MULTI-STEP BIDDING PROCESS
FOR
CONTRACTORS

Request For Solicitation For Construction Services

Stage II – Paving Contractors Bidders List FY09

May 6, 2009

NORTH PARKING LOT IMPROVEMENTS PHASE II
EAST LOT BUS IMPROVEMENTS

BRIDGERLAND APPLIED TECHNOLOGY COLLEGE

LOGAN, UTAH

DFCM Project No. 07298210

J.U.B. Engineers, Inc.
1047 S. 100 West, Suite 180
Logan, Utah 84321

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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: North Parking Lot Improvements Phase II – East Lot Bus Improvements
Bridgerland ATC – Logan, Utah
DFCM Project No: 07298210

Project Description: Rebuild East Lot to improve Bus access and improve parking lot lighting
Construction Cost Estimate: $100,000.00

Company	Contact	Fax
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 **Wednesday May 6, 2009** 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 **Darrell Hunting,** Project Manager, DFCM, at (801) 244-7647. No others are to be contacted regarding this project.

A **MANDATORY** pre-bid meeting and site visit will be held at **10:30AM** on **Wednesday May 13, 2009** in the lunch room located at the North end of the Building at BATC – 1301 North 600 West - Logan, UT. 84321. All pre-qualified prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by **2:30 PM** on **Tuesday, May 26, 2009** 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

PROJECT NAME: North Parking Lot Improvements Phase II – East Lot Bus Improvements
Bridgerland ATC – Logan, Utah
DFCM PROJECT #: 07298210

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Wednesday	May 6, 2009	10:00 AM	DFCM 4110 State Office Building SLC, UT and the DFCM web site*
Mandatory Pre-bid Site Meeting	Wednesday	May 13, 2009	10:30 PM	BATC – 1301 North 600 West Logan, Utah Lunch room – North end of building
Deadline for Submitting Questions	Monday	May 18, 2009	1:00 PM	Darrell Hunting – DFCM E-mail – dhunting@utah.gov
Addendum Deadline (exception for bid delays)	Thursday	May 21, 2009	2:00 PM	DFCM web site*
Prime Contractors Turn in Bid and Bid Bond	Tuesday	May 26, 2009	2:30 PM	DFCM 4110 State Office Building SLC, UT
Subcontractors List Due	Wednesday	May 27, 2009	2:30 PM	DFCM 4110 State Office Building SLC, UT Fax 801-538-3677
Substantial Completion Date	Wednesday	August 28, 2009	4:00 PM	On Site

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

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 **North Parking Lot Improvements Phase II – East Lot Bus Improvements – Bridgerland ATC - Logan, Utah - DFCM Project No: 07298210** 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: _____

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

Base Bid
_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by August 28, 2009, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$500.00** 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 l00% 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. l953, 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:

_____

_____

STATE OF _____)
) ss.
COUNTY OF _____)

By: _____
Attorney-in-Fact (Affix Corporate Seal)

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

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

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:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONTRACTOR LICENSE #
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.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

l. 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%

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.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

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 by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
David D. Williams, Jr. Date
DFCM Administrative Services Director

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
Lynn A. Hinrichs Date
Assistant Director Construction Management

APPROVED AS TO FORM:
ATTORNEY GENERAL
July 15, 2008
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

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. l953, 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, l953, 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: _____

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

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

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.

_____ by: _____

CONTRACTOR (include name of firm) (Signature) DATE

_____ by: _____

A/E (include name of firm) (Signature) DATE

_____ by: _____

USING INSTITUTION OR AGENCY (Signature) DATE

_____ by: _____

DFCM (Owner) (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

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

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
5-Exceptional	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"			
4-Very Good	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
3-Satisfactory	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
2-Marginal	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
1-Unsatisfactory	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

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

2. Rate Contractor administration of project costs, change orders and financial management of the project budget.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

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

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.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

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

Signed by:	Date:	Mean Score

Additional Comments:

TECHNICAL SPECIFICATIONS

FOR

BATC

EAST PARKING IMPROVEMENTS
LOGAN UTAH
DFCM #07298210

DOCUMENT 00010

TABLE OF CONTENTS

END OF SECTION

SECTION 01100

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Description of Work.

B. Location

C. Sequence of Work

1.2 GENERAL DESCRIPTION OF WORK

A. The BATC East Parking Improvement Project consists of the following WORK:

Construction of a 12,558 s.f. parking area expansion and entry way along with milling and replacement of 14,684 s.f. of asphalt in existing parking area and entryway. Project consists of clearing and grubbing of existing surface materials, installation of imported sub base and base material and asphalt surface course for an extension of an existing parking lot. Also included is the expansion of storm drain system and installation and restoration of existing landscaping and irrigation system. Curb and gutter and traffic paint will also be installed with this project along with new parking lot lighting.

1.3 LOCATION

A. The WORK is located at the BATC Utah College of Applied Technology building at 1301 N. 600 W. Logan, Utah.

1.4 SEQUENCE OF WORK

A. Adjacent grass landscaped areas may be used for staging. Site restoration will be required.

B. Construction of the parking lot will require traffic control when connecting to the existing parking lot and N. 600 W. Street.

C. Work must be substantially complete within 30 calendar days of beginning construction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01200

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of values.

B. Applications for payment.

C. Change procedures.

D. Defect assessment.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals

B. Section 01300 – Materials and Equipment

1.3 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section.

D. Include in each line item, amount of Allowances specified in this section.

E. Include within each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Submit at intervals stipulated in the Agreement.

E. Submit with transmittal letter as specified for Submittals in Section 01300.

F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
   1. Construction progress schedules, revised and current as specified in Section 01300.

1.5 CHANGE PROCEDURES

A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on DFCM Construction Change Directive Form.

C. The Architect/Engineer may issue a Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within 10 days.

D. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors. Document requested substitutions in accordance with Section 01600.

E. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

G. Construction Change Directive: Architect/Engineer may issue directive, on DFCM Form signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

H. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

I. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

J. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

K. Change Order Forms: DFCM Change Order Form

L. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

M. Correlation Of Contractor Submittals:
1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer.

D. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer, Owner.

E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.

F. Authority of Architect/Engineer to assess defects and identify payment adjustments, is final.

G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from transporting vehicle.
4. Products placed beyond lines and levels of required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Shop drawings.

E. Product data.

F. Manufacturers' instructions.

G. Manufacturers' certificates.

H. Construction photographs.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control.

B. Section 01700 - Contract Closeout.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal forms. Re-submittals shall have the original number with an alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail name or number(s), and specification Section number, as appropriate.

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

E. Schedule submittals to expedite the Project, and deliver to Engineer at 1047 S 100 W Suite 180, Logan, Utah 84321. Coordinate submission of related items.

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

G. Provide space for Contractor and Engineer review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal.

I. Distribute copies of reviewed submittals to affected parties. Instruct parties to promptly report any inability to comply with provisions.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within 10 days after date established in Notice to Proceed for Engineer review. Submit progress schedule no later than pre-construction conference.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

E. Indicate estimated percentage of completion for each item of Work at each submission.

F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 SHOP DRAWINGS

A. Submit the number of opaque reproductions which Contractor requires, plus five (5) copies which will be retained by Engineer.

B. Except as may otherwise be indicated herein, the ENGINEER will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 15 calendar days following their receipt by the ENGINEER. It is considered reason able that the contractor shall make a complete an acceptable submittal to the engineer by the

second submission of a submittal item. The STATE OF UTAH reserves the right to withhold monies due to the contractor to cover additional costs of the engineers for review beyond the second submittal. The engineers maximum review period for each submittal, including all re-submittals, will be 15 days per submittal. In other words, the maximum review period for that submittal could be 45 days.

C. After review, distribute in accordance with Article on Procedures above and for Record Documents described in the General Conditions.

D. Fabrication of an item shall be commenced only after the engineer has reviewed the pertinent submittals and returned approved copies to the contractor.

1.7 PRODUCT DATA

A. Submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Engineer.

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

C. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in the General Conditions.

1.8 MANUFACTURERS' INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Identify conflicts between manufacturers' instructions and Contract Documents.

1.9 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturer's certificate to Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.10 CONSTRUCTION PHOTOGRAPHS

A. Recommended for evaluation of the existing facility after completion of the project.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance/control of installation.

B. References.

C. Construction observation and testing laboratory services.

D. Manufacturers' field services and reports.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals.

B. Section 01600 - Material and Equipment.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from the Engineer.

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

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES

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

B. Should specified reference standards conflict with Contract Documents, request clarification from Engineer.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 CONSTRUCTION OBSERVATION AND TESTING LABORATORY SERVICES

A. Owner will appoint and employ for services of Engineer to perform Construction Observation and material testing.

B. The Engineer will observe all tests run by the Contractor in the field.

C. The Contractor shall be responsible for providing the equipment and manpower to assist the Engineer in taking tests.

D. The Contractor shall provide the equipment and manpower to conduct all performance tests as required in the specifications.

E. The Contractor shall notify the Engineer of the time in which tests are to be run forty-eight (48) hours prior to testing.

F. Reports will be submitted by the Engineer, to the Contractor indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

G. Cooperate with Engineer; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
   1. Notify Engineer 48 hours prior to expected time for operations requiring services.
   2. Make arrangements with Engineer and pay for additional samples and tests required for Contractor's use.

H. Retesting required because of non-conformance to specified requirements shall be performed by the Engineer. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 15 days of observation to Engineer for review.

1.7 PROJECT LIMITS

A. Confine all equipment, tools, and materials to the easements and project sites shown on the plans. Activities and staging are limited to the unimproved site only. Access the site through State of Utah accesses only.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 INSTALLATION

A. The contractor shall inspect material or equipment upon the arrival on the job site and immediately prior to installation and reject damaged and effective items.

B. The contractor shall verify measurements and dimensions of the work as an integral step of starting each installation.

C. Where installations include manufactured products the contractor shall comply with manufacturer applicable instruction and recommendation for installation, to whatever extent these are more explicit or more stringent than applicable requirement indicated in the Contract Documents.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 TEMPORARY SANITARY FACILITIES

A. Provide temporary facilities on site as necessary.

1.2 TEMPORARY ELECTRICITY

A. Provide, maintain and pay for temporary electricity as needed for construction. Coordinate amperage and voltage to ensure adequacy for construction.

1.3 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, to protect public safety, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for plant life designated to remain. Replace damaged plant life.

C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.4 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment as needed.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion and puddling.

1.5 DUST CONTROL

A. This item shall consist of furnishing and applying POTABLE water required in construction and for dust control, in accordance with the requirements of these specifications.

B. Water, when required, shall be applied at the locations and in the amounts required to properly compact the work. An adequate water supply shall be provided by the Contractor. The equipment used for watering shall be of ample capacity and of such design as to assure uniform application of water in the amounts required.

C. If required, watering shall be done at night or at other times when evaporation loss will be at a minimum.

D. In watering of subgrades, the Engineer may direct the Contractor to apply water in such quantities that the subgrade shall be compacted at a moisture content in excess of "optimum moisture." In no case will the Contractor be required to apply water in excess of three percent (3%) of optimum moisture.

E. The Contractor shall also apply water during the course of the work to control dust, maintaining all embankment and base courses in a damp condition.

F. The Contractor shall provide sufficient equipment to apply water as directed for controlling dust caused by construction activities. If dusty conditions continue to exist due to insufficient or inadequate watering practices or lack of watering equipment, it shall cause the closing down of those operations affected until remedied. Watering shall be done on Saturdays, Sundays, and Holidays at the same frequency and amounts as specified for work days at the Contractor's expense.

G. Watering equipment shall consist of water-tight tanks mounted on trucks, adequately powered, and capable of applying water as required. The water shall be applied under pressure from the tank through a spray apparatus as directed. The spray apparatus shall be equipped as to provide uniform, unbroken spread of water over the surface being watered. A suitable device for positive shut-off and for regulating the flow of water shall be located so as to permit positive drive control from the cab.

1.6 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosion of surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation, promptly apply corrective measures.

1.7 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Equipment and fuel storage shall be kept secured. Waste oil and waste fluids shall not be stored or changed at any construction site.

1.8 SECURITY

A. Provide security and facilities to protect work from unauthorized entry, vandalism or theft.

1.9 NOISE CONTROL

A. Construction involving noisy operations, including starting and warming up of equipment, shall be restricted to the hours between 7:00 a.m. and 7:00 p.m. on weekdays. Noisy operations shall be scheduled to minimize their duration and to ensure their completion by 7:00 p.m.

