.3 FITTINGS**

- A. Fittings for main and lateral lines shall be Schedule 40, Polyvinyl Chloride (PVC). Do NOT use galvanized fittings of any kind.
- B. Fittings on flex swing risers shall be barbed insert ells made of THICK-WALLED POLY PIPE as manufactured by Rainbird.

### **2.4 RISERS**

- A. Flexible swing pipe shall be THICK-WALLED POLY PIPE (funny pipe) as manufactured by Rainbird. This pipe is to be used only between heads and lateral lines and shall not exceed a distance of 5 feet.

### **2.5 SOLVENT CEMENT**

- A. Compatible with PVC pipe and of proper consistency.

### **2.6 AUTOMATIC CONTROLLERS**

- A. New valves shall be connected to existing Rainbird ESP-12SAT-2S controller which is, in turn, to be linked with the central Maxicom computer system.

### **2.7 VALVES**

- A. Ball Valves: Ball valves shall be solid bronze meeting Federal Specification WW-V-54, CLASS A, TYPE 1.
- B. Manual Drain Valves: All drain valves shall be 3/4" Mueller.
- C. Automatic Drain Valves: Automatic drains shall be 1/2" King Drains. Automatic drains are to be installed at low points of lateral lines only.

### **2.8 SLEEVES**

- A. All sleeves shall be PVC Schedule 40 sized 2 pipe sizes larger than the pipe or pipes being sleeved (4" diameter min.). Coordinate the installation of the sleeves with installation of all hard surfaces. Mark location of all sleeves with a 3/4" galvanized roofing nail at both sides of sidewalk or curb and gutter or asphalt in such a manner that future location will not require more than hand shovel

excavation. Insure that adequate amounts of sleeving are installed for both water lines and electric control wires.

## **2.9 ELECTRIC CONTROL WIRE**

- A. Wires shall be UF DIRECT BURIAL type. No wire shall be smaller than #14. Ground or neutral wires shall be WHITE, grass areas shall be RED and shrubbery areas shall be BLUE. Spare wires shall be Green.
- B. No splices in electric control wires. All wires shall be 'homeruns' from the valve to the controller.
- C. Conduit: Standard Electrical Conduit. Size as needed.
- D. Rainbird maxicom communication wire

## **2.10 HEADS**

- A. All heads shall be Rainbird or approved equal. Site conditions will dictate nozzle patterns to be used. Contractor shall adjust patterns to provide adequate coverage.

## **2.11 VALVE BOXES**

- A. Valve boxes shall be of sufficient size to house 1 (one) electric remote control valve and still allow room for maintenance without having to excavate or perform similar operations. Boxes shall be as manufactured by Carson or Brooks Industries meeting ASTM D368 for tensile strength of 12" deep and furnish with a non-hinged cover. Each valve box is to have a 6" bottom extension minimum. The extension should allow for the installation of the valve cluster at the depth of the lateral line (12"). The contractor shall also allow for 4-6" of clear space between the valve cluster and the gravel below the valve.
- B. Valve boxes shall be set flush with the finished grade. Valves shall be set 12" below the top of the box including ball valves and quick couplers where called for. Do NOT install more than one (1) electric remote control valves in a single standard valve box. All valves must have ample room and access for repair.

## **2.12 QUICK COUPLERS**

- A. All quick couplers shall be a 1" single lug.

## **PART 3 - EXECUTION**

### **3.1 WORKMANSHIP**

- A. Where possible, all trenching shall occur on soft spaces.

- B. If for any reason full and complete coverage of all irrigation areas does not cover, irrigation contractor shall be responsible to contact the Engineer before continuing with his work.

### **3.2 EXCAVATION AND TRENCHING**

- A. Perform all excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave-ins. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition.
- B. Trenches for lateral lines shall be dug a minimum of 12" deep and as wide as necessary to properly install pipes.
- C. Trenches for mainlines shall be dug a minimum of 18" deep. Run all electrical wires in mainline trench as shown in detail on drawings. Where it becomes necessary for wires to leave the mainline trench, the trench for all electrical wires shall be treated as a mainline trench, as herein described.
- D. Trenches shall be made wide enough to allow a minimum of 6 inches between parallel pipe lines.
- E. All trenches are to be 12" away from all curbs, buildings and sidewalks.

### **3.3 PIPE LINE ASSEMBLY**

- A. Install automatic control valves no closer than 12 inches to walk edges, building, and walls. Install in valve box, arranged for easy adjustment and removal. Allow sufficient space around entire valve assembly. Each valve group (up to 4 valves) shall be connected to the main line through a ball valve.
- B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit as needed.
- C. Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush.
- D. Install pipe in dry weather when temperature is above 40 degrees F. in strict accordance with Manufacturers instructions.
- E. Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.

### **3.4 BACKFILLING OF TRENCHES**

- A. Backfill around and over the pipes in accordance with the details on the drawings. All material that is to come in contact with the pipes shall be less than 1/4 inch in diameter. This material shall be imported for this specific use if necessary. Upon the approval of the Engineer, the existing material on site may be used as backfill material above the pipes.

### **3.5 FLUSHING AND TESTING**

- A. After installation of all new pipes, including laterals for a given circuit, the control valve shall be opened fully and a full head of water be used to flush out the system
- B. Testing will be performed after completion of each circuit and after completion of the entire system. At this time any necessary repair work will be done at the contractor's expense and the entire system will be in good working order prior to the issuance of the Certificate of Substantial Completion.

### **3.6 PIPING INSPECTIONS**

- A. Before any pipes are covered, the Engineer shall inspect the system for compliance with specifications and drawings. Any required changes will be made at this time at the expense of the contractor.

### **3.7 SYSTEM OPERATION**

- A. The entire system will be tested in the presence of the College, in order to insure COMPLETE coverage of all areas to be watered and the automatic operation of the system using the automatic clock. Any changes required will be made at this time at the contractor's expense.
- B. All heads will be adjusted to their proper coverage and set to the proper depth at this time.

### **3.8 AUTOMATIC CLOCK**

- A. Not Used.

### **3.9 ELECTRICAL CONTROL WIRES**

- A. Electrical control wires shall be installed in the same trench as the main line wherever possible. Wires shall be laid alongside the pipe by "snaking" into the trench to allow as much slack as possible for contraction and expansion of the wire. All wire connections at remote control valves will be left with two feet of wire so that the splice or the valve manifold can be brought to the surface for repairs without disconnecting the wires.
- B. It is important that the joint be absolutely waterproof so that there is no chance for leakage of water and corrosion build-up on the connection. All wiring shall be 'home-run from the valve to the controller.

