



STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

STANDARD LOW BID PROJECT

August 8, 2007

CSMS ACCESS ROAD/JOGGING TRACK DRAPER COMPLEX

UTAH NATIONAL GUARD DRAPER, UTAH

DFCM Project Number 07236480

Stanley Consultants
5353 South 960 East #220
Salt Lake City, Utah 84117

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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 General Conditions dated May 25, 2005.

DFCM Application and Certification 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>

NOTICE TO CONTRACTORS

Sealed bids will be received by the Division of Facilities Construction and Management (DFCM) for:

CSMS ACCESS ROAD/JOGGING TRACK - DRAPER COMPLEX
UTAH NATIONAL GUARD – DRAPER, UTAH
DFCM PROJECT NO: 07236480

Bids will be in accordance with the Contract Documents that will be available at 12:00 Noon on Wednesday, August 8, 2007, and distributed in electronic format only on CDs from DFCM, 4110 State Office Building, SLC, Utah and on the DFCM web page at <http://dfcm.utah.gov>. For questions regarding this project, please contact Wayne Smith, DFCM, at 801 550-6536. No others are to be contacted regarding this bidding process. The construction budget for this project is \$250,000.

A **mandatory** pre-bid meeting will be held at 11:00 AM on Tuesday, August 14, 2007 at 12953 South Minuteman Road, Draper, Utah. All bidders wishing to bid on this project are required to attend this meeting.

Bids will be received until the hour of 3:00 PM on Thursday, August 23, 2007 at 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.

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 and Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of DFCM.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Marla Workman, Contract Coordinator
4110 State Office Building, Salt Lake City, Utah 84114

PROJECT DESCRIPTION

This project consists of some concrete demolition and removing an existing railroad tie retaining wall, excavation to widen a roadway, and pour new asphalt for the roadway as well as concrete curb and gutter islands in the roadway. Also, a new concrete retaining wall will be constructed requiring architectural finish on the concrete. The National Guard logo will be imprinted into the wall in six different locations (Additive Alternate #1). There will also be a concrete stairway in the retaining wall leading to the jogging track. The jogging track will be approximately a 1/3 mile track ten feet wide, gravel surface.

The majority and the main focus of this project is the architecturally finished concrete retaining wall, the concrete stairs, and the concrete curb and gutters. Specialty concrete contractors depending on qualifications and work history will be allowed to bid this project as primary contractors, providing they can provide the necessary bonding (bid bond, payment bond, and performance bond).

This project is at a secure facility and all workers will require a security clearance to perform work. State identification and/or drivers licenses will be required to verify identification.

ANY Contractor wishing to submit a bid on this project must fall under at least ONE of the following conditions:

1. Contractors who have been selected on the 2008 General Contractor shortlist issued by DFCM (no qualification required)
2. Contractors who have had prior experience with state issued projects and proven work history of projects similar to this project (submit qualifications required below to DFCM by the date and time listed on the Project Schedule).
3. Contractors who have had no previous state work history (submit qualifications required below to DFCM by the date and time listed on the Project Schedule).
4. Contractors wishing to bid services from Specification Sections 26, 27, and/or 28 must also be pre-qualified by providing the information required in items 2 and 3 above. Subcontractors bidding from these sections must also be in attendance at the mandatory pre-bid meeting.

PRE-QUALIFICATION SUBMITTAL REQUIREMENTS

1. Provide work history of state projects within the last 3 – 5 years including project name, project number, project results, and project evaluation rating.
2. If work has not been performed for the state, provide work history of similar type work projects successfully completed within the last 3 – 5 years.
3. Provide a management plan for this particular project identifying key personnel; i.e., project manager, superintendent, key sub-contractors, etc. including their work experience and history with your firm. Provide as part of management plan the procedures that will be utilized to schedule work so that the facility is not impacted and work can be performed during normal working hours at the facility. Also all asphalt work must be scheduled to be complete prior to batch plants closing for the season.

Pre-qualification packets must be submitted to DFCM, State Office Building by **12:00 Noon on Monday, August 13, 2007**. DFCM will notify approved contractors by fax/phone no later than **4:00 PM, Monday, August 13, 2007**.

**PROJECT SCHEDULE**

PROJECT NAME:	CSMS ACCESS ROAD/JOGGING TRACK - DRAPER COMPLEX UTAH NATIONAL GUARD – DRAPER, UTAH			
DFCM PROJECT NO.	07236480			
Event	Day	Date	Time	Place
Bidding Documents Available	Wednesday	August 8, 2007	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Mandatory Pre- Qualification Submittal	Monday	August 13, 2007	12:00 NOON	Wayne Smith - DFCM 4110 State Office Bldg SLC, UT E-mail wsmith@utah.gov Fax (801) 538-3267
Mandatory Pre-bid Site Meeting	Tuesday	August 14, 2007	11:00 AM	12953 South Minuteman Dr Draper, Utah
Last Day to Submit Questions	Friday	August 17, 2007	4:00 PM	Wayne Smith - DFCM E-mail wsmith@utah.gov Fax (801) 538-3267
Addendum Deadline (exception for bid delays)	Tuesday	August 21, 2007	2:00 PM	DFCM web site *
Prime Contractors Turn In Bid and Bid Bond	Thursday	August 23, 2007	3:00 PM	DFCM 4110 State Office Bldg SLC, UT
Sub-contractor List Due	Friday	August 24, 2007	3:00 PM	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Substantial Completion Date	Monday	December 3, 2007		

* 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 "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the **CSMS ACCESS ROAD/JOGGING TRACK - DRAPER COMPLEX - UTAH NATIONAL GUARD - DRAPER, UTAH – DFCM PROJECT NO. 07236480** 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: _____

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

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

ADDITIVE ALTERNATE #1: Provide six National Guard concrete logos imprinted in the retaining wall. National Guard will provide the three dimensional logo templates.

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

UNIT PRICE: Price per square foot to remove and replace asphalt paving and base course: \$_____/sq ft.

I/We guarantee that the Work will be Substantially Complete by **December 3, 2007**, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **\$250.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

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

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

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable 100% Performance and Payment bonds are not delivered within the 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

INSTRUCTIONS TO BIDDERS

1. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Invitation to Bid.

2. Bids

Before submitting a bid, each contractor 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. 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 Representative and the necessary changes shall be accomplished by Addendum.

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 deadline for 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 bid bond 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. **NOTE: A cashier's check cannot be used as a substitute for a bid bond.**

3. Contract and Bond

The Contractor's Agreement will be in the form found in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract 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.

4. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the “Instructions and Subcontractor’s List Form”, which are included as part of these 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 is subject to a debarment hearing and may be debarred from consideration for award of contracts for a period of up to three years.

5. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Project Manager a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addenda posted on DFCM’s web site at <http://dfcm.utah.gov>. Neither the DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

6. Addenda

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.

7. 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 the State of Utah 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.

8. DFCM Contractor Performance Rating

As a contractor completes each DFCM project, DFCM, the architect/engineer and the using agency will evaluate project performance based on the enclosed “DFCM Contractor Performance Rating” form. The ratings issued on this project will not affect this project but may affect the award on future projects.

9. 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.

10. 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.

11. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

12. Time is of the Essence

Time is of the essence in regard to all the requirements of the Contract Documents.

13. Withdrawal of Bids

Bids may be withdrawn on written request received from bidder prior to the time fixed for opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

14. 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 A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued addendum. 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 A/E.

15. 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.

16. Debarment

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by DFCM as part of the requirements for award of the Project.

BID BOND

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

KNOW ALL PERSONS BY THESE PRESENTS:

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

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

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

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

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

DATED this _____ day of _____, 20_____.

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

By: _____

Title: _____

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

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

By: _____

Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

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

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

My Commission Expires: _____

Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

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

**Division of Facilities Construction and****INSTRUCTIONS 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, on the following basis:

PROJECTS UNDER \$500,000 - ALL SUBS \$20,000 OR OVER MUST BE LISTED
PROJECTS \$500,000 OR MORE - ALL 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.
- Bidder must list "Self" if performing work itself.

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.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'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.

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM
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GROUND 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	CONT. 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)

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



SUBCONTRACTORS LIST
FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

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

We certify that:

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

FIRM: _____

DATE: _____

SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. 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 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%

CONTRACTOR'S AGREEMENT
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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 Invitation to Bid, Instructions to Bidders/ Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

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

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

safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

PRINCIPAL:

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

SURETY:

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

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

Subscribed and sworn to before me this _____ day of _____, 20____.

My commission expires: _____

Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

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

PAYMENT BOND

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

KNOW ALL PERSONS BY THESE PRESENTS:

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

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

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

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

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

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

PRINCIPAL:

By: _____ (Seal)
Title: _____

WITNESS OR ATTESTATION:

SURETY:

By: _____ (Seal)
Attorney-in-Fact

STATE OF _____)
) ss.
COUNTY OF _____)

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

Subscribed and sworn to before me this _____ day of _____, 20____.

My commission expires: _____
Resides at: _____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

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



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:

- As-built 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. The amount withheld pending completion of the list of items noted and agreed to shall be: \$_____. 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

**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
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

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

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

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
<u>Agency Comments:</u>	
<u>A & E Comments:</u>	
<u>DFCM Project Manager Comments:</u>	

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

Signed by:	Date:	Mean Score
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Additional Comments:



State of Utah—Department of Administrative Services

DIVISION OF FACILITIES CONSTRUCTION
AND MANAGEMENT

4110 State Office Building/Salt Lake City Utah 84114/538-3018

Project Manual

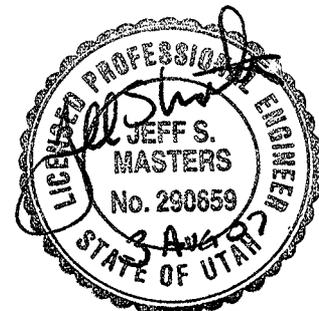
for

Utah National Guard Draper Complex CSMS Access Road/Jogging Track

DFCM Project Number 07236480

**Division of Facility Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114
Telephone: (801)538-3260**

August 3, 2007



Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

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DRAPER COMPLEX CSMS
ACCESS ROAD/JOGGING TRACK

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DRAWING LIST

Drawing No.	Title	Rev. No.
G1	Cover Sheet	
G-2	General Notes	
C-1	Existing Conditions Plan	
C-2	Demolition Plan	
C-3	Site Plan	
C-4	Retaining Wall Plan and Profile	
C-5	Retaining Wall Plan and Profile	
C-6	Civil Details Sheet	
C-7	Civil Details Sheet	

SECTION 00 10 00**SUMMARY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Contract description.
- B. Contractor's use of site and premises.
- C. Future work.
- D. Recommended work sequence.
- E. Owner occupancy.

1.02 CONTRACT DESCRIPTION

- A. Work of this contract comprises the demolition and removal of existing curb, retaining wall, asphalt pavements, gravity irrigation line, and irrigation structures; relocation of existing chain link fencing and gate, fire hydrant; and general construction of retaining wall, access stairs, water line, asphalt pavement and jogging track located at 12953 South Minuteman Drive, Draper, Utah for the Utah National Guard through the Division of Facilities Construction and Management.

1.03 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
 - 1. Owner ingress and egress to the vehicle maintenance areas.
- B. Construction Operations: Limited to areas noted on Drawings
- C. Utility Outages and Shutdown: Coordinate water shut downs with Owner.
- D. Coordinate use of premises under direction of Owner.

RECOMMENDED WORK SEQUENCE

- A. It is recommended to Construct Work in stages to accommodate Owner's occupancy requirements during the construction period, coordinate construction schedule and operations with Owner:
 - 1. Stage 1: Install new 24" RCP irrigation line along northern limits of project area. Remove existing curb and abandon or remove existing irrigation line and structures. Remove existing irrigation line as needed to accommodate construction of new retaining wall. Remove existing chain link fencing and gate, store chain link fencing fabric and gate on site for future use.
 - 2. Stage 2: Construct new retaining wall and access stairs; relocate existing fire hydrant and install water line. Construct jogging track.
 - 3. Stage 3: Install new asphalt pavement; remove and replace existing asphalt pavements; perform final site grading; install chain link fence and gate.

1.05 OWNER OCCUPANCY

- A. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations. To as much of the extent as possible maintain traffic flow along existing East Access Road.
- B. Schedule the Work to accommodate Owner occupancy.

1.06 MAJOR WORK ITEMS

- A. The following table of major work items is provided for the Contractor's convenience and is for information only. The Estimated Quantities contained in the table are estimates only, actual quantities may vary. The Contractor Bid shall be based on Contractor's own measurements based on review of site, construction means and methods, and as shown on the construction drawings.

No.	Description	Unit	Estimated Quantity
1.	Mobilization	LS	1
2.	Remove Existing Curb and Retaining Wall	LS	1
3.	Abandon and Remove Existing Irrigation Line and Structures	LS	1
4.	Site Grading	LS	1
5.	Retaining Wall	LF	625
6.	Access Stairs	EA	2
7.	Curb & Gutter	LF	440
8.	Asphalt Pavement	SF	15,100
9.	Remove and Replace Asphalt Pavement	SF	5,200
10.	Relocate Chain Link Fence and Gate	LS	1
11.	Relocate Fire Hydrant	LS	1
12.	24" RCP Irrigation Line	LF	215
13.	Connect to Existing Irrigation Box	EA	2
14.	Signing and Striping	LS	1
15.	10' Jogging Track (BID ALTERNATE NO. 1)	LF	1,760
16.	Utah National Guard Logo Retaining Wall Form Liner (BID ALTERNATIVE NO. 2)	EA	6

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 22 00**WORK ITEMS****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Description of major work items.