B. Notification of special circumstances or emergency conditions that require work beyond the hours specified above shall be provided as follows:

1. The Contractor shall notify the Engineer 48 hours in advance of any proposed extended work hours for preauthorization. Notification shall include a written request for authorization to perform work specified and the circumstances that warrant this request. This notification shall include any additional measures to mitigate noise generated by this construction activity if deemed necessary by the Engineer.
2. If an emergency situation occurs that warrants extended hours, the Contractor shall notify the Engineer immediately upon determining the need for this work.

1.10 TREE AND PLANT PROTECTION

A. CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS: All landscaped areas and other surface improvements which are damaged by actions of the Contractor shall be restored to a condition equal to or better than it was prior to construction. Areas shall not be cleared until related construction activities require the work.

1.11 PROTECTION OF INSTALLED WORK

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

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

1.12 ACCESS ROADS

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for impeded traffic flow in excess of two hours.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide and maintain access for emergency vehicles.

E. Provide means of removing mud from vehicle wheels before entering streets or adjacent parking areas.

1.13 PARKING

A. Do not allow construction personnel to park in any way which may affect the access of emergency vehicles or owner personnel.

B. Arrange for temporary surface parking to accommodate construction personnel.

C. When site space is not adequate, provide additional off-site parking.

1.14 PROGRESS CLEANING

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

B. Remove waste materials, debris, and rubbish from site periodically and dispose off-site in approved solid waste facilities at no additional cost to owner.

B. Provide necessary containment and clean-up of all hazardous/dangerous materials on-site that result from Contractor's actions.

C. Dispose of all hazardous/dangerous waste in approved hazardous waste facilities that result from Contractor's actions.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion.

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

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product Delivery

C. Transportation and Handling

D. Storage and protection.

E. Product options.

F. Proposed Substitutions or “or equal” Item.

G. Owner furnished equipment.

1.2 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacturer, for similar components where more than one choice is available.

1.3 PRODUCT DELIVERY

A. STATE OF UTAH will not accept any deliveries addressed to CONTRACTOR or its Subcontractors.

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions and deliver to project site in undamaged condition in manufacturer’s unopened containers and packaging.

B. Promptly review shipments to assure that products comply with requirements,

quantities are correct, and products are undamaged. Replace damaged products at no additional cost to OWNER.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

D. The contractor shall provide additional protection during handling to prevent marring and otherwise damaging product, packaging and surrounding surfaces.

1.5 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for review. Periodically review to assure products are undamaged and are maintained under specified conditions.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.7 PROPOSED SUBSTITUTIONS OR “OR EQUAL” ITEM

A. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words “or equal” indicating that a substitution is permitted, materials or equipment of other suppliers may be accepted if sufficient information

is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:

1. The burden of proof as to the type, function, and quality of any such substitution product, material or equipment shall be upon the CONTRACTOR

2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitution and the ENGINEER's decision shall be final.

3. The ENGINEER may require the CONTRACTOR to furnish additional data about the proposed substitution.

4. The STATE OF UTAH may require the CONTRACTOR to furnish a special performance guarantee or other surety with respect to any substitution.

5. Acceptance by the ENGINEER of a substitution item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitution.

6. The CONTRACTOR shall be responsible for resultant changes which the accepted substitution requires in the CONTRACTOR'S WORK, the WORK of its subcontractor and of other contractors.

B. The procedure for review by the ENGINEER will include the following:

1. If the CONTRACTOR wishes to provide a substitution item, the CONTRACTOR shall make written application to the ENGINEER on the "Substitution Request Form."

2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the "Substitution Request Form(s) shall be within the 30 day period after award of the Contract.

3. Wherever a proposed substitution item has not been submitted within said 30-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide the material or equipment indicated in the Contract Documents.

4. The CONTRACTOR shall certify that the proposed will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.

5. The ENGINEER will evaluate each proposed substitution within a reasonable period of time.

6. As applicable, no shop drawing submittals shall be made for a substitution item nor shall any substitution item be ordered, installed, or utilized with out the ENGINEER's prior written acceptance of the CONTRACTOR's "Substitution Request Form."

7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes by the CONTRACTOR in the Contract Documents occasioned thereby.

C. The CONTRACTOR's application using the "Substitution Request Form" shall contain the following statements and information which shall be considered by the ENGINEER in evaluating the proposed substitution:

1. The evaluation and acceptance of the proposed substitution will not prejudice the CONTRACTOR's achievement of substantial completion on time.

2. Whether or not acceptance of the substitution for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitution.

3. Whether or not incorporation or use of the substitution in connection with the WORK is subject to payment of any license fee or royalty.

4. All Variations of the proposed substitution from the items originally specified will be identified.

5. Available maintenance, repair, and replacement services will be indicated. The manufacturer shall have a local service agency (within 100 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.

6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitution, including cost of redesign and claims of other contractors affected by the resulting change.

D. Without any increase in cost to the STATE OF UTAH, the CONTRACTOR shall be responsible for and pay all costs in connection with proposed substitutions and of inspections and testing of equipment or materials submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK, whether or not the ENGINEER accepts the proposed equipment or material. The CONTRACTOR shall reimburse the STATE OF UTAH for the charges of the ENGINEER for evaluating each proposed substitution.

1.8 OWNER FURNISHED EQUIPMENT

A. No owner furnished equipment will be used on this project.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01700

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Starting of systems.

D. Demonstration and instructions.

E. Protecting installed construction.

F. Project record documents.

G. Operation and maintenance data.

H. Manual for materials and finishes.

I. Manual for equipment and systems.

J. Spare parts and maintenance products.

K. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Architect/Engineer required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all of the site as specified in Section 01100.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Clean filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer seven days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and / or Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel one weeks prior to date of Substantial Completion.

B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

E. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas. Unless areas are designated access locations.

1.7 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.8 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photocopies of warranties and bonds.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit two sets of revised final volumes in final form within 10 days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

G. Include color coded wiring diagrams as installed.

H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule, and list of lubricants required.

K. Include manufacturer's printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

R. Include test and balancing reports as specified in Section 01400.

S. Additional Requirements: As specified in individual product specification sections.

T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time Of Submittals:
1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02055

SOILS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Subsoil materials.
2. Topsoil materials.

B. Related Sections:
1. Section 02060 - Aggregate.
2. Section 02230 Site Clearing.
3. Section 02311 - Rough Grading.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
2. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

B. Materials Source: Submit name of imported materials source.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each subsoil material from single source throughout the Work.

PART 2 - PRODUCTS

2.1 SUBSOIL MATERIALS

A. Subsoil Type S1:
   1. Excavated and re-used material.
   2. Graded.
   3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   4. Conforming to ASTM D2487 Group Symbol GP.

B. Topsoil Type S2:
   1. Topsoil stripped from existing site.
   2. Free of sod or other vegetation
   3. Free of clumps larger than 2”.

2.2 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Control Services: Testing and Inspection Services Testing and analysis of soil material.

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D1557.

C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D1557.

D. When tests indicate materials do not meet specified requirements, change material and retest.

E. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Strip topsoil to full depth of topsoil in construction areas. Excavate subsoil from areas designated.

B. Stockpile excavated material meeting requirements for subsoil materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for subsoil materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Stockpile topsoil 8 feet high maximum.

E. Prevent intermixing of soil types or contamination.

F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

G. Stockpile unsuitable or hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 02060

AGGREGATE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Coarse aggregate materials.

B. Related Sections:
   1. Section 02055 - Soils: Fill and grading materials.
   2. Section 02311 - Rough Grading.
   3. Section 02721 - Aggregate Base Course.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.

B. ASTM International:
   1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
   4. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

B. Materials Source: Submit name of imported materials suppliers.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

PART 2 - PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate Type A1: Natural stone or crushed rock; free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136, ASTM D2487 Group Symbol GM GC; to the following limits:

Minimum Size: 1/2 inch (25 mm)
Maximum Size: 1 1/2 inch (50 mm)

Use for free draining gravel material, pipe foundation material as indicated on the Drawings.

B. Coarse Aggregate Type A4: Durable material free of shale, clay, organic matter, friable material and debris meeting the following limits: (Alternative gradations will be considered)

Sieve Size	Percent Passing
6 inches	100
4 inches	98 to 100
3 inches	95 to 100
2 inches	75 to 100
1 inch	40 to 80
No. 4	25 to 60
No. 200	5 to 12

Use for the Granular Borrow, import trench backfill, structure backfill, site fill material, and where specified elsewhere and shown on the Drawings.

2.2 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Control Services: Testing and inspection services.

B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D1557. ASTM D4318. ASTM C136.

C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D1557. ASTM D4318. ASTM C136.

D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.

B. Remove excess excavated materials not intended for reuse, from site.

C. Remove excavated materials not meeting requirements for coarse aggregate materials and fine aggregate materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Stockpile unsuitable and hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Removing surface debris.
2. Removing designated paving, curbs, and slabs.
3. Removing designated trees, shrubs, and other plant life.
4. Removing abandoned utilities.

B. Related Sections:
1. Section 02311 - Rough Grading.

1.2 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

1.3 QUALITY ASSURANCE

A. Conform to applicable code for environmental requirements and disposal of debris.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verify existing plant life designated to remain is tagged or identified.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than two working days before performing Work.
1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

A. Locate, identify, and protect utilities indicated to remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life from site.

B. Partially remove paving, curbs, and, slabs as indicated on Drawings. Neatly saw cut edges at right angle to surface.

C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

E. Do not burn or bury materials on site. Leave site in clean condition.

END OF SECTION

SECTION 02311

ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating subsoil.
   2. Cutting, grading, filling, rough contouring, compacting, site for site structures, building pads, drainage and pavement.

B. Related Sections:
   1. Section 02055 - Soils.
   2. Section 02060 - Aggregate.
   3. Section 02230 - Site Clearing: Excavating topsoil.
   4. Section 02740 – Asphaltic Concrete Paving

1.2 REFERENCES

A. ASTM International:
   1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   3. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
   4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

B. Materials Source: Submit name of imported materials suppliers.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 – Project Closeout: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subsoil Fill: Type S1 as specified in Section 02055.

B. Structural Fill: Type S1, A2, A4 as specified in Section 02055, 02060.

C. Granular Fill: Type A2, A4 as specified in Section 02060.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of existing conditions before starting work.

B. Verify site conditions under provisions of Section 02230

C. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than two working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Protect utilities indicated to remain from damage.

D. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, relandscaped, or regraded.

B. Do not excavate wet subsoil.

C. When excavating through roots, perform Work by hand and cut roots with sharp axe.

D. Remove excess subsoil not intended for reuse, from site.

3.4 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place fill material in continuous layers and compact in accordance with schedule at end of this section.

C. Place material in continuous layers as follows:
1. Subsoil Fill: Maximum 8 inches compacted depth. 95% max density.
2. Structural Fill: Maximum 8 inches compacted depth. 95% max density.
3. Granular Fill: Maximum 8 inches compacted depth. 95% max density.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Make grade changes gradual. Blend slope into level areas.

F. Repair or replace items indicated to remain damaged by excavation or filling.

3.5 TOLERANCES

A. Section 01400 - Quality Control Services: Tolerances.

B. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.6 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control Services: Testing and inspection services.

B. Perform laboratory material tests in accordance with ASTM D1557.

C. Perform in place compaction tests in accordance with the following:
1. Density Tests: or ASTM D2922.
2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Tests: Pavement and Slabs - 1 test per lift per 1000 square feet

END OF SECTION

SECTION 02324

TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating trenches for utilities from 5 feet outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:
1. Section 02055 - Soils.
2. Section 02060 - Aggregate.
3. Section 02311 - Rough Grading: Topsoil and subsoil removal from site surface.
4. Section 02630 - Storm Drainage: Section 03300 - Cast-in-Place Concrete: Concrete materials.

1.2 REFERENCES

A. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
3. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
4. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

B. Materials Source: Submit name of imported fill materials suppliers.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.6 COORDINATION

A. Section 01040 – Project Coordination: Coordination and project conditions.

B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 BEDDING MATERIALS

. Type B1 - Pea Gravel: Natural stone; free of clay, shale, organic matter; graded in accordance with ANSI/ASTM C136, to the following:
1. Minimum Size: 1/4 inch
2. Maximum Size: 5/8 inch.

A. Type B2 - Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; uniform in size with no material larger than 3/4".

2.2 FILL MATERIALS

A. Subsoil Fill: Type S1 as specified in Section 02055.

B. Structural Fill: Type S1, A2, A4 as specified in Section 02055. 02060.

C. Granular Fill: Type A2, A4 as specified in Section 02060.

PART 3 - EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
1. Architect/Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Call Local Utility Line Information service at 811 not less than two working days before performing Work.
1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.3 TRENCHING

A. Excavate subsoil required for utilities to utility service.

B. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume.