### **3.10 SLEEVING**

- A. All lines to be laid under hard surfaces shall be installed in a 4" minimum PVC Schedule 40 sleeve unless noted otherwise. Depth of sleeves to be determined by the type of line that is to be placed in sleeve. In the case of new construction, all sleeves are to be placed prior to laying of any hard surface. In the case of existing construction, the sleeves must be installed by boring under the existing hard surface.

### **3.11 QUICK COUPLERS**

- A. Quick couplers shall be installed on a swing joint.
- B. Install one (1) quick coupler at each remote control valve or valve cluster.

### **3.12 TESTING**

- A. Operation Testing: After finish grading, contouring and mulching, test the entire system for operation including electrically actuating the remote control valve. Run the system until water begins to puddle and/or run off to determine the initial controller run time to determine the number of irrigation cycles necessary to meet weekly evapotranspiration rates (E.T.) for the plant material installed.

### **3.13 ADJUSTMENT**

- A. After completion of grading, seeding, or sodding, and rolling of grass areas, carefully adjust lawn sprinkler heads so they will be flush with, or not more than 1/2" below finish grade.

### **3.14 CLEAN-UP**

- A. Remove from the site all debris resulting from work of this section.

END OF SECTION 02810

## **SECTION 02900**

### **LANDSCAPING**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. The Extent of the landscape development work is shown on the drawings and schedules and includes preparation of landscaped areas, restoration of areas disturbed by construction, and placement of all plant materials bark mulch, and sod.

##### **1.2 AS-BUILT DRAWINGS**

- A. The Contractor will keep a record of all departures from the contract drawings that occur during construction. These shall be kept on a clean set of prints of the contract drawings. The Engineer will review the "as-built drawings" to verify that changes are being recorded as construction occurs.

##### **1.3 QUALITY ASSURANCE**

- A. The landscape work shall be done by a single licensed Landscape Contractor specializing in landscape work. The on site supervisor must have a minimum of three years experience in landscape construction and one year experience in a supervisory role.

##### **1.4 PLANT MATERIAL SOURCE QUALITY CONTROL**

- A. General: Ship landscape materials with certificates of inspection as required by governmental authorities. Comply with governing regulations applicable to landscape materials.
- B. The source or supplier for all plant materials shall be furnished to the Engineer prior to the delivery of any plant materials on site or stored elsewhere.
- D. Plant materials and other landscape items will be evaluated according to compliance with drawings, schedules, and specifications; as well as overall aesthetic quality, grower or supplier reputation, physical inspection, and American Association of Nurseryman Standards (AANS).

##### **1.5 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at the site.

##### **1.6 GRADING AND TOPSOIL**

- A. Examine the subgrade, verify the elevations to be no more than 2" above or below subgrade elevation which should allow for 6" of topsoil in all sod areas. Observe the conditions under which work is to be performed, and notify the Engineer of unsatisfactory conditions.

### **1.7 EXISTING UTILITIES**

- A. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. The Contractor shall have the area "Blue Staked" prior to digging. It is the responsibility of the Contractor to repair or replace any damage incurred by the contractor or the contractor's employees at no expense to the owner.

### **1.8 EXCAVATION**

- A. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Engineer before planting.

### **1.9 GUARANTEE**

- A. Guarantee lawns and trees for one year following substantial completion of Landscape work.

## **PART 2 - MATERIALS:**

### **2.1 TOPSOIL**

- A. Topsoil: All topsoil is to be imported topsoil which shall consist of natural sandy loam and be of uniform quality, free from subsoil, hard clods, stiff clay, hard-pan, sod, partially disintegrated debris or any other undesirable material. Soil shall be free of plants roots or seeds that would be toxic or harmful to growth. Topsoil shall be obtained from naturally drained areas and shall have an acidity range from 5.5 to 7.7 inclusive.

### **2.2 GRASS MATERIALS**

- A. Seed: All seed shall comply with the seed mix specified on the plans. It shall be installed in accordance with all suppliers recommendations.

## **PART 3 - EXECUTION**

### **3.1 COORDINATION**

- A. The contractor shall coordinate his work with that of other contractors on site, and shall cooperate to the fullest extent to see that the work is completed in a timely and workmanship like manner.
- B. The Landscape contractor shall coordinate his work with the removals as called out for on the plans. Work is to be performed in a manner that minimizes the amount of damage to the landscape.

### **3.2 INSTALLATION OF TOPSOIL**

- A. Prior to the installation of any topsoil, contractor shall inspect the existing subgrade for compliance to the specifications with regards to the grade and cleanliness. Any discrepancy shall be brought to the attention of the Engineer for appropriate action.
- B. When contract operations have been completed to a point where the areas will not be disturbed, subgrade shall be cleaned free of waste material of all kinds. Scarify and pulverize the subgrade to a depth of not less than 6" inches. Scarification shall be completed in all areas that are to be planted or sodded or are to receive topsoil.
- C. Spread the topsoil mix to a minimum depth of 6" in all seeded areas. Do not place topsoil over subgrade that is frozen or damp.

### **3.3 PREPARATION FOR SEED**

- A. The surface on which the seed is to be installed shall be firm and free of footprints, depressions or undulations of any kind. The surface shall be free of all rocks larger than 1/2" in diameter and all sticks, roots, rubbish, and other extraneous materials. NO EXCEPTIONS.
- B. The finish grade of the topsoil adjacent to all sidewalks, etc., prior to seeding shall be 1" below the top surface of the concrete or hard surface.
- C. If a crust has formed on the topsoil, it shall be loosened by raking prior to seeding.

### **3.4 SEED**

- A. Prior to placing seed, the entire surface to receive the seed shall be uniformly covered with the specified fertilizer in accordance with the requirements listed on the plans.
- B. Watering of the seed shall be the complete responsibility of the contractor. Provide acceptable visual barriers by means of barricades set at appropriate distances and strings or tapes between the barriers as an indication of new work. Restore any damaged areas caused by others, erosion, or vehicular traffic until such a time as the lawn is accepted by the owner.