1.02 DESCRIPTION OF MAJOR WORK ITEMS

- A. Mobilization; lump sum (LS): Price includes mobilization costs along with general and miscellaneous responsibilities and operations not normally attributed to any other single bid item. When 10% of the original contract amount is earned, 25% of the bid amount will be paid. When 25% of the original contract amount is earned, 50% of the bid amount will be paid. When 50% of the original contract amount is earned, 75% of the bid amount will be paid. When 75% of the original contract amount is earned, 100% of the bid amount will be paid.
- B. Remove Existing Curb and Retaining Wall; lump sum (LS): Price includes furnishing material, equipment, and labor for removal and disposal of material at an off site location of all existing concrete curb, railroad ties, and concrete retaining wall as shown on the drawings. Includes any backfilling made necessary by these operations.
- C. Abandon and Remove Existing Irrigation Line; lump sum (LS): Price includes furnishing material, equipment, and labor for removal and disposal of material at an off site location of existing irrigation line and structures as shown on the drawings. Remove and dispose of existing irrigation line as needed for construction of the new retaining wall. Includes plugging and abandoning existing irrigation line that is not removed at the locations shown on the drawing and shall also include any backfilling made necessary by these operations.
- D. Site Grading; lump sum (LS): Price includes furnishing all material, equipment and labor for general site clearing and grading. Site grading shall include but is not limited to incidental earthwork required for construction of new retaining wall, removal and disposal of debris not suitable for fill material, disposal of suitable material on site at the Owners designated location in a manner suitable to the Owner, and includes final site grading. Price shall also include coordination with Owner for the grading of existing stock piled material as shown on the drawings.
- E. Retaining Wall; linear foot (LF): Price includes furnishing all material, equipment, labor, dewatering, form work, reinforcing steel, concrete, embedded items, curing, excavation, shoring, bracing, backfilling and incidentals for concrete for the construction of a cast in place concrete retaining wall as shown on the drawings.
- F. Access Stairs; each (EA): Price includes furnishing all material, equipment, labor, dewatering, form work, reinforcing steel, concrete, embedded items, curing, excavation, shoring, bracing, backfilling and incidentals for concrete for the construction of a cast in place concrete stairs as shown on the drawings.
- G. Curb and Gutter; linear feet (LF): Price includes furnishing all material, equipment, labor, dewatering, form work, reinforcing steel, concrete, embedded items, curing, backfilling and incidentals for concrete for the construction of a cast in place concrete curb and gutter as shown of the drawings.
- H. Asphalt Pavement; square feet (SF): Price includes furnishing all material, equipment, labor, grading, and compacting for the placement of asphalt pavement as shown on the drawings. Price includes saw cutting, expansion joint material and joint sealing,

- I. Remove and Replace Asphalt Pavement; square feet (SF): Price includes furnishing all material, equipment, labor, for the removal and replacement of existing asphalt pavement. Price includes saw cutting, expansion joint material and joint sealing, and disposal of material at an off site location
- J. Relocate Chain Link Fence and Gates; lump sum (LS): Price includes furnishing all materials, equipment, labor, and incidentals for the installation of relocated chain link fencing and gate. Reuse existing chain link fencing fabric and gate with accessories; provide new posts, tension bands, barbed wire and braces. Price also includes furnishing all materials, equipment, labor, and incidentals for two (2) new 4'-0" single swing gates at access stairs.
- K. Relocate Fire Hydrant; lump sum (LS): Price includes furnishing all materials, equipment, labor, excavation, dewatering, shoring, bracing, concrete, backfilling, connection to existing waterline, and testing for the relocation of an existing fire hydrant and installation of approximately 30 linear feet of 6" PVC PC 200 waterline.
- L. 24" RCP Irrigation Line ; linear foot (LF): Price includes furnishing all materials, equipment, labor, excavation, dewatering, shoring, bracing, concrete, backfilling, and incidentals for the installation of RCP irrigation line. Price shall also include demolition and disposal of material at an off site location of two (2) existing irrigation bubble boxes.
- M. Connect to Existing Irrigation Box; each (EA): Price includes furnishing all materials, equipment, labor, excavation, dewatering, backfilling, and incidentals for the connection of the new 24" RCP Irrigation line to existing irrigation control structures.
- N. Signing and Striping; lump sum (LS): Price Includes furnishing all materials, equipment, labor, and incidentals for the installation of two traffic signs and roadway striping as shown on the drawings.
- O. 10' Jogging Track (BID ALTERNATE NO. 1); linear foot (LF): Price includes furnishing all materials, equipment, labor, clearing, excavation, incidental grading, backfilling, compacting, and incidentals for the construction of jogging track 10' wide. Price to include furnishing all materials, equipment, labor, clearing, excavation, backfilling, compacting, and incidentals for the installation of concrete access for vehicle storage area.
- P. Utah National Guard Retaining Wall Form Liner (BID ALTERNATE NO. 2); each (EA): Price includes all materials, equipment, labor, and incidentals for duplicating Utah National Guard Logo as provided by Owner and installing at locations selected by the Owner along retaining wall.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Product Data.
- D. Shop Drawings.
- E. Test reports.
- F. Certificates.
- G. Manufacturer's instructions.
- H. Engineer's duties.

1.02 SUBMITTAL PROCEDURES

A. Deliver submittals to:

Mr. Jeff S. Masters, P.E.
Email: mastersjeff@stanleygroup.com
Suite 220
5353 S 960 E
Salt Lake City, UT 84117-7269

- B. Drawings, instruction manuals, and other submittals shall be in English language.
- C. Symbols and drawings shall conform to ANSI Y32.2/IEEE 315/CSA Z99.
- D. Shop Drawings and manufacturers' information submitted shall be accompanied by completed copies of Submittal Transmittal Form, bound herein. Submit number of copies as specified.
- E. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- F. Do not include submittals for more than one section of specifications on the Shop Drawing Transmittal form (disregard if inapplicable).
- G. A brief description under "Title" should clearly identify the specific application of the equipment or material covered by the Shop Drawing, utilizing where possible the same title used in Drawings and Specifications. Identify Project, Contractor, Subcontractor, and supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- H. Information under the heading "Contractor's Transmittal" shall be completed by Contractor prior to submittal.
- I. Information under "Engineer's/Architect's Action" will be completed by Engineer.

- J. Apply Contractor's stamp, signed or initialed certifying that review, approval, 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.
- K. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.
- L. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- M. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.
- N. Notify Engineer in writing, at time of submission, of any deviations in submittals from requirements of Contract Documents. Any such deviations permitted by Engineer will require modifications of Contract Documents.
- O. Provide space for Contractor and Architect/Engineer review stamps.
- P. When revised for resubmission, identify all changes made since previous submission.
- Q. Submittals containing language imposing duties on others (such as verification of dimensions or supply of related information) inconsistent with the contract language shall be null and void.
- R. Shop drawings shall not be used as media for inquiries for information or for verification of information that must be supplied by others to Contractor. Inquiries or verification of information shall be made by separate Contractor submittal using Request For Information (RFI) process.
- S. Begin no fabrication or Work which requires submittals until return of submittals by Engineer with Engineer stamp, as either "Reviewed" or Reviewed as Noted."
- T. Distribute copies of reviewed submittals that carry Engineer stamp as either "Reviewed" or "Reviewed as Noted" as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- U. Submittals not requested will not be recognized or processed.

1.03 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules within 20 days after date of Notice to Proceed. After review, resubmit required revised data within ten days.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit a computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.

- H. Provide separate schedule of submittal dates for Shop Drawings, Product Data, and Samples, including dates reviewed submittals will be required from Engineer. Indicate decision dates for selection of finishes.
- I. Revisions to schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of separate contractors.

1.04 PRODUCT DATA

- A. Product Data: Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Provide copies and distribute in accordance with article "Submittal Procedures.
- B. Submit the number of copies which the Contractor requires, plus 2 copies which will be retained by the Engineer.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review distribute in accordance with article "Submittal Procedures" above and provide copies for record documents described in Section 01 70 00.

1.05 SHOP DRAWINGS

- A. Submit to Engineer for review for the limited purpose of checking for conformance to information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with article "Submittal Procedures".
- B. Sheet size: 8-1/2" x 11" minimum, 36" x 120" maximum.
- C. Make submittals to Engineer promptly in accordance with approved schedule, and in such sequence as to cause no delay in Work or in work of any other contractor.
- D. Shop Drawings may be submitted in electronic format.
 - 1. Submit electronic copy on CD, or E-mail files.
 - 2. Text documents shall be submitted in .pdf format.
 - 3. Drawings shall be submitted in .pdf or .tif format.
- E. Number of submittals required:
 - 1. Shop Drawings: Submit number of opaque reproductions which Contractor, Owner and/or approving agency (ies) requires, plus 2 copies which will be retained by Engineer.*
- F. Submittals shall contain:
 - 1. Date of submission and dates of any previous submissions.
 - 2. Project title and number.
 - 3. Contract identification.
 - 4. Names of:
 - a. Contractor.

- b. Supplier.
- c. Manufacturer.
- 5. Identification of product, with Specification section number and article number.
- 6. Field dimensions, clearly identified as such.
- 7. Relation to adjacent or critical features of Work or materials.
- 8. Applicable standards, such as ASTM or Federal Specification numbers.
- 9. Identification of deviations from Contract Documents.
- 10. Identification of revisions on resubmittals.
- 11. An 8" x 3" blank space for Contractor and Engineer stamps.
- 12. Indication of Contractor's approval, initialed or signed, with wording substantially as follows:

"Contractor represents to Owner and Engineer that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or assumes full responsibility for doing so and has reviewed or coordinated each Shop Drawing or Sample with requirements of Work and Contract Documents."

- 13. If Contract Documents include performance specifications stating required results which can be verified as meeting stipulated criteria, so that further design by Contractor prior to fabrication is necessary, Shop Drawings depicting such design must be prepared under seal of professional engineer registered *licensed* in appropriate state *jurisdiction* and Shop Drawing shall be signed and sealed in accordance with applicable regulations and with the following certification statement:

"I hereby certify that this engineering document was prepared by me or under my direct personal supervision, that I am a duly registered licensed professional engineer under the laws of the state of Utah and I accept responsibility for the adequacy of this document to meet criteria stipulated in the Contract Documents."

- G. Resubmission requirements: Make any corrections or changes in submittals required by Engineer and resubmit until stamped as either "Reviewed" or "Reviewed as Noted" by Engineer. Text and depictions changed on Shop Drawings shall be back-circled (clouded). Engineer will assume that portions of Shop Drawings not back-circled have not been changed by Contractor from previous submission. Indicate revision number and date in document revision block.

1.06 TEST REPORTS

- A. Submit for the Engineer's knowledge as contract administrator or for the Owner.
- B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.07 CERTIFICATES

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.08 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.09 ENGINEER DUTIES

- A. Review required submittals with reasonable promptness and in accord with schedule, only for general conformance to design concept of Project and compliance with information given in Contract Documents. Review shall not extend to means, methods, sequences, techniques, or procedures of construction or to safety precautions or program incident thereto. Review of a separate item as such will not indicate approval of assembly in which item functions.
- B. Affix stamp and initials or signature, and indicate requirements for resubmittal, or review of submittal. Engineer's action on submittals is classified as follows:
 - 1. **Reviewed:** Submittal has been reviewed and appears to be in conformance to design concept of Project and Contract Documents. Contractor may proceed with fabrication of work in submittal.
 - 2. **Reviewed As Noted:** Submittal has been reviewed and appears to be in conformance to design concept of Project and Contract Documents, except as noted by Engineer. Contractor may proceed with fabrication of work in submittal with modifications and corrections as indicated by Engineer.
 - 3. **Resubmit:** Submittal has been reviewed and appears not to be in conformance to design concept of Project or with Contract Documents. Contractor shall not proceed with fabrication of work in submittal, but instead shall make any corrections required by Engineer and resubmit for review.
 - 4. **Returned without Review:** Submittal is being returned without having been reviewed because: 1) not required by Contract Documents; 2) grossly incomplete; 3) indicates no attempt at conformance to Contract Documents; 4) cannot be reproduced; 5) lacks Contractor's completed approval stamp; or 6) lacks design professional's seal when required by law or Contract Documents. If submittal is required by Contract Documents, Contractor shall not proceed with Work as detailed in submittal, but instead shall correct defects and resubmit for review.
 - 5. **For Information Only:** Submittal has not been reviewed but is being retained for informational purposes only.
- C. Return 2 copy of submittals to Contractor. Contractor shall make additional copies as required.
- D. Engineer's review of submittals shall not relieve Contractor from responsibility for any variation from Contract Documents unless Contractor has, in writing, called Engineer's attention to such variation at time of submission, and Engineer has given written concurrence pursuant to Contract Documents to specific variation, nor shall any concurrence by Engineer relieve Contractor from responsibility for errors or omissions in submittals.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 45 29**TESTING LABORATORY SERVICES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Testing laboratory services.
- B. Qualification of laboratory.
- C. Laboratory duties.
- D. Limitations of authority of testing laboratory.
- E. Contractor's responsibilities.
- F. Specific tests, inspections, and methods required.

1.02 RELATED SECTIONS

- A. Conditions of Agreement: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective sections of Specifications: Certification of products.
- C. Each Specification section listed: Laboratory tests required, and standards for testing.
- D. Testing laboratory inspection, sampling, and testing required for:
 - 1. Section 03 00 10 – Concrete Work.
 - 2. Section 31 23 00 – Excavation and Fill
 - 3. Section 32 11 23 – Aggregate Base Courses.
 - 4. Section 32 12 16 – Asphaltic Concrete Paving.

1.03 TESTING LABORATORY SERVICES

- A. Owner shall employ and pay for services of independent testing laboratory to perform specified services and testing.

1.04 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualifications," published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in state in which Project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by inspection.
- E. Testing equipment:
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:

- a. National Bureau of Standards.
- b. Accepted values of natural physical constants.

1.05 LABORATORY DUTIES

- A. Cooperate with Engineer and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling, and testing of materials and methods of construction:
 1. Comply with specified standards.
 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of Work or products.
- D. Promptly submit written report of each test and inspection; one copy each to Engineer, Owner, Contractor, and one copy to record documents file. Each report shall include:
 1. Date issued.
 2. Project title and number.
 3. Testing laboratory name, address, and telephone number.
 4. Name and signature of laboratory inspector.
 5. Date and time of sampling or inspection.
 6. Record of temperature and weather conditions.
 7. Date of test.
 8. Identification of product and Specification section.
 9. Location of sample or test in Project.
 10. Type of inspection or test.
 11. Results of tests and compliance with Contract Documents.
 12. Interpretation of test results, when requested by Engineer.
- E. Perform additional tests as required by Engineer or Owner.

1.06 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Approve or accept any portion of Work.
 3. Perform any duties of Contractor.

1.07 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.
- B. Secure and deliver to laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide laboratory preliminary design mix proposed to be used for concrete, and other materials mixes which require control by testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 1. To provide access to Work to be tested.
 2. To obtain and handle samples at Project Site or at source of product to be tested.
 3. To facilitate inspections and tests.
 4. For storage and curing of test samples.

- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

- G. Employ and pay for services of separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required:
 - 1. For Contractor's convenience.
 - 2. When initial tests indicate Work does not comply with Contract Documents.

