

TOWN OF HOTCHKISS

PUBLIC WORKS FACILITY

MARCH, 2019

Updated August, 2019

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I hereby certify that these plans and specifications have been prepared under my direct supervision and to the best of my knowledge represent the work required for Public Works Facilities. Engineer makes no warranties, expressed or implied in connection with consultant's services. Any additions, deletions, or modifications to any part of these documents will void any warranty expressed or implied.



Joanne Fagan

3/2019

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REQUEST FOR PROPOSALS

Sealed Proposals will be received by the Town of Hotchkiss, Colorado until [3:00 pm Wednesday April 24, 2019](#) at the Hotchkiss Town Hall, 276 W. Main St. Hotchkiss, CO, to furnish all labor, equipment, and materials, and incidentals for both preconstruction and construction of the Public Works Facility Project. Services are proposed to be furnished as Contract Manager at Risk format in accordance with the Contract Documents.

Owner reserves the right to reject any and all Proposals, to waive any and all informalities and to negotiate contract terms with the successful Proposer, or to accept the Proposal for the contract which in its judgment best serves the interest of the Owner, and the right to disregard all non-conforming, non-responsive, or conditional Proposals.

Contract documents may be obtained from the Hotchkiss Town Hall. (970) 872 3663.

Each Proposer is responsible for inspecting the site and for reading and being thoroughly familiar with the Contract Documents. The failure or omission of any Proposer to do any of the foregoing shall in no way relieve any Proposer from any obligation in respect to its Proposal.

A meeting will be held at the Hotchkiss Town Hall on [Tuesday April 16, 2019 at 2:00 pm](#) for the purpose of addressing any questions concerning the proposed project. A site visit will be included as part of the meeting. Proposers are strongly encouraged to attend this meeting.

Publication: Delta County Independent
March 20, 27, 2019

Town of Hotchkiss
By: Marlene Searle, Town Clerk/Treasurer

SECTION 00100 - INSTRUCTIONS TO PROPOSERS

1. COPIES OF PROPOSAL DOCUMENTS AND CONTRACTOR SELECTION METHODOLOGY

1.1. Complete sets of the Proposal Documents in the number and for the sum, if any stated in the Request for Proposals may be obtained from Engineer or the Owner.

1.2. Complete sets of Proposal Documents must be used in preparing Proposals; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposing Documents.

1.3. Owner and Engineer in making copies of Proposing Documents available on the above terms do so only for the purpose of obtaining Proposals on the Work and do not confer a license or grant for any other use.

1.4 The Owner is requesting proposals using a methodology similar to the Contract Manager at Risk as further described herein. The Owner's design team has prepared the plans and specifications to about 50% completion from which Proposers should prepare their proposals and proposal pricing. Proposals should include pricing for both preconstruction and construction services as requested on the proposal form. Proposers will be evaluated based on the criteria outlined below and will be scored using the sample matrix in the Proposal section. The Owner and Owner's design team will rate each Proposer using the matrix and select the Contractor based on the highest ranking in the matrix. The Owner will execute an Agreement and issue a Notice of Award to the highest rank proposer for pre construction services as detailed in the contract documents who shall assist the design team and Owner with the completion of the design documents.

1.5 At the completion of the design, the Contractor that has been working with the design team will be given an opportunity to update his cost for the construction from that provided in his Proposal to reflect the updated scope of work in the final design and give the Town a guaranteed maximum price for the Work. If the Town finds the price is reasonable given the changes between preliminary and final design and the total cost is within the Town's budget, the Town would execute the construction contract with him. If the Town did not find the price fair, the Town would reject the Contractor's pricing and instead rebid the Work as a typical design, bid, build project.

2. QUALIFICATIONS OF PROPOSERS

To be considered as a qualified Proposer, Proposer must demonstrate that he has satisfactorily completed similar work of similar size and complexity on other projects and that the lead personnel that will be assigned to the project have the necessary experience to satisfy these requirements. Proposer must also demonstrate that he and his staff assigned to this Work have the expertise and positive recommendations for past projects and that they meet or exceed the minimum experience requirements

for the various types of work specified in the Contract Documents and that he has the financial resources to satisfactorily complete the project.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1. It is the responsibility of each Proposer before submitting a Proposal, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance of furnishing of the Work, including without limitation, improvements, soil conditions, drainage, topography and all other features of the terrain and conflicts, (c) consider federal, state and local laws, ordinances, rules and regulations; and (d) study and carefully correlate Proposer's observations with the Contract Documents as each may affect cost, progress, or performance of the work, or apply in any manner whatsoever to the work.

3.2 Contractor has given the Owner written notice of all conflicts, errors, or discrepancies that he discovered in the contract documents and such documents are acceptable to the Contractor.

3.3 On request, and with adequate notice, Owner will provide each Proposer access to the site to conduct such investigations and tests as each Proposer deems necessary for submission of his Proposal.

3.4. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor.

3.5. The submission of a Proposal will constitute an incontrovertible representation by the Proposer that Proposer has complied with every requirement of this Article 3 without exception, that the Proposal is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work, and to provide for a completed, properly functioning installation in conformance with all applicable codes, ordinances, statutes and intent of Contract Documents as provided with the request for proposals. The failure or omission of any Proposer to do any of the foregoing shall in no way relieve any Proposer from any obligation with respect to its Proposal or to complete the Work.

4. INTERPRETATIONS

The Owner and Engineer will conduct a meeting prior to Proposal opening at the date and time specified in the Request for Proposals for the purpose of reviewing the project scope and field conditions and interpreting the meaning or intent of the Contract Documents. Interested Proposers are strongly encouraged to attend the conference. The meeting will include a visit to the site. The site visit shall in no way relieve the Proposer of his responsibilities under Article 3.

Questions about the meaning or intent of the Contract Documents are to be submitted to the Engineer in writing at least 7 days before the Proposal opening date in the Request for Proposals. All questions will be answered in writing after the pre-proposal meeting by Addenda or written response emailed, mailed, or delivered to all parties recorded by Engineer as having received the Proposing Documents. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5. PROPOSAL SECURITY

Each Proposal must be accompanied by Proposal Security made payable to Owner in an amount of 5% of the Proposer's maximum Proposal price for both pre construction services and construction of the project and in the form of a certified or bank check or a Proposal Bond (on form attached). The Proposal security of the successful Proposer will be retained until such Proposer has executed the Agreement for construction and furnished required Contract Security, whereupon it will be returned. If the Successful Proposer fails to execute and deliver Agreement and furnish the required contract security within 10 days of Notice of Award, Owner may annul the Notice of Award and Proposal Security of that Proposer will be forfeited.

6. CONTRACT TIME

The number of days within which, or the date by which, the pre construction Work is to be completed and ready for final payment (the pre construction services Contract Time) is set forth in the Agreement. Strict adherence to timeframe is required.

7. LIQUIDATED DAMAGES

Provisions for liquidated damages are set forth in the Agreement.

8. SUBSTITUTE MATERIAL AND EQUIPMENT

Information regarding substitute material and equipment is provided in Section 01000.

9. SUBCONTRACTORS, ETC.

9.1. Proposals shall include a preliminary list of sub-contractors and suppliers and others proposed to furnish materials and/or equipment the Contractor intends to use for project construction. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person or organization. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either may before giving the Notice of Award, request the apparent Successful Proposer to submit an acceptable substitute without an increase in Proposal price. If

the apparent Successful Proposer declines to make any such substitution, Owner may award the Contract to the next best qualified Proposer that proposes to use acceptable Subcontractors, Suppliers and other persons and organizations.

9.2. No Contractor shall be required to employ any Subcontractor, other person or organization against who he has reasonable objection.

10. PROPOSAL FORM

10.1. The Proposal Form is attached hereto. Proposer shall submit a complete proposal package which shall include the proposal form and the attachments required as attachments.

10.2. The price(s) quoted in the Proposal Form shall include the costs of labor, materials, equipment, and all incidentals required to provide a fully complete and functioning unit requested in the plans and specifications. The price(s) stated in the Proposal Form shall be complete and total payment for each item in the Proposal Form. No additional payment will be made for the work included on the Proposal Form and or needed to complete the work.

10.3. Proposal Forms must be completed in ink or by typewriter.

10.4. Unit price quantities stated in the Proposal form are estimates only and may vary when constructed. The Contractor will perform the required quantity of work for the unit price stated in the Proposal form. Owner reserves the right to modify the quantity of work without a change in unit price and to delete entire Proposal items in order to make the scope of work fit the budget.