C. Perform excavation within 36 inches of existing utility service in accordance with utility’s requirements.

D. Do not advance open trench more than 200 feet ahead of installed pipe.

E. Cut trenches 12" wider than the outer diameter of the utility. Remove water or materials that interfere with Work.

F. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utilities.

G. Do not interfere with 45 degree bearing splay of foundations.

H. When Project conditions permit, slope side walls of excavation as OSHA requires. When side walls can not be sloped, provide sheeting and shoring to protect excavation as specified in this section.

I. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered.

J. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type A4 and compact to density equal to or greater than requirements for subsequent backfill material.

K. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

L. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

M. Remove excess subsoil not intended for reuse, from site.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place material in continuous layers as follows:
1. Subsoil Fill: Maximum 8 inches compacted depth.
2. Structural Fill: Maximum 8 inches compacted depth.
3. Granular Fill: Maximum 8 inches compacted depth.

D. Employ placement method that does not disturb or damage, utilities in trench.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Do not leave more than 50 feet of trench open at end of working day.

G. Protect open trench to prevent danger to Owner.

3.6 TOLERANCES

A. Section 01400 - Quality Control Services: Tolerances.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control Services: Testing and inspection services.

B. Perform laboratory material tests in accordance with ASTM D1557.

C. Perform in place compaction tests in accordance with the following:
1. Density Tests: or ASTM D2922.
2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

E. Frequency of Tests: 1 Test mid and top of trench every 100 feet.

3.8 PROTECTION OF FINISHED WORK

A. Section 01700 – Project Closeout: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

A. Storm, Sanitary Piping and Utilites:
1. Bed pipe where directed by the engineer with aggregate type A1.
2. Cover pipe and bedding with Fill Type S1, A4: To subgrade elevation.
3. Compact uniformly to minimum 95 percent of maximum density.

END OF SECTION

SECTION 02630

STORM DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Storm water piping buried beyond 5 feet of building.

B. Related Sections:
   1. Section 02060 - Aggregate: Aggregate for backfill in trenches.
   2. Section 02324 – Trenching and Backfill:
   3. Execution requirements for trenching required by this section.
   4. Section 03300 - Cast-in-Place Concrete: Execution requirements for placement of concrete specified by this section.

1.2 REFERENCES

A. ASTM International:
   1. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
   2. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
   3. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
   4. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
   5. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
   6. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   7. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric Joints.
   8. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Association of State Highway and Transportation Officials (AASHTO):
   1. AASHTO M294 – Standard Specification for Corrugated Polyethylene Pipe, 300mm to 1200mm Diameter (12” – 60”).
   2. AASHTO Section 30 – Construction Standard, Thermoplastic Pipe.

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
2. Storm Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

C. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Closeout procedures.

B. Project Record Documents:
1. Accurately record actual locations of equipment and pipe runs, connections, clean-outs and pipe invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Product storage and handling requirements.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Product Requirements.

B. Do not install underground piping when bedding is wet or frozen.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 STORM WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Reinforced Concrete Pipe: ASTM C76, Class III
   1. Fittings: Reinforced concrete.
   2. Joints: ASTM C443, rubber compression gasket.

B. Polyethylene Pipe: AASHTO M294, Smooth inner wall, corrugated outer wall.
   1. Fittings: ASTM D3212, molded or fabricated.
   2. Joints: Bell and spigot

C. Plastic Pipe: ASTM D3034, Type PSM, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of 8 inches, bell and spigot style rubber ring sealed gasket joint.
   1. Fittings: PVC.
   2. Joints: ASTM F477, elastomeric gaskets.

2.2 CATCH BASINS

A. Barrel: ASTM C478; precast concrete box with additional riser sections as needed to accommodate required flow lines and finish grading and paving.

B. Inlet Assembly: Two piece heavy-duty cast steel or cast iron frame and grate or solid cover (see drawings) with ground or machined grate and frame bearing surfaces.
   1. All grates and covers to be rated for H-20 traffic loads and be bicycle safe.
   2. All grates and lids to be maximum possible size to fit box and meet all other requirements of this section.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type A2 as specified in Section 02060.

B. Cover: Fill Type A4 as specified in Section 02060.

C. Soil Backfill from Above Pipe to Finish Grade: Soil Type S1, as specified in Section 02055. In landscaped areas.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, location, and invert are as indicated on Drawings.

B. Establish elevations of buried piping with not less than 18 inches of cover.

C. Excavate pipe trench in accordance with Section 02324.

D. Install pipe to elevation as indicated on Drawings.

E. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 8 inches loose depth; compact to 95 percent maximum density.

F. Install pipe on prepared bedding.

G. Route pipe in straight line.

H. Pipe Cover and Backfilling:
   1. Backfill trench in accordance with Section 02324.
   2. Maintain optimum moisture content of fill material to attain required compaction density.
   3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
   4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
   5. Do not use wheeled or tracked vehicles for tamping.

3.4 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test storm drainage piping system by means of visual inspection for straightness. Pass a mandrel through the pipe with a diameter of 95% of the

inside diameter of the pipe to measure for pipe deflection. If either of these tests fail the contractor will remove and reinstall the pipe.

END OF SECTION

SECTION 02721

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 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.

1.2 RELATED WORK

A. Section 02740 – Asphaltic Concrete Paving.

1.3 REFERENCES

A. American Society for Testing Materials (ASTM).

B. American Association of Safety and Highway Transportation Officials (AASHTO)

PART 2 - PRODUCTS

2.1 BASE COURSE MATERIAL

A. Granular 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:

Sieve Size	Percent Passing By Weight
1”	100
½”	70 - 100
No. 4	41- 68
No. 16	21- 41
No. 40	10 - 27

No. 200 4 - 13

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

B. 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.

C. The subgrade shall then be proof rolled in the presence of the Engineer by passing loaded rubber-tired construction equipment uniformity over the surface at a constant rate. At least two (2) passes shall be made over all subgrade areas.

D. 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 recompacted to 95% maximum Modified Proctor Density using approved subgrade stabilizing material.

E. Ensure subgrade is to required lines and elevations.

3.2 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 manufacturer's 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 may be placed in one layer, provided the ability of the equipment to achieve specified compaction to the full layer depth is demonstrated. In no case shall compacted lift thickness be greater than 8".

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 pressure 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 ½" of required grade. Completed thickness of base course shall be within ½" 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.

3.3 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 hail 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.

3.4 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:

Item	Type	Frequency
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 02740

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Place and compact asphaltic concrete paving.

B. Protection of newly placed pavement.

1.2 RELATED WORK

A. Section 02230 – Site Clearing

B. Section 02311 – Rough Grading

C. Section 02721 – Aggregate Base Course

D. Section 02763 – Pavement Marking

1.3 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 roadbase 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.

1.4 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. Utah Department of Transportation, “2005 Standard Specifications For Road and Bridge Construction”.
1. Section 02741 Hot Mix Asphalt (HMA).

1.5 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 one week prior to commencement of the work.

B. Written certification of compliance for pavement marking paint.

C. Product Data: Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

1.6 WARRANTY

A. See General Conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphaltic Material:
1. Performance Graded Asphalt binder, PG-58-28, conforming to requirements of ASTM D-6373 (AASHTO M-320, Table 2), and Section 02745 – Utah Department of Transportation, “2008 Standard Specifications For Road and Bridge Construction”.

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:

Sieve Size	Percent Passing by Weight
1”	100
¾”	90-100
½”	<90
#8	23-49
#200	2-8

2.2 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. Mix design shall be based on the Marshall Method. The combined mineral aggregate plus any approved additives when mixed with the asphaltic cement in accordance with ASTM D-1559 shall conform to the following requirements:

Requirement	Value
Percentage of Wear:	40
Marshall Stability:	1200 lb. Minimum
Flow (0.01 inch):	10 -18
Air Voids:	3.0% to 5.0%
Retained Strength:	60% Minimum
Asphalt Cement Content:	4.75% to 5.75% by weight

C. The asphaltic cement shall be heated at the mixing plant to a temperature at which it can be applied uniformly to the aggregate.

D. Coarse and fine aggregate shall be stored separately at the mixing plant in a manner that will prevent intermingling.

E. 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.

F. Cold aggregates shall be fed carefully to the plant so that surpluses and shortages will not occur and cause breaks in the continuous operation.

G. 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).

H. 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.

I. 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.

J. 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 particle 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.

2.3 UDOT ASPHALTIC CONCRETE PAVING MIXTURE

A. In accordance with UDOT 2008 standard specification 02741.

2.4 TACK COAT

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean overlay area in accordance with Section 02230.

B. Install risers for manholes, valves and cleanouts to match finished grade of asphalt surface course if applicable.

C. Sawcut all asphalt edges to a clean straight line when patching.

D. Sawcut 6” minimum past any disturbed base course material.

3.2 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.

3.3 TACK COAT

A. Prior to placing pavement, tack coat shall be applied to the vertical edges of concrete and "cold" pavement (over ½ 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 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.

3.4 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 mixture without tearing, shoving or gouging, and of producing a finished surface of specified quality. Place inaccessible and small areas by hand.

B. Ensure asphalt pavement temperature is between 150 and 300 centistokes as determined with ASTM D-2170 when mixing with a pugmill, or between 300°F and 315°F when using the dryer-drum mixing process, immediately after placing and prior to initial rolling.

C. 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.

D. If more than ½ hour elapses between adjacent paving passes, the "cold joint" shall have tack coat applied to the "cold" pavement prior to placing the adjacent pass.

3.5 COMPACTION

A. Roll and compact to specified density before temperature of the mixture drops below 280°F.

B. Compact asphalt paving course to required density, with a steel wheeled 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 the 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 ½ 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 95% minimum, (no test less than 95% of the density determined in accordance with ASTM D-1559).

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.

3.6 PLACEMENT OF UDOT ASPHALTIC CONCRETE PAVEMENT

A. Place pavement in accordance with UDOT Standard Specification 02741.

3.7 SCHEDULE

Asphalt type and thickness:
Driveway and parking area – Regular Asphaltic Surface Course, 3” or 4” thick as called for on the plans.

3.8 FIELD QUALITY CONTROL

A. Testing and inspection will be provided by the Owner. Tests provided by the Owner are as follows:

Item	Type	Frequency
In-place Density	ASTM D2167, D2922 and D3017	1 Test / 2000sf

END OF SECTION

SECTION 02763

PAVEMENT MARKING

PART 1 - GENERAL

1.1. SUMMARY

A. Section Includes:
   1. Pavement and curb markings.

1.2. REFERENCE

A. Utah Department of Transportation 2005 Standard Specifications for Road and Bridge Construction.

1.3. QUALITY ASSURANCE

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

1.4. 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.
   2. Latex Paint –
      a. Atmospheric temperature above 50°F.
      b. When temperature is not anticipated to drop below 50°F during drying period.
   3. Alkyd or Chlorinated Rubber Paint-
      a. Atmospheric temperature above 40°F.
      b. When temperature is not anticipated to drop below 40°F during drying period.

PART 2 PRODUCTS

2.1. MATERIAL

A. Paint
   1. UDOT Section 02765 – Pavement Marking Paint
      a. Paragraph 2.1.A
   2. Colors-
      a. Yellow – Parking stripes, crosswalk stripes, and safety markings.
      b. Blue & White – Handicapped markings, Staff Parking Areas
      c. Red – Fire lanes and no parking zones.

PART 3 - EXECUTION

3.1. PREPARATION

A. Do not apply acrylic latex systems until new paving has cured 7 days minimum. Do not apply alkyd or chlorinated rubber until paving has cured 3 months minimum.

B. Surfaces shall be 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 ¼ inch variance on straight segments.
      b. Plus or minus ½ inch variance on curved alignments.

B. Coat with coverage of 103-113 sq ft/gal.

C. Thickness – Minimum paint thickness 7 mil dry.

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 Architect/Engineer prior to performance.

3.4. REAPPLICATION

A. Contractor shall return four to six (4-6) weeks following the completion of slurry sealing and painting of parking lot and reapply paint to all pavement markings.

END OF SECTION

SECTION 02810

UNDERGROUND IRRIGATION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Underground irrigation systems complete with heads, valves, controls, and accessories.