### **3.5 MAINTENANCE**

- A. Begin maintenance immediately after planting.
- B. Maintain natural grass for not less than the period stated below, and longer as required to establish an acceptable lawn.
  - 1. Not less than four (4) growing months (April to September), and a minimum of two (2) mowings, after Substantial Completion.
  - 2. If installed in fall and not given full four months of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
  - 3. The contractor shall be responsible for the protection, watering and replacement of any damaged grass until acceptance by the owner. This guarantee shall include repairing of any eroded places and maintaining the lawn by watering, mowing and controlling of insects as well as advising the owner of any maintenance or watering procedures necessary to care for and promote plant life. All lawn must be in satisfactory condition at the time of the final acceptance.

### **3.6 CLEANUP AND PROTECTION**

- A. During landscape work store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.
- B. Protect landscape areas, work and materials from damage due to operations by other contractors, trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.
- C. The contractor shall keep the site free from accumulation of waste material. At the time of completion, all areas must be swept or washed clean and all rubbish removed to the satisfaction of the Engineer.

### **3.7 INSPECTION AND ACCEPTANCE**

- A. Substantial Completion for landscape work.
  - 1. When the landscape work is completed, including maintenance, the Engineer will, upon request, make an inspection to determine acceptability.
  - 2. The landscape work may not be inspected for acceptance in parts.

3. Where inspected landscape work does not comply with the requirement, replace rejected work and continue specified maintenance until re-inspected by the Engineer and found to be acceptable. Remove rejected plants and materials promptly from the project site.
4. As-built Drawings shall be furnished to the Engineer at the time of the Substantial Completion Inspection before final acceptance.

END OF SECTION 02900

**INDEX**

**DIVISION 16 - ELECTRICAL WORK**

<u>SECTION</u>	<u>TITLE</u>	<u>PAGES</u>
16000	General Provisions, Electrical .....	6
16020	Contractor Allowances .....	1
16110	Raceways .....	4
16120	Conductors .....	3
16130	Electrical Boxes .....	2
16140	Outlets and Wiring Devices .....	2
16190	Supporting Devices .....	1
16195	Electrical Identification .....	1
16400	Secondary Service and Distribution .....	1
16450	Secondary Grounding .....	2
16500	Lighting .....	3

## SECTION 16000

### GENERAL PROVISIONS, ELECTRICAL

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions and Division 1 Specification Sections apply to work of this section and all other Division 16 specification sections.
- B. This section applies to all Division 16 specification sections.

##### 1.2 SUMMARY

- A. This section includes general administrative and procedural requirements for electrical installations to expand the requirements of the General Conditions and Division 1 Specification Sections.

##### 1.3 STANDARDS

- A. The following industry standards are considered minimum requirements for electrical work and are made a part of the contract documents:
  - 1. National Electrical Code, 2005 Edition (NEC)
  - 2. Electrical Ordinances of Local Governing Authority
  - 3. Utah State Fire Marshal's Rules and Regulations
  - 4. International Building Code
  - 5. International Fire Code
  - 6. Underwriters Laboratories (UL) Standards
  - 7. American National Standards Institute (ANSI)
  - 8. National Electrical Manufacturer's Association (NEMA)
  - 9. National Fire Protection Association (NFPA) Standards
  - 10. Regulations of American Standards Association
- B. If any conflict occurs between these rules and the contract documents or between the plans and specifications, notify the Engineer promptly in writing. Do not proceed with any work in conflict until a solution is approved in writing by the Engineer.

##### 1.4 WORKMANSHIP

- A. All Electrical Work of any nature shall be performed by qualified electricians, experienced in the type of work to be performed and licensed with the State of Utah. Electricians shall show their license upon request of the Owner, Engineer and/or their representatives.

##### 1.5 CODE INSPECTIONS

- A. Code inspections will be conducted by an inspection agency hired by the Owner.

- B. Contractor is responsible to schedule inspections with the inspection agency.

#### 1.6 ELECTRICAL WORK INCLUDED

- A. The basic contract work includes all labor, material, tools, transportation, equipment, and superintendence specified, indicated on the drawings or necessary to make a complete installation of, but not limited to, the following:
  - 1. Appliances, apparatus and materials not specifically noted on drawings or mentioned herein, but which are necessary to make a complete working installation of all electrical systems required for the project.
  - 2. Hangers, anchors, sleeves, chases, supports and fittings as may be required and as indicated.
  - 3. Complete electric service with service conduits, service conductors, main distribution panel, distribution system, transformers, branch panels and branch circuits for power and lighting with raceway system and outlet boxes.
  - 4. Parking lot lighting and controls.

#### 1.7 SUBSTITUTIONS

- A. Material or products specified by name of manufacturer, brand or trade name or catalogue reference will be the basis of the bid and furnished under the contract unless changed in writing by the Engineer. Where two or more materials are named, the choice of these will be optional with the Contractor.
- B. Submit requests for substitution in writing to the Engineer as required by Division 1 Specifications and the General Conditions.

#### 1.8 ACCURACY OF DATA

- A. Data given herein and on the drawings are as exact as could be secured, but their absolute accuracy is not guaranteed. Specifications and drawings are for the assistance and guidance of the Contractor.
- B. Electrical drawings are diagrammatic, but will be followed as closely as construction and work of other contractors will permit. All deviations from the drawings required to make the Electrical Work conform to the the work of other contractors will be made by the Contractor as approved by the Engineer.

#### 1.9 VISIT THE SITE

- A. Contractors are assumed to have visited the site and thoroughly acquainted themselves with conditions affecting the proposed work. Verify existing conditions and measurements at the site before beginning work and immediately notify the Engineer of any discrepancies which may adversely affect completion of the work.

## SLCC New Jordan Campus Parking Lot

### 1.10 TEMPORARY POWER

- A. Provide temporary power for reasonable convenience during construction in accordance with the General Conditions.
- B. Provide GFCI Protection for all temporary power outlets.
- C. Use temporary power for construction purposes only. Do not use temporary power for electric space heating, etc..

### 1.11 SHOP DRAWING SUBMITTALS

- A. As soon as possible after contract award, submit shop drawings for review in accordance with the General Conditions and Division 1 Specifications.
- B. Submit shop drawings in three ring loose-leaf binder.
- C. Provide manufacturers' catalogue and/or descriptive literature indicating specific model and/or catalog numbers, options, accessories and modifications for the following items:
  - 1. Underground Pullboxes
  - 2. Light Fixtures, Poles and Fusing
- D. Above list is considered minimum. Additional items may be required to be submitted for review.
- E. Refer to individual Specification Sections for additional Shop Drawing Submittal requirements.