10.5. Proposals by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

10.6. Proposals by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

10.7. The Proposal shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Proposal Form.)

11. SUBMISSION OF PROPOSALS

Proposals shall be submitted at the time and place indicated in the Request for Proposals and shall be enclosed in an opaque sealed envelope, marked with the Project title and name and address of the Proposer and accompanied by Proposal Security and the other required documents. If the Proposal is

sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "PROPOSAL ENCLOSED" on the face of it. Proposal attachments shall not exceed the page limits in the Proposal request with font no smaller than Arial 10.

12. MODIFICATION AND WITHDRAWAL OF PROPOSALS

Proposals may be modified or withdrawn by an appropriate document duly executed (in the manner that a Proposal must be executed) and delivered to the place where Proposals are to be submitted at any time prior to the opening of Proposals.

13. OPENING OF PROPOSALS

When Proposals are opened publicly, at the time and place specified in the request for Proposals, the Proposal total will be read aloud, and an abstract of the amounts of the base Proposals and major alternates (if any) will be made available after award of the project by the Owner. Proposals will be acted upon by the Owner at a later date.

14. PROPOSALS TO REMAIN OPEN

All Proposals shall remain open for ninety (90) days after the day of the Proposal opening, but Owner may, at its sole discretion, release any Proposal and return the Proposal Security (if any) prior to that date.

15. AWARD OF CONTRACT

15.1. Owner reserves the right to reject any of the individual Proposal items of a Proposal, to reject any and all Proposals, to waive any and all informalities and to negotiate contract terms with apparent Successful Proposer, and the right to disregard all nonconforming, non-responsive or conditional Proposals. Also Owner reserves the right to reject the Proposal of any Proposer if Owner believes that it would not be in the best interest of the Project to make an award to that Proposer, whether because the Proposal is not responsible or responsive or the Proposer is unqualified or of doubtful technical and/or financial ability or fails to meet any other pertinent qualifications, standards, or criteria established by the Owner.

15.2 Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices.

15.3 In evaluating Proposals, Owner will consider the full proposal package including but not limited to:

Price and value for the construction based on the contract documents provided with the request for proposals
Qualifications and expertise of the proposer and proposed sub contractors and equipment including examples of recent projects.
Price and value of preconstruction services working with the design team on plan review and preparing cost estimates
Suggestions in Contractor's proposal to improve constructability and overall project quality
Contractor and Project Team Experience including sub contractors
Contractor approach to the project
Contractor references for similar project
Project Team references
Equipment and materials proposed
Construction time line

and whether or not the Proposals comply with the prescribed requirements, and such alternates, unit prices and other data as may be requested in the Proposal form or prior to the Notice of Award. Owner may accept or delete Proposal items and/or alternates in any order or combination.

Contractor's submittal shall be bound in a loose leaf binder with dividers separating the required topics. The Owner will use the proposal package and other information the Owner gathers concerning the Proposer to make a determination of scores for the proposer ranking.

15.4. Proposers will be evaluated using a matrix that weights the above criteria. A blank copy of the matrix with scoring is included with the Proposal Form. The three top scoring Proposers will be interviewed by the design team and Owner and scoring updated and the highest scoring Proposer would be selected.

15.5. Owner may conduct such investigations as he deems necessary to assist in the evaluation of any Proposal and to establish the responsibility, qualifications and financial ability of Proposers, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

15.6. Owner reserves the right to reject the Proposal of any Proposer who does not pass any such evaluation to Owner's satisfaction.

15.7. If the contract is to be awarded, it will be awarded to the best qualified, responsible and responsive Proposer(s) whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project including an assessment of life cycle costs of any equipment and/or alternatives proposed using the evaluation matrix and interview results. The Owner shall be solely responsible for determining its best interests and life cycle costs.

15.8. If the contract is to be awarded, Owner will give the Successful Proposer(s) a Notice of Award within ninety (90) days after the day of the Proposal opening or if agreed to by both parties such extension of time beyond the 90 days to allow for execution the Energy and Mineral Impact grant contract.

16. CONTRACT SECURITY

The Owner's requirements as to Performance and Payment Bonds are set forth in the Agreement. When the Successful Proposer delivers the executed Construction Agreement for Construction to Owner it shall be accompanied by the required Performance and Payment Bonds.

17. Funding Agency Requirements

17.1 The project is partially funding by an Energy and Mineral Assistance grant from DOLA. Copies of the contract is available for review at Town Hall. Compliance with the terms of the funding agencies is a requirement of the contract.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Proposer(s), it will be accompanied by at least three unsigned counterparts of the Agreement with all other written Contract Documents attached. Within ten (10) days thereafter Contractor shall sign and deliver at least three counterparts of the Agreement with attached documents to Owner with the required Bonds and insurance certificates.

19. AGREEMENT

The Contract, when executed, shall be deemed to include the entire Agreement between the parties thereto, and the Proposer shall not claim any modifications thereof resulting from any representation or promise made at any time by an officer, agent, or employee of the Owner or by any other person. Note that the initial Agreement will be for just pre-construction services.

20. STATE STATUTES

The Contractor must comply with all State Statutes including but not limited to the requirements HB 13-1292- and CRS 8-17.5-101.

SECTION 00300 - PROPOSAL

PROJECT IDENTIFICATION: Town of Hotchkiss – Public Works Facility

THIS PROPOSAL IS SUBMITTED TO: Town of Hotchkiss
P.O. Box 369
Hotchkiss, CO 81419

Proposal of _____ (hereinafter called "Proposer", organized and existing under the laws of the State of _____ doing business as _____ (a corporation, partnership, individual).

To the Town of Hotchkiss (hereinafter called "Owner").

In compliance with your request for Proposals, PROPOSER hereby proposes to perform all WORK for the construction of Public Works Facility Project in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this PROPOSAL, each PROPOSER certifies, and in the case of a joint PROPOSAL, each party thereto certifies as to its own organization, that this PROPOSAL has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this PROPOSAL with any other PROPOSER or with any competitor.

PROPOSER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the number of days and date specified in the Agreement. PROPOSER further agrees to pay as liquidated damages, the sum specified in the Agreement each day thereafter as provided in Agreement

In submitting this Proposal, Proposer represents, as more fully set forth in the Agreement, that:

(a) Proposer has examined copies of all the Proposing Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	_____
_____	_____

(b) Proposer has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, characteristics of the area and physical conditions, including without limitation, improvements, conflicts, soil conditions, drainage, topography, and all other features of the terrain, and with the local conditions and site constraints, and federal, state, and local laws, ordinances, rules, and regulations that in any manner may affect cost, progress, or performance or furnishing of the Work, or apply in any manner whatsoever to the Work. After a Proposal has been submitted, the Proposer shall not assert that there was a misunderstanding concerning the nature or

quantities of work to be done or the conditions under which the work will need to be performed nor that the Proposer was unaware that the scope of the work could be modified to fit the budget.

(c) Proposer has given Engineer written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Proposer.

(d) This Proposal is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any person, firm or corporation to refrain from Proposing; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over Owner.

(e) Proposer hereby certifies that, as of the date hereof, it does not knowingly employ or contract with an illegal alien who will perform work under this Agreement, and the Contractor will participate in the federal e-verify program or the state program pursuant to CRS 8-17-102(5) in order to confirm eligibility of all employees who are newly hired for employment under this agreement.

Proposer acknowledges that the Contract Price is based on the estimated quantities listed which are approximate and are furnished only for the purpose of estimating probable cost and comparing Proposals offered on the Work, except where the unit is Lump Sum (LS), in which case payment will be based on the lump sum price Proposal. Owner reserves the right to add and/or delete work in any order and in any quantity at no change in unit price.

Proposer agrees to perform all Work described in the Contract Documents for the following unit prices or lump sum which each include the full scope of work specified and detailed in Section 00350 Measurement and Payment and as required to complete the work:

Hotchkiss Public Work Facility Proposal Form – Updated August 17, 2019

No.	Description	Qty	Units	Unit Cost	TOTAL
	Complete Building Package per the Contract Documents	1	LS		
	TOTAL BASE BID				

ALTERNATE BID ITEMS

A	Concrete Flat work 6" thick (add or delete)		SY		
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B	Alternate Add Elec #1 – Add generator set and transfer switch		LS		
C	Alternate Add Elec #2– Add Photovoltaic Panels		LS		
D	Alternate Add #3 - Light tube		EA		
E	Alternate Add #4 – Add Pole light at entry gate.		LS		
F	DELETE Overhead Garage Door		EA		

Proposer agrees that the Work will be substantially complete within the timeframe described in the Agreement and completed and ready for final payment within accordance with the time required in the Agreement.

Proposer accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

The following documents are attached to and made a condition of this Proposal:

(a) A tabulation of Subcontractors, Suppliers and other persons and organizations required to be identified in this Proposal.