B. Related sections:
   1. Sections 02925 - Sodding
   2. Sections 02930 - Exterior Plants

1.2 REFERENCE STANDARDS

A. A. NFPA 70: National Electric Code.

B. ASTM: American Society for Testing and Materials

C. IA: The Irrigation Association: Main BMP Document, Landscape Irrigation Scheduling and Water Management Document.

D. ASIC: American Society of Irrigation Consultants: ASIC Grounding Guideline

E. City Code/Ordinance relating to Landscape and Irrigation

1.3 DEFINITIONS

A. Water Supply: Culinary and/or secondary pumping, piping, and components provided and installed by others to provide irrigation water to this project. Includes but is not limited to: storage ponds, pump stations, saddles, nipples, spools, shut-off valves, corporation stop valves, water meters, pressure regulation valves, and piping or components upstream of (or prior to) the Point-of-Connection.

B. Main Line Piping: Pressurized piping downstream of the point-of-connection to provide water to remote control valves and quick coupling valves. Normally piping is under constant pressure.

C. Lateral Line Piping: Circuit piping downstream of the remote control valves to provide water to sprinkler heads, drip system, or bubblers. Normally piping is under pressure only when control valve is in operation.

1.4 PERFORMANCE REQUIREMENTS

A. The work to be performed under this Section shall consist of furnishing all labor

and materials necessary to construct a complete working and tested underground sprinkler irrigation system per all drawings and specifications, providing one hundred (100) percent head-to-head coverage on all lawn and planting areas on the site without overspray onto hardscape, buildings, or other site features. Included also will be system maintenance and warranties.

B. The Contractor shall perform, but not be limited to, all of the following functions: complete all excavation and backfill; provide miscellaneous pipe fittings; install electric valves, valve control devices, conduit, junction boxes, and all noted necessary wiring. All work shall be in compliance to applicable codes and requirements of the utility companies involved.

C. If any or all of the above mentioned fees or charges are not listed on the bidding schedule or on plan, they shall be included in the bid lump sum price of the irrigation sprinkling system item.

D. Contractor shall verify with the appropriate water district the location of the water service main line and water pressure, and complete all requirements necessary to bring water service to the site. Total cost to be included in the irrigation sprinkling system bid item.

E. The Contractor shall operate, maintain until acceptance, and guarantee the new system until all lawn and plants installed on this project have become established and have been approved by the State Project Manager.

1.5 SUBMITTALS

A. Product Data: Complete set of manufacturer's technical data and installation instructions for all equipment to be installed on the project. Submittal shall be made prior to commencement of any irrigation work.

B. Main line and lateral line pressure test results: Submitted at the time of occurrence.

C. Controller Map: Each controller shall be equipped with a color-coded copy of the area that the controller services. Include valve zone number, type of plant material irrigated, and zone location on the project. Laminate map with heat shrink clear plastic and mount inside controller.

D. Contractor shall supply shop drawings of existing irrigation system and proposed modifications, including head type, pipe size, valves, and coverage areas for the affected zones prior to installation.

1.6 QUALITY ASSURANCE

A. Acceptance: Do not install work of this section prior to acceptance of the area by the Owner Project Manager as being properly prepared to receive said work (i.e. at proper grade, properly compacted, permanent fixtures in place, etc.).

B. Workmanship: It is the intent of this specification that all materials herein specified and shown on the construction documents shall be of the highest quality available and meet the requirements specified. All work shall be performed in accordance with the best standards of practice relating to the trade.

D. The Contractor shall provide to the City a document or resume which includes the following information:
1. The Contractor has been installing sprinkler systems on commercial projects for at least five (5) previous consecutive years.
2. The Contractor is currently licensed to perform landscape construction in the State of Utah.

1.7 PROJECT CONDITIONS

A. Any discrepancies between existing site conditions and those indicated on the plans shall be called to the attention of the Inspector and/or Landscape Architect, prior to continuance of the project.

B. The Contractor shall use only the equipment and products specified in the construction drawings. No substitution of materials will be allowed on the irrigation system without prior authorization from the Landscape Architect and the Owner.

C. During delivery, installation, and storage of materials for the project, all materials shall be protected from contamination, damage, vandalism, and prolonged exposure to sunlight. All material stored at the project site shall be neatly organized in a compact arrangement and storage shall not disrupt the project Owner or other trades on the project site. All material to be installed shall be handled by the Contractor with care to avoid breakage or damage. Materials damaged by the Contractor shall not be used, but shall be replaced with new materials at the Contractor’s expense.

D. The Contractor shall familiarize himself and his workmen with all hazards and existing utilities prior to commencing work.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials shall be manufactured by United States companies.

B. Handling and unloading of all equipment, pipe, and fittings shall be in such a manner as to insure delivery at the job site in a sound, undamaged condition. Any equipment or pipe found to be damaged or defective in workmanship or materials shall be rejected or removed and replaced if found installed.

2.2 SALVAGE MATERIALS

A. The Contractor shall salvage all valves, irrigation heads, valve boxes for the State

of Utah. Damaged parts will be the responsibility of the Contractor to replace. Utilize salvaged parts to re-construct the irrigation system.

2.3 PIPE

A. All PVC pipe used on this project for the irrigation system shall conform to the requirements of ASTM -1685. It shall be free from cracks, holes, foreign material, blisters, inside bubbles, wrinkles, and dents.

B. All pipe, 4 inches inside diameter and smaller (including all fittings), shall be Schedule 40 PVC solvent weld bell end unless otherwise specified.

C. All pipe, 6 inches inside diameter and larger (including all fittings), shall be PVC (except as required for conversion to metal fittings), Class 200 gasketed bell end.

D. Maximum flows allowed through main line and lateral line pipe shall be determined by water speed in the pipe. The maximum water speed allowed in both main lines and lateral lines is five (5) feet per second. The resulting maximum gallons per minute (gpm) allowed to flow through PVC pipes are as follows:

PIPE SIZE	GPM
3/4"	8
1"	12
1 1/4"	22
1 ½"	30
2"	50
2 ½"	75
3"	110
4"	190
6"	425

For sizes larger than 6", consult manufacturer's recommendations.

E. No bends in pipe shall be permitted. The Contractor shall use elbow fittings of ninety (90), forty five (45), twenty two and one half (22-1/2), and eleven and one quarter (11-1/4) degrees as individual situations demand.

F. All pipe used from the main line to the control valves shall be solvent weld Sch. 80 PVC pipe.

2.4 FITTINGS

A. All PVC fittings used on this project for the irrigation system shall conform to the requirements of ASTM D-2466.

B. Main Line Fittings:
1. All main line fittings three (3) inches or larger shall be push-on, gasketed, and constructed of ductile iron material.
2. All ductile iron fittings having a change of direction shall have proper concrete thrust blocks installed. The size and type of thrust block depends on pressure,

pipe size, kind of soil, and type of fitting. As a general rule, one (1) cubic foot minimum of class AA (AE) Type II concrete is required for each thrust block. Follow ductile iron fitting manufacturer's recommendations for thrust block size. Thrust restraining fittings may also be used in addition to the thrust blocking.

3. All main line fittings smaller than three (3) inches shall be solvent weld Schedule 80 PVC.
4. Epoxy coated double strap saddles, M.J. tees, Schedule 80 tees with SxT Schedule 80 bushings, or Harco ductile iron service tees are approved on PVC main lines for automatic control valve installation. M.J. fittings shall be greased and wrapped.

C. Lateral Line Fittings:
1. All lateral line fittings shall be solvent weld Schedule 40 PVC.
2. All risers and exposed fittings shall be solvent weld Schedule 80 PVC, including conversions to metal pipe and fixtures, unless otherwise noted on the plans.

2.5 VALVES

A. Master Valve: Master valve assembly shall match existing installation.

B. Isolation Gate Valve (on main line):
1. Isolation valves shall only be used on the main line.
2. Isolation valves shall conform to AWWA specification C 509. They shall be of Class 200 cast iron body, resilient-seat, and have a non-rising stem with rubber "0" rings. Stems shall be of cold rolled, solid bronze, high tensile strength. Valves shall be hydrostatically pressure tested for 400 P.S.I. and shall be designated for a working pressure of 200 P.S.I. Each valve shall contain a resilient wedge urethane rubber seat. Unless otherwise shown or specified, valves shall have flanged end connections.
3. Buried valves shall have two (2) inch square operating nuts. No handles or wheels will be permitted. Valves inside structures (vaults or valve boxes) shall have lever handles.
4. Action unions shall be installed on each side of all valves except flanged valves.
5. The Contractor shall provide adequate material for the connection of valves to the system, i.e., adapters, flanges, nuts, bolts, gaskets, etc.
6. All buried main line isolation valves shall be fitted with a four (4) inch minimum diameter pipe sleeve place over the top of the valve vertically and extended to grade. Cover with a ten (10) inch round "Carson" valve box with bolt down lid and set at finished grade.

C. Remote Control Valve Assembly:
1. Remote control valves shall match existing valves only.
2. Remote control valves shall be globe configuration, electrically activated, normally closed, forward flow design.
3. All pipe on the control valve assembly shall be Schedule 80 PVC pipe. See detailed drawings.
4. Action unions shall be installed on each side of the control valve assembly,

allowing valve to be removed from the box for maintenance without cutting pipe.

5. Each control valve shall have a ball valve installed immediately upstream of the valve and located within the same valve box.
6. Flows through each remote control valve shall not exceed the following limits:

VALVE SIZE	GPM RANGE
1"	1 - 30
1 ½"	31 - 75
2"	76 - 150

7. Each drip remote control valve assembly shall contain the following components:
   a. PVC ball valve.
   b. Inline disc or screen filter with 100 micron/150 mesh filter element.
   c. Remote control valve capable of operating at very low flow levels.
   d. Inline pressure regulator.

   All components shall be installed according to manufacturer's recommendations, and located within a single valve box, one valve per box (no multi-valve assemblies permitted).

D. Quick Coupling Valve Assembly:
1. Quick coupling valves shall match existing.
2. Quick coupling valves shall be heavy duty brass, two-piece, single lug locking cap.

E. Manual Drain Valve Assembly:
1. All manual drains shall be three quarter (3/4) inch (weld top) heavy duty brass ball valve.
2. Manual drain valves shall be required at all low points in the main lines. See plans, notes, and details.
3. The location of each manual drain shall be shown on the "as built" drawing with dimensions from the nearest permanent fixture, such as a building corner, etc.
4. Each manual drain valve will be accessed by a vertical two (2) inch PVC Schedule 40 pipe sleeve, capped by a locking valve cap with a key, enclosed within a ten (10) inch round valve box with bolt down lid. The top of the drain sleeve shall be three to six (3 - 6) inches below the lid of the valve box.
5. Each manual drain shall empty into a gravel sump, a minimum of eighteen (18) inches by eighteen (18) inches by twelve (12) inches deep. The gravel shall be washed three quarter (3/4) inch rock.

F. Automatic Drain Valves: Automatic drain valves shall not be used.

2.6 VALVE BOXES

A. All valve boxes shall have a locking lid.

B. Valve box size shall be listed in the installation details for each irrigation system component.

2.7 CONTROL VALVE WIRE

A. All irrigation control wire shall bear approval as U.L. listed type of underground feeder (direct burial) and each conductor shall be of electrical conductivity grade solid copper in accordance with ASTM 30.
B. No aluminum wire shall be used on this project.

C. Wire size shall be #14 gauge minimum.

D. Two spare wires shall be run from each controller to the farthest valve under its control in all directions and any valve which is on a dead-end line.

E. All wire crossing water, attached to bridges, going under paving, or where conditions require protection, shall be housed in conduit or sleeves. All out-of-ground conduits shall be rigid metal. All buried conduit may be PVC.

F. All splices shall be water-tight. All connections made inside the box to connect wires to the valve shall be made using a dry-splice connector. Each connector shall be completely sealed and water-proof.

G. All other splices in control wire shall be housed in a separate valve box.

H. The pigment or color of the wires shall be integrated into the covering, rather than painted on. All common or ground wires shall be white in color. Where more than one controller is required, a different colored hot wire shall be used for each controller. A separate color shall be used for all spare wires.

2.8 SPRINKLER HEADS

A. General:
   1. All heads used on this project shall match existing.

D. Bubblers, Tree Well, and Root Watering Systems: Manufactured by Rain Bird and installed per manufacturer's recommendations. Use only where and when specified.

2.9 DRIP IRRIGATION

A. Drip irrigation materials shall be manufactured by Rain Bird.

B. Emitters shall be of the individual, self-cleaning, pressure-compensating type.

C. Dripline tubing shall be constructed of high quality linear, low density, UV-resistant, polyethylene resin materials with internal, integral emitters at specified intervals.

D. All insert barbed fittings shall be constructed of molded, UV-resistant plastic. Each fitting shall have a minimum of two (2) ridges or barbs per outlet. All fittings shall be from the manufacturer and shall be available in one of the following end configurations:
   1. Barbed insert fittings.