1.08 SPECIFIC TESTS, INSPECTIONS, AND METHODS REQUIRED

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vehicular access.
- B. Progress cleaning and waste removal.
- C. Security.
- D. Water control.
- E. Dust control.
- F. Erosion and sediment control.

1.02 VEHICULAR ACCESS

- A. Location as approved by Owner
- B. Provide and maintain access to fire hydrants.
- C. Provide means of removing mud from vehicle wheels before entering streets.

1.03 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

1.04 SECURITY

- A. Security program:
 - 1. Initiate program in coordination with Owner's existing security system at project mobilization.
 - 2. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.
- B. Entry control:
 - 1. Restrict entrance of persons and vehicles into Project site and existing facilities.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors, make available to Owner on request.
 - 4. Owner will control entrance of persons and vehicles related to Owner's operations.
 - 5. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.
- C. Personnel identification:
 - 1. Provide identification badge to each person authorized to enter premises.
 - 2. Badge to include: Personal photograph, name and employer.
 - 3. Maintain a list of accredited persons, submit copy to Owner on request.
 - 4. Require return of badges at expiration of their employment on the Work.

1.05 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion

1.06 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.07 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 erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 02 41 00**DEMOLITION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Removal and disposal, removal and salvage, and removal, relocation and reinstallation of existing concrete curb, fire hydrant, chain link fencing, chain link fence gate, and associated work.
- B. Demolition work of this contract includes, but is not limited to:
 - 1. Removal and disposal of existing concrete curb and railroad ties.
 - 2. Removal and disposal of existing storm drain/irrigation manholes and piping.
- C. Remove and reinstall:
 - 1. Chain link fence and chain link fence gate.
- D. Perform reinstallation work by competent workers familiar with installation of chain link fencing and chain link fence gate.
- E. Excavation and dewatering required to accomplish this Work shall be included in Contractor's Bid.
- F. Contractor is responsible for determining actual site conditions, extent to which demolition is required, and method of demolition.

1.02 SALVAGEABLE ITEMS

- A. Following equipment shall be removed and remain property of Owner. Contractor shall remove salvageable equipment and transport to Owner's designated storage area
- B. Salvageable equipment list:
 - 1. Fire Hydrant.

1.03 SITE CONDITIONS

- A. Known underground piping, foundations, and other underground obstructions in vicinity of new construction are shown on Drawings.
- B. Protect underground facilities encountered during excavation until it is determined whether they are active or inactive. Repair, without compensation, existing active facilities shown on Drawings damaged during operations.
- C. Notify Engineer and Owner of unexpected subsurface conditions and discontinue Work in area until Owner provides notification to resume Work.

1.04 SCHEDULING

- A. Perform Work in manner which will provide least interference and most protection to public and existing construction. Contractor's operations subject to approval by Owner prior to commencement of Work.
- B. Carefully coordinate time and manner of demolition work with Engineer to assure continued operation of existing facilities and to maintain construction schedule requirements.
- C. Take care to minimize outages of electrical systems.

1.05 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for demolition work under this contract except as specifically described and listed in Agreement. Include costs in connection with Work in lump sum Contract Price or unit price for demolition.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION**3.01 PROTECTION**

- A. Protect existing facilities from damage by falling debris, dust, and construction operations.
- B. Provide shoring and bracing where necessary to support existing construction and protect personnel during demolition operation.

3.02 DEMOLITION - GENERAL

- A. Remove existing construction as specified and shown and as required to permit new construction.
- B. Perform removal in manner that will minimize dust, noise, and other nuisance. Maintain haul routes for disposal of material clean and free of debris.
- C. Remove existing construction carefully providing for neat and orderly junctions at construction to remain in place. Final appearance of exposed surfaces shall be similar and equal to that of adjacent existing work. Grind off rough surfaces to remove sharp projections.
- D. Perform demolition operations in manner that in no way endangers personnel, public, existing structures, utilities, roadways, or facilities not to be demolished.
- E. Any portion of existing construction whether structural, or accessory which has become unstable through removal of other parts of construction shall be removed as soon as practicable and no such unstable part shall be left free-standing or inadequately braced against causes of collapse at end of each day's work.
- F. No demolition shall be performed on piping, electrical circuits, or equipment until system has been isolated by Owner. Contractor shall verify isolation of system.
- G. Contractor shall relocate existing active miscellaneous piping, conduit, and electrical circuits and devices not detailed on Drawings but required for installation of equipment and items installed by this Contract.
- H. Fires will not be permitted in Project area. Burning of waste lumber and other building materials or trash on Site will not be permitted.
- I. Use of blasting will not be permitted.
- J. Provide temporary personnel and vehicle protection at openings or ledges made by demolition.

3.03 SALVAGE OF MATERIALS

- A. Salvageable materials, except items specified to remain property of Owner, shall become property of Contractor and shall be removed from site as Work progresses.

- B. Certain equipment and material shall be removed and reinstalled as indicated on Drawings and specified herein. Contractor shall remove such items, store if required, and reinstall as indicated. In the event of loss or damage to such material or equipment, Contractor shall replace items without additional cost to Owner.

3.04 DISPOSAL OF MATERIALS

- A. Storage of materials to be removed not permitted to accumulate on site. Promptly remove and dispose of nonsalvageable equipment and materials.
- B. Debris shall not be allowed to accumulate on roofs, floors, or in areas outside of and around any buildings being removed. Waste materials and debris resulting from Work shall be removed and disposed of daily by Contractor in disposal area obtained by Contractor.
- C. Burning of waste lumber and other building materials or trash on Site will not be permitted.
- D. No material, obstructions, or debris shall be placed or allowed to accumulate within 15' of any fire hydrant. Fire hydrants shall be accessible at all times.

3.05 REPAIR AND RESTORATION

- A. Contractor shall be responsible for damage to personnel, public, roadways, streets, structures, utilities, facilities, and equipment caused by operations and shall repair any damage at its own expense or replace items damaged beyond repair.
- B. Do not operate vehicles or equipment on existing construction or roadways that could be damaged.
- C. Backfill applicable excavated areas, open pits, and other depressions as work progresses. Backfill materials shall conform to requirements of Drawings and other specification sections.
- D. Grade areas disturbed by construction to smooth, uniform surfaces sloped to drain.
- E. Replace construction removed to facilitate operations with construction of equal quality to that removed.

3.06 CLEAN-UP

- A. Maintain public streets, alleys, or other thoroughfares used in carrying out disposal free of litter or soil attributable to this operation. Equip and load trucks or other vehicles to prevent leakage, blowing off, or other escape of any portion of whatsoever is being hauled. Cost incurred by Owner in cleaning up such litter will be charged to Contractor and deducted from monies due or to become due it under this contract.
- B. Upon completion of demolition work in each area, thoroughly clean area of materials not to remain.
- C. Remove materials (except paint) adhered to construction to remain.
- D. Leave areas in broom clean and vacuumed condition.

END OF SECTION

SECTION 03 00 10**CONCRETE WORK****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Cast-in-place concrete including formwork, reinforcing steel and miscellaneous materials.

1.02 SUBMITTALS

- A. Shop Drawings on reinforcing steel for retaining wall.
- B. Quality assurance data:
 - 1. Tests, or certificates of compliance with standards specified in this Section at least 14 days prior to commencing concrete placement for:
 - a. Cement: From each car from which cement will be used.
 - b. Fly ash: From each separate shipment from which fly ash is being used.
 - c. Aggregates: For each size aggregate from each source of aggregate, for grading, deleterious substances and soundness.
 - 2. List of admixtures, joint fillers, sealants, curing compounds, and other manufactured materials proposed identifying manufacturer and type. Provide data on specific items when requested by Engineer or Owner.
 - 3. Testing laboratory reports required at least 14 days prior to commencing concrete placement for each class of concrete and each size aggregate:
 - a. Proposed concrete design mix.
 - b. Tests on concrete cylinders from trial batch of proposed mix.
 - 4. Testing laboratory reports for tests on concrete cylinders taken in field.

1.03 QUALITY ASSURANCE

- A. Contractor shall retain services of qualified independent testing laboratory.
- B. Responsibility of testing laboratory will include:
 - 1. Obtaining, making samples and trial batches and performing laboratory and field testing specified.
 - 2. Provide reports to Engineer giving information on materials, concrete design mixes and testing performed.
 - 3. Reports shall indicate whether or not materials meet specifications.
- C. Perform Work in accordance with ACI 117 and 301.
- D. Tests:
 - 1. Establish proposed concrete design mix proportions on basis of either field experience and/or trial mixtures in accordance with ACI 318, Chapter 5, except specific requirements shall conform to requirement of these specifications. Determine and submit supporting data, standard deviation, trial batch tests, required average strength, proportions, air content, and slump range for each mix.
 - 2. Concrete strength tests:
 - a. Comply with ASTM C39/C39M for testing and ASTM C31/C31M or C192/C192M for preparation of cylinders.
 - b. Field tests: Sample in accordance with ASTM C172; make and test 3 cylinders from each sample on basis of not less than:
 - 1) One sample from each day's placement for each class of concrete.
 - 2) One sample from each 150 cu yd (120 cu m).
 - 3) One sample for each 5,000 sq ft (460 sq m) of surface area for slabs or walls.

- 4) For a given class of concrete, if frequency of testing specified above would provide less than 3 samples, sample at least 3 randomly selected batches or each batch if 3 batches or fewer are required.
- c. Cylinders shall be laboratory cured. Test one laboratory cured cylinder at 7 days and other two at 28 days for average strength.
- d. If tests indicate deficient strength as defined by ACI 318, immediately adjust mix to increase average of subsequent test results and, when directed, perform drilled core testing, ASTM C42/C42M. Testing and remedial work shall be at no additional cost to Owner.
3. Slump tests:
 - a. Test each batch as delivered; comply with ASTM C172 and C143/C143M.
 - b. If slump exceeds Specifications, promptly remove batch from Work and dispose of off-site at location selected by Contractor. Do not add water in excess of specified water-cement ratio to batch to achieve desired slump.
4. Air content tests:
 - a. Sample on basis specified above for field strength tests.
 - b. Obtain samples from concrete after it has been placed and consolidated.
 - c. Determine air content by pressure method; comply with ASTM C231.
 - d. If air content does not meet Specifications, remove deficient concrete from Work.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Cement: Keep clean, dry, and free from weather damage.
- B. Aggregates: Stockpile each gradation separately on clean, noncontaminating surface.

PART 2 PRODUCTS

2.01 CEMENT

- A. Portland cement: ASTM C150, Type I.
- B. High-early-strength portland cement: ASTM C150, Type III. May be used instead of Type I cement at Contractor's option, unless specified otherwise, to achieve 28-day strength at 7 days.
- C. Use only 1 brand of each type of cement.

2.02 AGGREGATE

- A. Regular aggregate: Strong, durable, well-graded minerals conforming to ASTM C33 requirements for grading, deleterious substances and soundness.
- B. Aggregates not conforming exactly to above specifications may be used provided:
 1. Special tests or actual service establish that such aggregates will produce concrete of quality specified.
 2. An Addendum to Specifications is issued prior to receipt of Bids; no deviations will be permitted after receipt of Bids.
- C. Coarse aggregate nominal size:
 1. 1-1/2" to No. 4: Use for all concrete unless specified otherwise.
 2. 3/4" to No. 4: Use for slabs and thin sections and areas where clear spacing between reinforcing bars is less than 3".

2.03 FLY ASH

- A. Conform to ASTM C618* including Supplementary Optional Physical Requirements in Table 2A*.

- B. Fly ash for total Project shall be obtained from single source.
- C. Design concrete mixes to include fly ash in amount of approximately 15% to 20% of cement by weight.
- D. May be used at Contractor's option for all concrete,

2.04 WATER

- A. Clean, fresh, free from injurious amounts of oil, alkali, acid, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mix water shall comply with ASTM C1602.

2.05 ADMIXTURES

- A. Water-reducing and set-controlling admixture, ASTM C494/C494M, type as required. Use for all concrete.
- B. Air entraining agent, ASTM C260. Use in accordance with manufacturer's recommendations. Use for all concrete.

2.06 REINFORCING

- A. Bars: ASTM A615/A615M, Grade 60 (420) deformed bars.
- B. Bend bars cold to conform to required details.

2.07 FORMS

- A. Acceptable materials:
 - 1. Douglas fir, exterior type, concrete form plywood, 5/8" thick minimum, conforming to DOC PS 1, Grade B-B, Class I or II.
 - 2. Removable metal forms with surfaces equal to Douglas fir, exterior type, concrete form plywood.
 - 3. Fiber tube forms: Cylindrical fiber reinforced forms.
- B. Form ties: Type leaving no metal within 1" of finished surface after removal of forms.
- C. Form coating:
 - 1. Wood forms: Nonstaining mineral oil or commercially produced form-release agent that will not bond with, stain, or adversely affect concrete surfaces and curing, and will not impair bond or adhesion of subsequent treatment of concrete surfaces, "Nox-Crete Form Coating," by Nox-Crete Chemicals, or equal.
 - 2. Metal forms: Treat surfaces as recommended by manufacturer before placing reinforcing.
 - 3. Fiber tube forms: Treat surfaces as specified for wood forms or as recommended by manufacturer.
- D. Utah National Guard Logo Retaining Wall Form Liner (BID ALTERNATE NO. 2)
 - 1. Owner to provide sample for Contractor to duplicate Utah National Guard Logo. Contractor to provide Utah National Guard Logo form liner at six locations along retaining wall. Contractor to coordinate location of Utah National Guard Logo with Owner. See Figure 1 for photo of Utah National Guard Logo.



Figure 1 – Utah National Guard Logo (approximate size 3 to 4 feet)

2.08 JOINT MATERIALS

A. Expansion joint filler:

1. Preformed nonextruding and resilient bituminous type, ASTM D1751; use where shown.

B. Expansion joint sealant:

1. Horizontal joints: "Sonolastic SL2," multi-component polyurethane base by Sonneborn Division of ChemRex, Inc., or equal.
2. Vertical joints: "Sonolastic NP-2," multi-component polyurethane base by Sonneborn Division of ChemRex, Inc., or equal.
3. Provide primer as recommended by manufacturer.
4. Use for all expansion joints. Sawed control joint sealant:
 1. "Epolith-P," 2-part flexible 100% solids epoxy joint filler, by Sonneborn Division of ChemRex, Inc., or equal.
 2. Use for sawed control joints.