(b) A statement of Proposer's Qualification with supporting data and references regarding similar projects.

(c) Required Proposal Security shall be made payable to the Owner, in an amount specified in the Information to Proposers and in the form of a certified or bank Check or a Proposal Bond (on form attached) issued by a surety meeting the requirements of the General Conditions.

7. Communications concerning this 970 872 3663.

Submitted on _____, 20_____.

Respectfully submitted:

Signature Address

Title Date

License number (if applicable) Phone

SEAL - (if PROPOSAL is by a corporation)

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto as OWNER in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, this day of _____, 20__.

The Condition of the above obligation is such that whereas the Principal has submitted to a certain PROPOSAL, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

NOW, THEREFORE,

- (a) If said PROPOSAL shall be rejected, or in the alternate,
- (b) If said PROPOSAL shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (Properly completed in accordance with said PROPOSAL) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said PROPOSAL,

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

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

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

_____(L.S.)
Principal

Surety

By: _____

SECTION 00350 - MEASUREMENT AND PAYMENT

PART I – GENERAL

This section is intended to further define the scope of the Proposal items on the Proposal form. It is the intent of these Contract Documents that the costs for all the work required for a complete project as described in the Contract Documents be included on the Proposal form. If there is a question of what Proposal items should include what costs, a written request shall be made to the Engineer at least 7 days prior to Proposal opening. Nothing in this Section or in the Proposal Form, including not finding a specific item or scope described, will negate the Contractor's responsibility to furnish a complete, functional project as described in the Contract Documents.

All pricing in each Proposal item shall be the complete cost to complete each item whether specifically listed or needed to complete the work including mobilization, materials, equipment, labor, quality control and testing, testing equipment, protection of the work and other improvements above and below ground, and shall include permitting (including but not limited to securing, complying, and closing) stormwater, dewatering, and other required permits, compliance with applicable Town, State, and Federal regulations and compliance with terms of easements and permits, stabilization, traffic control, project safety, coordination with others, all submittals specified (including O&M manuals and as-constructed surveys and drawings), schedules, surveying and staking, temporary facilities, clean up, restoration and demobilization, and shall include overhead, profit, supervision, all applicable taxes, copyright, trademark and patent fees, and incidental work, tools, and materials and the associated costs of complying with all the requirements of the Contract Documents including by reference, the Town's Standard Conditions and Typical Drawings for Infrastructure Construction.

Compensation included in each Proposal item shall also include any contractor loss or damage caused by the nature of the work, the action of the elements, or any unforeseen difficulties which may be encountered during the prosecution of the work, for all expenses incurred in consequence of the suspension or discontinuance of the work as herein specified.

Owner reserves the right to add and/or delete work in any order and in any quantity at no change in unit price. The order of the additive alternates is not indicative of the order in which they might be awarded as that decision will in part be based on if there is available funding and how much is available. If there is insufficient funding to complete the base contract, the Owner will adjust the scope as needed to fit the budget and the Town's needs.

All materials incorporated into the work shall be free from defects and new, unless otherwise specified.

Note: The Contractor shall anticipate that the soils maybe incompetent and/or unstable, and that the groundwater table may be shallow and shall include the costs of handling groundwater, saturated materials, and instability in each relevant Proposal item. This note is applicable to each of the Proposal items which includes work below grade.

Access to the work area is limited. Contractor shall carefully inspect the site and access to it prior to submitting a Proposal and include the costs associated with the limited access, site constraints, and any needed improvements and include the costs of such work in the Proposal items which are impacted by such constraints.

The numbering below corresponds to the numbering on the Proposal Form:

BASE BID

BUILDING PACKAGE COMPLETE

The lump sum base bid shall include furnishing all labor, materials, and equipment necessary to construct the building and improvements including in the contract documents except that the Owner will coordinate the installation of natural water, sewer, gas and power to **5' feet outside the concrete outside the building** and provide power to the transformer. Building package includes the main building including the mezzanine, office, ADA restroom, and break room, the awnings, overhangs, outside slabs, fencing, lights, interior and exterior stairs, all structural and sheathing steel, doors, windows, carpentry, hardware, plumbing, mechanical, electrical and insulation of the size, dimensions and performance requirements and with all the details and work shown on the plans and included in the Contract Documents and all other items and appurtenances needed for a complete project in accordance with the contract documents, applicable and referenced codes and good practice. Unless otherwise shown as an additive or deductive alternate, all work shall be included in the base bid for the full building package.

ALTERNATE BID ITEMS & UNIT PRICE ITEMS

Each of the unit price bid items are intended to provide pricing should the Owner request and/or authorize a change in the scope of the work. As with the bid items, the costs for the unit price work should include all the appurtenant and incidentals listed above which are associated with the work. Unit prices will not be used in determining the successful bidder.

Prices listed shall include furnishing and installing materials, equipment, labor, quality control, testing, disinfecting, protection of the work and all other improvements, and shall include mobilization, dewatering, controlling flow, stabilization, shoring, coordination with others, locating and adjusting for other utilities, traffic control, storm water management, submittals, schedules, staking, clean up, restoration and demobilization, overhead profit, supervision, all applicable taxes, and incidental work, tools, and materials and the associated costs of complying with all the requirements of the Contract Documents. The Owner reserves the right to reject any of these unit prices, should they appear unbalanced or excessive. Such rejection shall not invalidate the acceptance of the Bid or any contract based thereon.

A. Concrete Flat Work 6" thick (Add or Delete)

For the unit price indicated furnish all labor, equipment, and materials required furnish and install concrete with 6" thick, fiber reinforced 6 sack concrete mix. Work will be measured and paid for by the square yard measured horizontally.

B. Alternate Electrical #1 – Add generator set and automatic transfer switch. For the price listed furnish and install 20 Kva generator Kohler 14/20 RESA designed for natural gas or equal and automatic transfer switch. Include all wiring, controls, gas service, permitting, appurtenances, necessary to run the emergency loads on the generator, complete and operational.

C. Alternate Electrical #2 – Add Photovoltaic panels. For the price listed furnish and install solar grid interactive power panels, Enphase or equal 3.5 kw micro inverter expandable to 20kW, compatible with battery backup system, include mounting racks and hardware, wiring, controls, interconnect to DMEA net metering systems, data logging for electricity generated, complete and operational including 10 year manufacturer's warranty on panels and micro inverter.

D. Add 22" Light Tube

For the unit price add a 22" diameter light tube including all the associated framing, structural elements, roof penetration and sealing to install each light tube, complete. Work will be measured and paid by the each tube system installed, complete.

E. Add Pole Mounted Light at entry gate.

For the lump sum listed, furnish and install a 100 watt equivalent dark sky compliant 20' high pole mounted light at the entry gate. Pole and electrical shall be installed consistent with entry gate light detail on sheet E1-2, complete.

F. Delete north side Overhead Garage Door

Work includes deleting overhead garage door on the north side of the building including the door, the operator, controls, framing, complete and furnishing and installing structural elements, insulation, and siding to cover the opening, complete. Also includes deletion of the concrete apron in front of that door and replacement with the typical awning gravel surface. Work will be measured and paid by the each.

ATTACHMENT 1
QUALIFICATION STATEMENT

Please complete all the questions. If additional space is needed, please attach a separate sheet of paper which references the question number.

Contractor Name: _____

Address: _____

Telephone _____ Email _____

Principal Owner/Officer: _____

	Name	Title	
___ Corporation	___ Partnership	___ Individual	___ Joint Venture

I. TYPES OF WORK (list years of experience for each type of work desired)

Earthwork and Grading	_____	Steel Buildings	_____
Concrete	_____	Underground Utilities	_____
Plumbing	_____	Electrical	_____
Mechanical	_____		
Others (list)	_____		

II. GENERAL EXPERIENCE INFORMATION

2.1 Are you licensed as a Contractor Yes ___ No

Location	Type of License & Number
----------	--------------------------

2.2 How many years has your organization been in business as a Contractor under your present business name? _____ Under the current owners? _____

2.3 Date of organization or incorporation: _____ State
Names, Titles of Officers/Owners/Partners:

If a partnership is it a general, limited, or association?

2.4 If you have controlling interest in any firm(s) other than the one listed above, list here:

2.5 List percent of work normally performed with own forces

List trades: _____

If the answer to any of questions 2.6 - 2.11 is yes, provide explanation and/or details on a separate sheet of paper.

2.6 Have you or your organization or any officer or partner thereof failed to complete a contract awarded to it? Yes No If yes, give details:

2.7 Has the firm, any of its officers, principals, superintendents, or managers been involved in any litigation or court proceeding in the past eight (8) years? Yes No If yes, explain (listing type, kind, plaintiff, defendant, current status, etc.