2. Male pipe threads (MPT) with barbed insert fittings
3. Female pipe threads (FPT) with barbed insert fittings.

E. Each drip remote control valve assembly shall contain the following components (in required sequence):
1. PVC ball valve.
2. Inline disc or screen filter with 100 micron/150 mesh filter element.
3. Remote control valve.
4. Inline pressure regulator.

F. Provide the following equipment to each drip valve circuit, located and installed per manufacturer's recommendations:
1. Line flushing valve(s) - minimum of one (1) on each exhaust header and one (1) for every fifteen (15) gpm in the circuit.
2. Air/Vacuum relief valve(s) at all high points in the system.

PART 3 EXECUTION

3.1 GENERAL

A. The irrigation plan is diagrammatic in nature, and some drafting liberties have been taken to maintain the graphic clarity of the drawings. All irrigation equipment shall be located in planting areas only, unless noted otherwise. The Contractor shall install piping to minimize changes in direction, avoid placement under large trees or large shrubs, and avoid placement under hardscape features. Refer to the irrigation legend, details, and specifications for equipment and proper installation.

B. The Contractor shall visit and inspect the project site. He shall take into consideration known and reasonably inferable conditions affecting the proposed work. Failure to visit the site shall not relieve the Contractor of furnishing materials and performing the work required. Any discrepancies between existing site conditions and those indicated on the plans shall be called to the attention of the Landscape Architect prior to continuance of the project.

C. The Contractor shall keep the premises clean and free of excess equipment, materials, and rubbish incidental to work of this project. Work areas shall be swept clean and trash and debris picked up daily. Open trenches or hazards shall be protected with yellow caution tape. The Contractor is responsible for removal and legal disposal (offsite) of trash and debris generated by his work on this project.

D. Existing Landscapes:
1. Where existing landscape areas are a part of the project, the Contractor shall repair or replace work damaged by his irrigation system installation at his own expense. If the damaged work is new, the Contractor or the original installer of that work shall perform repairs. The existing landscape shall remain in place, protected and undisturbed.
2. The Contractor shall protect and work around all existing plant materials designated to remain.
3. Coordination of trench and valve locations shall be laid out prior to any excavation work. Plant material deemed damaged by the Owner's Project

Manager shall be replaced with new plant material at the Contractor's expense. The Contractor shall not cut existing tree roots larger than two (2) inches in diameter. Route pipe, wire, and irrigation components around tree canopy drip lines where possible to minimize damage to tree roots.

4. The Contractor shall leave no part of the existing landscape without water for more than forty eight (48) hours at a time.

E. Pre-Construction Meeting: A pre-construction shall be held prior to beginning any work on a the project. The Owner Project Engineer, the project designer, the Owner, and the Contractor and his sub-contractors shall all be in attendance.
   1. The purpose of this meeting is to review project goals and expectations, the project schedule, and all procedures relative to inspections, permits, and changes that may arise.
   2. In the pre-construction meeting, it shall be made clear that the construction documents (plans, details, specifications, and contract) shall be binding upon the Contractor and upon all of his work. Any work not in accordance with the plans and specifications shall be rejected, and the Contractor shall bring the project into compliance at his own expense.

3.2 CONSTRUCTION STAKING

A. The Contractor shall provide the necessary staking to obtain the layout shown on the plans. The points of reference shall be as indicated in the drawings, and shall include such features as the existing walks, buildings, curbs, etc. The staking shall be approved by the Owner Project Engineer prior to commencing installation operations. Any changes in the system which appear necessary due to field conditions must be called to the attention of the Owner Project Engineer and approved at the time they are discovered and prior to making any changes.

3.3 EXCAVATION AND BACKFILLING

A. Excavation:
   1. Excavation work shall be as deep and as wide as will be required to safely perform the work, such as making mainline connections or forming vaults.
   2. Trenches shall be deep and wide enough to provide working space for placing two (2) inches of bedding underneath all new mainline pipe and fittings where the soil is rocky or gravelly. Place eighteen (18) to thirty (30) inches of cover over the top of all pipe and fittings on main lines. All trench bottoms shall be sloped so that the pipes will gravity drain back to the main connection point or the nearest manual drain. If the existing main line is deeper than thirty (30) inches, the Contractor shall install a riser to a depth of eighteen (18) to thirty (30) inches and then install the new line at the required depth. At no time will the mainline be installed less than eighteen (18) inches or deeper than thirty (30) inches unless prior approval is given by the City Project Manager.
   3. Trenches shall be deep enough to maintain eight (8) to fourteen (14) inches of cover over the top of all lateral line pipe and fittings. They shall be deep enough to guarantee that all swing joints drain back to the lateral lines. Trenches shall be a minimum of twelve (12) inches away from any walks and/or curbs, buildings, or other hardscape improvements. They shall be of sufficient

width to accommodate tees and other fittings that come out sideways (horizontally) from the lateral lines. Lateral lines may be pulled by a mechanical puller provided all other applicable specifications are met.

4. Any rocks or other debris over one (1) inch in diameter uncovered during excavation or trenching shall be removed from the area.
5. If more than one (1) pipe line is required in a single trench, that trench shall be deep and wide enough to allow for at least six (6) inches of horizontal separation (if both are lateral lines), or six (6) inches of both horizontal and vertical separation (if one line is a main line) between pipes.
6. Any existing utility lines damaged during excavating or trenching shall be reported immediately to the utility owner and the Owner Project Engineer. After proper notification to utility owner and City, repairs to the damaged utility shall be made immediately. Repair materials and methods shall meet industry standards and the owner's satisfaction. Should utility lines be encountered which are not indicated on the plans, the Owner Project Engineer shall be notified. The repair of any damage shall be done as soon as possible by the Contractor or the utility owner, and proper compensation will be negotiated by the City. Such utility locations shall be noted on the "As-Built" drawings required before final payment of the irrigation system contract.
7. Where trenching is done in established lawn, care shall be taken to keep the trenches only as wide as is necessary to accomplish the work. The trenches shall be backfilled as specified and then four (4) inches of topsoil placed to bring the trench up to existing grade so that sod can be laid. Only new sod shall be used as trench cover. It shall be established new sod of standard width and shall be laid along the trenches so as to match the existing sod. No small pieces of sod shall be used and only standard lengths shall be accepted. No sod from the construction site shall be used unless otherwise specified. In the event of any backfill settlement, the Contractor shall perform the required repairs at his own expense.

B. Backfilling:

1. No backfilling of trenches shall be done until the system has been inspected and approved by the Owner Project Engineer for proper trench depths, installation of equipment, control wire, and location of heads.
2. Before trenches are backfilled, the Contractor must show the Owner Project Engineer the redlined "As-Built" drawing he has been keeping on the site, indicating that changes and corresponding dimensions have been recorded where such changes have been made.
3. Prior to backfilling, the system shall be tested under pressure for leaks and general operation of the equipment. The main line shall be tested for a period of four (4) hours at a pressure of 120 PSI. Lateral lines shall be tested for one (1) hour at design pressure. Design pressure shall be considered to be the highest operating PSI listed on the irrigation equipment schedule. Any failures detected during the testing period shall be repaired by the Contractor and the testing shall be repeated. The Owner Project Engineer shall certify the testing to insure that it has been completed and that the system has met all testing requirements. All defects discovered by the pressurization and operation test shall be corrected by the Contractor before proceeding with further work.
4. Trench bedding and backfill material shall be existing site soil free of rocks

larger than one (1) inch in diameter and any other debris. Wasted pipe and other excess project materials or rubbish (tape, wire, trash, wrappers, boxes, bottles, etc.) shall not be backfilled into the trenches. All trenches shall be backfilled, and then watered sufficiently to insure no settling of the surface. In the event of any backfill settlement prior to the end of the guarantee period, the Contractor shall perform all required repairs at his own expense.

5. Backfill under and around the lines to the center line of the pipe shall be placed in maximum layers of six (6) inches and thoroughly compacted. Compaction shall be ninety five (95) percent relative density (modified proctor) under walks and roads, and eighty five (85) percent in planting areas.
6. Special care shall be taken to assure complete compaction under the haunches of the pipe. Backfill compaction under the haunches of the pipe shall be compacted to the original density. Compaction requirements above the pipe shall be the same as for surrounding areas.

3.4 PIPE AND FITTINGS

A. Install pipe to allow for expansion and contraction as recommended by pipe manufacturer. Where the main line will be allowed to sit uncovered for any length of time in the trench prior to testing, shade the main line with a thin covering of backfill soil to minimize weather-related expansion or contraction of pipe. Do not cover up valves or other installed equipment prior to inspection and acceptance.

B. The ends of all pipe shall be cut squarely, and reamed free of all inside scale or burrs. Spigot ends of pipes three (3) inches and larger shall be beveled. Threads shall be cut clean and sharp, and to a length equal to one and one eighth (1-1/8) times the length of the female thread receiving the pipe. The threaded pipe shall be screwed into a full length of the female thread.

C. All threaded pipe joints shall be properly sealed using teflon tape and pipe dope properly applied to the areas to be joined.

D. Solvent weld joints shall not be glued unless ambient temperatures are at least fifty (50) degrees F. Pipe shall not be glued in rainy conditions unless properly tented. Use only the brand and type of primer and glue specified. All workers performing glue operations shall provide evidence of certification. Glued main line pipe shall cure a minimum of twenty four (24) hours prior to being energized. Lateral lines shall cure a minimum of two (2) hours prior to being energized and shall not remain under constant pressure unless cured for twenty four (24) hours.

E. Every care shall be taken during installation to prevent dirt and debris (especially rocks) from getting into the pipes.

F. All tees coming out of main lines for valves and other fixtures shall be vertical and constructed with Sch. 80 PVC pipe.

G. All tees coming out of the lateral lines for heads and other fixtures shall be horizontal so that no direct weight or pressure may be exerted through the head to the top or bottom of the lateral line pipe. Tees on lateral lines shall also be SxSxT

to the head swing joints.

3.5 THRUST BLOCKS

A. Thrust blocks are needed wherever the main pipe line:
   1. Changes any direction at tees, angles, and crosses vertical and horizontal.
   2. Changes size at reducers.
   3. Stops at a dead-end.
   4. Valves at which thrust develops when closed.

   The size and type of thrust block depends on pressure, pipe size, kind of soil, and type of fitting. As a general rule, one cubic foot (minimum) of class AA (AE) Type II concrete is required for each thrust block. Follow the ductile iron fitting manufacturer's recommendations for the minimum thrust block size.

B. Thrust blocks shall rest against undisturbed original earth in the direction of thrust.

C. Where a fitting is used to make a vertical bend, use a bar to anchor the fitting to a thrust block braced against undisturbed soil. The thrust block should have enough resistance to withstand upward and outward thrusts at the fitting.

3.6 PIPE SLEEVES

A. Pipe sleeves shall be required for all piping under all new concrete or other new paving. The size of the sleeve shall be at least twice the size of the pipe or wires to be sleeved. Wires shall be sleeved separately within their own sleeve. All pipe sleeves four (4) inches and smaller in diameter shall be PVC Schedule 40 pipe; sleeves greater than four (4) inches in diameter shall be Class 200 PVC.

3.7 VALVES

A. General:
   1. Isolation valves, remote control valves, and quick coupling valves shall be installed according to manufacturer's recommendations and these drawings and specifications.
   2. Valve boxes shall be set over valves so that all parts of the respective valve assembly can be reached for service. Valve box and lid shall be set to be flush with the proposed finished grade.
   3. No valve box shall rest directly upon the valve or any fixture associated with it, including main line and lateral lines. Each valve box shall be centered on the valve assembly it covers. Each valve box shall have five (5) inches of three quarter (3/4) inch rock placed in the bottom underneath the valve and lines to reduce the potential of mud and standing water therein.

B. Remote Control Valve:
   1. Each control valve shall have its own ball valve, and only one (1) control valve and ball valve per valve box. No valve manifolds shall be allowed.
   2. The bottom of the remote control valve shall be a minimum of five (5) inches above the gravel.
   3. Quick coupling valves shall be installed within a ten (10) inch round Carson

valve box unless next to concrete pad. In the latter case, install at finished grade.

4. All control valve assemblies shall be placed within planting areas and in the approximate location as shown on the plans. No grouping of valves in any one spot shall be allowed.
5. Control valve assemblies shall be installed no closer to one another then five (5) feet.
6. No control valve shall be installed more than twelve (12) inches below finished grade.
7. Tag each control valve with a permanent and non-smearing label indicating its proper controller and valve number as shown on the irrigation plans.