2.09 CURING MATERIALS

A. Liquid membrane-forming compound:

1. ASTM C309, Type 1 with fugitive dye, except Type 2 with white pigment for surfaces exposed to direct rays of sun.
2. Do not use compounds containing wax, oil, resin, varnish, or other bases that will prevent bonding of finishes *such as floor coverings, tile, additional concrete, paint, and similar applied finishes.*
3. Use for curing at Contractor's option except where other products are specified for particular application.

B. Plastic film:

1. Polyethylene plastic film, white, nonstaining, conforming to ASTM D2103.
2. Minimum 4-mil (0.1 mm) thickness.
3. Use for curing at Contractor's option except where other products are specified for particular application.

C. Absorptive mat:

1. Cotton fabric, burlap fabric, or burlap-polyethylene material woven or bonded to prevent separation.
2. Material shall be clean and nondetrimental to concrete or finish.
3. Use for curing at Contractor's option except where other products are specified for particular application.

2.10 GROUT

A. Regular grout:

1. One part portland cement to 3 parts fine aggregate with sufficient water to maintain adequate workability. Substitute white cement for normal portland cement to match color of adjacent concrete.
2. Minimum strength: *4,000 psi (28 Mpa)* at 28 days.
3. Use for patching.

B. Nonshrink grout:

1. Nonmetallic and free of chloride, gypsum or corrosive-type materials; ASTM C1107, Grade C; formulation suitable for application.
2. Minimum strength: * 5,000 psi (34.5 Mpa)* at 28 days.
3. Use for grouting beneath *baseplates, * *bearing plates, * *equipment bases, * *and where shown.*

2.11 CONCRETE DESIGN AND USE

- A. Each concrete design mix shall be established in strict accordance with ACI 318 by proportioning on basis of either experience and/or trial mixtures.

B. Strength classifications:

Class	Specified Compressive Strength, f'c	Required Average Compressive Strength, f'cr
A	4,000 psi	5,200 psi

- C. Required average compressive strengths: Produce concrete of average strengths noted above unless test results substantiate a lower permissible average strength based on standard deviation criteria set forth in ACI 318. Strengths listed above are 7-day strengths for concrete using high-early-strength cement and 28-day strengths for concrete using other type cements.

- D. Maximum water-cement ratio: 0.48 by weight *except for Class B concrete*. Where pozzolan fly ash is used, water-cement plus pozzolan ratio shall not exceed specified ratio.

- E. Air entrainment: Concrete shall contain entrained air within following limits.

Nominal Maximum Size of Coarse Aggregate, In.	Total Air Content, Percent By Volume
3/4"	4 to 8
1-1/2"	3 to 6

Nominal Maximum Size of Coarse Aggregate, mm.	Total Air Content, Percent By Volume
19	4 to 8
38	3 to 6

F. Workability:

1. Proportions of concrete shall produce a mixture, suited to placement methods, which will work readily into corners and angles of forms and around reinforcement and embedded items. Segregation of materials or presence of free water will not be permitted.
2. Slump of concrete: Use minimum practical; vary within limits given to suit placement conditions; in no case is slump to be increased by addition of water in excess of design mix quantity.

Type of Construction	Slump, in.	
	Minimum	Maximum
All concrete unless noted otherwise	2	5

Type of Construction	Slump, mm.	
	Minimum	Maximum
All concrete unless noted otherwise	50	125

- G. Concrete use:
1. Class A: Use for all concrete unless specified otherwise.

2.12 READY-MIX CONCRETE

- A. Provide concrete from an established, approved ready-mix plant. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA QC-3.
- B. Equipment and methods: Conform to ASTM C94/C94M.

PART 3 EXECUTION

3.01 PREPARATION

- A. Construct forms strong, straight, adequately braced and securely fastened.
- B. Remove laitance from previously placed or existing concrete; thoroughly clean surface before placing additional concrete.
- C. Apply form coating on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.
- D. Do not apply form coating where concrete surfaces are scheduled to receive special finishes which may be affected by agent.

3.02 PLACING CONCRETE

- A. Clean transporting equipment, reinforcing, and embedded items before placing concrete. Remove water and debris from places to be occupied by concrete.
- B. Place no concrete until forms, reinforcing, and embedded items have been verified as adequately supported and accurately placed. Place no concrete over water-covered, muddy, or frozen soil.
- C. Immediately remove concrete where water, soils, or other deleterious substances are permitted to mix with concrete, form or embedded item movement occurs, or inadequate consolidation is obtained.
- D. Hot weather concreting:
1. Applies to concrete placed when ambient temperature exceeds 90°F.
 2. Conform to ACI 305R recommendations and requirements.
- E. Cold weather concreting:
1. Applies to concrete placed when ambient temperature is below 40°F.
 2. Conform to ACI 306R recommendations and requirements.

3. If temporary heating facilities used are of type which produce an atmospheric condition of high carbon dioxide content, seal off concrete in such manner that no damage will result to concrete surface.
- F. Employ best industry practices to prevent segregation during placing. Do not drop concrete more than 5'. Use tremied or pumped concrete to provide proper placement. Place in layers approximately 18" deep.
- G. Place concrete continuously in each section until completed. Permit not more than 30 minutes between depositing adjacent layers of concrete within each section, unless an acceptable set retarder is used in concrete mix.
- H. Thoroughly compact, puddle, and vibrate concrete into corners and around reinforcing and embedded items. Use internal vibration where size of section permits.
- I. Maintain concrete placing temperature between 50°F and 90°F except as specified for hot and cold weather concreting.
- J. Place sections of concrete in sequence that eliminates shrinkage effects to greatest extent practicable.
- K. Protect concrete from injury due to sun, cold weather, running water, construction operations, and other causes until properly cured.

3.03 REINFORCEMENT PLACEMENT

- A. Remove scale, loose flaky rust, dirt, grease, curing compound, and other coatings that would impair bond.
- B. Install slab-reinforcing bars in correct position by use of preformed bolsters and spacers, except concrete blocks may be used to position bars in concrete placed on grade. Concrete block shall have compressive strength equal to that of surrounding concrete.
- C. Space bars properly and tie securely in position before placing concrete. Tack welding to keep reinforcing in place is not permitted.

3.04 CONSTRUCTION JOINTS

- A. Install only where shown or where specifically permitted.
- B. Provide keyway 1-1/2" (38 mm) deep covering approximately 1/3 area of construction joint, unless shown otherwise.

3.05 EXPANSION JOINTS

- A. Formed joints: Make exposed edge of concrete slightly rounded with edger at joints to contain joint sealant.
- B. Install materials in accordance with manufacturers' instructions. Set preformed material securely in place before placing concrete.
- C. Install joint filler to within joint width (1/2" minimum) of exposed surface. Fill remainder of joint with joint sealant.

3.06 EMBEDDED ITEMS

- A. Install items required under this contract to be embedded in concrete. Install items required by others for embedding in concrete, if so instructed before placing concrete.
- B. Fasten embedded items securely in proper position before placing concrete.
- C. Conduit or pipe embedded in slabs or walls:
 - 1. Locate in center of slab or wall and space not closer than 3 diameters on center; locate to avoid impairing strength of concrete.
 - 2. Coordinate placing of reinforcing with conduit or pipe location. Do not cut reinforcing to clear conduit or pipe.
- D. Aluminum pipe shall not be embedded in concrete. Where aluminum projects into or rests against surface of concrete, coat surfaces of aluminum to prevent direct contact with concrete.

3.07 GROUTING

- A. Roughen concrete surfaces by light chipping to remove laitance to approximately 1/2". Do not expose reinforcing steel.
- B. Remove materials which might interfere with bond; prepare surfaces in strict conformance to manufacturer's instructions.
- C. Mix, place, and cure grout in strict accordance to manufacturer's instructions.
- D. Remove shims after grout is placed. Fill shim voids with grout.

3.08 FINISHING

- A. Flatwork:
 - 1. Tamp concrete to force coarse aggregate down from surface.
 - 2. Screed with straightedge, eliminate high and low places, bring surface to required finish elevations.
 - 3. Dusting of surface with dry cement or sand during finishing operations is not permitted.
 - 4. Apply curing compounds and similar materials in accordance with manufacturer's instructions during or after finishing.
 - 5. Finish surfaces within following tolerances as measured with a 10' straightedge:
 - a. Sidewalks: 5/16".
 - b. Other slabs: 3/16".
 - c. Top surfaces of structures other than slabs: In accordance with ACI 117.
 - 6. Float finish:
 - a. Float surface to true, even plane.
 - b. Float second time to uniform finish with wood or cork float; use edger on exposed edges.
 - c. Use on tops of structure foundations.
 - 7. Broomed or belted finish:
 - a. Float surface to true, even plane.
 - b. Steel trowel to smooth, uniform surface.
 - c. Broom with fiber brush or drag burlap belt across surface in direction transverse to traffic flow.
 - d. Use on sidewalks, paving, and exterior slabs at door entrances.*
- B. Formed surfaces:
 - 1. Remove fins, projections, and loose material.
 - 2. Clean surfaces of form oil.
 - 3. Patch honeycomb, aggregate pockets, voids, and holes as follows:

- a. Chip out until sound concrete is exposed to minimum depth of 1" (25 mm).
 - b. Prepare patching mortar with approximately 2 parts normal portland cement, one part white cement, 9 parts fine aggregate; vary proportions of cement as necessary to match color of adjacent concrete.
 - c. Saturate surfaces with water and fill cavities with patching mortar.
4. Fill holes left by form ties with patching mortar.
 5. Cure patches as specified for concrete.

3.09 FORM REMOVAL

- A. Minimum time before removal after placing concrete, unless permitted otherwise:
 1. Footings: 24 hours.
 2. Walls, piers, and columns: 48 hours (24 hours for metal-lined forms).
 3. Self-supported beams and slabs: 14 days.
 4. Time specified above represents cumulative time during which temperature of concrete is maintained above 50°F and for concrete without set-controlling admixtures.
- B. Reduce removal time by half for high-early-strength cement concrete.
- C. In any event, do not remove supporting forms and shoring until concrete has acquired sufficient strength to safely support own weight plus construction loads.
- D. Take care when removing forms that concrete is not marred or gouged and that corners are true, sharp and unbroken.

3.10 CURING

- A. Cure all concrete; begin curing as soon as possible after placement of concrete.
- B. Use of liquid membrane-forming curing compound permitted for all concrete except where product would impair bond of other applied materials to surface, *where surface curing and sealing product is specified for use,* or where other method of curing is specified for particular use.
- C. Plastic film curing:
 1. Dampen surface of concrete and lay plastic film with minimum 6" side laps and free of wrinkles; tape side laps.
 2. Hold film in place with lumber or use similar provisions to prevent exposure of concrete for 7 days after placing.
 3. Immediately repair tears in film.
- D. Water curing:
 1. Keep concrete continuously wet for 7 days after placing.
 2. Use on concrete surfaces not receiving compound or plastic film curing.
 3. Clean, nonstaining absorptive mat may be used with water curing.
 4. Do not use for curing cold weather concrete.

END OF SECTION

SECTION 05 50 00**METAL FABRICATIONS****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Anchor bolts.
- B. Expansion anchors.
- C. Handrails and guardrails.

1.02 QUALITY ASSURANCE

- A. Perform welding in accordance with AWS D1.1 "Structural Welding Code" and AWS D1.2 "Structural Welding Code - Aluminum," *and AWS D1.6 Structural Welding – Stainless Steel* as applicable.

1.03 SUBMITTALS

- A. Product Data: List of manufactured materials proposed, identifying manufacturer and type.
- B. Shop Drawings for miscellaneous steel and aluminum, including anchors.
- C. Quality assurance data: ICC-ES evaluation reports for expansion anchors provided to verify conformance to specifications.

1.04 ALLOWANCES

- A. Furnish and install metal items not shown but found necessary after award of contract.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Galvanizing: ASTM A123/A123M.
- B. Standard bolts: ASTM A307.
- C. High-strength bolts: ASTM A325/A325M, Types 1 or 3.
- D. Aluminum bolts: Anodized alloy 2024-T4.

2.02 ANCHOR BOLTS

- A. Material: ASTM F1554, Grade 36.
- B. Provide anchor bolt assemblies for:
 - 1. Access stairs handrails.
- C. Provide washers and heavy hexagon heads and nuts on anchor bolts unless specified otherwise.
- D. Do not prime paint surfaces to be embedded in concrete.

- E. Installation of anchor bolts per manufacturer's instructions.

2.03 EXPANSION ANCHORS

- A. Torque controlled wedge-type with expanding cone.
- B. Provide stainless steel where indicated on Drawings.
- C. Size and locations: As shown or required for equipment installation.
- D. Expansion anchors shall be ductile, Category 1, and approved for use in seismic applications and for cracked concrete.
- E. Manufacturer: "Kwik-Bolt TZ", "HSL-3," or "HDA Undercut Anchors" by Hilti; or equal.

2.04 STEEL HANDRAILS AND GUARDRAILS

- A. Material: ASTM A53/A53M, Grade B or ASTM A501.
- B. Use steel pipe for rails and uprights.
- C. Connections: Weld and grind smooth.
- D. Bend pipe at corners; do not miter pipe.
- E. Provide removable rails where shown.
- F. Conform to details shown on Drawings.

2.05 ALUMINUM HANDRAILS AND GUARDRAILS

- A. Material: Aluminum Alloy 6063-T6, anodized.
- B. Use 1-1/2" Schedule 40 aluminum pipe for rails and 1-1/2" Schedule 80 aluminum pipe for uprights.
- C. Field connections: Field splice horizontal rails using 6" long, aluminum "Splice Lock Connectors" by R & B Wagner, Inc., Butler, Wisconsin, or equal.
- D. Connections: Weld and grind smooth. Shop weld into as large sections as possible prior to anodizing.
- E. Bend pipe at corners; do not miter pipe.

2.06 SHOP PAINTING

- A. Surface preparation: Remove oil, grease, dirt, rust, loose mill scale, and other foreign elements by "Power Tool Cleaning" in accordance with SSPC-SP3.
- B. Shop primer: Apply one shop coat of: "10-99 Rust Inhibitive Primer," by Tnemec Co., or equal; apply in accordance with manufacturer's directions including recommended coverage.
- C. Leave unpainted steel clean and free from rust.

PART 3 EXECUTION**3.01 ERECTION**

- A. Anchor handrails, guardrails, ladders, and miscellaneous items securely to structural steel framing, concrete or masonry.
- B. Install expansion anchors in accordance with manufacturer's recommendations.