### 1.12 RECORD DRAWINGS

- A. Provide As-Built Record Drawings in accordance with the General Conditions and Division 1 Specifications.
- B. Indicate location and routing of all underground raceways on the As-Built Record Drawings by dimension to permanent structures such as buildings, sidewalks, curbs, etc.
- C. Indicate all changes made to the drawings such as changes in fixture and outlet location, changes in circuit routing and circuit numbering, etc. Include all changes by Addenda, Change Order, Supplemental Instruction or verbal instruction.
- D. Refer to individual Specification Sections for additional Record Drawing requirements.

### 1.13 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals in accordance with the General Conditions and Division 1 Specifications.
- B. Include manufacturers' catalog and/or descriptive literature of equipment actually installed. Clearly indicate on literature the specific model and/or catalog numbers of

## SLCC New Jordan Campus Parking Lot

equipment installed, including all options, accessories and/or modifications.

- C. All copies of literature will be new, clean and clearly legible. Sheets used for shop drawing submittals with review stamp, remarks, etc., will not be acceptable.
- D. Refer to individual Specification Sections for additional Operation and Maintenance Manual requirements.

### 1.14 WARRANTY

- A. Provide Warranty for Electrical Work in accordance with the General Conditions and Division 1 Specifications.
- B. Provide manufacturer's warranty for all equipment which the manufacturer normally provides a warranty in excess of twelve months. Refer to individual Specification Sections for extended warranty requirements.

### 1.15 EXTRA MATERIAL STOCK

- A. Provide extra stock in original cartons, or packaged with protective coverings, for storage and identified with labels clearly describing contents.
- B. Turn over extra stock to Owner and place in storage prior to Substantial Completion. Exact location of storage to be determined by the Owner.
- C. Obtain signed receipt for extra stock materials from the Owner's Project Manager. Include copy of signed receipt in the Project Operation and Maintenance Manuals.
  - 1. Receipt shall include description and quantity of all material.
- D. Provide the following extra stock of materials to the Owner.
  - 1. Fixture Fuses and Lamps: Refer to Specification Section 16500 - Lighting for required quantities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. All materials and equipment for which U.L. Standards have been established, will be listed by and bear the label of Underwriters Laboratories, Inc..
- B. All materials will be new and bear the manufacturer's name, trade name and catalog or model numbers. Similar items will be of the same manufacturer.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Installation of materials will comply with all codes and be accomplished with good workmanship in the judgement of the Engineer.

### 3.2 COOPERATION WITH OTHER CONTRACTORS

- A. Cooperate with other contractors doing work on the building as may be necessary for the proper execution of the work of various trades employed in construction of the building.
- B. Refer to drawings, for construction details, and coordinate the electrical work with that of other contractors to the end that unnecessary delays and conflicts will be avoided.

### 3.3 MATERIAL HANDLING

- A. Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

### 3.4 CUTTING AND REPAIRING

- A. Provide all required digging, cutting, etc. incidental to the Electrical Work. Make required repairs thereafter to the satisfaction of the Engineer.
- B. Install the Electrical Work to proceed with other trades in order to avoid unnecessary cutting of the construction.

### 3.5 CONSTRUCTION REVIEW

- A. The Owner and/or Engineer will perform construction review throughout the construction of the project. The construction review does not relieve the contractor from the responsibility of providing all materials and performing the work in accordance with the Contract Documents.
- B. Notify the Engineer in writing, giving ample notice, at the following stages of construction and allow the Owner and/or Engineer to review the installed work.
  - 1. When underground electrical work is complete, before backfilling, including work under floor slabs.
  - 2. When all electrical rough-in is complete, but not covered.
  - 3. Pre-Final, upon completion of all electrical work.
  - 4. Final, upon completion of all items noted in the Pre-Final Construction Review Report.
- C. Prerequisite for Final Electrical Construction Review:
  - 1. Engineer must be present.
  - 2. Electrical Contractor's job foreman must be present.
  - 3. Owner's Representative must be present.
  - 4. Clear access must be provided to all devices and equipment.
  - 5. All light fixtures, outlets, equipment, etc., must be energized and operable.
  - 6. Contractor must have pad and pencil to list all deficient items.

SLCC New Jordan Campus Parking Lot

7. Make all corrections and adjustments after the Final Construction Review, not during. Items requiring correction will appear on the Final Construction Field Report.
  8. Contractor must have all required keys to provide access to all panels and doors.
- D. Test all systems and equipment provided and/or connected under the Contract for short circuits, ground faults, proper neutral connections and proper operation in the presence of the Owner and/or Engineer.
- E. The entire construction will be installed in accordance with the contract documents and be free of mechanical and electrical defects prior to final acceptance of the work.

\* END OF SECTION 16000 \*

## SECTION 16020

### CONTRACTOR ALLOWANCES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SUMMARY

- A. This section specifies administrative and procedural requirements governing handling and processing allowances.
  - 1. Allowances have been established to defer actual costs to a later date when additional information is available. Adjustment of actual costs, if necessary, will be issued by Change Order.
- B. Types of allowances required include the following:
  - 1. Lump sum allowances.
- C. Procedures for submitting and handling Change Orders are included in the General Conditions of the Contract for Construction.

#### PART 2 - PRODUCTS (Not Applicable).

#### PART 3 - EXECUTION

##### 3.1 SCHEDULE OF ALLOWANCES

- A. Include the following Allowances in the Base Bid.
  - 1. Material cost of new parking lot light fixtures and poles as indicated on the Fixture Schedule on the drawings.

##### 3.2 PAYMENT

- A. Contractor to make payment to Supplier as agreed between the Contractor and Supplier.
- B. Submit copy of supplier's invoices for materials purchased under an allowance to the Owner upon request of the Owner.

\* END OF SECTION 16020 \*

## SECTION 16110

### RACEWAYS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide a complete raceway system for all wiring as shown on the drawings and as specified herein.

#### PART 2 - PRODUCTS

##### 2.1 RACEWAYS

- A. Provide minimum 3/4" trade diameter raceways for all wiring systems.
- B. Do not use aluminum conduit, intermediate steel conduit (IMC), BX cable, MC cable, Flexible Non-metallic Tubing, NM cable, Direct Burial Cable or any other wiring methods not allowed by this specification unless approved in writing by the Engineer and/or Engineer.