2.8 Are there any judgments, claims, arbitration matters, unresolved contract disputes, or suits pending or outstanding against the firm, or any of its officers or principals? Yes No If yes, explain.

2.9 In the last eight years (8) has your firm, any of its officers, principals, managers, or superintendents filed any lawsuits or requested arbitration or formal mediation for or related to a construction contract? Yes No If yes, explain.

2.10 Has the firm, any of its officers, principals, superintendents, or managers been involved in any bankruptcy action as a bankrupt? Yes No If yes, explain

2.11 In the last eight (8) years has any of the firms officers, principals, managers, or superintendents ever been an officer or principal in another organization when it failed to complete a construction contract or filed any claims, lawsuits or requested arbitration or formal mediation for a construction contract? Yes No If yes, explain.

2.12 Have you been found liable for breach of contract with respect to a previous project, other than a breach for legitimate cause, during the 5 years immediately preceding the date of the advertisement for this Proposal? Yes No If yes, explain.

2.13 Total average annual construction valve of work for the last 5 years. \$ _____

2.14 List on a separate sheet of paper the major projects your firm has in progress at this time, providing, at a minimum, the following information for each project.

- Name, Contact Name, Address, Phone of: Project, Owner, and Engineer,
- Type of Project
- Contract Amount
- Scheduled & Expected Completion Date

Percent Completed Percentage of work done being done with own forces and nature of that work

2.15 Total value of work under contract and in progress \$ _____

III. REFERENCES

3.1 Surety - List the Surety Companies that have bonded your work for the past five years (use a separate paper if necessary):

<u>Name of Surety</u>	<u>Project</u>	<u>Period of Bond</u>		<u>Maximum Limits &</u>
<u>Name, Address</u>	<u>and</u>	<u>From</u>	<u>To</u>	<u>General Comments</u>
<u>of Agent</u>	<u>Location</u>			

3.1.a Total Currently Bonded _____ Total Current Bond Limits _____

3.2 Bank References

3.3 Trade References

IV. FINANCIAL INFORMATION

4.1 If requested, provide a financial statement with balance sheet and income statement and the following minimum information:

Current Assets: Cash, joint venture accounts, accounts receivable, notes receivable, accrued interest on notes, deposits, materials, prepaid expenses, net fixed assets, and other assets.

Current Liabilities: Accounts Payable, notes payable, accrued interest on notes, provision for incomes taxes, advances received from owners, accrued salaries, accrued payroll taxes, other liabilities and capital (capital stock, authorized and outstanding shares of value, earned surplus and retained earnings).

Name of firm preparing the statement and date of the statement

4.2 Is the financial statement for the same exact firm as the qualification statement? If not, what is the relationship and the financial responsibility of the organization whose financial statement is provided?

4.3 Will the organization whose financial statement is provided act as a guarantor for the contract for which this qualification statement is provided? _____.

AFFIDAVIT

_____ certifies and says: That he is an authorized representative (list title) of (organization) _____ submitting this statement of experience; that s/he has read the same, and that the same is true of his/her knowledge; that the statement is for the purpose of providing construction Proposals/proposals for the Hotchkiss Public Works Facility project and that any vendor or other agent therein named is hereby authorized to provide information necessary to verify the statement; and that furthermore, should this statement at any time cease to properly or truly represent his condition in any substantial respect, it will refrain from further work for the Town until it shall have submitted a revised and corrected statement.

I certify and declare under penalty of perjury that the foregoing and attached information provided herein is true, correct, and sufficiently complete to not be misleading:

Subscribed on this _____, 20__ at _____

Note: Use full corporate name & attach corporate seal here, if corporation

Official must sign here _____

Title _____

Attested: _____

NOTE: Statement will be returned and Proposals and/or proposals rejected unless this affidavit is completed in EVERY respect.

CONSTRUCTION CONTRACT

AGREEMENT

THIS AGREEMENT is made between the **TOWN HOTCHKISS**, Colorado, (Owner or Town) and the Contractor, _____ for the Construction Project known as **Public Works Facility Project**

The Owner's Representative (OR) is: As designated by the Owner at the Preconstruction Conference.

The Owner and Contractor agree as follows:

ARTICLE 1

THE WORK:

The Contractor shall perform all the Work required by the Contract Documents for: **Public Works Facility Project** described in the Contract Documents. Contractor shall furnish all labor, services, materials, tools, and equipment for the construction and completion of the work proposed to be done under this Agreement. Contractor will construct and complete the work in a thorough and workmanlike manner in every respect to the satisfaction and approval of the Owner, within the time specified herein and in strict accordance with the Contract Documents

ARTICLE 2

TIME OF COMMENCEMENT AND COMPLETION:

2.1 The Work to be performed under this Contract shall commence upon Notice to Proceed. There will separate Notices to Proceed for preconstruction and construction services. Deadlines for the preconstruction phase are included in the CMAR preconstruction agreement. Work shall be completed and ready for final payment within **120 calendar days** of Notice to Proceed on facility construction and no later than **February 28, 2020**. Additional details regarding work schedule are provided Paragraph 26.3 below and in the General Conditions and General Notes. It will likely require working on several aspects of the project at the same time in order to complete the work in the time allotted. The Town intends to be moved into the building by **March 15, 2020**.

ARTICLE 3

CONTRACT AMOUNT AND BASIS:

The Owner shall pay the Contractor for the satisfactory performance of the Work, subject to additions and deductions by Change Order as provided in this Agreement based on the unit prices in the Contractor's Proposal and Guaranteed Maximum Price Proposal.

ARTICLE 4

PROGRESS PAYMENTS:

Based upon Applications for Payment submitted to the OR by the Contractor accompanied by

such supporting documentation, and Certificates for Payment issued by the OR the Owner shall make progress payments to the Contractor as follows:

On a monthly basis for the work satisfactorily completed based on the detailed invoices for hours of labor, equipment, materials, overhead, profit as required to be submitted as evidence of work completed during the month consistent with the Guaranteed Maximum price proposal.

5% of each amount certified for payment shall be retained by the Owner until final payment.

ARTICLE 5

FINAL PAYMENT:

After completion of the Work, provided the Contract be then fully performed, subject to the provisions of Article 16 of the General Conditions, the Owner shall publish a Notice of Final Settlement twice at least 10 days prior to the date of final settlement. The Owner shall withhold from final payments any amounts as required pursuant to C.R.S. 38-26-107.

ARTICLE 6

ENUMERATION OF CONTRACT DOCUMENTS:

The Contract Documents are indicated by a check or X in the boxes below:

- Agreement including General Conditions
- Request for Proposals and Instructions to Proposers
- Proposal Package including Proposal Form and submitted support documents.
- Measurement and Payment
- Guaranteed Maximum Price Proposal
- Specifications
- Drawings
- Addenda – if any
- Change Orders - if any
- Written Interpretation of OR - if any
- Performance Bond and Payment Bond (if required)
- Notice of Award
- Notice to Proceed

ARTICLE 7

CONTRACT DOCUMENTS:

7.1 The Contract Documents consist of this Agreement (which includes provisions commonly referred to as General Conditions), and the documents indicated in Article 6 by an X. These form the Contract and what is required by any one shall be as binding as if required by all. The intention of the Contract Documents is to include all labor, materials, equipment and other items as provided in Paragraph 10.2 necessary for the proper execution and completion of the Work and the terms and conditions of payment therefore, and also to include all Work which may be reasonably inferable

from the Contract Documents as being necessary to produce the intended results.

7.2 The Contract Documents shall be signed in not less than triplicate by the Owner and the Contractor. By executing the Contract, the Contractor represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.

7.3 The term Work as used in the Contract Documents includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

ARTICLE 8

OWNER'S REPRESENTATIVE (OR)

8.1 The OR will provide general administration of the Contract and will be the Owner's representative during construction and until issuance of the final Certificate for Payment.

8.2 The OR shall at all times have access to the Work wherever it is in preparation and progress.

8.3 The OR will make periodic visits to the site to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of his on-site observations, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor. The OR will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The OR will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

8.4 Based on such observations and the Contractor's Applications for Payment, the OR will determine the amounts owing to the Contractor and will review Requests for Payment in accordance with Article 16.

8.5 The OR will be, in the first instance, the interpreter of the requirements of the Contract Documents. He will make decisions on all claims and disputes between the Owner and he Contractor.

8.6 The OR will have authority to reject Work which does not conform to the Contract Documents.

8.7 No act, representation, or instruction of OR or Engineer shall in any way relieve the Contractor from liability for damages or costs that result from activities of the Contractor

ARTICLE 9

OWNER:

9.1 The Owner shall furnish control for the work as specified in paragraph 10.11 below.

9.2 The Owner shall secure any required permanent easements or real property necessary for the project and advise Contractor of the boundaries of Owner's easements or property.