3.8 VALVE BOX

A. Where indicated in the installation details, valve boxes shall rest on concrete pavers only, thus eliminating any weight or pressure from being exerted on the main line or valve inside the valve box. There shall be a minimum of three to six (3 to 6) inches of clear space between the valve box lid and the topmost part of the valve (including solenoid).

B. Valve box extensions shall be used where necessary to prevent soil around the valve from collapsing into the space inside the valve box.

3.9 WIRE & CABLES

A. Multiple wires in the same trenches shall be banded together at ten (10) foot intervals for protection. Where wires pass under paved areas, Schedule 40 PVC sleeves shall be installed prior to installation of the paving, if possible, and prior to installation of the wires. Sleeves for fourteen (14) gauge wires shall be sized as follows:

NUMBER OF WIRES	SLEEVE SIZE
1 - 10	1"
11 - 18	1 1/4"
19 - 25	1 1/2"
26 - 40	2"
41 - 56	2 ½"
57 - 88	3"
89 - 150	4"

B. All control wires shall be bundled and taped together every ten (10) feet and installed in the pipe trench directly under the pipe. Every twenty (20) feet there shall be a twenty-four (24) inch loop made and taped to the bottom of the pipe. See detailed drawing showing the wire located in those positions. Control wires not placed in the trenches under the pipes shall be placed in conduit and buried eighteen (18) inches or deeper and marked on the "as built" drawings.

C. Two (2) spare wires shall be run from each controller to the farthest valve under its control in all directions and to any valve which is on a dead-end line. The spare wires shall be a different color from the regular wires and shall be labeled at both

ends. Each spare wire shall be brought up to the surface in each valve box it passes through and coiled with twenty four (24) inches for use in future connections. Each spare wire shall be tested for continuity prior to final acceptance of the project and guaranteed by the Contractor to be functional. Should the maintenance personnel discover a defect within one (1) year afterwards, the Contractor shall locate the problem and cause it to be repaired at his own cost. Install extra wires as needed for moisture sensors.

D. Run a single 14 gauge wire along the top of the main line to be used for tracking the location of the main line. Every twenty (20) feet there shall be a twenty-four (24) inch loop. The color of the tracing wire shall be different than any other wire color used.

E. All wires shall be installed with twenty four (24) inches of excess wire (coiled) at the end of each wire run, wire splice, and at each controller.

F. Isolation valves, quick coupling valves, and wire splices not specifically associated with the control valve shall be located in separate valve boxes.

3.10 SPRINKLERS

A. General:
1. All sprinkler heads shall be installed above grade so as to minimize washing of the topsoil and seed during the landscaping establishment period, except those which border paving or flat work of any kind. These heads shall be installed at the finished grade of the adjacent paving or flat work. Prior to final acceptance of the project, all heads shall be raised or lowered to final lawn or planting grade.
2. All sprinkler heads shall be installed using the bottom inlet. No side outlets shall be used.
3. Rotor heads located on hillsides shall be adjusted to the downhill side to avoid cutting into the hill by the stream of water and causing erosion.
4. Heads installed in existing sod shall be set at the grade of the soil.
5. All rotary pop-up heads shall be installed at final grade on double swing joints. All swing joints must drain by gravity back to the supply lines.
6. All pop-up, shrub spray, lawn spray, bubbler and strip spray heads shall be installed as shown in the details.
7. All pipes, lines, and risers shall be flushed thoroughly with water before installation of any heads. All debris and rocks found at that time shall be removed from the area as soon as possible.
8. All spray sprinklers shall be flushed thoroughly with water a second time before installation of nozzles.
9. The Contractor shall adjust all heads to provide a uniform coverage and to keep spray off buildings, walkways, walls, parking areas, and drives.
10. Check valves shall be used where indicated and where necessary to prevent water flow from lower elevation heads when system is turned off. Install per manufacturer’s recommendations.

B. Inline Drippers

1. Inline drip tubing shall be spaced at a distance equal to or less than the inline emitter spacing. For slope applications, place drip tubing laterals parallel to the slope contour. When slopes exceed thirty (30) percent, increase the recommended lateral spacing by twenty five (25) percent on the lower one third (1/3) of the slope.
2. Inline dripper tubing shall be installed at finished grade with soil staples and covered with three (3) inches of specified mulch. Supply and exhaust headers shall be installed at normal lateral line depths.
3. All drip tubing shall be held in place by soil staples and shall conform to the following:
   a. Sandy Soil - One staple per every three (3) feet and two (2) staples on each change of direction (tee, elbow, or cross)
   b. Loam Soil - One staple every four (4) feet and two (2) staples on each change of direction (tee, elbow, or cross)
   c. Clay Soil - One staple every five (5) feet and two (2) staples on each change of direction (tee, elbow, or cross)
4. Installation of inline drip circuits shall generally conform to the following steps:
   a. Assemble and install ball valve, filter, remote control valve and pressure regulating valve assembly in accordance with installation details.
   b. Assemble and install supply header(s) in accordance with installation details. Tape or plug all open connections to prevent debris contamination.
   c. Install lateral drip lines in accordance with details and relevant specifications and manufacturer's recommendations. Tape or plug all open ends while installing to prevent debris contamination.
   d. Assemble and install exhaust header(s) in accordance with installation details. Tape or plug all open connections to prevent debris contamination.
   e. Install air/vacuum relief valve(s) at the zone's highest point(s) in accordance with installation details.
   f. Thoroughly flush supply header(s) and connect drip lateral lines while flushing.
   g. Thoroughly flush drip lateral lines and connect to exhaust header(s) and any interconnecting lateral lines while flushing.
   h. Thoroughly flush exhaust header(s) and install line flushing valves in accordance with details.

3.11 OPERATIONAL TEST AND MAJOR INSPECTIONS

A. Maintenance/Establishment Period:
   1. The maintenance period shall begin one (1) day after the substantial completion inspection. The Contractor shall complete all punch list items during the maintenance period, as well as maintain and operate the entire irrigation system.
   2. The irrigation Contractor (if different than the landscaping Contractor) shall coordinate with the landscaping Contractor during the entire plant and lawn establishment period on the use, scheduling, and maintenance of the sprinkler system.

B. Final Acceptance:
   1. A second inspection shall be held at the end of the maintenance period to

insure that all punch list items have been completed and the entire system is ready for acceptance by the Owner.

3.12 GUARANTEE AND MAINTENANCE

A. Guarantee:
1. Upon final acceptance of the sprinkler irrigation system as being operational and properly installed, the Contractor shall guarantee the workmanship, materials, fixtures, and equipment to be free from defects for a period of one (1) year after that date.
2. The Contractor shall insure and guarantee complete drainage of the system. In working with or connecting to an existing system, the Contractor shall guarantee compatibility in operation and drainage between the two systems.

B. Maintenance Required During Guarantee Period:
1. The Contractor, with the City's maintenance personnel and Owner Project Engineer in attendance, shall energize the sprinkler irrigation system again the following spring and shall repair all defects found as a result of winter damage, improper installation, improper maintenance, defective materials or inadequate sprinkler drainage.
2. At the end of the guarantee period, when the lawn and landscaping have been approved, the Contractor shall call for a final inspection of the sprinkler irrigation system. There shall be at least five (5) days prior notice given in writing to the Owner Project Engineer so that the appropriate people have opportunity to attend.
3. Prior to that time, the City shall adjust all heads to their proper pattern, radii, and height. The system shall have been flushed out, checked for operation, and any defects not covered by the guarantee corrected shall be repaired. The entire system shall be inspected and checked to determine if everything is in working order. A final list of warranty items found in need of correction (if any) shall be made and the Contractor shall correct them. The Contractor shall notify the Owner Project Engineer when he has verified that every item is corrected.
4. After all warranty items have been corrected, the Owner shall, in writing, officially release the Contractor from all warranty claims pertaining to the irrigation system and assume full and complete responsibility for said system.

END OF SECTION

SECTION 02891

TRAFFIC SIGNS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing traffic signs.

1.2 REFERENCES

A. ASTM A153: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

B. ASTM A653: Steel, Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process

C. ASTM A1011: Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

D. ASTM B 209: Aluminum and Aluminum-Alloy Sheet and Plate.

1.3 TRAFFIC SIGN COMPONENT

A. Substrate: The aluminum base material upon which the background sheeting is attached.

B. Panel: Assembly of aluminum substrate and attached sheeting with reflective legend, symbols, and borders.

C. Sheeting: The reflective or non-reflective material that comprises the background legend, border, and symbols.

D. Sign: A complete assembly comprised of post, frame, and panel.

E. Size: Horizontal x vertical

PART 2 PRODUCTS

2.1 MATERIALS

A. Substrate: 0.080 inch thick. ASTM B 209 alloy 6061-T6, or 5052-H38.

B. Posts:

1. Slip Base Tubular Steel Sign Post
   a. Post ASTM A 500 Grade C; 46,000 psi minimum yield
   b. Finish: Galvanize ASTM A 153
   c. Shape: As shown

C. Reflective Sheeting:
   1. Encapsulated lens sheeting or encapsulated lens (flexible) as specified.
   2. Meet Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects FP-92, Type III.

D. Nonreflective Sheeting: As specified. Meet Military Specification MIL-M 4371B, Type I, Class I.

E. Fasteners: As specified. Meet ASTM A 314, Class 304, 18-8, Stainless Steel.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate utility location.

B. Coordinated sign location with field engineer and parks personnel

3.2 INSTALLATION - GENERAL

A. Excavate hole to proper depth.

B. Install post into hole and set post plumb in both directions.

C. Compact backfill to a density equal to surrounding materials.

D. Establish proper elevation and orientation of all signs, structures, and determine proper sign post lengths as dictated by construction slopes.

3.3 SCHEDULE

A. Handicap Sign – 12” x 18”, Aluminum Substrate

B. Van Accessible sign – 12” x 6”, Aluminum Substrate

END OF SECTION

SECTION 02925

SODDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preparation of subsoil.
2. Placing topsoil.
3. Fertilizing.
4. Sod installation.
5. Maintenance.

B. Related Sections:
1. Section 02810 - Landscape Irrigation.
2. Section 02930 - Exterior Plants.

1.2 REFERENCES

A. ASTM International:
1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

B. Turfgrass Producers International:
1. TPI - Guideline Specifications to Turfgrass Sodding.

1.3 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SUBMITTALS

A. Product Data: Submit data for sod grass species, fertilizer, mulch and other accessories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilize.

1.6 QUALITY ASSURANCE

A. Sod: Root development capable of supporting its own weight without tearing, when suspended vertically by holding upper two corners.

1.7 QUALIFICATIONS

A. Sod Producer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section with minimum 1 years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets or in rolls. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

1.9 COORDINATION

A. Section 01300 - Administrative Requirements: Requirements for coordination.

B. Coordinate with installation of underground sprinkler system piping and watering heads.

PART 2 PRODUCTS

2.1 SOD

A. Obtain all shipments of sod from approved sources.

B. Mowed regularly and carefully maintained from planting to harvest to assure reasonable quality and uniformity.

C. Free of grassy and broadleaf weeds, and bare or burned spots.

D. Clean, strongly rooted sod of variety indicated.

E. Cut sod in pieces not exceeding 1 square yard. Limit depth of cut to 1/2-inch minimum and 1-inch maximum.

F. Match existing grass mixture to nearest extent possible.

2.2 SOIL MATERIALS

A. Topsoil: Excavated from site and free of weeds. Type S2.

2.3 HARVESTING SOD

A. Machine cut sod and load on pallets in accordance with TPI.

B. Cut sod in area not exceeding 1 sq yd, with minimum 1/2 inch and maximum 1 inch topsoil base.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify prepared soil base is ready to receive the Work of this section.

3.2 PREPARATION OF SUBSOIL

A. Prepare sub-soil and eliminate uneven areas and low spots.

B. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.

D. Remove contaminated subsoil.

E. Scarify sub-soil to depth of 3 inches where topsoil is to be placed.

F. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

3.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of 6 inches over area to be sodded.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas and to ensure positive drainage.

E. Install edging at periphery of sodded areas in straight lines to consistent depth.

3.4 FERTILIZING

A. Apply fertilizer at application rate recommended by soil analysis.

B. Apply fertilizer after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix fertilizer thoroughly into upper 4 inches of topsoil.

E. Lightly water soil to aid dissipation of fertilizer.

3.5 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod within 24 hours after harvesting to prevent deterioration.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas.