3.02 ANCHOR BOLTS

- A. Install embedded anchor bolts in accordance with manufacturer's recommendations.
- B. Coat threaded portion of anchor bolts with oil or grease and wrap with protective tape at time bolts are positioned for new construction. Tape shall remain in place until bolts are secured.

3.03 FIELD PAINTING

- A. Apply one field coat of primer to cleaned surfaces of bolts, new welds and abrasions to shop coat after erection.
- B. Do not paint aluminum, stainless steel, or galvanized steel work.

END OF SECTION

SECTION 31 10 00**SITE CLEARING****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Clearing and grubbing.
- B. Disposal.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

- A. Clearing: Remove and dispose of fences, trees, logs, brush, rubbish, and other objectionable material.
- B. Grubbing: remove and dispose of stumps and roots 3" (75 mm) and larger in diameter.
- C. Roads and parking areas: Entirely remove trees, stumps, brush, roots, and other vegetation.
- D. Other areas: Remove trees, stumps, brush, roots, and other vegetation to a depth of not less than 18" below subgrade or existing ground line, whichever is lower.
- E. Backfill depressions caused by grubbing, and compact to conform to density of surrounding earth.

3.02 DISPOSAL

- A. Dispose removed materials to locations off site. Off-site locations shall be arranged for by Contractor and at its expense.
- B. Grade final cover to allow for positive surface drainage.

END OF SECTION

SECTION 31 22 00**GRADING****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Embankments materials.
- B. Stripping.
- C. Earth and borrow excavation.
- D. Embankment construction.
- E. Finish grading and protection.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement for payment includes all site grading including excavation, providing and installing fill material, backfilling and all other necessary construction activities to provide final grade as shown on the Contract Drawings within the project limits.
- B. Payment shall be on a lump sum basis.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Obtain material from excavated areas or from an approved borrow area.
- B. Materials shall be free from debris, roots, organic, or other unstable or unsuitable materials.
- C. Use best earth materials (most granular in nature) as select fill for construction of pump station and pavement areas.

PART 3 EXECUTION

3.01 STRIPPING

- A. Prior to grading and/or borrow excavation, strip topsoil, vegetation and other objectionable material from construction areas. Average depth assumed to be 12". Stockpile clean topsoil at job site for future use. Dispose of vegetation and other objectionable material at off-site location selected by Contractor.

3.02 EARTHWORK

- A. Grading shall consist of excavation, removal and satisfactory disposal of excess excavated materials taken from within project area, construction of building pads, roads, parking areas, embankments, subgrades, ditches, detention ponds, and incidental work; and removal and satisfactory disposal of unstable and unsuitable materials and their replacement with satisfactory materials where needed.
- B. The exposed subgrade for the pump station excavation and pavement areas shall be hand-probed or proof-rolled and inspected by the Geotechnical Engineer for and soft or loose areas.

- C. Any soft or loose areas shall be removed and replaced with properly compacted structural fill as directed by the Engineer or Project Representative.
- D. Dispose of unstable material off site at location selected by Contractor.
- E. Following stripping and proof rolling, the exposed soils at the pump station and pavement excavation areas shall be scarified to a minimum depth of 8 inches, moisture conditioned to near optimum, and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D1557.

3.03 STRUCTURAL FILL AND COMPACTION

- A. Maintain fill in satisfactory condition until final acceptance.
- B. All fill placed within the proposed retaining wall and pavement areas shall meet the following structural fill requirements;
 - 1. Structural fill may consist of approved on-site granular soils, or approved granular import material.
 - 2. Import structural fill shall consist of granular soils with a maximum of 50 percent passing the No. 4 mesh sieve and a maximum of 20 percent passing the No. 200 mesh sieve with no particles larger than 4 inches in maximum diameter. All material passing the No. 200 mesh sieve must be non-plastic.
- C. Preparation of surfaces to receive fill:
 - 1. After stripping of organic material or foreign matter, proof-roll areas to receive fill by making a minimum of three passes with a roller.
 - 2. If unsuitable or unstable material is encountered under embankment area, remove material and replace with suitable material prior to placing embankment material.
- D. Moisture control:
 - 1. Moisture content of fill materials prior to, and during compaction shall be uniform throughout each layer of material.
 - 2. Place earth materials at or within 2% of optimum moisture content; wet granular materials thoroughly during or immediately prior to compaction.
 - 3. Add supplementary water to materials by sprinkling and mixing uniformly throughout layer as required.
 - 4. Spread temporarily excavated materials too wet for placing until moisture content is acceptable.
- E. Placing:
 - 1. Place materials in manner permitting drainage, and in continuous, approximately horizontal layers, not exceeding 8" loose thickness.
 - 2. Avoid abrupt changes in embankment levels.
 - 3. If surface of previously placed materials is too dry or smooth to provide satisfactory bonding surface with new material, moisten and/or scarify in manner and to depths required to avoid shear plane.
 - 4. If compacted surface of any layer of fill is too wet for proper compaction of next succeeding layer to be placed:
 - a. Allow materials to dry or work with suitable equipment.
 - b. Compact to provide satisfactory bonding surface for next succeeding layer of fill to be placed.
 - 5. When each layer of material has been conditioned to moisture content specified, compact as follows:
 - a. Compact structural fill material to minimum of 95% of maximum dry density as determined by ASTM D1557.
- F. Grade areas disturbed by construction operations to smooth, uniformly sloping surfaces.

3.04 FINISH GRADING

- A. Finish fill, excavated areas, and other disturbed areas to uniform grade and section normally obtainable with blade grader.
- B. Allowable template tolerances: + 0.10'.
- C. Finish grade to neat appearance and to provide positive drainage.

3.05 FIELD QUALITY CONTROL

- A. Moisture-density laboratory tests: Minimum of one test on each type of soil to be used in construction; conform to ASTM D698. Perform tests prior to placement of materials.
- B. In-place density tests: Perform tests on building pads, pipe trenches, and paved areas during course of work on subgrade for each successive 8" layer at intervals appropriate to confirm sufficient conforming to ASTM D1556 or ASTM D2922.

3.06 PROTECTION

- A. Water shall be used as controlling agent to prevent operations from polluting air with dust.
- B. Regulations as set forth by OSHA and appropriate state agencies, shall govern.

END OF SECTION

SECTION 31 23 00
EXCAVATION AND FILL**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Pipe bedding requirements.
- B. Trench excavation and backfill.
- C. Backfill for manholes, appurtenances and structures.
- D. Sidewalk and pavement construction.
- E. Erosion control.
- F. Dewatering.
- G. Sheet piling, shoring and bracing.
- H. Surface restoration and cleanup.

1.02 RELATED SECTIONS

- A. Section 01 45 29 - Testing Laboratory Services.
- B. Section 33 11 00 – Water Utility Distribution Piping

1.03 SUBMITTALS

- A. Quality assurance data:
 - 1. Prepare and submit traffic control plan. Coordinate plan with construction schedule.
 - 2. Provide name, address, and telephone number of person who has access to equipment and is authorized to make emergency repairs to Contractor's Work, such as to correct trench cave-ins, moving excavated material, and correct other problems during weekends and off-work hours, so access can be maintained for fire fighting equipment, and to maintain barricades for public safety.

1.04 QUALITY ASSURANCE

- A. Regulatory requirements:
 - 1. Retain independent, qualified testing agency to perform laboratory and field tests specified and any additional tests required to determine compliance with OSHA excavation requirements.
 - 2. Include costs for materials sampling and testing in Bid.
 - 3. Perform sampling and testing in strict accordance with testing criteria established.

1.05 SCHEDULING

- A. Schedule Work to keep streets, sidewalks, and utilities in usable condition; avoid property owner inconvenience insofar as practicable.
- B. Do not trespass on private property. Maintain construction operations on existing right-of-way or easements provided by Owner.
- C. When access must be denied due to construction, provide suitable access within 24 hours after responsible construction is completed.

- D. Whenever construction is stopped due to inclement weather, weekends, holidays, or other reasons, suitable access shall be provided for Owner.

PART 2 PRODUCTS

2.01 PIPE ENVELOPE

- A. Applies to full trench width from bottom of trench to 1' above top of pipe.
- B. Reinforced concrete pipe:
 - 1. Bedding: Finely divided, job-excavated material, free from debris, stones larger than 3/4", organic matter, and frozen material. If trench bottom material is not suitable for hand working to uniform bearing surface or if in rock excavation, provide bedding consisting of sand or gravel with maximum size of 3/4".
 - 2. Initial backfill: Finely divided job excavated material free from debris, stones larger than 3/4", organic matter, and frozen material. If job excavated material is not finely divided, use select backfill.
- C. Pressure pipe:
 - 1. Use for ductile iron pipe or polyvinyl chloride pressure pipe.
 - 2. Bedding: Finely divided, job-excavated material, free from debris, stones larger than 3/4", organic matter, and frozen material. If trench bottom material is not suitable for hand working to uniform bearing surface or if in rock excavation, provide bedding consisting of sand or gravel with maximum size of 3/4".
 - 3. Initial backfill: Job excavated material free from debris, stones larger than 1/2", organic matter, and frozen material. If job excavated material is not finely divided, use select backfill.

2.02 REMAINING BACKFILL

- A. Applies to backfill above 1' above top of pipe.
- B. Job-excavated material: Free from debris, stones larger than 1-1/2", organic matter, and frozen material.
- C. Select backfill: Consisting of well-graded mineral particles with 100% passing 1-1/2" sieve and not over 12% passing No. 200 sieve.
- D. Remaining backfill (for all types of pipe):
 - 1. Trenches with centerline beneath or closer than 10' to paved streets and drives or curb and gutter: Backfill with select backfill or suitable job excavated granular material meeting requirements of select backfill.
 - 2. Trenches with centerline beneath or closer than 10' to sidewalks, seal coat, or gravel surfaced streets and drives: Backfill with suitable job excavated material.
 - 3. Trenches with centerline more than 10' from sidewalks, streets, drives, or curb and gutter: Backfill with suitable job excavated material.
- E. Rock trench bottoms carried below required grade: Backfill with pea gravel, crushed rock, or pipe bedding material.
- F. Unauthorized excavation for appurtenances carried below required depth: Backfill with concrete.
- G. New pipe below existing water, sewer, or gas main: Backfill under existing water, sewer, or gas main with select backfill.

2.03 BACKFILL FOR MANHOLES, APPURTENANCES, AND STRUCTURES

- A. Backfill material as required for adjacent trench.

2.04 SIDEWALK AND PAVEMENT MATERIALS

- A. Sidewalks:
 - 1. Material: Concrete.
 - 2. Reinforcing: None.
 - 3. Expansion joints: 1/2" (13 mm) preformed expansion joint material.
- B. Curb and gutter:
 - 1. Material: Concrete.
 - 2. Expansion joints: 1/2" (13 mm) preformed expansion joint material.
- C. Concrete streets and drives:
 - 1. Base: Aggregate Base Course as specified.
 - 2. Pavement: Concrete.
 - 3. Expansion joints: 1/2" preformed expansion joint material.
- D. Asphalt streets and drives:
 - 1. Base course: Aggregate Base Course as specified.
 - 2. Prime coat: As specified.
 - 3. Surface course: As specified.

PART 3 EXECUTION**3.01 PREPARATION**

- A. Obtain from utility companies exact locations of buried utilities shown on Drawings.
- B. Building services are not shown on Drawings. Obtain locations of building services from utility companies.
- C. Make arrangements with utility companies to temporarily support, brace or remove utility poles either adjacent to or in trench excavation at no cost to Owner.
- D. Utility mains shown on Drawings, in conflict with new facilities: Perform relocation or make arrangements with utility to perform Work at no additional cost to Owner.
- E. Utility mains not shown on Drawings, in conflict with trench excavation or new facilities:
 - 1. Notify Engineer immediately.

3.02 TRENCH EXCAVATION - GENERAL

- A. Classification:
 - 1. Earth: Materials not classified as rock; includes clay, silt, sand and gravel, hardpan, disintegrated shale and rock, debris, and detached rock less than 1 cu yd (1 cu meter) in volume.
 - 2. Rock: Materials that cannot be excavated without use of pneumatic tools, drilling and blasting, or line drilling and wedging, and detached pieces of such materials larger than 1 cu yd (1 cu meter) in volume.
- B. Rock excavation not anticipated.
- C. Excavation shall be open cut unless otherwise specified or shown.
- D. Trenches not requiring select backfill: Pile excavated material, suitable for backfill, in an orderly manner a sufficient distance back from edge of excavation to avoid slides or cave-ins; 2'-0" minimum clear distance.

- E. Trenches requiring "select" backfill: Place unsuitable excavated material directly on trucks and haul away. No spoil banks permitted.
- F. If granular material suitable for select backfill is encountered in trenches requiring select backfill: Pile in an orderly manner a sufficient distance back from edge of excavation to avoid slides or cave-ins; 2'-0" minimum clear distance.
- G. Excavate existing utilities sufficiently in advance of pipe laying to determine crossing arrangement. No payment will be allowed for down time due to utility relocation.
- H. Use caution when placing and compacting backfill to avoid placing construction loads on pipe which may damage or displace newly laid pipe.

3.03 TRENCH EXCAVATION - EARTH

- A. Strip and stockpile topsoil for use in surface restoration.
- B. Keep trench width below top of pipe as narrow as practicable; provide adequate width for proper pipe jointing operations and for placing and compacting backfill.
- C. Slope walls of trench or provide trench shoring as required to comply with OSHA and safety requirements; maintain walls of excavation vertical below top of pipe. Use trench box or shield as required.
- D. Excavate to full depth by machine. Trench bottom shall be suitable for hand working of finely divided, loose, excavated material or for placement of pipe bedding material.
- E. If soft, spongy, or otherwise unstable material is encountered which may not provide suitable foundation for pipe:
 - 1. Notify Engineer immediately.
 - 2. Engineer will authorize remedial measures in writing as required.
 - 3. Removal and replacement of questionable material will be authorized only if dewatering methods are unsuccessful in stabilizing trench bottom.
 - 4. If removal of unsuitable material is authorized:
 - a. Replace with crushed rock or clean gravel having same gradation as pipe bedding material.
 - b. Compact replacement material with vibratory or pneumatic tampers.
- F. Excavate by hand:
 - 1. Under tree roots 3" and larger.
 - 2. Under and around structures and utilities.

3.04 EXCAVATION FOR APPURTENANCES

- A. Excavate as required for appurtenances.
- B. Carry excavation to firm, undisturbed soil.
- C. Unauthorized excavation carried below required depth: Backfill with concrete at no expense to Owner.