9.3 The Owner shall issue all instructions to the Contractor through the OR.

ARTICLE 10

CONTRACTOR:

10.1 The Contractor shall supervise and direct the Work competently and efficiently, using his best skill, expertise, and attention in order to perform the work in accordance with the Contract Documents proceeding in an efficient sequence without delays. Contractor shall keep a competent superintendent of work on the premises at all times to receive instructions and to comply with them. Superintendent should be supervising, not operating equipment. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract

10.2 Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

10.3 The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

10.4 The Contractor warrants to the Owner and the OR that all materials and equipment incorporated in the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective.

10.5 The Contractor shall pay all sales, consumer, use and other similar taxes required by law and shall secure all permits, and licenses necessary for the execution of the Work at Contractor's expense except as provided in Article 24. The Owner is exempt from state and local sales and use taxes on construction and building materials for use in the project. Contractor shall take steps to obtain such exemption from the Colorado Department of Revenue pursuant to C.R.S. 39-26-708.

10.6 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the Work, and shall notify the OR if the Drawings and Specifications are at variance therewith.

10.7 The Contractor shall be responsible for the acts and omissions of all its employees and all Subcontractors, their agents and employees and all other persons performing any of the Work under a contract with the Contractor.

10.8 The Contractor shall review, stamp with his approval and submit all samples and shop drawings as directed for approval of the Engineer for conformance with the design concept and with the information given in the Contract Documents. The Work shall be in accordance with approved samples, submittals, and shop drawings. Work subject to submittal shall not commence until Engineer approval of submittal has been received.

10.9 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as his tools, construction equipment, machinery and surplus materials, and shall clean all surfaces and shall leave the Work "broom clean" or its equivalent, except as otherwise specified.

10.10 The Contractor shall contact Colorado Utility Notification Center (1 800 922 1987) at least three business days prior to any excavation work.

10.11 The Owner will furnish two control points and a bench mark which the contractor shall protect. Contractor shall provide all survey work necessary to construct the work to the line and grade in the contract documents and to confine its operations to the properties the Town owns and/or for which the Town has applicable easements. Where the Contractor's work and/or work area are in close proximity to the site boundaries and/or disturbance limits, the Contractor shall construct a temporary fence to insure his work and materials stay within the designated boundaries.

ARTICLE 11 SUBCONTRACTS:

11.1 A Subcontractor is a person who has a contract with the Contractor to perform any of the Work at the site.

11.2 Unless otherwise specified in the Contract Documents or in the Instructions to Proposers, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Engineer a written list of the names of Subcontractors proposed for the principal portions of the Work. The Contractor shall not employ any Subcontractor to whom the Engineer, OR, or the Owner may have a reasonable objection. The Contractor shall not be required to employ any Subcontractor to whom he has a reasonable objection. Contracts between the Contractor and the Subcontractor shall be in accordance with the terms of this Agreement and shall include the General Conditions of this Agreement and the SRF Requirements insofar as applicable.

ARTICLE 12 SEPARATE CONTRACTS AND OWNER WORK:

12.1 The Owner reserves the right to award other contracts in connection with other portions

of the Project or other work on the site or to perform such work itself.

12.2 The Contractor shall afford other contractors and/or Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate its Work with theirs.

12.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

ARTICLE 13

ROYALTIES AND PATENTS:

The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

ARTICLE 14

PERFORMANCE AND PAYMENT BONDS:

A Performance and a Payment Bond shall be submitted by Contractor for all contracts in excess of \$50,000 or if indicated in Article 6.

Each bond shall be in the amount of the contract sum and shall either be in the form supplied by Owner or shall be in such other form as approved by Owner. Each bond shall comply with the requirements of C.R.S. 38-26-105 and 106 and shall remain in effect no less than one year after final payment.

ARTICLE 15

Time and Liquidated Damages

15.1 All time limits stated in the Contract Documents are of the essence of the Contract. Contractor further agrees to pay as liquidated damage in the sum of \$550.00 for each day that expires after the deadlines in Contract Documents.

15.2 If the Contractor is delayed at any time in the progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in transportation, unavoidable casualties, causes beyond the Contractor's control, or by any cause which the OR may determine justifies the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the OR may determine.

15.3 Contractor waives any claim for damages due to delay unless caused in whole or in part by the acts or omissions within the control of the Owner or persons acting on behalf thereof.

ARTICLE 16
PAYMENTS:

16.1 Payments shall be made as provided in Article 4 of this Agreement.

16.2 Payments may be withheld on account of (1) defective Work not remedied, (2) claims asserted or evidence which indicates probable assertion of claims, (3) failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment, (4) damage to another contractor or Owner, or (5) unsatisfactory prosecution of the Work by the Contractor. No funds, payable under this Agreement or any part thereof, shall become due and payable, if the Owner so elects, until the Contractor shall satisfy the Owner that it has fully settled or paid for all materials and equipment used in or upon the work and labor done in connection therewith. The Owner may pay any or all such claims or bills, wholly or in part, and deduct the amount or amounts so paid from any funds due Contractor. In the event the surety on any contract, performance bond, payment bond, or warranty bond given by the Contractor becomes insolvent, or is placed in the hands of a receiver, or has its right to do business in the state revoked, the Owner may withhold payment of funds due Contractor until the Contractor has provided a bond or other security to the satisfaction of the Owner in lieu of the bond so executed by such surety.

16.3 Final payment shall not be due until (1) the Contractor has delivered to the Owner a bond, a clean irrevocable letter of credit, cash or other security satisfactory to the Owner indemnifying Owner against any claim which has been asserted by anyone for labor, materials, equipment or otherwise arising out of the contract or on account of any claim which either Owner or Contractor believes may be asserted, (2) the Owner has inspected and approved the Work as complying with the contract, (3) written consent of surety, (4) release of liens from subcontractors and/or suppliers when requested, and (5) any manufacturers or suppliers warranties and equipment literature, and any as built plans and O&M manuals required are delivered to Owner.

16.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from (1) unsettled claims, (2) faulty or defective Work appearing after final Payment, (3) failure of the Work to comply with the requirements of the Contract Documents, or (4) terms of any warranties or special guarantees required by the Contract Documents. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled as noted or referenced on the final payment form.

16.5 Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by Engineer, nor the issuance of a certificate of Substantial Completion, nor any payment by Owner to Contractor under the Contract Documents, nor any use or occupancy of the Work or any part thereof by Owner, nor any act of acceptance by Owner nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by Engineer pursuant to paragraphs regarding "Final Payment" above, nor any correction of defective Work by Owner will constitute an acceptance of Work not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents.

ARTICLE 17

PROTECTION OF PERSONS AND PROPERTY AND RISK OF LOSS:

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to (1) all employees on the Work and other persons who may be affected thereby, (2) all the Work and all materials and equipment to be incorporated therein, and (3) other property at the site or elsewhere. Contractor shall bear all risk of loss to the work, or materials or equipment for the work due to fire, theft, vandalism, or other casualty or cause, until the work is fully completed and accepted by the Owner. Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. All damage or loss to any property caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor. At no time shall any part of the work be left in an unsafe condition where it could cause injury to any employee or the public.

ARTICLE 18

INDEMNIFICATION AND INSURANCE:

18.1: Indemnification: The CONTRACTOR agrees to indemnify and hold harmless the STATE of COLORADO, OWNER, its officers, employees, consultants, insurers, and self-insurance pool, from and against all liability, claims, actions, and demands, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, violation of statute, ordinance, or regulation or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this contract, if such injury, loss, or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, contractor error, mistake, negligence, or other fault of the CONTRACTOR, any subcontractor of the CONTRACTOR, or any officer, employee, representative, or agent of the CONTRACTOR or of any subcontractor of the CONTRACTOR, or which arise out of any workmen's compensation claim of any employee of the CONTRACTOR or of any employee of any subcontractor of the CONTRACTOR. The CONTRACTOR agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the CONTRACTOR, or at the option of OWNER, agrees to pay OWNER or reimburse OWNER for the defense costs incurred by OWNER in connection with, any such liability, claims, or demands. The CONTRACTOR also agrees to bear all other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims, or demands alleged are groundless, false, or fraudulent. The obligation of this Section 18.1 shall not extend to any injury, loss, or damage which is caused solely by the act, omission, or other fault of the OWNER, its officers, or its employees.