E. Place top elevation of sod 1/2 inch below adjoining edging, paving, and curbs

F. Do not place sod when temperature is lower than 32 degrees F.

G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

3.6 MAINTENANCE

A. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

B. Immediately replace sod on areas showing deterioration or bare spots.

C. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 02930

EXTERIOR PLANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preparation of subsoil and topsoil.
2. Topsoil bedding.
3. Trees, plants, and ground cover.
4. Mulch.
5. Fertilizer.
6. Pruning.
7. Maintenance.

B. Related Sections:
1. Section 02810 - Landscape Irrigation.
2. Section 02925 - Sodding.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A300 - Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices.
2. ANSI Z60.1 - Nursery Stock.

1.3 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

B. Plants: Living trees, plants, and ground cover specified in this Section.

1.4 SUBMITTALS

A. Coordinate planting plan with owner for final design.

B. Product Data: Submit list of plant material sources, data for fertilizer and other accessories.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include pruning objectives, types and methods; types, application frequency, and recommended coverage of fertilizer. Maintain one copy copies of each document on site.

1.6 QUALIFICATIONS

A. Nursery: Company specializing in growing and cultivating plants with three years experience.

B. Installer: Company specializing in installing and planting plants with 3 years experience.

C. Maintenance Services: Performed by installer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect and maintain plant life until planted.

B. Deliver plant life materials immediately prior to placement. Keep plants moist.

C. Plant material damaged as a result of delivery, storage or handling will be rejected.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

B. Do not install plant life when wind velocity exceeds 30 mph.

1.9 COORDINATION

A. Install plant life after and coordinate with installation of underground irrigation system piping and watering heads specified in Section 02811.

1.10 WARRANTY

A. Furnish one year manufacturer warranty for trees, plants, and ground cover.

1.11 MAINTENANCE SERVICE

A. Maintain plant life immediately after placement until plants are well established and exhibit vigorous growing condition. Continue maintenance until termination of warranty period.

B. Maintenance includes:

1. Applying herbicides for weed control. Remedy damage resulting from use of herbicides.
2. Remedy damage from use of insecticides.
3. Irrigating sufficient to saturate root system.
4. Pruning, including removal of dead or broken branches.
5. Disease control.
6. Maintaining wrapping, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

PART 2 PRODUCTS

2.1 TREES, PLANTS, AND GROUND COVER

A. Planting Stock:
1. Species: In accordance with Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.
2. Identification: Label individual plants or each bundle of plants when tied in bundles.
3. Plants: No. 1 Grade conforming to “American Standard for Nursery Stock” of American Association of Nurserymen (AAN); well-branched, vigorous and balanced root and top growth; free from disease, injurious insects, mechanical wounds, broken branches, decay and other defects.
4. Trees: Furnish with reasonably straight trunks, well balanced tops, and single leader.
5. Deciduous plants: Furnish in dormant state, except those specified as container grown.

B. Trees, Plants, and Ground Cover: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

2.2 SOIL MATERIALS

A. Topsoil: Excavated from site. Type S2

2.3 MULCH MATERIALS

A. Mulching Material: Composted, shredded hardwood bark, dark brown in color.

2.4 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Stakes: Softwood lumber, pointed end. Mild steel angle, galvanized, pointed end.

C. Cable, Wire, and Eye Bolts: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

2.5 TOP SOIL MIX PLANT SOIL MIX

A. Top Soil Mix Plant Soil Mix: Uniform mixture of 1 part peat and 3 parts topsoil by volume.

2.6 WEED BARRIER

A. Non-woven Geotextile - Meeting the following properties:
   1. Grab Tensile Strength, lbs. ASTM D 4632-90
      a. Percent of tensile strength retained determined after ultraviolet weathering per ASTM D 4355 for 500-hours.
   2. Grab Elongation, % ASTM D 4632-50
   3. Puncture Strength, lbs. ASTM D 4833-25
   4. Trapezoid Tear, lbs. ASTM D 4533-30
   5. Apparent Opening size (AOS - US Sieve) ASTM D 4751-50
   6. Ultraviolet Degradation, % ASTM D 4355-70

B. Manufacturers
   1. Mirafi - Model: 140NL
   2. Propex - Model: Geotex 351

C. Suppliers

1.	Contech Construction Products	(801)363-3873
2.	ACF West	(801)521-5141

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify prepared subsoil and planters are ready to receive work.

B. Saturate soil with water to test drainage.

C. Verify required underground utilities are available, in proper location, and ready for use.

3.2 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to depth of 4 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds three times wider than plant root system.

3.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of 6 inches over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to minimum thickness of 6 inches.

3.4 FERTILIZING

A. Apply starter fertilizer at rate of 1/2 pound of actual nitrogen per 1,000 square feet for trees and shrub areas and 1 pound of actual nitrogen per 1,000 square feet for turf areas.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 4 inches of topsoil.

D. Lightly water soil to aid dissipation of fertilizer.

3.5 TRANSPLANTING

A. Use a tree spade where possible to get as much of the root ball as possible. In locations where tree spade cannot be used, the main root ball shall be carefully dug around and boxed so that moving will not break the root ball.

B. Lift the tree by the root balls. Trees damaged due improper lifting will be replaced at the contractor’s expense.

3.6 PLANTING

A. Place plants for best appearance for review and final orientation by Architect/Engineer.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with prepared plant mix, at minimum depth of 6 inches as indicated on Drawings under each plant. Remove loosen burlap, ropes, and wires, from top half of root ball.

E. Place bare root plant materials so roots lay in natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

F. Saturate soil with water when pit or bed is half full of topsoil and again when full.

3.7 INSTALLATION OF ACCESSORIES

A. Place decorative cover and membrane stone where indicated on Drawings at base of plant to nominal depth of 3 inches.

B. Wrap deciduous shade and flowering tree trunks and place tree protectors.

3.8 Ground Cover

3.9 PLANT SUPPORT

A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:

Tree Caliper	Tree Support Method
1 inch	1 stake with one tie
1 - 2 inches	2 stakes with two ties
2 - 4 inches	3 guy wires with eye bolts and turn buckles
Over 4 inches	4 guy wires with eye bolts and turn buckles

3.10 FIELD QUALITY CONTROL

A. Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formwork for cast-in place concrete.
   2. Form accessories.
   3. Form stripping.

B. Related Sections:
   1. Section 03300 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
   2. ACI 301 - Specifications for Structural Concrete.
   3. ACI 318 - Building Code Requirements for Structural Concrete.
   4. ACI 347 - Guide to Formwork for Concrete.

B. ASTM International:
   1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318.

B. For wood products furnished for work of this Section, comply with AF&PA.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Products storage and handling requirements.

1.5 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Form Materials: At discretion of Contractor to meet tolerances.

2.2 FORMWORK ACCESSORIES

A. Form Anchors and Hangers:
   1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.

B. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
   1. Manufacturers:
      a. Arcal Chemical Corporation Arcal-80.
      b. Industrial Synthetics Company Synthex.
      c. Nox-Crete Company Nox-Crete Form Coating.
      d. Substitutions: Section 01600 - Product Requirements.

C. Corners: Chamfer, type; 1 x 1 inch size; maximum possible lengths.
   1. Fillet ½" – 1" radius on curb and gutter

D. Bituminous Joint Filler: ASTM D1751.

E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

A. Formwork - General:

1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.

B. Forms for Smooth Finish Concrete:
1. Use steel, plywood or lined board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full size sheets of form lines and plywood wherever possible.
5. Use care in forming and stripping wood forms to protect corners and edges.
6. Level and continue horizontal joints.
7. Keep wood forms wet until stripped.

C. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301.

D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

E. Obtain Architect/Engineer’s approval before framing openings in structural members not indicated on Drawings.

F. Install chamfer strips on external corners of walls.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

G. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

H. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true and sharp.

I. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
2. Slope slabs to drain where required or as shown on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

J. Screed Supports:

1. For concrete over waterproof membranes and vapor barrier membranes, use cradle, pad or base type screed supports which will not puncture membrane.
2. Staking through membrane is not be permitted.

K. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

B. Tolerances: Construct formwork to produce completed concrete surfaces within construction tolerances as follows:
1. Walls: ¼” per 10’
2. Floors: ¼” per 10’

3. All other concrete: as specified in ACI 117.

3.8 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 WORK INCLUDED

This section includes the fabrication and placement of steel reinforcement for cast-in-place concrete structures, including bars, ties, supports, and welded wire fabric.

1.2 RELATED SECTIONS

A. Submittals: Section 01300.

B. Cast-in-Place Concrete: Section 03300.

1.3 QUALITY ASSURANCE

A. Codes and Standards: The Contractor shall comply with all requirements of the following codes and standards (most recent edition), except as modified herein:

1. American Welding Society, AWS D12.1 "Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction."

2. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

3. American Concrete Institute, ACI 318 "Building Code Requirements for Reinforced Concrete."

4. American Concrete Institute, ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structure."

5. Other References:

a.	ASTM A82 -	Specification for Steel Wire, Plain, for Concrete Reinforcement.
b.	ASTM A185 -	Specification for Welded Wire, Fabric, Plain for Concrete Reinforcement.
c.	ASTM A615 -	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
d.	AASHTO M31-	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
e.	AASHTO M32-	Cold Drawn Steel Wire for Concrete.
f.	AASHTO M54-	Fabricated Steel Bar or Rod Mats for Concrete Reinforcement.
g.	AASHTO M55-	Welded Steel Wire Fabric for Rein- forced Concrete.

1.4 SUBMITTALS

A. Manufacturer's Data:

The Contractor shall submit the Manufacturer's specifications and installation instructions for all proprietary materials and reinforcement accessories.

B. Shop Drawings:

1. The Contractor shall submit shop drawings for the fabrication, bending, and placement of concrete reinforcement. All work shall comply with the ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures." Submittals shall show bar schedules, stirrup spacing, diagrams of bent bars, arrangements and assemblies.

2. The Contractor shall submit certification of grade, chemical analysis and tensile properties of the steel furnished.

3. Also see Section 01300, SUBMITTALS.

1.5 DELIVERY, HANDLING, AND STORAGE

A. All steel reinforcement delivered to the project site shall be bundled, tagged, and marked. Metal tags shall be used indicating the bar size, lengths, and other information corresponding to markings shown on placement diagrams in accordance with ACI 315.

B. The Contractor shall store concrete reinforcement materials at the site in a manner that will prevent damage and accumulation of dirt or excessive rust. Store to prevent contact with the ground. Protect all reinforcement from any contact with oil, grease, or petroleum based products of any kind.

PART 2 PRODUCTS

2.1 REINFORCING STEEL GRADE

A. Unless otherwise called for on the Drawings, all rein-forcing steel for this project shall conform to ASTM A615 Grade 60, except for #3 stirrups or column ties which shall be Grade 40.

B. Bar mats shall conform to the requirements of AASHTO M54 (ASTM A82).

2.2 ACCESSORIES

A. Chairs and spacers shall be metal stock, designed for the purpose intended.

B. All accessories shall comply with CRSI "Recommended Practice for Placing Bar Supports, Specifications and Nomenclature."

C. The Contractor shall provide stainless steel accessories for sight-exposed concrete (exterior), and concrete surfaces exposed to moisture or containing water.

D. Slabs on grade where the base material will not support chairs, shall use supports with sand plates or horizontal runners to properly locate steel reinforcing in the slab.

E. Wire-bar type supports shall complying with CRSI recommendations. Wood, brick, or other materials will not be accepted.

F. Tie wire shall be 16-gauge, black, soft-annealed wire. Tie wire shall not be closer than 1-inch from surface of wall or slab after tying in place.

2.3 WELDED WIRE FABRIC

Welded-wire fabric shall be electrically welded, 65,000 psi yield strength minimum, and shall conform to ASTM A185 or A 497 (AASHTO M55) and ACI 318, latest edition.

2.4 SPLICES AND MECHANICAL CONNECTIONS

A. Metal Sleeve: If used for splice, provide with cast filler metal, capable of developing in tension or compression 125 percent of specified yield strength of the bar, as manufactured by:

1. Erico Products, Inc., Cleveland, OH, Cadweld C-Series.

2. Or equal.

B. Mechanical Threaded Connections: Metal coupling sleeve with internal threads which engage threaded ends of bars to be spliced, and develops in tension or compression 125 percent of the specified yield strength of the bar, as manufactured by:

1. Erico Products, Inc., Cleveland, OH, Lenton Reinforcing Steel Couplers.

2. Richmond Screw Anchor Co., Inc., Fort Worth, TX, Richmond DB-SAE Dowel Bar Splicers.

PART 3 EXECUTION

3.1 FABRICATION

General: The Contractor shall fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI "Manual of Standard Practice" and ACI 301. In case of fabricating errors, the heating, rebending or straightening of reinforcement will not be permitted.