3.05 SHEETING, SHORING, AND BRACING

- A. Construct sheeting, shoring, and bracing where shown on Drawings and where required to hold walls of excavation to protect existing utilities, trees, structures, and other similar features and to provide protection of employees.

- B. Design of sheeting, shoring, and bracing shall be responsibility of Contractor and shall comply with OSHA requirements.
- C. Sheeting which may be removed, in opinion of Engineer, without endangering utilities or structures shall be considered incidental and shall not be paid for.
- D. Sheeting and shoring, the removal of which, in opinion of Engineer, might cause damage to pipe, utilities or structures shall be left in place and will be paid for in accordance with Section 01 22 00.
- E. When movable trench shield is used below centerline of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement, unless moved by rearward thrusting jacks.

3.06 DEWATERING

- A. Execute Work in the dry.
- B. Provide equipment for handling water encountered.
- C. Do not lay pipe or pour concrete on excessively wet soil.
- D. Prevent surface water from flowing into excavation; promptly remove any water accumulated.
- E. Divert stream flow and/or sewage away from areas of construction.
- F. Do not discharge water pumped from excavations to existing sanitary sewers.
- G. Methods used shall not cause settlement or damage to adjacent property.

3.07 SIDEWALK AND PAVEMENT REMOVAL

- A. Where large portions of existing streets are removed, measure and record exact dimensions and elevations before pavement removal. Streets and curbs shall be rebuilt to same widths and elevations as existed prior to construction.
- B. Remove pavement, sidewalk, or curb and gutter to minimum of 1'-0" (300 mm) from trench. No undercutting will be permitted.
- C. Cut vertically and horizontally, remove on straight lines approximately parallel or perpendicular to center line of pavement.
- D. Concrete pavement:
 - 1. Cut with concrete saw; minimum vertical cut 1" or as needed to give clean break.
 - 2. Break out remainder of slab.
- E. Sidewalk: Remove to nearest joint beyond minimum distance of 1'-0" (300 mm) from edge of trench.
- F. Asphalt pavement: Cut edges neatly, minimum vertical cut 1-1/2" (38 mm).
- G. Seal coat or gravel surfaces: Remove with excavating machine.
- H. Dispose of waste material in disposal area.

3.08 SIDEWALK AND PAVEMENT REPLACEMENT

- A. Sidewalks:
 - 1. Thickness: 5", except use 8" across driveways.
 - 2. Width and finish to match existing sidewalks.

3. Expansion joints: Use joint material at intervals not exceeding 50' and at junction with existing Work, and along adjacent curbs.
 4. Finish: Provide edge and joint tooling and finish to match existing.
- B. Curb and gutter:
1. Cross section and finish to match existing Work.
 2. Expansion joints: Use joint material at intervals not exceeding 50' and at junction with existing Work.
- C. Concrete streets and drives:
1. Base: 6" (150 mm) crushed rock compacted to 95% maximum density as determined by ASTM D1557.
 2. Pavement: Match thickness of existing pavement except use 8" (200 mm) minimum for streets and 7" (175 mm) minimum for drives.
 3. Joint to match existing pavement.
 4. Provide joint material for isolation joint around manholes and inlets.
 5. Finish: Match existing pavement.
 6. Pavement markings: Restore to match existing.
- D. Asphalt streets and drives:
1. Subbase course:
 - a. Streets with existing brick or concrete base: 4" thick gravel or crushed rock.
 - b. Streets with existing gravel or crushed rock base: Place base on trench backfill or existing subgrade.
 - c. Compact to 95% maximum density as determined by ASTM D1557.
 2. Base course: Aggregate Base Course as specified.
 3. Prime coat: As specified.
 4. Surface course: As specified.
 5. Machine place surface course on clean and primed base; match existing surface grade.
 6. Repair scars in existing asphalt surface resulting from construction operations.
 7. Pavement markings: Restore to match existing.

3.09 PIPE BEDDING

- A. Bedding for reinforced concrete pipe.
1. Depth of bedding material as shown on Civil Details.
 2. Provide bell holes at each pipe joint; allow access completely around circumference of pipe for proper jointing operations.
 3. Trench bottoms carried below required grade: Backfill to proper elevation with bedding material at no additional expense to Owner.
 4. Shape pipe bedding with template before placing pipe for pipe sizes greater than 24" diameter. Minimum depth of shaping to be 10% of outside pipe diameter.
 5. Place in layers not to exceed 12" and compact by hand held tamping device.
 6. Force bedding under edge of pipe by slicing with shovel.

3.10 BACKFILLING TRENCHES

- A. Backfill trench immediately after Engineer has recorded location of connections and appurtenances.
- B. Limit amount of trench open at one time to minimum.
- C. Pull wood sheeting, to be removed, ahead of backfilling to prevent formation of voids. Steel sheeting may be pulled after backfilling.
- D. Initial backfill for reinforced concrete pipe, and pressure pipe.
1. Pressure pipe: Place material and compact to 85% maximum density, ASTM D698, in 6" layers, to depths shown on Civil Details.

2. Reinforced concrete pipe: Place material and compact to 85% for Class C and 95% for Classes A and B, ASTM D698 in 6" layers, to depths shown on Civil Details.
 3. Backfill shall be carefully placed with clamshell bucket or other similar means. Pushing material over edge of trench will not be permitted.
 4. Material shall be hand worked to completely fill all voids around pipe.
 5. Backfill simultaneously on both sides of pipe to prevent displacement.
- E. Remaining backfill (for all types of pipe):
1. Trenches with center line beneath or closer than 10' to paved streets and drives or curb and gutter: Mechanically or hydraulically compact to 95% maximum density as determined by ASTM D698. Prepare upper portion of trench for surface restoration or pavement replacement.
 2. Trenches with center line beneath or closer than 10' to sidewalks or seal coat or gravel surfaced streets and drives: Backfill in layers not to exceed 6"; moisten if required; compact to 90% maximum density as determined by ASTM D698; prepare upper portion of trench for surface restoration or pavement replacement.
 3. Trenches with center line more than 10' from sidewalks, streets, drives, or curb and gutter: Consolidate by mechanical compaction; fill upper portion of trench with topsoil and prepare for surface restoration; notify Engineer before mounding over trench or leveling off. Subsequent settlement: Refill, compact, and level.
 4. Trenches in specific locations shown or noted: Backfill with excavated material without compaction and mound over trench.
- F. New pipe below existing water, sewer, or gas main: Backfill under existing water, sewer, or gas main with select backfill; mechanically compact to 95% maximum density as determined by ASTM D698; length of backfill at elevation of existing utility shall extend 5' each side of existing utility.

3.11 BACKFILL FOR MANHOLES, APPURTENANCES AND STRUCTURES

- A. Notify Engineer prior to backfilling.
- B. Backfill and compact as required for adjacent trench.
- C. Backfill simultaneously on all sides; protect any waterproofing from damage.
- D. Carefully place backfill material to minimum of 1' above highest pipe entering manhole or structure.

3.12 REPAIR AND RESTORATION

- A. Repair, at no additional cost to Owner, existing fences, culverts, and drain tile disturbed by construction.
- B. Contractor fully responsible for liaison with utility companies and for repairing, at no expense to Owner, utilities damaged by Contractor. In event of break in existing water main, gas main, sewer, or electric or communication cable, immediately notify responsible official of organization operating utility affected.
- C. Restore obstructions removed to accommodate equipment or to facilitate excavation.

3.13 SOIL AND MATERIAL TESTING

- A. Moisture-density tests: ASTM D698; minimum of one determination of optimum moisture for each type of soil incorporated into Work.
- B. In-place density tests: ASTM D1556, D2167, or D2922.
 1. Perform tests in areas of backfill and where compaction requirements are specified.
 2. Provide equipment necessary and perform field density tests during course of Work.
 3. Perform tests for fill or backfill at following interval: One test per 500 yd³ at random depths.

- C. Sieve analysis: ASTM C136; minimum of one test on each source of each material of specified gradation unless otherwise specified or provide certified copy of test report from material supplier.
- D. If tests indicate inadequate placement or compaction, Contractor shall correct inadequacies and perform additional tests in same area at no additional cost to Owner.
- E. Remove brush, rubbish, spoil, excess excavated material, and material not suitable for backfill to off-site location of Contractor's choice.
- F. Remove waste material promptly as it is generated by construction operations; do not permit to accumulate. Cleanup each portion of construction as it is completed.
- G. Cleanup operations in public right-of-way shall be kept within 400' of construction operations.
- H. Cleanup and remove rubbish, debris, and surplus material.
- I. Grade disposal areas periodically to reasonably neat surface to provide for drainage and access by others.
- J. Leave Site in neat condition.
- K. Reopen to traffic as soon as practicable.

3.14 EROSION CONTROL

- A. Take care to minimize soil erosion during and after construction.
- B. Cover existing storm water inlets adjacent to construction operations and take additional measures necessary to prevent sediment from entering storm sewers.
- C. Disturb only minimum area during construction. Pile excavated material in a manner as to prevent erosion of material. Restore surfaces to prevent erosion.
- D. Remove excess excavated material and debris and dispose of these materials in an acceptable manner to prevent erosion and sedimentation.
- E. Employ erosion control measures and surface restoration procedures, as appropriate, in borrow and waste disposal areas.
- F. Take measures necessary, in addition to those specified herein, to prevent erosion, prevent sediment from entering surface drainage courses, and prevent sediment from being washed onto adjacent areas.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base including subgrade preparation, hauling, spreading, moisture control, compacting, and material tests.

1.02 SUBMITTALS

- A. Laboratory test results indicating conformance to "Materials," this Section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aggregate shall be gravel, crushed gravel, crushed quartzite, crushed limestone, or crushed slag meeting following gradation:

Sieve Size	Percent Passing Sieve
1-1/2"	100
1"	90-100
3/4"	100
3/8"	78-92
No. 4	55-67
No. 16	28-38
No. 200	7-11

- B. Percent of loss shall not exceed 45 in accordance with AASHTO T96 and 25 in accordance with AASHTO T104, 5-cycle, sodium sulfate solution. Plasticity index shall not exceed 4 in accordance with AASHTO T90.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Prior to placing aggregate base, prepare subgrade in a manner meeting requirements specified herein.
- B. Moisture content shall be sufficient to prevent segregation of aggregate and to obtain satisfactory compaction. Use of a central mixing plant to obtain moisture content will be permissible, but wetting aggregate in cars, bins, stock piles, or trucks will not be permitted.
- C. Construct base in layers not more than 4" compacted thickness, except that if tests indicate desired results are being obtained, compacted thickness of any layer may be increased to a maximum of 8".

- D. Immediately after material has been placed with spreader, compact with tamping roller, vibratory roller, pneumatic-tired roller, or with combination of any roller types to a density of not less than 95% maximum density determined in accordance with ASTM D698.
- E. Compaction of top layer shall continue until aggregates are completely interlocked and stable and all movement of material stops. Give top layer final rolling with 3-wheel or tandem roller.
- F. If any subgrade material is worked into base material during the compacting or finishing operations, remove granular material within affected area and replace with new aggregate.

END OF SECTION

SECTION 32 12 16
ASPHALTIC PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Asphaltic pavement including prime coat, tack coat, preparation and compaction of asphaltic mixtures, and surface tests.

1.02 RELATED SECTIONS

- A. Section 01 33 00 - Submittal Procedures.
- B. Section 01 45 29 - Testing Laboratory Services.

1.03 QUALITY ASSURANCE

- A. Provide testing of materials and job-mix formula. Refer to Section 01 45 29.
- B. Samples of materials proposed for use shall be submitted to an approved testing laboratory for test, analysis, and development of job-mix formulas.
- C. Sample materials in accordance with AASHTO T2 (aggregates), T40 (asphaltic material) and T168 (asphaltic paving mixtures).
- D. Submit job-mix formula for each mixture. Formulas shall be determined by an approved testing laboratory based on "Marshall Method" and following criteria:

	Base Course Mixture
Asphalt Content	3% to 7%
No. of Compaction Blows, Each End	75
Stability, minimum	1800
Flow	10-18
Percent Air Voids	3-8
Percent Voids in Mineral Aggregate, minimum	13

- 1. Following tolerances will be allowed per single test:

Passing Sieve	Percent
No. 4 and larger	±4
No. 8 thru No. 100	±3
No. 200	±2

Passing Sieve	Percent
Asphalt Content	±0.3

2. Submit job-mix formulas to Engineer prior to any pavement construction.

1.04 MEASUREMENT AND PAYMENT

- A. If quantity of asphaltic concrete pavement is changed from that required by Contract Documents, lump sum Contract Price will be adjusted on basis of unit adjustment price set forth in Agreement.
- B. Asphaltic Concrete Pavement: square yard (SY): Unit adjustment price includes furnishing all materials, equipment, and labor to construct asphaltic pavement including subgrade preparation; aggregate base course; prime coat; tack coats; preparation, hauling, spreading, and compacting asphaltic mixtures; surface tests and all sampling and laboratory testing of materials.

PART 2 PRODUCTS

2.01 ASPHALTIC MATERIALS

- A. Use following asphaltic materials for purpose indicated and meet requirements for type and grade of applicable specifications listed in AISS No. 2, "Specifications for Paving and Industrial Asphalts."
 1. Prime coat: Liquid asphalt MC-30.
 2. Tack coat: Liquid asphalt RC-70.
 3. Paving mixture: Asphalt cement, 85-100.

2.02 MINERAL AGGREGATE

- A. Mineral filler shall meet requirements of AASHTO M17.
- B. Fine aggregate shall consist of hard, durable grains of natural sand, crushed stone, or crushed gravel.
- C. Coarse aggregate shall consist of crushed stone, crushed gravel, or crushed slag. Aggregate shall be produced from sources which normally show an abrasion loss not exceeding 40, determined in accordance with AASHTO T96 and a freezing and thawing loss not greater than 10, determined in accordance with AASHTO T104, 5-cycle, sodium sulfate solution.
- D. Combination of aggregates shall meet the following gradation:

Sieve Size	Gradation
1"	100
3/4"	100
1/2"	---
3/8"	75-91
No. 4	46-62
No. 8	-
No. 16	22-34

Sieve Size	Gradation
No. 50	11-23
No. 200	3-7

PART 3 EXECUTION

3.01 EQUIPMENT

- A. Asphalt mixing plant designed to produce a uniform mixture within job-mix tolerances.
- B. Self-powered paving machine with electronic level control and long ski-grade follower capable of spreading mixture to thickness and width specified, true to line, grade, and crown shown on Drawings.
- C. Sufficient number of smooth, metal-bedded haul trucks to ensure orderly and continuous paving operations.
- D. Pressure distributor capable of applying prime and/or tack coats uniformly without atomization.
- E. One or more steel-wheeled, self-propelled rollers, weighing 10 to 12 tons.
- F. Power broom or power blower.
- G. Hand tools as necessary to complete Work.