18.2 Insurance: The CONTRACTOR agrees to procure and maintain, at its own cost, a policy or policies of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to Section 18.1. Such insurance shall be in addition to any

other insurance requirements imposed by this contract or by law. The CONTRACTOR shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to Section 18.1 by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

18.2.1 CONTRACTOR shall procure and maintain, and shall cause any subcontractor of the CONTRACTOR to procure and maintain, the minimum insurance coverages listed below. The Contractor shall not allow any subcontractor to commence work on this project until all similar insurance required of the subcontractor has been obtained and approved. For the duration of this Agreement, the Contractor must maintain the insurance coverage required in this section. Such coverages shall be procured and maintained with forms and insurers acceptable to OWNER. All coverages shall be continuously maintained from the date of commencement of work to cover all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to Section 18.1. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

18.2.1(A) Workers' Compensation insurance to cover obligations imposed by the Workers' Compensation Act of Colorado and any other applicable laws for any employee engaged in the performance of Work under this contract, and Employers' Liability insurance with minimum limits of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) each accident, FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - policy limit, and FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - each employee. Evidence of qualified self-insured status may be substituted for the Workmen's Compensation requirements of this paragraph.

18.2.1(B) Commercial General Liability insurance on ISO occurrence form CG 00 01 10/93 or equivalent covering bodily injury, premises operations, broad form property damage (including completed operations) fire damage, independent contractors, products and broad form property insurance including completed operations, blanket Contractual liability, personal injury (including coverage for contractual and employee acts), and advertising liability with minimum combined single limits of (a) ONE MILLION DOLLARS (\$1,000,000) each occurrence, (b) TWO MILLION DOLLARS (\$2,000,000) aggregate, (c) ONE MILLION (\$1,000,000) products and completed operations aggregate, and (d) FIFTY THOUSAND (\$50,000) any fire. The policy shall be applicable to all premises and operations. The policy shall include coverage for explosion, collapse, and underground hazards. The policy shall contain a severability of interests provision. If any aggregate limit is reduced below \$2,000,000 because of claims made or paid, CONTRACTOR shall immediately obtain additional insurance to restore the full aggregate limit and furnish to OWNER a certificate or other document satisfactory to OWNER showing compliance with this provision.

18.2.1(C) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS (\$1,000,000) each occurrence and ONE MILLION DOLLARS (\$1,000,000) aggregate with respect to each of CONTRACTOR's owned, hired and/or non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision. If the CONTRACTOR has no owned automobiles, the requirements of this Paragraph (3) shall be met by each employee of the CONTRACTOR providing services to the OWNER under this contract.

18.2.2 The policy required by paragraphs 18.2.1(B) and (C) above shall be endorsed to include the State of Colorado, the OWNER (Town of Hotchkiss) and OWNER's officers and employees as additional insureds. Every policy required above shall be primary insurance and any insurance carried by OWNER, its officers, or its employees, or carried by or provided through any insurance pool of OWNER, shall be excess and not contributory insurance to that provided by CONTRACTOR. No additional insured endorsement to any policy shall contain any exclusion for bodily injury or property damage arising from completed operations. The CONTRACTOR shall be solely responsible for any deductible losses under any policy required above. Additional insured coverage for completed operations shall be on endorsements CG 2010 11/85, CG 2037, or equivalent.

18.2.3 The certificates of insurance which are consistent with State requirements shall be completed by the CONTRACTOR's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by OWNER prior to commencement of the contract. Each certificate shall identify this contract and shall provide that the coverages afforded under the policies shall not be cancelled, non renewed, terminated or materially changed until at least 30 days prior written notice has been given to OWNER. If the words "endeavor to" appear in the portion of the certificate addressing cancellation, those words shall be stricken from the certificate by the agent(s) completing the certificate. The completed certificate of insurance shall be sent to OWNER.

18.2.4 Failure on the part of the CONTRACTOR to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which OWNER may immediately terminate this contract, or at its discretion OWNER may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by OWNER shall be repaid by CONTRACTOR to OWNER upon demand, or OWNER may offset the cost of the premiums against any monies due to CONTRACTOR from OWNER.

18.2.5 OWNER reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

18.2.6 The parties hereto understand and agree that OWNER is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently \$350,000 per person and \$990,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, { 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to OWNER, its officers, or its employees.

18.2.7 Subrogation Waiver – All insurance policies in any way related to the project and secured and maintained by the CONTRACTOR as required herein shall include clauses stating that each carrier shall waive all rights of recovery, under subrogation or otherwise, against OWNER or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

18.2.8 The Agreement shall not be executed, and no notice or authorization to proceed shall be given until the Certificates required above, are submitted and approved by the Owner.

18.2.9 In carrying out any of the provisions of this Agreement or in exercising any power or authority thereby, there shall be no personal liability of the Owner, its governing body, staff, consultants, officials, attorneys, representatives, agents, or employees.

ARTICLE 19

PROPERTY INSURANCE:

19.1 Unless otherwise provided, the Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interest of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of Fire, Theft, Extended Coverage, Vandalism and Malicious Mischief. Such policy shall be an "all-risk" Builders Risk policy.

19.2 Any insured loss is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of any mortgagee clause.

19.3 The Contractor shall file a copy of all such policies with the Owner prior to the commencement of the Work.

19.4 The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance provided under this paragraph. The Contractor shall require similar waivers by Subcontractors and Sub-subcontractors.

ARTICLE 20

CHANGES IN THE WORK:

20.1 The Owner without invalidating the Contract may order Changes in the Work consisting of additions, deletions, or modifications with the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by written Change Order signed by the Owner.

20.2 The Contract Sum and the Contract Time may be changed only by Change Order.

20.3 The cost or credit to the Owner, if any, from a Change in the Work shall be determined by unit prices if specified in the contract documents, or by mutual agreement using materials costs, and estimated labor and equipment times as a basis where practical.

ARTICLE 21

CORRECTION OF WORK:

21.1 The Contractor shall correct any Work that fails to conform to the requirements of the Contract Documents where such failure to conform appears during the progress of the work and shall remedy any defects or deficiencies due to faulty materials, equipment or workmanship which

appear within a period of one year from the Date of Final Settlement of the Contract or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. The provisions of this Article 21 apply to Work done by Subcontractors as well as to Work done by direct employees of the Contractor, and are in addition to any other remedies or warranties provided by law, or other provisions of the Contract Documents. Neither the payment of any estimate or progress payment nor the payment of any retained percentage shall relieve the Contractor of any obligations to correct any defective work or material.

ARTICLE 22

TERMINATION BY THE CONTRACTOR:

If the OR fails to process a request for payment for a period of thirty days through no fault of the Contractor, or if the Owner fails to make payment thereon for a period of thirty days from date of receipt of grant and/or loan funds, the Contractor may, upon seven days' written notice to the Owner and the OR, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment tools, and construction equipment and machinery, including reasonable profit and damages.

ARTICLE 23

TERMINATION BY THE OWNER:

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Owner may, after seven days' written notice to the Contractor and without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor or, at his option, may terminate Contractor's work under the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient, and if the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. These rights and remedies are in addition to any right to damages or other rights and remedies allowed by law.

ARTICLE 24

PERMITS:

Contractor shall be responsible for securing any necessary permits for the work including but not limited to CDOT, dewatering and stormwater management. Contractor shall comply with conditions of all permits secured by the Town and those secured by the Contractor. Contractor shall submit at least two sets 24 x 36 " of building plans to the Town building official with the building permit application.

ARTICLE 25

MISCELLANEOUS PROVISIONS:

25.1 This contract is governed by the laws of the State of Colorado. The parties agree to the jurisdiction and venue of the courts of Delta County in connection with any dispute arising out of or in any matter connected with this Agreement.

25.2 Contractor shall not assign this contract. The provisions of the contract are binding on the heirs, successors or assignees of the parties.

25.3 The rights and remedies available under this contract shall be in addition to any rights and remedies allowed by law.

25.4 No failure to enforce any provision of the contract on account of any breach thereof, shall be considered as a waiver of any right to enforce provisions of this contract concerning any subsequent or continuing breach.

25.5 The terms of this agreement shall remain in full force and effect following final payment.

25.6 No change order requiring additional payments for additional compensable work or otherwise shall be issued unless an appropriation is available therefore and the Contractor is so advised in writing.

ARTICLE 26

ADDITIONAL PROVISIONS:

26.1 PROJECT FUNDING AGENCY REQUIREMENTS

26.1a. This contract shall comply with all applicable federal and Colorado state laws and shall be governed by the applicable law of the State of Colorado notwithstanding provisions herein to the contrary.

26.1b. This project is funded in part by funding from Energy and Mineral Impact funds. Contractor shall strictly adhere and implement requirements of the funding agencies. Contractor shall comply with all applicable DOLA (and other applicable) requirements and applicable laws and regulations. Copies of the funding contracts is available for review at Town Hall.