##### 2.2 ABOVEGROUND RACEWAYS

- A. Provide Electrical Metallic Tubing (EMT), galvanized inside and out, for raceways not subject to permanent moisture or damage.
- B. Provide Galvanized Rigid Steel Conduit (GRC) where raceways are subject to permanent moisture such as underground, or damage such as vehicular traffic, etc..

##### 2.3 UNDERGROUND RACEWAYS

- A. Provide Schedule 40 PVC electrical conduit in earth or in concrete in contact with earth.
  - 1. Provide a separate ground wire in all PVC conduits, except main electrical service conduits.
  - 2. Provide Galvanized Rigid Steel Conduit (GRC) for all bends greater than 22 degrees in PVC conduits.
  - 3. Do not use PVC conduit above grade nor for penetrations through structural elements such as foundation walls, floor slabs, etc..
- B. Provide Galvanized Rigid Steel Conduit (GRC) for conduit penetrations through floor slab or grade to extend minimum 12" above floor or grade.

- C. Provide Galvanized Rigid Steel Conduit (GRC) for conduit penetrations through foundation walls to extend minimum 36" beyond the foundation wall.
- D. Corrosion protect all galvanized rigid steel conduit (GRC) installed in earth or in concrete in contact with earth with two (2) half-lapped layers of 0.010" thick approved waterproof PVC tape equal to Scotch No. 50 or use factory PVC coated rigid steel conduit with all field joints coated after installation.

#### 2.4 FLEXIBLE RACEWAY CONNECTIONS

- A. Provide Flexible Steel Conduit for final connection to equipment subject to vibrations or movement, not to exceed 3 feet in length.
- B. Provide liquid-tight flexible steel conduit outside and in wet, humid, corrosive and oily locations.
  - 1. Provide Sunlight Resistant liquid-tight flexible steel conduit outdoors.
- C. Provide a ground conductor in all flexible steel conduit.
- D. Flexible Steel Conduit may be used where misalignment or cramped quarters exist only with prior approval of the Engineer.
- E. Minimum 1/2" flexible steel conduit or 3/8" factory fabricated fixture whips may be used to make final connections to lay-in light fixtures.

#### 2.5 CONDUIT FITTINGS

- A. Provide steel compression type or steel set screw type fittings for Electrical Metallic Tubing.
- B. Provide malleable iron clamp type fittings for Flexible Steel Conduit.
- C. Provide steel compression type fittings for Liquid-Tight Flexible Steel Conduit.
- D. Provide threaded fittings for GRC conduit. Provide double locknuts and plastic bushing for GRC conduit terminations or provide boxes and enclosures with threaded hubs.
- E. Provide liquid-tight and gas-tight conduit fittings underground using fittings and PVC cement as recommended by the conduit manufacturer.
- F. Provide steel rain-tight, compression type fittings for all conduit installed outside and in wet, humid, corrosive and oily locations.
- G. Provide Insulated Throat Connectors for all conduit terminations 1" diameter and smaller. Provide insulating bushings for all conduit terminations 1-1/4" diameter and larger.
- H. Provide Grounding Bushings bonded to the electrical system ground:

## SLCC New Jordan Campus Parking Lot

1. On each end of all conduits used to protect ground conductors.
  2. On all conduit terminations installed in concentric or eccentric knockouts or where reducing washers have been installed.
- I. Do not use cast metal or indenter type fittings. Do not use screw-in type fittings for Flexible Steel Conduit. Do not use spray (aerosol) PVC cement.

### 2.6 PULL BOXES

- A. Provide pull boxes or conduit bodies in accessible locations where required to reduce the number of bends in the conduit run to less than 360 degrees and at points not exceeding 100 feet in long branch circuit conduit runs.
1. Indicate exact location of pull boxes and conduit bodies on the As-Built Record Drawings.

### 2.7 PULL STRING

- A. Provide a nylon or polypropylene pull string with not less than 200 lb tensile strength in all spare conduits and conduits installed for use by others.

## PART 3 - EXECUTION

### 3.1 SUPPORTS

- A. Securely support all raceways with full (2 hole) pipe straps, hangers, or ceiling trapeze directly from building structure such as roof trusses, beams, floor joists, etc., in accordance with Specification Section 16190 - Supporting Devices.
1. Do not support raceways from other electrical systems or mechanical systems.
- B. Provide supports at 5'-0" on center with a minimum of two supports for each ten foot length of conduit or fraction thereof up to 6 feet.
- C. Provide a support within 12" of each coupling, fitting, box, enclosure and bend.

### 3.2 INSTALLATION

- A. Raceway layouts on the drawings are generally diagrammatic and the exact routing of raceways will be governed by structural conditions and the work of other contractors.
- B. Install raceways concealed within finished ceilings, walls and floors except where exposed raceways are specifically shown on the drawings or permitted by the Engineer.
- C. Install exposed raceways parallel with or perpendicular to walls and ceilings, with right angle turns consisting of symmetrical bends or conduit bodies equal to Crouse-Hinds "Condulet". Avoid all bends and offsets where possible.
1. Paint exposed raceways to match surrounding surfaces except raceways in unfinished areas such as mechanical rooms and electrical rooms will not be

## SLCC New Jordan Campus Parking Lot

required to be painted.

- D. Install raceways minimum 12" from insulation of hot water piping, steam piping and other systems or equipment with temperatures in excess of 104° F (40° C).
- E. Make all field bends and offsets with a radius not less than allowed by the National Electrical Code for the type of raceway system.
  - 1. Do not install bends or offsets which are flattened, kinked, rippled or which destroy the smooth internal bore or surface of the conduit.
- F. Cap the open ends of raceways during construction to prevent the accumulation of water, dirt or concrete in the raceways. Thoroughly clean raceways in which water or other foreign matter has been permitted to accumulate or replace the raceway where such accumulation cannot be removed by a method approved by the Engineer.
- G. Do not install raceways which have been crushed or deformed in any manner.
- H. Do not install wiring until work which might cause damage to the wires or raceways has been completed.