3.02 PRIME COAT INSTALLATION

- A. After aggregate base course has been prepared, surface shall be made free of all loose material, and when in a warm, dry condition, apply asphaltic material uniformly at rate of 0.3 to 0.5 gal/sq yd.
- B. Allow prime coat to cure until it has been absorbed by surface and will not pick up. Minimum curing time shall be not less than 24 hours. Pools of asphalt material occurring in depressions shall be broomed or squeegeed over surrounding surface same day prime coat is applied. At no time during curing period shall traffic be allowed upon primed surface.
- C. If primed surface is damaged, it shall be repaired. Prime coat shall be maintained at all times until cover coat is constructed.

3.03 TACK COAT INSTALLATION

- A. Prior to placing second layer of base course and prior to placing binder and surface course, clean all exposed surface of loose or foreign material; and then apply tack coat at rate of 0.02 to 0.05 gal/sq yd.

3.04 PREPARING MIXTURE

- A. Regulate exact proportions of various materials within limits required by job-mix formula so as to produce satisfactory bituminous coating and mixture. Order of sequence in which several aggregates shall be drawn or weighed may vary under different conditions. Aggregates shall first be mixed dry, then asphalt cement added. Mixer shall be so operated that mixture is of consistently uniform temperature and as discharged from mixer will not vary more than 20°F. Temperature of base course mixture shall not exceed 310°F and that of binder and/or surface course mixture shall not exceed 330°F.
- B. In batch type mixers, size of batch shall not exceed manufacturer's rated capacity. Dry-mixing time, after all aggregates are in mixer, shall be not less than 5 seconds. Wet-mixing time, after all asphalt

has been added and before opening discharge gate, shall be not less than 25 seconds. Length of dry- and wet-mixing periods may vary, but total mixing time shall be not less than 40 seconds.

- C. In continuous-type plants, mixing time may be determined by weight method using following formula:
- $$\frac{\text{Pugmill contents, lb}}{\text{Pugmill output, lb/sec}} = \text{Mixing time (seconds)}$$
- Mixing time shall be at least 30 seconds.

3.05 PLACING ASPHALTIC CONCRETE MIXTURE

- A. Drawings show thickness of various courses. Place a maximum thickness not greater than pneumatic or vibrator compaction equipment limits established by equipment manufacturer.
- B. Remove all standing water from surface prior to paving operations.
- C. Spread mixture on areas of uniform width with electronically controlled asphalt spreader with long ski-grade follower. Spread mixture at such a rate that when compacted, layer will be substantially of thickness and dimensions specified or shown on Drawings. Use string line as a guide for finishing machine to maintain edge alignment.
- D. Asphaltic concrete mixtures shall have a minimum temperature of 225°F for base course and 245°F for binder and/or surface course. Deliver hot asphaltic concrete at a rate sufficient to provide as nearly continuous of spreading unit as possible.
- E. For irregular areas where use of a finishing machine is not practical, mixtures may be spread by hand methods. Spread hot mixture uniformly with hot shovels and rakes. After spreading hot mixture, carefully smooth mixture to remove all segregated coarse aggregate and rake marks. Rakes and lutes for hand spreading and smoothing shall be of type designed for use on asphalt mixtures.
- F. Apply tack coat to edge of paving placed previous day prior to placing adjacent lane.

3.06 COMPACTION

- A. Compact each layer thoroughly and promptly. For all rollers, initial contact with hot mixture shall be made by compaction roll. Roll longitudinal joints smooth and even at time of construction.
- B. Use mechanical tampers in areas inaccessible to rollers. Use steel-tired finish rollers to smooth out all marks and roughness in surface. Overall rolling procedure shall produce a surface free of ridges, marks, or bumps.
- C. Compact each layer to not less than 97% of maximum density obtained by laboratory job-mix formula.

3.07 JOINT CONSTRUCTION

- A. Offset longitudinal joints at least 3" for each succeeding layer. Adjust spreading of hot mixture along longitudinal joints to secure complete closure of joint and full compression of mixture with a smooth surface after compaction.
- B. Separate transverse construction joints by not less than 6'. Saw cold mixture layer to a straight line at right angles to center line so that a full thickness, a true surface, and a vertical edge will be provided.

3.08 TOLERANCES

- A. After asphaltic mixture has been compacted, test surface for smoothness by means of a 10' straightedge placed parallel to center line of pavement and touching surface. If ordinates measured from straightedge to pavement surface exceed 1/4", entire area so affected shall be corrected.

3.09 FIELD QUALITY CONTROL

- A. Place asphalt paving mixture only when specified density can be obtained. Take precautions at all times to compact mixture before it cools too much to obtain required density. Do not place mixture on any wet or frozen surface or when weather conditions will otherwise prevent its proper handling or finishing.
- B. Do not place asphaltic surface course and/or leveling-binder course when air temperature is below 40°F. If course is 1" or less in thickness, temperature must be 50°F or above.
- C. Do not place asphaltic base course when air temperature is below 40°F.
- D. Provide one sample of in-place mixture for each days run to laboratory for testing. Sample shall be tested for requirements specified.
- E. Provide armored thermometer suitable for asphalt temperature testing prior to placement.

END OF SECTION

SECTION 32 16 00**CURBS AND GUTTERS****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Forming.
- B. Concrete curb or concrete curb and gutter.

1.02 MEASUREMENT AND PAYMENT

- A. If quantity of following item is changed from that required by Contract Documents, linear foot Contract Price will be adjusted on basis of unit adjustment prices set forth in Agreement.
- B. Concrete Curb and Gutter, linear foot (LF): Includes furnishing materials, labor, and equipment to construct curb and gutter, including subgrade preparation, placing subbase, setting forms to line and grade, mixing and depositing concrete, installing joints, finishing, curing, and backfilling.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Curb and gutter: See Section 03 10 00.

PART 3 EXECUTION

3.01 FORMING

- A. Wood or metal, free from warp and of sufficient strength to resist springing during process of depositing concrete. Forms shall be securely staked or braced and held firmly to required line and grade.

3.02 CONCRETE CURB OR CONCRETE CURB AND GUTTER

- A. Shape: As shown on Drawings.
- B. Subgrade: Compact and finish to a firm, smooth surface.
- C. Subbase: If shown on Drawings, place sand or gravel with maximum size of 3/4" and less than 5% passing No. 200 sieve.
- D. Joints:
 - 1. Contraction joints: Form by use of a steel plate or grooving tool, space not more than 20' oc and/or as shown on Drawings.
 - 2. Expansion joints: Preformed joint filler shaped to exact cross section of curb and gutter, locate as shown on Drawings.
- E. Finish: Provide light brush finish while concrete is still green.
- F. Backfill: After concrete has been cured and forms removed, backfill spaces in back of curb and gutter to required elevation with excavated material. Compact material until firm and neatly grade surface.

3.03 PROTECTION

A. Curing: See Section 03 10 00.

END OF SECTION

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roadway striping.

1.02 MEASUREMENT AND PAYMENT

- A. If quantity of following item is changed from that required by Contract Documents, lump sum Contract Price will be adjusted on basis of unit adjustment prices set forth in Agreement.
- B. Parking Stall Painting, linear foot (LF): Includes furnishing all materials, labor, and equipment to paint lines delineating parking stalls.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Traffic paint: Yellow, ready-mixed traffic paint; AASHTO M248, Type F.

PART 3 EXECUTION

3.01 ROADWAY STRIPING PAINTING

- A. Furnish and apply pavement marking materials in accordance with lines and dimensions shown on Drawings or as described herein.
- B. Perform painting in neat, straight lines. Apply 4" continuous painted line with hand striper at the rate of 16 gallons per mile of line. Stall lines shall be accurately chalk-lined before being painted.

END OF SECTION

SECTION 32 31 13**CHAIN LINK FENCES AND GATES****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Fencing.

1.02 RELATED SECTIONS

- A. Section 03 10 00 - Concrete Work.

1.03 SUBMITTALS

- A. Product Data on dimensions, materials, and finishes.

1.04 QUALITY ASSURANCE

- A. Fencing shall meet or exceed minimum standards established by Chain Link Fence Manufacturers Institute Product Manual for materials, finishes, and installation.
- B. Perform installation with experienced fence erectors under supervision of factory-authorized representative.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Anchor Fence Co.
- B. United States Steel Corporation.
- C. American Chain and Cable Company, Inc.
- D. Colorguard Corporation.
- E. Approved equivalent.

2.02 FENCE MATERIALS

- A. Fence height: 8' to top of mesh and framing. Barbed wire shall be in addition to this height.
- B. Fabric:
 - 1. Reuse existing fabric.
 - 2. 2" diamond mesh, 9-gage.
 - 3. Tensile strength: 80,000 psi minimum.
 - 4. Top selvage: Twisted and barbed.
 - 5. Bottom selvage: Knuckled.
- C. Barbed wire:
 - 1. Reuse existing barbed wire.
 - 2. Composed of 3 lengths of barbed wire attached to 45° extension arms.
 - 3. Each wire shall consist of 2 strands of 12-1/2 gage zinc-coated wire with 14-gage wire barbs in 4-point pattern on 5" centers.

- D. Framework: ASTM F1043, Group 1A steel pipe; or ASTM F1043, Group 1C high-strength steel pipe. Pipe shall conform to following sizes and weights:

Sizes and Description	Outside Diameter, in (mm)	Weight, Group 1A lb/ft (kg/m)	Weight, Group 1C lb/ft (kg/m)
Top rail	1.660 (42)	2.27 (3.38)	1.40 (2.10)
Line post	2.375 (60)	3.65 (5.44)	3.12 (4.65)
End, corner, and pull post	2.875 (73)	5.79 (8.63)	4.64 (6.91)
Brace rail	1.660 (42)	2.27 (3.38)	1.40 (2.08)
Gate post:			
Up to 6' (1.8 m) wide	2.875 (73)	5.79 (8.63)	4.64 (6.91)
7' to 12' (2.1 m to 3.6 m) wide	4.000 (100)	9.11 (13.57)	6.56 (9.77)

- E. Post tops: Post tops shall be so designed as to exclude moisture from post. C-section posts shall not require tops.
- F. Tension wire: 6- or 7-gage, zinc-coated wire.
- G. Truss rods: 3/8" diameter, zinc-coated steel rod, adjustable.
- H. Gate frame: Pipe, joined at corners by welding or fittings. Provide fabric and any necessary bracing and adjustable truss rods.
- I. Gates: ASTM F900 swing type, or ASTM F1184 sliding type, as required, complete with necessary latches, stops, keepers, hinges or rollers and roller tracks, and provision for padlocking.
- J. Fittings: Galvanized press steel, malleable, or ASTM F626 cast steel.
- K. Finishes:
1. Chain link fabric: Steel galvanized after weaving by hot-dip process to give a minimum of 1.2 oz of zinc/sq ft of wire surface distributed over entire fabric, including cut ends, in accordance with ASTM A392 Class 1.
 2. Framework:
 - a. External coating:
 - 1) Steel pipe, ASTM F1043, Group 1A: Zinc-coated in accordance with paragraph 7.1.1.
 - 2) Steel pipe, ASTM F1043, Group 1C: Zinc with organic overcoat in accordance with paragraph 7.1.2.
 - b. Internal coating:
 - 1) Steel pipe, ASTM F1043, Group 1A: Zinc-coated in accordance with paragraph 7.2.1.
 - 2) Steel pipe, ASTM F1043, Group 1C: Zinc-coated in accordance with paragraph 7.2.2.

PART 3 EXECUTION

3.01 FENCE INSTALLATION

- A. Spacing of posts:
1. Space posts evenly for distance required unless specific spacing is shown.
 2. Maximum spacing: 10' c to c.
- B. Set each post in concrete as follows:
1. Diameter: 10" for line posts, 12" for corner posts, 18" for gate posts; crown concrete tops to shed water.
 2. Depth: Extend gate posts 5'-0" into 5'-6" foundation; other posts 3'-0" into 3'-6" foundation.

3. Concrete: As specified in Section *03 10 00.
 4. Form top 6" with "Sonotube," or equal.
 5. Line posts may be set with 1-1/2" x 1-1/2" x 30" (38 mm x 38 mm x 760 mm), drive anchors at Contractor's option.
- C. Where fence turns corner or bends in excess of 30° horizontally or vertically, provide corner post complete with bracing.
- D. Connect fabric securely to line posts and top rails using tie wires every 12" on posts and 24" on rails.
- E. Provide necessary tie wires, clips, angles, and fastening devices to erect fence and gates to structural supporting elements.
- F. Gates shall swing freely to open 180° upon completion of installation.
- G. Install one extension arm with barbed wire on top of fence.
- H. Install gates plumb, level, and secure for full opening without interference. Anchor center stops and keepers in concrete.

END OF SECTION

SECTION 33 11 00**WATER UTILITY DISTRIBUTION PIPING****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Polyvinyl chloride pipe.
- B. Repair of damaged water mains and services.
- C. Valves, sleeves and valve boxes.
- D. Hydrants with auxiliary gate valves.
- E. Underground warning tapes.
- F. New water main crossing sewer or force main.
- G. New water main paralleling sewer or force main.
- H. Thrust blocks.
- I. Test and disinfection.

1.02 POTABLE WATER SYSTEM REQUIREMENTS

- A. Components, materials, and treatment chemicals that come into contact with potable water shall be certified for conformance to ANSI/NSF Standard 60 or 61, as applicable.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's catalog data for pipe, pipe joints, hydrants, valves, and valve boxes.
- B. Quality assurance data:
 - 1. Certificates from manufacturer evidencing compliance with AWWA standards listed herein for pipe, pipe joints, valves, valve boxes, and hydrants.
 - 2. Certification by nationally recognized, independent organization that components, materials, and treatment chemicals in contact with potable water conform to ANSI/NSF Standard 60 or 61, as applicable.

PART 2 PRODUCTS

2.01 SPECIAL PROTECTIVE-LINED DUCTILE IRON PIPE

- A. Pipe:
 - 1. Design: AWWA C150.
 - 2. Manufacture: AWWA C151.
 - 3. Minimum thickness: As shown on drawings.
- B. Fittings:
 - 1. Buried: Mechanical, 3" - 48", or push-on, 3" - 64", joints.
 - a. 3" through 24" and 54" through 64": AWWA C153.
 - b. 30" through 48": AWWA C110; rated working pressure, 250 psi.
 - 2. Exposed: Flanged joints.
 - a. 3" through 48": AWWA C110; rated working pressure, 250 psi.