26.1c. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract

26.1d. The State of Colorado, CDPHE, DOLA, the State Auditor, or the Town, or any properly delegated or authorized representatives of these entities, including independent certified public accountants of

their choosing, shall have the right to inspect, examine and audit the Contractor's records, books, accounts, and other relevant documents concerning this contract for a period of five years after final payment.

26.1.e. The Contractor must comply with all State Statutes including but not limited to the requirements HB 13-1292- and CRS 8-17.5-101.

26.2 Contractor hereby assigns all manufacturers' warranties to Owner and shall assist the Owner in enforcing such warranties. No limitation of any manufacturer's warranties, or additional warranties of Contractor, shall be construed to limit the obligations of the Contractor under any warranties or other provisions of the contract documents.

26.3 WORK HOURS - All work at the site shall be performed during regular working hours, and Contractor will not permit overtime work or performance of Work on Saturday, Sunday, or any state legal holiday (as enumerated in CDOT Standards #101.32 without Owner's written consent given after prior written notice to Engineer). Contractor shall reimburse Owner for all expenses of Owner including construction observation and testing, incurred as a result of working during non-regular hours. Regular hours shall not exceed 10 hours in a 24 hour period nor 40 hours in a seven day period, nor include Saturdays, Sundays, or legal holidays. Other work hours shall be considered non-regular. In addition work shall not commence prior to 7:30 am and continue past 6 pm. In non-residential neighborhoods, work may commence at 7 am and be completed by 6 pm. Concrete placement that requires testing shall not be placed on a Friday.

26.4 C.R.S. 8-17.5 and E-Verify Requirements

26.4a. Contractor certifies, warrants, and agrees that it or its sub contractors do not knowingly employ or contract with an illegal alien who will perform work under this Agreement, and shall confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform work under this Agreement through participation in Federal E-Verify Program or the state program established pursuant to CRS 8-17.5-102(5)(c).

26.4b. Contractor shall not knowingly employ or contract with an illegal alien to perform work under this Agreement or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this Agreement.

26.4c. Contractor hereby certifies that it has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this agreement through participation in either the e-verify program or the state program.

26.4d. Contractor is prohibited from using either the e-verify program or the state program procedures to undertake pre-employment screening of job applicants while this Agreement is being performed.

26.4e. If Contractor obtains actual knowledge that a subcontractor performing work under this Agreement knowingly employs or contracts with an illegal alien, Contractor shall be required to:

(i) notify the subcontractor, the Owner, and State within three (3) days that Contractor has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and

(ii) terminate the subcontract with the subcontractor if within three (3) days of receiving the notice required pursuant to this subparagraph the subcontractor does not stop employing or contracting with the illegal alien; except that Contractor shall not terminate the contract with the subcontractor if during such three (3) days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien.

26.4f. Contractor shall comply with any reasonable in the course of investigation undertaken pursuant to CRS 8.17.5-102(5) by the Colorado Department of Labor and Employment.

26.4g. If Contractor fails to comply with any requirement of this subsection of the Agreement or CRS 8.17.5-101 et seq. the Owner may terminate this Agreement for breach. If this Agreement is so terminated, Contractor shall be liable for actual and consequential damages to the Town.

26.3h In addition to complying with the above requirements, Contractor is also responsible to comply with federal employment verification requirements including requirements that all employees complete the I-9 Employment Eligibility Verification Form at time of hire and that employer verify the information using e-verify or other legally acceptable method.

This Agreement is dated _____.

TOWN OF HOTCHKISS, COLORADO

By _____

CONTRACTOR:

By _____

NOTICE OF AWARD

DATED:

TO: _____
Proposer

ADDRESS: _____

PROJECT NAME: Town of Hotchkiss – Public Works Facility Project

CONTRACT FOR: Town of Hotchkiss – Public Works Facility Project
Name of Contract as it appears in Proposing Documents

You are notified that your Proposal dated _____ for the above Contract has been considered. You are the apparent successful Proposer and have been awarded a contract for Town of Hotchkiss – Public Works Facility Project with the following amended scope:

The Contract Price of your contract is _____ and 00/100 Dollars (\$ _____).

Actual payments will be based on the quantity and unit price for the work completed in accordance with the Contract Documents and shall not exceed the Guaranteed Maximum Price as modified by written change orders.

You must comply with the following conditions precedent within ten days of the date of this Notice of Award, that is by _____.

1. You must deliver to the Owner three fully executed counterparts of the Agreement including required Contract Securities (Bonds) as specified in the Agreement.
2. Certificates of Insurance with the minimum limits and additional insurers listed in the Contract Documents.
3. (List other conditions precedent). (None)

Failure to comply with these conditions within the time specified will entitle Owner to consider you Proposal abandoned, to annul this Notice of Award and to declare your Proposal Security forfeited.

Within ten days after you comply with those conditions, Owner will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

Town of Hotchkiss
Owner

BY: _____
Authorized Signature

Title

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by:

_____ on _____, 20

BY: _____ Title: _____

Employer ID Number: _____

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and _____
(Corporation, Partnership, or Individual) (Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER in the total aggregate penal sum of _____
Dollars (\$ _____)

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

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____ 20____, a copy of which is hereto attached and made a part hereof for the construction of:

Project Name: _____

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER with or without notice to the SURETY and during the one year guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its

obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiaries hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original, this the _____ day of 20 _____ .

ATTEST:

Principal

(Principal) Secretary

By _____(s)

(SEAL)

(Address)

Witness as to Principal

(Address)

ATTEST:

Surety

By _____

Witness as to Surety

Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and _____
(Corporation, Partnership, or Individual) (Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof for the construction of:

Project Name: _____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, sub-contractors, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such Contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said Work whether by Sub-Contractor or otherwise then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its

obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

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

IN WITNESS WHEREOF, this instrument is executed in __ counterparts, each of which shall be deemed an original, this the ___ day of _____ 20__.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

By _____(s)

(Address)

Witness as to Principal

(Address)

ATTEST:

Surety

Witness as to Surety

By
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

oOo

NOTICE TO PROCEED

DATED:

TO: _____
Proposer

ADDRESS: _____

PROJECT NAME: Town of Hotchkiss – Public Works Facility Project

CONTRACT FOR: Town of Hotchkiss – Public Works Facility Project
Name of Contract as it appears in Proposing Documents

You are notified that the Contract Time under the above contract will commence to run on _____. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 2 of the Agreement the date of Completion is _____.

Before you may start any Work at the site you must provide the Owner certificates of insurance which is required in the Agreement which is required to be purchased in maintained in accordance with the Contract Documents. You must also schedule with the Engineer and attend a pre-construction conference at the office of the Owner.

Also before you may start any Work at the site you must:

Town of Hotchkiss
Owner

BY: _____
Authorized Signature

Title _____

ACCEPTANCE OF NOTICE to Proceed

Receipt of the above Notice to Proceed is hereby acknowledged by:

_____ on _____, 20__

BY: _____ Title:

Employer ID Number: _____

CHANGE ORDER No. ____

PROJECT: Public Works Facility Project DATE OF ISSUANCE:

OWNER: Town of Hotchkiss CONTRACTOR:
Address: P.O. Box 369, Hotchkiss, CO 81419

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE

CHANGE IN CONTRACT TIME

Original Contract Price

Original Contract Time

Previous Change Orders #_ to #_

Net Change From Previous Change Orders

Contract Price Prior to this Change Order

Contract Time Prior to this Change Order

Net Increase (Decrease) this Change Order

Net Increase (Decrease) this Change Order

Contract Price w/all approved Change Orders

Contract Time w/all appr'd Change Orders

RECOMMENDED:

APPROVED:

APPROVED:

Engineer

Contractor

Owner

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Name: Town of Hotchkiss – Public Works Facility Project

Contractor: _____

Contract for: Town of Hotchkiss – Public Works Facility Project

Contract Date: _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

The Work to which this Certificate applies has been inspected by authorized representatives of the Owner, Contractor, and Engineer, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on _____.

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by the Contractor within ____ calendar days of the above date of substantial completion.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, and insurance shall be as follows:

RESPONSIBILITIES:

OWNER:

CONTRACTOR:

The following documents are attached to and made a part of this Certificate:

Tentative list of Items to be Completed

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligations to complete the Work in accordance with the Contract Documents.