3.2 GENERAL

A. Meet requirements in the manual titled, "Placing Reinforcing Bars", published by Concrete Reinforcing Steel Institute (CRSI).

B. Steel reinforcement shall be protected at all times from injury. When placed in the work, it shall be free from dirt, detrimental scale, paint, oil and other foreign substance. When steel reinforcement has detrimental rust, loose scale and dust which is easily removable, it shall be cleaned by a satisfactory method, if approved.

C. All bars shall be bent cold, unless otherwise permitted. No bars partially embedded in concrete shall be field bent except as shown on the Drawings or otherwise permitted.

D. Details of concrete reinforcement and accessories not covered herein or on the Drawings shall be in accordance with ACI 315.

E. Notify Engineer when reinforcing is ready for inspection and allow sufficient time for this inspection prior to close-up of the forming system or placing concrete.

3.3 INSTALLATION

A. The Contractor shall clean reinforcement to remove all loose rust and mill scale, earth, ice, oil or grease, and other materials which reduce or destroy the bond between the concrete and reinforcing steel.

B. The Contractor shall position, support, and secure all reinforcement to prevent displacement by formwork, construction loadings, or concrete placement operations. Steel reinforcing shall be located and supported by metal chairs, runners, bolsters, spacers and hangers, as required. The reinforcement shall be placed to obtain the coverage for concrete protection noted on the Drawings. Where the coverage is not shown, the reinforcement shall be placed to obtain at least the minimum coverage specified hereinafter. The Contractor shall arrange, space, and securely tie bars and bar supports together with 16-gauge wire to hold reinforcement accurately and solidly in position during concrete placement operations. Wire ties shall be set so that the twisted ends are directed away from the exposed concrete surfaces. All reinforcement will be tied and secured in the correct position in the forms before placing concrete. Do not stab reinforcing into fresh placed concrete.

C. The Contractor shall provide a sufficient number of supports of adequate strength to carry the reinforcement. Reinforcing bars shall not be placed more than 2 inches beyond the last leg of any continuous bar support. Supports shall not be used as bases for runways for concrete conveying equipment and similar construction loads.

D. Supports or spacers of pebbles, pieces of broken stone, concrete rubble, broken brick or building blocks, metal pipe or wooden blocks will not be permitted.

E. Splices:

1. Standard reinforcement splices shall be done by lapping the ends, placing the bars in contact, and tightly wiring the splice together. The requirements of ACI 318 for minimum lap of spliced bars shall be provided. Use lap splices unless otherwise shown on the Drawings or permitted in writing by the Engineer. Stagger splices minimum of 40 bar diameters in adjacent bars unless otherwise shown on the Drawings or permitted in writing by the Engineer.

2. No field welding or tacking of reinforcement will be permitted.

3. Vertical bars in columns shall be offset at least one bar diameter at lapped splices. To ensure proper placement, templates shall be furnished for all column dowels.

F. Unless otherwise shown on the Drawings, the Contractor shall provide cover as follows:

1. Not less than 3 inches where the concrete is placed against the ground and without use of forms.

2. Not less than 1 1/2-inches for bars smaller than No. 6 and not less than 2-inches for No. 6 bars and larger where concrete is exposed to the weather, water, or in contact with earth, but placed in forms.

3. Not less than 1 1/2-inches for interior slabs, walls, beams, and columns.

G. The Contractor shall provide a minimum of two No. 4 bars in the top and bottom of a slab or wall face at 45 degrees on all four corners at all openings in structural slabs and walls, unless otherwise shown on the Drawings. Bars shall extend on each side sufficiently to develop bond in each bar.

H. The Contractor shall notify the Engineer when reinforcing is in place so that an inspection of reinforcement placement can be made prior to the close-up of formwork or the placement of concrete.

I. Conform to ACI 301 for all placing tolerances.

J. Bars may be moved to avoid interference with other reinforcing steel, conduits, or embedded items. If moved more than one bar diameter or the stipulated tolerance, the Contractor shall consult with the Engineer to determine final placement.

K. At construction joints and before constructing concrete form work for next stage of construction, the Contractor shall clean all dowels, reinforcing bars and concrete surfaces. All loose material and foreign objects shall be cleaned out of forming before placement of concrete.

L. Placing Welded Wire Fabric:

1. Extend fabric to within 2-inches of edges of slab, and slab control joints and lap splices at least 1½ courses of fabric or minimum 8-inches.

2. Tie laps and splices securely at ends and at least every 24-inches with 16-gauge black annealed steel wire.

3. Place welded wire fabric on #4 continuous bars at 4'-0" at proper distance above bottom of slab. All slab reinforcing is to be discontinuous at slab control joints.

4. Meet current ACI 318 and current Manual of Standard Practice, Welded Wire Fabric, by the Wire Reinforcement Institute regarding placement, bends, laps, and other requirements.

5. All welded wire fabric shall be provided in flat sheets. Rolled fabric will not be permitted.

M. Field Bending:

1. Straightening and Rebending: Do not straighten or rebend metal reinforcement. Field bending of reinforcing steel bars is not permitted.
2. Unless permitted by Engineer, do not cut reinforcing bars in the field.

3.4 MECHANICAL SPLICES AND CONNECTIONS

A. Install as required by manufacturer with threads tightened as required by referenced ICBO Report.

B. Carefully inspect each splice and verify that each component meets manufacturer's and ICBO requirements.

C. Maintain minimum edge distance and concrete cover.

END OF SECTION 03200

SECTION 03251

EXPANSION AND CONSTRUCTION JOINTS

PART 1 GENERAL

1.1 WORK INCLUDED

Work necessary to furnish and install, complete, the expansion, construction, and control joints including premolded, pourable, and gun grade fillers.

1.2 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

A. Submittals: Section 01300.

B. Saw-cut Control Joints: Section 03300.

1.3 SUBMITTALS

A. Product Data: Furnish for the following:

1. Joint fillers for horizontal and sloped joints.

2. Preformed control joints.

3. Sealants.

C. Quality Control submittals: Furnish the following documents:

1. Joint Filler and Primer: Manufacturer's written instructions for product shipment, storage, handling, application, and repair.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Prepare and protect materials for shipment in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 BOND BREAKER TAPE FOR EXPANSION JOINT

A. Adhesive-backed glazed butyl or polyethylene tape which will adhere to the premolded joint material or concrete surface.

B. Width: Same as the joint.

C. Location: As shown.

2.2 BOND BREAKER

A. Provide either bond breaker tape as hereinbefore specified.

2.3 BACKING ROD

A. Backing rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material used and shall have a tensile strength of not less than 40 psi and o compression deflection of approximately 25 percent at 8 psi. The rod shall be 1.8 inch larger than the joint width except that one-inch diameter rod shall be used for ¾ inch wide joint.

2.4 JOINT FILLER (JF)

A. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick.

2.5 JOINT SEALANT

A. Joint sealant shall be approved for use in potable water supply systems. The specific gravity of the in-place filler after curing shall be greater than 1.0. The manufacturers of the following fillers shall provide written certification that the products are approved by the EPA and the State Department of Health for use in potable water supply systems, and will not be a hazard to health.

B. Manufacturers and Products:

1. Sikaflex 2C, Colonial White color only, as manufactured by Sika Chemical Company, Lyndhurst, NJ; submit product information for review and acceptance.

2. On sloping joints, use Gun Grade material of the above products of Sikaflex 1A similar nonsag material; submit product information for review and acceptance.

3. Or equal.

2.6 ACCESSORIES

A. Joint Sealant: Joint sealant shall be two-part polysulfide or urethane conforming to FS TT-S-00227. The type used shall be specifically intended for exterior, submerged control joint applications. A non-sag joint sealant shall be used for vertical joints and self-leveling for horizontal joints.

PART 3 EXECUTION

3.1 GENERAL

A. Locate joints as shown, or noted on the Drawings.

B. Verify conformance of water stops with dimensions shown and with reviewed product data prior to embedding water stops in concrete.

C. Construct straight joints; make vertical or horizontal, except where walls intersect sloping floors.

D. Commence concrete placement after the joint preparation is complete.

E. Time Between Concrete Pours:

1. At least 2 hours must elapse after depositing concrete in long or high columns and/or heavy walls before depositing concrete in beams, girders, or slabs supported thereon.

2. For short columns and low height walls, 10 feet or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

3. Consider beams, girders, brackets, column capitals, and haunches as part of the floor or roof system and place monolithically with the floor or roof system.

3.2 SURFACE PREPARATION

A. Expansion Joint with Joint Sealant:

1. Use motorized wire brush or other motorized device to mechanically roughen and thoroughly clean concrete surfaces on each side of joint from plastic water stop to the top of the joint.

2. Use clean and dry high pressure air to remove dust and foreign material, and dry joint.

3. Prime surfaces before placing joint filler.

3.3 EXPANSION JOINT INSTALLATION

A. General:

1. Joint Sealant:

a. Sufficient in width to completely fill the joint space where shown.

b. If a water stop is in the joint, cut premolded joint filler to butt tightly against the water stop and the side forms.

2. Precut premolded joint filler to the required depth, as detailed, at locations were joint filler or sealant is to be applied.

3. Form cavities for joint filler with either precut, premolded joint filler, or smooth removable accurately-shaped material.

4. Vibrate concrete thoroughly along the joint form to produce a dense, smooth surface.

C. Pourable Joint Filler:

1. General: Install in accordance with the manufacturer's written instructions, except as specified below:

a. Apply primer prior to pouring joint filler.

b. Use masking tape on top of slabs at sides of joints; clean all spillage.

2. Place cold-applied, two-component fillers in accordance with manufacturer's written instructions.

3.4 CONTROL JOINT

A. Sawcut or score control joint at spacings a minimum of the least dimension of the slab to a depth of ¼ the slab thickess.

B. Place backer rod and joint sealant in control joint.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Curb and gutter.

B. Related Sections:
   1. Section 03100 - Concrete Forms and Accessories.
   2. Section 03251 – Expansion and Construction Joints.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM C33 - Standard Specification for Concrete Aggregates.
   2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
   3. ASTM C150 - Standard Specification for Portland Cement.
   4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   5. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
   6. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
   7. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
   8. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
   9. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
   10. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
   11. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on joint devices, attachment accessories, admixtures and.

C. Design Data:
1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
a. Hot and cold weather concrete work.
b. Air entrained concrete work.
2. Identify mix ingredients and proportions, including admixtures.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Acquire cement and aggregate from one source for Work.

C. Conform to ACI 305 when concreting during hot weather.

D. Conform to ACI 306.1 when concreting during cold weather.

1.5 COORDINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type IIIA - Air Entraining Portland type; ASTM C595, list appropriate blend and cement type.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494 Type A - Water Reducing Type B - Retarding Type C - Accelerating Type D - Water Reducing and Retarding Type E - Water Reducing and Accelerating Type F - Water Reducing, High Range Type G - Water Reducing, High Range and Retarding.

C. Fly Ash: ASTM C618 Class F.

D. Plasticizing: ASTM C1017.

2.3 ACCESSORIES

A. Concrete Reinforcing Fibers: ASTM C1116, high strength industrial-grade fibers specifically engineered for secondary reinforcement of concrete. Tensile strength -130 ksi; toughness 15 ksi; 3/4 inch long fibers, 34 million/lb fiber count.

2.4 CONCRETE MIX

A. Mix concrete in accordance with ACI 301. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301 trial mixtures.

C. Provide concrete to the following criteria: See Structural notes on the Construction Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

E. Place joint filler in slab slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

F. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface.

G. Install construction joint devices in coordination with slab slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

H. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

I. Place concrete continuously between predetermined expansion, control, and construction joints.

J. Do not interrupt successive placement; do not permit cold joints to occur.

K. Screed slabs and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

L. Slope slab to drain where applicable.

3.4 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with finish as Scheduled in this section.

B. Finish concrete slab surfaces in accordance with ACI 301.

C. Steel trowel surfaces which are indicated to be exposed.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure slab surfaces in accordance with ACI 301.

3.6 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing and Inspection Services.

B. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01400.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

E. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

F. Three concrete test cylinders will be taken for every 30 or less cu yds of concrete placed.

G. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

H. One slump test will be taken for each set of test cylinders taken.

I. One air content test will be made for each set of test cylinders taken.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.7 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Curb and gutter: 4,000 PSI 28 day concrete, air entrained, toweled finish with broomed surface.

B. Concrete Headwall: 4,000 PSI 28 day concrete, air entrained with smooth wall form finish.

C. Flatwork: Curb and gutter: 4,000 PSI 28 day concrete, air entrained, toweled finish with broomed surface.

END OF SECTION