- b. 54" through 64": AWWA C153; rated working pressure, 150 psi.
- C. Include gaskets, glands, bolts, and nuts required for complete installation.
- D. Mark each length of pipe with manufacturer's name and class.

2.02 POLYVINYL CHLORIDE PIPE

- A. Design and manufacture: AWWA C900.
- B. Pressure class 200; dimension ratio 14.
- C. Pipe outside diameter: Identical to that of cast iron or ductile iron pipe.
- D. Joints: Integral bell with elastomeric gaskets conforming to ASTM F477.
- E. Fittings: Cast or ductile iron in accordance with AWWA C110 or C153.

2.03 RESILIENT-SEATED GATE VALVES

- A. Design and manufacture: AWWA C509.
- B. Use valves of one manufacturer insofar as practicable.
- C. Pressure rating: AWWA 200 psi.
- D. Body and gate material: Ductile iron.
- E. Bonnet: Bolted.
- F. Stem and trim: Bronze.
- G. Use type permitting repacking under pressure when wide open.
- H. Packing: O-ring.
- I. Stem arrangement: Nonrising stem with 2" wrench nut.
- J. Resilient seat: Applied to gate.
- K. Direction of opening: Turn left to open.
- L. Joint: Mechanical joint.
- M. Interior coating: Epoxy; AWWA C550.
- N. Quality standard: Clow "R/W" valve, Mueller "Resilient Seat," American Valve and Hydrant "80 CRS" valve, or equal.

2.04 VALVE BOXES

- A. Provide valve box for each buried valve.
- B. Valve box shall be complete, assembled unit consisting of adjustable box and extension stem with 2" square operating nut.
- C. Box section: Hand-adjustable to required depth through coupling gland with O-ring seal.
- D. Stem assembly: Telescoping design with torque capacity of 1,000 ft-lb.
- E. Equip lower end of box with self-centering alignment ring to center box over valve nut.
- F. Lid shall drop into valve box top, rotate 90° to retain, and lock in place with single bolt.
- G. Arrange entire assembly to prevent dirt and grit from entering valve box assembly.
- H. Lid shall be marked "Water" "Sewer" and have directional arrow for open rotation.
- I. Materials:
 - 1. Valve box, base, alignment ring, and top: High-density polyethylene.
 - 2. Extension steel: Galvanized steel tubing.
 - 3. Bolts and screens: Stainless steel.
 - 4. Lid: Cast iron.
- J. Manufacturer: American Flow Control "Trench Adapter," or equal.

2.05 HYDRANTS WITH AUXILIARY GATE VALVES

- A. Design and manufacture: AWWA C502.
- B. Hydrant connection: Flange joint; 6".
- C. Provide two 2-1/2" hose nozzles and one 4" hose nozzle; include nozzle caps securely chained to hydrant barrel.
- D. Hose nozzle threads: National Standard.
- E. Length of hydrant: Suitable for 5' of trench depth.
- F. Hydrant valve opening: 5-1/4".
- G. Dry-barrel hydrant with automatic drain valve to drain hydrant barrel when main valve is closed.
- H. Packing: O-ring.
- I. Direction of opening: Counterclockwise.
- J. Operating nut: National Standard 1-1/2" pentagon.
- K. Exterior paint: Shop painted, AWWA C502 with top section painted red.
- L. Interior coating: Epoxy; AWWA C550.
- M. Provide flanged and mechanical joint end auxiliary gate valve complete with valve box for each hydrant.

- N. Quality standard: Waterous Co., (American Flow Control) Pacer, American Darling B-50-B, Mueller A-442, Clow Medallion, or equal.

2.06 UNDERGROUND WARNING TAPES

- A. Type: Blue; 6" wide, polyethylene, with detectable metallic core for ease of locating buried pipe. Printed wording shall read "Caution - Water Line Buried Below".
- B. Bury approximately 12" deep directly above water main.
- C. Location: Entire length of water main except for railroad and highway crossings.
- D. Manufacturer: Seton Name Plate Company, or equal.

PART 3 EXECUTION

3.01 VERIFICATION OF MEASUREMENTS

- A. Before installation, verify measurements at Site, including:
 - 1. Actual location of connections to existing water mains.
 - 2. Type of joints on existing lines at point of connection.
 - 3. Outside diameter of existing pipe.
- B. Make necessary field measurements to determine accurately pipe laying lengths to permit installation without forcing or springing.

3.02 VERIFICATION OF CONDITIONS

- A. Verify condition of exterior coating, corrosion deposits, or other surface irregularities of water main that may interfere with proper seating and sealing of each fitting against each main.
- B. Structural defects in main, service connections, appurtenances, adjacent utilities, etc. that could interfere with installation shall be immediately reported to Owner.
- C. If conditions interfere with installation and operation of fittings or support and thrust restraint systems, move location up or downstream to structurally sound pipe.
- D. Conform to manufacturer's recommendations regarding determination of inside pipe diameter and condition of mortar pipe liner.

3.03 PIPE INSTALLATION IN TRENCH

- A. Store, handle, join, lay, and otherwise install in accordance with pipe manufacturer's recommendations.
- B. Trench excavation and backfill: Conform to requirements of Section 31 23 00.
- C. Minimum earth cover: 4 feet.
- D. Clean pipe interior of foreign material before lowering into trench; keep clean at all times by securely closing open ends of pipe and fittings.
- E. Lay pipe in the dry.
- F. Handle pipe and accessories in manner to ensure delivery to trench in sound, undamaged condition; take particular care not to injure pipe coating or cement lining.

- G. Cut pipe in neat and workmanlike manner without damage to pipe.
- H. Carefully protect joint material from injury while handling and storing pipe; keep weight off joint material on spigot; use no pipe with joints deformed, gouged, or otherwise impaired.
- I. Pipe which is damaged or unsound will be rejected; before installation of ductile iron pipe, tap with light hammer to detect cracks.
- J. Use suitable fittings where grade or alignment requires offsets greater than manufacturer's recommended joint deflections.
- K. Plug or cap and block pipe ends or fittings left for future connections.
- L. Uncover existing mains, to which connections are to be made, a sufficient time ahead of pipe laying operations to determine fittings required.
- M. Make connections between existing and new water mains with specials and fittings to suit actual conditions.
- N. Install polyethylene encasement of ductile iron pipe in accordance with AWWA C105.

3.04 THRUST BLOCKS

- A. Provide thrust blocks where buried piping changes direction, changes size, or at deadends.
- B. Carry thrust block to undisturbed edge of trench for bearing.
- C. Install thrust blocks in accordance with Civil Details.
- D. Size of thrust block, in accordance with Civil Details.
- E. Concrete shall conform to Section 03 00 10.
- F. Installation of thrust blocks shall be confirmed by Engineer prior to backfilling.
- G. At Contractor's option, restrained joints may be used. Provide Engineer with restrained joint plan.

3.05 SETTING VALVES, VALVE BOXES, AND HYDRANTS

- A. Valves:
 - 1. Install with stems vertical, except where shown otherwise.
 - 2. Tighten valve glands as work is installed; replace O-rings if required, and retighten glands after valves are placed in operation and brought up to operating pressure.
 - 3. Replace any O-ring which is deteriorated or in unsatisfactory condition.
 - 4. Set buried valves on concrete thrust block extending to undisturbed earth and having bearing area equal to "dead end" for pipe of same size as valve.
- B. Valve boxes:
 - 1. Provide for each buried valve.
 - 2. Center on valves.
 - 3. Carefully tamp backfill around each valve box to a distance of 4' on all sides of box or to undisturbed trench face, if less than 4'.
- C. Hydrants:
 - 1. Install plumb; set at elevation so that cover will not be less than distributing main and grade mark on hydrant barrel is at ground level.
 - 2. Set on concrete foundation.

3. Carefully tamp backfill around hydrant to a distance of 4' on all sides of hydrant or to undisturbed trench face if less than 4'.
4. Tighten all stuffing boxes as hydrant is installed; operate hydrant in open and closed positions to assure all parts are in working condition.
5. Block hydrant in place.
6. Install as shown on Civil Details.

3.06 TESTS FOR WATER MAINS

- A. Test piping after installation in accordance with AWWA Specification C600.
- B. Test piping with water.
- C. Pressure test for water main:
 1. Pressure test: 200 psi at lowest point in test section.
 2. Duration of pressure test: 2 hours.
 3. Flush out main before test to remove air; insert taps if necessary to blow off trapped air.
 4. Maximum allowable pressure variation during test period: 5 psi (35 kPa).
- D. Leakage test for water main:
 1. Conduct concurrently with pressure test.
 2. Measure water supplied to maintain test pressure within 5 psi (35 kPa) of test pressure by pumping from calibrated container.
 3. Maximum allowable leakage (L) in gallons per hour:

$$L = \frac{SD \sqrt{P}}{133,200}$$

S = length of pipe tested in feet
 D = nominal pipe diameter in inches
 P = average test pressure, psig

****OR****

Maximum allowable leakage (L) in l per hour:

$$L = \frac{SD \sqrt{P}}{707,186}$$

S = length of pipe tested in meters
 D = nominal pipe diameter in mm
 P = average test pressure, kPa

4. When testing against closed metal seated gate valves, an additional leakage of 0.0078 gallons per hour per inch of nominal valve size shall be allowed.
- E. Provide test pumps, test plugs, pipe, calibrated container, and gages, and make required piping connections.
- F. Carefully examine visible joints during the time pressure is on pipe.
- G. Refit piping showing visible leakage or as needed to minimize or eliminate leakage.
- H. Locate and repair or replace defective pipe or fittings until leakage is within specified allowance.

3.07 DISINFECTION

- A. Flush thoroughly and disinfect in accordance with AWWA C651 before pressure testing and backfilling have been completed.

- B. Disinfect by injecting a solution of calcium hypochlorite and water at slow rate; concentration of solution shall provide minimum residual chlorine content of 25 ppm in water mains; system shall stand full of solution for not less than 24 hours.
- C. Test to determine chlorine residual at pipe extremities; residual shall be not less than 10 ppm at end of 24-hour disinfection period.
- D. Operate valves and hydrants in line to assure full disinfection.
- E. Repeat disinfection procedure if test indicates less than required residual.
- F. Thoroughly flush lines after disinfection and testing until extremities indicate same chlorine residual as supply water.
- G. Connections to existing mains:
 - 1. Using tapping sleeve and valve:
 - a. Thoroughly clean outside of existing main and inside of sleeve and valve by swabbing or spraying with 1% hypochlorite solution.
 - b. After installing tapping sleeve and valve and before tapping existing main, place calcium hypochlorite inside sleeve and valve.
 - c. Place calcium hypochlorite around outside of valve and inside of fittings when making connections.
 - 2. Connecting to existing fitting:
 - a. Follow procedure outlined above.
 - b. When existing main has been opened, place calcium hypochlorite inside existing fitting.
- H. Owner will take samples and submit for bacteriological analysis. Contractor shall assist Owner in collecting samples as required. If initial disinfection fails to produce satisfactory bacteriological results, main shall be rechlorinated at no additional cost until satisfactory results are obtained. Do not place system into operation until test results of water samples are satisfactory.

END OF SECTION

SECTION 33 42 00**CULVERTS****PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Reinforced concrete pipe (RCP).
- B. Canal Gates.

1.02 SUBMITTALS

- A. Include data on manufacturer's catalog data for pipe, pipe joints, and gaskets,
- B. Submit certificates of compliance for materials as specified.

1.03 MEASUREMENT AND PAYMENT

- A. If quantities of the following items are changed from those required by Contract Documents, lump sum Contract Price will be adjusted on basis of unit adjustment prices set forth in Agreement.
 - 1. RCP; linear foot (LF): Unit adjustment price includes furnishing materials, equipment, and labor to construct pipe culvert in place including excavation, bedding, jointing, and backfilling.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforced concrete pipe (RCP): AASHTO M170. Diameter and class shown on Drawings.
- B. Fittings: Includes tees, wyes, bends, and mitered pipe.
 - 1. Conform to requirements for RCP in same location.
 - 2. Fabrication: Shop-welded reinforcement.
- C. Rubber ring, gasket type, flexible joint:
 - 1. Pipe smaller than 42" diameter: ASTM C443
 - 2. Pipe 42" and larger: ASTM C361
- D. Irrigation Gate
 - 1. Water C-10 Canal Gate of approved equivalent.
 - 2. Refer to manufacturer for installation information.
 - 3. Refer to detail.
 - 4. Provide means to connect gate to adjacent pipe system, structure, or appurtenance indicated.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

- A. Execute Work in the dry; provide pumping or drainage necessary to completely remove water from work area.
- B. Commence at lowest point in line.

- C. Bedding: Provide firm, compacted foundation of uniform density throughout length of pipe; shape to provide full bearing contact for lower quadrant of pipe. Foundation shall be free from clods, frozen lumps, rocks, roots, or other foreign material.
- D. Keep pipe clean of dirt and foreign material. Protect pipe from damage at all times.
- E. Seal joints in RCP culverts with preformed flexible gasket. Push or pull each section of pipe as tight as reasonably possible to section in place to ensure tight joints.
- F. Fill handling holes in RCP culverts with a precast plug, seal, and cover with mastic or mortar.
- G. Backfilling:
 - 1. Use material excavated from site. Use best granular material available for placement under pipe haunches and for backfill on sides of pipe up to top of pipe.
 - 2. Backfill material shall be free of clods, rocks, organic matter, and other deleterious material.
 - 3. Placing and compacting:
 - a. Place and compact soil under haunches and on sides of pipe with special care.
 - b. Place backfill material simultaneously on both sides of pipe in layers not exceeding 6" in depth.
 - c. Compact backfill material, under haunches and on sides of pipe up to top of pipe, to 95% as determined by ASTM D698.
- H. Carry hand-compacted backfill sufficient height above top of pipe to eliminate possibility of damage to pipe by equipment.
- I. Lay culvert pipe with camber to allow for embankment settlement.
 - 1. Compute camber as 1" per 5' of cover over pipe.
 - 2. Center of culvert shall be not higher than inlet of pipe.
- J. Plug existing storm (irrigation) where indicated; fill pipe with concrete for a minimum length of 2'.

END OF SECTION