### 3.3 UNDERGROUND RACEWAY INSTALLATION

- A. Install underground raceways within buildings minimum 4" below the bottom of the concrete floor slab to the top of the raceway.
- B. Install underground raceways outside of building minimum 24" below finished grade to the top of the raceway.
  - 1. Provide a plastic red magnetic warning ribbon stating "CAUTION - BURIED ELECTRICAL" 12" directly above the top of the raceway.
- C. Use select granular fill, free of rocks or hard clumps with sharp or angular edges, for the first 6" of backfill around underground raceways including raceways below concrete floor slabs. Provide imported sand backfill where required by Division 2 Specifications or where excavated materials are not suitable.
- D. Coordinate location of underground raceways with the General Contractor to avoid areas where raceways may be damaged by subsequent installation of trees, shrubbery or other landscape vegetation.
- E. Install underground raceways minimum 3'-0" from parallel runs, and minimum 1'-0" from perpendicular runs, of underground natural gas and propane lines.
- F. Do not use torches to heat PVC conduit for field bends. Do not install PVC conduit that has been scorched by heating for bends.

\* END OF SECTION 16110 \*

## **SECTION 16120**

### **CONDUCTORS**

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide all conductors for power and lighting as shown on drawings and as specified herein.

#### PART 2 - PRODUCTS

##### 2.1 CONDUCTORS

- A. Provide Copper building wire, minimum #12 AWG, with type THHN/THWN or XHHW 600 volt insulation, except as otherwise noted on the drawings or required by NEC.
  - 1. Provide conductors in underground raceways with insulation approved for wet locations such as type THWN or XHHW.
- B. Provide stranded conductors for wires #8 AWG and larger and for terminal connections to all motors. Stranded or solid conductors may be used for sizes smaller than #8 AWG at the contractor's option.
- C. Provide conductors rated 90° C minimum in wiring channels of High Intensity Discharge lighting fixtures.
- D. Provide conductors with surface printed identification showing conductor size and material, insulation type, voltage rating and approvals at regularly spaced intervals of 24".
- E. Do not use sizes smaller than #12 AWG in branch circuits carrying load. Circuits requiring larger sizes to meet voltage drop conditions, etc., are indicated on the drawings.
  - 1. Where branch circuit homeruns indicate conductor size, use that size conductor for the entire branch circuit, including switch legs, etc.
- F. Do not use aluminum conductors.

##### 2.2 SPLICES

- A. Provide Ideal wirenuts or Scotchlock spring connectors for all conductor splices #8 AWG and smaller. Provide split-bolt or compression type connectors for all conductor splices

## SLCC New Jordan Campus Parking Lot

larger than #8 AWG.

- B. Provide splices which are UL listed for the type, quantity and size of the conductors to be spliced.
- C. Provide all splices with insulation at least equal to that of the conductor.
- D. Provide watertight splices in junction or outlet boxes located outside and in wet locations. Provide heat shrink insulating kits or use connectors pre-potted with an approved waterproof compound.
- E. Splice conductors only in approved boxes.
- F. Do not splice conductors in conduit bodies, panelboard enclosures, switchboard enclosures, or similar locations.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install all conductors in approved raceway systems.
- B. Install branch circuit conductors continuous without splice from panelboards to fixture outlet boxes, device terminals, etc..
  - 1. Provide suitable pull boxes in readily accessible locations where necessary at intermediate points of branch circuits. Indicate exact location of all boxes on the As-Built Record Drawings.
- C. Do not install wiring until work which might cause damage to the wires has been completed.

#### 3.2 COLOR CODING AND IDENTIFICATION

- A. Color code all wiring at each enclosure and box where conductors are accessible and at each splice, tap or termination by means of colored conductor insulation.
  - 1. For conductors #4 AWG and larger, colored self-adhesive tape with the appropriate color designations may be used.
- B. Color code each conductor of each circuit as follows.
  - 1. Ground: Green or Bare Copper
  - 2. 120/208 Volt, 3 Phase, 4 Wire System
    - a. Phase A - Black
    - b. Phase B - Red
    - c. Phase C - Blue
    - d. Neutral - White

## SLCC New Jordan Campus Parking Lot

3. 277/480 Volt, 3 Phase, 4 Wire System
    - a. Phase A - Brown
    - b. Phase B - Orange
    - c. Phase C - Yellow
    - d. Neutral - Gray
  4. Match existing conductor color coding if different than above.
- C. Color code switch legs and travelers according to phase with colors other than used for phase conductors, to be consistent throughout the project.

### 3.3 IDENTIFICATION

- A. Provide conductor identification in accordance with Specification Section 16195 - Electrical Identification.

### 3.4 MULTI-WIRE BRANCH CIRCUITS

- A. Where a common neutral is run for multi-wire branch circuits, connect phase conductors to separate phases such that the neutral conductor will carry only the unbalanced current. Use neutral conductors of the same size as the phase conductors unless specifically noted otherwise.
- B. Do not install more than three phase conductors in any raceway except where specifically shown on the drawings or approved by the Engineer.

### 3.5 PHASE ROTATION

- A. Phase rotation for Three Phase System will be A leads B Leads C from front to back, from left to right or from top to bottom as viewed from the front of the enclosure.

\* END OF SECTION 16120 \*

## SECTION 16130

### ELECTRICAL BOXES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide junction boxes and outlet boxes at each outlet, fixture and other device location as shown on drawings and as specified herein.

#### PART 2 - PRODUCTS

##### 2.1 OUTLET AND DEVICE BOXES

- A. Provide galvanized or cadmium plated sheet steel electrical boxes in indoor dry locations, of the most suitable size and shape for the conditions encountered and in accordance with NEC requirements for the number of conductors allowed.
- B. Provide minimum 4" Square or Octagonal, 1-1/2" Deep Boxes unless specifically indicated otherwise on the drawings.
- C. Provide Type FD cast metal boxes outside, in wet, humid or corrosive locations and where exposed to damage such as vehicular traffic.
- D. Confer with the various equipment suppliers and either use or properly provide for boxes which are furnished with the equipment, such as speakers, horns, bells, etc..
- E. Do not use "THRU-THE-WALL" boxes, sectional (gangable) boxes or non-metallic boxes.

##### 2.2 JUNCTION BOXES

- A. Provide junction boxes as specified for outlet and device boxes except that boxes 6" square and larger may be painted sheet steel.
- B. Provide underground pullboxes as indicated on the drawings.

##### 2.3 BOX ACCESSORIES

- A. Provide fittings, plaster rings, cover plates and other accessories suitable for the purpose and location of each box.
- B. Provide industrial raised covers for surface mounted outlet and device boxes.

### PART 3 - EXECUTION

#### 3.1 SUPPORTS

- A. Support each box from the building structure independent of the raceway system.
- B. Secure surface mounted boxes to building structure with minimum of 2 screws or bolts as required.
- C. Do not use side mounted boxes or brackets.

#### 3.2 INSTALLATION

- A. Install flush mounted boxes, after being equipped with extensions, accessories, etc., flush with finished face of wall, ceiling or floor.
- B. Seal around the surface of all switch and outlet boxes with plaster or grout to close any opening between the outlet box and the wall finish.
- C. Install boxes level and plumb.

#### 3.3 LOCATIONS

- A. The wiring system layouts on the drawings are generally diagrammatic and the location of outlets and equipment are approximate.
- B. Study all available drawing details, shop drawings, equipment drawings, existing conditions and materials surrounding each outlet and device box prior to installing the box to ascertain the exact location required for each box.
- C. The right is reserved to make any reasonable change in the location of the outlets before roughing in, without involving additional expense.

\* END OF SECTION 16130 \*

## SECTION 16140

### OUTLETS AND WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide all wiring devices complete with coverplates and necessary accessories as shown on the drawings and as specified herein.

##### 1.3 SUBMITTALS

- A. Provide submittals for each type of wiring device to be used on the project in accordance with Division 1 Specifications and Section 16000 - General Provisions, Electrical to verify compliance with the contract documents.

#### PART 2 - PRODUCTS

##### 2.1 WIRING DEVICES

- A. Provide wiring devices rated 20 amps minimum, as specified below, or equivalent of Eagle, General Electric, Hubbell, Leviton or Pass & Seymour.
  - 1. Receptacle, duplex convenience, 3-wire Bryant 5352
  - 2. Receptacle, duplex, GFCI protected Bryant GFR53FT
- B. Color of devices in finished areas will be as selected by the Engineer from the manufacturer's standard colors to compliment the color of architectural finishes.
- C. Provide Gray devices in unfinished spaces such as mechanical and electrical rooms.
- D. Provide convenience outlets with GFCI protection in accordance with NEC requirements, where installed outside or within 6 feet of any sink and as indicated on the drawings.
  - 1. Provide a self-adhesive printed label stating "GFCI PROTECTED" for each outlet protected by feed-through GFCI receptacles or GFCI circuit breakers.
  - 2. Use feed-through GFCI outlets only to protect other outlets within sight of the GFCI protected outlet.

##### 2.2 COVERPLATES

- A. Provide a cover plate for each outlet and box suitable for the location and function of the

## SLCC New Jordan Campus Parking Lot

outlet and box.

- B. Provide blank cover plates for junction boxes and outlet boxes not used.
- C. Provide nylon or impact resistant thermoplastic coverplates for outlets and boxes installed in finished areas, of the same manufacturer and color as the wiring devices.
- D. Provide Stainless Steel coverplates for outlets and boxes installed in unfinished areas such as mechanical and electrical rooms.
- E. Provide UV Stabilized Polycarbonate, "Raintight While In Use" coverplates with spring return lids and suitable gasket as manufactured by Eagle or Taymac for all devices installed outside or in wet locations.

### 2.3 ACCESSORIES

- A. Equip each outlet with devices suitable for the purpose of the outlet and with means of properly connecting the equipment served, whether or not such devices are specifically mentioned.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Properly locate each outlet to fulfill its particular purpose. Do not install receptacles or boxes inside cupboards, behind drawers, or otherwise so located, as to be inaccessible or unsuited for the purpose intended.
- B. Install all outlets and wiring devices flush with face of coverplate, with the coverplate in contact with the finished face of the wall and with mounting strap of device in contact with the outlet box.
- C. Provide compacted gravel base for installation of underground pullboxes.

\* END OF SECTION 16140 \*

## SECTION 16190

### SUPPORTING DEVICES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide suitable supporting devices for all electrical equipment, raceways and components as specified herein and as shown on the drawings.
- B. Refer to individual specification sections for additional supporting requirements.

#### PART 2 - PRODUCTS

##### 2.1 SUPPORTING DEVICES

- A. Provide support anchors which will support in tension a minimum of 4 times the weight of the equipment to be supported but not less than 100 lbs.
- B. Provide wood screws in wood; toggle bolts in hollow masonry units; expansion bolts with lead shield or shot anchors in concrete and brick; and machine screws, threaded 'C' clamps or spring-tension clamps on steel work.
- C. Do not use tie wire for support unless specifically called for in individual specification sections.
- D. Do not weld supports, equipment, boxes, raceways, etc., to steel structures.
- E. Do not use wooden plugs or plastic inserts as a base for supports.
- F. Do not use shot anchors or drilled anchors of any kind in prestressed or post-tensioned concrete slabs and beams except as approved in writing by the Engineer.

#### PART 3 - EXECUTION

##### 3.1 INSTALLATION

- A. Secure supporting devices to building structure.
- B. Do not install supporting devices with sheetrock or plaster as the sole means of support. Provide proper blocking behind the sheetrock or plaster as required to support equipment.

\* END OF SECTION 16190 \*

## SECTION 16195

### ELECTRICAL IDENTIFICATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide identification of all electrical equipment, devices, enclosures, conductors, cables, etc., as shown on the drawings and as specified herein.
- B. Refer to individual specification sections for additional identification requirements.

#### PART 2 - PRODUCTS

##### 2.1 CONDUCTOR IDENTIFICATION

- A. Identify each branch circuit at each outlet box, pull box, or other accessible location with hand lettering in black India ink in the enclosure to indicate panel and circuit numbers of all conductors in the enclosure.
- B. Identify individual conductors with self adhesive printed markers equal to Thomas & Betts "E-Z Code" markers in outlet boxes, pull boxes, or other accessible location according to the panel and circuit number.

#### PART 3 - EXECUTION

##### 3.1 INSTALLATION

- A. Install conductor labels to be visible from normal viewing angles.

\* END OF SECTION 16195 \*

**SECTION 16400**

**SECONDARY SERVICE AND DISTRIBUTION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

- A. Provide complete electrical service as shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. The Existing Secondary Electrical Distribution System is 277/480 Volt, Three Phase, Four Wire, 60 Cycle for HID Lighting, Fluorescent Lighting, and Equipment; and 120/208 Volt, Three Phase, Four Wire, 60 Cycle for Incandescent Lighting, Appliances and Outlets.

PART 3 - EXECUTION

3.1 POWER OUTAGES

- A. Power outages to any portion of the existing campus will not be allowed except on weekends, holidays and/or as directed by the Owner.
  - 1. Submit written requests for power outages to the Owner not less than Seven (7) working days prior to all proposed outages.
  - 2. Do not take any power outages without the Owners permission.

\* END OF SECTION 16400 \*

## SECTION 16450

### SECONDARY GROUNDING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Ground all non-current carrying metallic parts of electrical equipment, raceway systems and the neutral conductor of the wiring system as shown on the drawings and specified herein.

#### PART 2 - PRODUCTS

##### 2.1 GROUND CONDUCTORS

- A. Provide copper ground electrode conductors, minimum No. 8 AWG solid. Stranded conductors may be used for sizes No. 2 AWG and larger.
- B. Provide an insulated equipment ground conductor in all raceways on the load side of the service disconnect.

##### 2.2 GROUND CONNECTIONS

- A. Make ground connections to the existing building ground system and extend to new electrical equipment, raceways, outlets, lighting, etc..
- B. Bond the neutral conductor to electrical service ground system at the main transformer and the main service equipment only.
- C. Make above ground connections by means of pressure connectors, compression connectors, clamps or other means which are UL Listed and classified as suitable for purpose.
- D. Make all underground connections by means of an exothermic welding process equal to Cadweld or Thermoweld, in strict accordance with manufacturer's written instructions and recommendations.

##### 2.3 GROUND RODS

- A. Provide copper ground rods, minimum 3/4" diameter and 10'-0" long, which conform to UL 467, Grounding and Bonding Equipment where indicated on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Leave ground connections accessible for inspection.
- B. Install ground rods minimum 8 feet into earth. Space adjacent ground rods minimum 6 feet apart.
- C. Provide a separate ground terminal for each ground conductor in each panelboard, switchboard, and similar electrical equipment enclosures.
- D. Install all grounding in accordance with the latest edition of the National Electrical Code.

\* END OF SECTION 16450 \*

## SECTION 16500

### LIGHTING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

##### 1.2 SCOPE

- A. Provide all lighting fixtures, as shown on drawings and as described herein, complete with all necessary wiring, sockets, lamps, auxiliaries, supports, etc..

##### 1.3 SUBMITTALS

- A. Provide shop drawing submittals for each Fixture and Ballast type in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.
- B. Include Manufacturer's standard published literature for each fixture type. Clearly indicate all options, accessories, finishes, etc., to be provided with each fixture type.

#### PART 2 - PRODUCTS

##### 2.1 FIXTURES

- A. Provide fixtures which comply with the appropriate Underwriters Laboratories (UL) Standards for the fixture type and which are UL Listed and UL Labeled.
- B. Acceptable fixture manufacturers and types are indicated on the Fixture Schedule included with the Drawings.
  - 1. Listing of the manufacturer's catalog numbers on the Fixture Schedule is intended to establish the general fixture type required and does not relieve the contractor and/or supplier from the responsibility to provide all accessories and options included in the fixture description nor from meeting the requirements of this specification.

##### 2.2 HIGH INTENSITY DISCHARGE (HID) BALLASTS

- A. Provide UL Listed, High Power Factor, High Intensity Discharge (HID) Ballasts which conform to the applicable ANSI Designation for the wattage and type of lamp served.
- B. Ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type, UL listing and Date of Manufacture Code.

## SLCC New Jordan Campus Parking Lot

- C. HID Ballasts shall contain no PCB's.
- D. HID Ballast Warranty shall be 2 Years from the "Date of Manufacture" Code on the ballast.

### 2.3 LAMPS

- A. Provide lamps of the Wattages, Types, and with color characteristics as indicated on the Fixture Schedule included with the Drawings.
- B. Provide High Intensity Discharge (HID) lamps suitable for the installed burning position which conform to the applicable ANSI designations for the wattage and type of lamps specified on the drawings.
- C. Acceptable Lamp Manufacturers, subject to compliance with the Contract Documents are General Electric, Phillips, Sylvania and Venture.

### 2.4 LIGHTING POLES

- A. Provide all outside lights and poles.
- B. Provide reinforced concrete bases for the lighting poles in accordance with the applicable Division 3 Specification Sections and as detailed on the drawings.

### 2.5 POLE FIXTURE FUSING

- A. Provide breakaway fusing in the handhole of each pole mounted light fixture as follows:
  - 1. Fuse holder for 120 or 277 Volt Circuits: Buss type HEB-JW, 600 Volt, with single conductor load side screw terminal and line side copper rod terminal for connection to breakaway receptacle.
  - 2. Fuse holder for 208, 240 or 480 Volt Circuits: Buss type HEX-JW, 600 Volt, with single conductor load side screw terminal and copper rod line side terminal for connection to breakaway receptacle.
  - 3. Breakaway Receptacle: Buss type RLC-J with single conductor line side screw terminal or type RYC with two conductor line side screw terminal as required.
  - 4. Provide Buss type 'L' single conductor or type 'Y' two conductor waterproof insulating boots as required for load and line side conductor terminations.
  - 5. Provide each fuse holder with Buss type KTK, 600 volt fuses. Size fuses at approximately 150% of the protected ballast(s) nameplate ampere rating or as recommended by the ballast manufacturer.

### 2.6 EXTRA STOCK

- A. Provide the following extra stock of materials to the Owner.
  - 1. Lamps: 10% , but not less than 1 of each type used on the project.

2. Pole Fixture Fuses: 10%, but not less than 1 of each type used on the project.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Properly locate fixture pole bases to coordinate with final parking lot layout and underground utilities.
- B. Install poles and fixtures in accordance with the manufacturer's written installation instructions.

#### 3.2 SUPPORTS

- A. Provide all necessary connectors, straps, etc., for secure mounting of all fixtures.

#### 3.3 LAMP BURN-IN

- A. Burn-in all fluorescent and HID lamps for a minimum of 100 hours prior to completion of the project and replace all defective lamps.

#### 3.4 COORDINATION

- A. Verify available voltages and coordinate fixture voltage with the fixture supplier prior to ordering fixtures. Immediately notify the Engineer in writing of any discrepancies between available voltages and the specified fixture voltages.

\* END OF SECTION 16500 \*