Executed by Engineer on _____, 20

Engineer _____

BY: _____

Contractor accepts this Certificate on _____, 20

Contractor _____

BY: _____

Owner accepts this Certificate on _____, 20

Owner _____

BY: _____

FINAL PAYMENT REQUEST

Town of Hotchkiss – Public Works Facility Project

TO: Town of Hotchkiss
P.O. Box 369
Hotchkiss, CO 81419

Application for Payment _____

Period Ending: _____

Original Contract Amount	\$
Change Order Amount	\$
Total Work Constructed (see attached list)	\$
Total Project	\$
Less Previous Payments	\$
TOTAL AMOUNT DUE - FINAL PAYMENT	\$

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief that all labor covered by the application has been paid including all sub-contractors and that title to all materials and equipment incorporated in the Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to Owner). This final payment represents final payment of all compensation due the Contractor for the Work in the Contract for the Public Works Facility Project between the Town of Hotchkiss and _____.

Engineer

Contractor

Town of Hotchkiss

Engineer

Contractor

Owner

Title

Title

Title

Date

Date

Date

SECTION 01000 - GENERAL REQUIREMENTS

SCOPE OF GENERAL REQUIREMENTS

The provisions of these General Requirements supplement the General Requirements in the Agreement. The requirements detailed in this section are as applicable to all of these Contract Documents as if the requirements were specifically stated in each section, unless the requirements are specifically superseded within a specific section.

CONFORMANCE WITH TOWN STANDARDS & SPECIFICATIONS

In addition to conforming with these Contract Documents, all work shall be completed in conformance with the Town of Hotchkiss Standard Specifications and Typical Drawings for Infrastructure (Town Standards), latest revisions which are available at Town Hall. Should there be a conflict between the documents, they should be brought to the Engineer's attention. Typically the more stringent standard will apply.

TERMINOLOGY

Different sections of the plans use the terms Architect, Engineer, Owner's representative. Each of those terms shall refer to the Project Engineer.

MATERIALS

The Contractor shall furnish all materials needed to complete the Work required under the terms of his Contract, except those materials specified to be furnished by Owner. Materials incorporated in the Work and not specifically covered in the Specifications shall be the best of their kind. Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new.

The Contractor shall submit satisfactory evidence of compliance with the specifications of such materials to be furnished by him and used in the Work as the OR may require.

DESIGN CRITERIA AND COORDINATION

Drawings and specifications are complementary; what is called for in either of these is binding as though called for in both. In cases of conflict between the plans and specifications, the Contractor shall notify the Engineer of the conflict and shall obtain a written interpretation or clarification from the OR. In most cases the most stringent requirement will apply.

NOTE: The technical specifications may cover not only the work specifically included in the scope of the Work being bid, but also contain specifications for work that could be added as the work progress or to complete the project.

The Contractor is responsible for reviewing and understanding Contract Documents and documents incorporated by reference. Contractor shall execute his work in accordance with the Contract Documents and insure that all his sub contractors do as well. Additional work or materials required to

bring the work in conformance with these requirements shall be provided at no additional cost to the Owner. The Contractor is responsible for a complete project whether the work is self performed or performed by sub contractors and shall insure that there are no gaps or discrepancies between work of the various sub contractors.

Contract Drawings are diagrammatic in character and do not necessarily indicate every required offset, etc. The Contract drawings shall not be scaled for roughing-in measurements nor be used as shop drawings. Where drawings are required for these purposes, or have to be made from field measurements, Contractor shall take the necessary measurements and prepare the drawings. Before beginning any installation work, Contractor shall carefully study all contract drawings and check for interference. If conflicts are discovered as work progresses, a set of prints marked with red pencil showing recommended resolution shall be submitted to the OR for approval prior to installation. Contractor should anticipate needing to adjust his work to fit with existing improvements as part of his scope of work included in his unit prices.

CONTRACTOR'S USE OF PREMISES

Confine operations to areas permitted by law, ordinances, permits, and the Contract Documents. Do not trespass onto private property. Do not unreasonably encumber the project with materials or equipment. Coordinate use of the authorized work area with the Owner and others who may need access at various times including other contractors and emergency officials. It is expected that there will be other work being conducted in the proposed work area at the same time. Assume full responsibility for protection and safekeeping of products stored on and off premises. Move any stored products which interfere with operations of Owner or others. Obtain and pay for use of additional storage or work areas needed for operations.

ADDITIONAL CONTRACTOR RESPONSIBILITIES

Nuisances - Provide necessary precautions to control noise, dust, water and air pollution, and damage from vibration of equipment used in construction. Noise shall be reduced by proper use of mufflers and other appropriate means on motorized equipment. Noise levels during construction shall not be greater than permitted by OSHA regulations and Town ordinances, both on site and along routes the Contractor's operations traverse. Take such measures as are required to keep dust and mud controlled at the Work site and the surrounding area.

Site Security - Security of the work and storage areas shall be the Contractor's responsibility from Notice to Proceed until Contract completion and final acceptance and final payment.

Supervision - Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents and so that it will proceed in a regular sequence without delays including prompt cleanup. Contractor shall keep a competent superintendent of work on the premises at all times to receive instructions and to comply with them. The superintendent shall have full authority to act on behalf of the Contractor and directions given to the superintendent shall be considered given to the Contractor. At most times the superintendent shall not be in engaged in operation of equipment.

Work Sequence - The sequence of construction will largely be left to the Contractor, but Contractor shall sequence his work in a manner to minimize interferences with Town work on the shop and work in the work site. If contract includes specific work needs to be completed as specific time or in specific order, Contractor will be expected to comply with those requirements. Contractor will be required to submit a schedule to the OR for review and approval which details the construction sequence in accordance with the schedule submittal requirements below. Schedule shall take into account work by the Town and others as it impacts the Contractor and work in the area. A week-ahead schedule shall be provided to the Town and the Engineer by the Contractor on weekly basis. It shall be the responsibility of the Contractor(s) to coordinate his activities to minimize the conflicts with other work in the area and to expedite and optimize the completion of the work in a timely manner.

Completion Schedule - The contract time is tight and it may require the Contractor to be using multiple crews a portion of the time in order to complete the work in the timeframe specified.

Existing Conditions - Prior to commencing construction, the Contractor shall be responsible for documenting the existing condition of the construction work zones and surrounding areas. Photographs and written descriptions of all substandard pre-existing conditions are recommended. Width and conditions of driveways, vegetation, and existence of drainage should be noted for roadways, as should vegetation in sub standard condition, and broken fences and other private structures which may be in need of repair. Unless sub-standard conditions are adequately documented prior to commencing work, the Owner will assume that conditions were good prior to the Work. Since construction equipment tends to be destructive of gravel and paved roads, particular attention should also be paid to recording conditions of roads which will be traversed by construction equipment. Roadways and other improvements damaged by contractor's construction shall be repaired at contractor's expense.

Code Issues - Contractor shall coordinate his work with building, official, electrical and plumbing inspectors as applicable. Contractor shall secure and comply with any needed electrical or plumbing permit. Contractor shall notify Engineer when Contractor notes that Contract Documents fail to comply with codes and regulations. Contractor shall assume responsibility for Work known to be contrary to such requirements if notice is not provided.

Notifications - The Contractor shall notify the Town at least 3 working days before beginning any Work. If, for any reason, the Contractor should halt Work on a project during any stage of construction for more than one working day, it shall be the responsibility of the Contractor to notify the Town or its designated representative a day in writing in advance of resuming construction. Notify the Owner at least one business day in advance of any testing.

PROTECTION OF POTABLE WATER SUPPLY, STREAMS, LAKES, AND RESERVOIRS

The Contractor shall be sure that waters used for moisture and dust control are handled in a manner which will not create a health, safety, water quality, or nuisance problem. The Town shall provide potable water for the construction of the project at no cost to the Contractor. The Town shall identify a fire hydrant for that purpose. The Contractor shall furnish all needed backflow devices to insure

sanitary protection of the Town's water supply. Only the Town personnel shall operate the Town's water system so the Contractor needs to coordinate his water needs with the Town.

The Contractor will take all necessary precautions to prevent pollution of streams, lakes, and reservoirs by sediment, fuels, oils, bitumens, calcium chloride, fertilizers, insecticides, or other harmful materials. Contractor shall conduct and schedule his operations to avoid or minimize runoff and/or siltation of streams, lakes, and reservoirs. All work must conform to all applicable local, state, and federal regulations. Additional protections for potable water supply are included in Division 2.

TRAFFIC CONTROL

The Contractor shall be required to provide adequate construction signing, flagmen, barricades, etc. to warn vehicular and pedestrian traffic of work in progress, obstacles, etc., and divert traffic as may be required in the course of construction. All signing and traffic control shall be subject to approval of the Town Marshall and generally in accordance with the Manual of Uniform Traffic Control. When specifically authorized by the Town, portions of a street may be allowed to be partially closed to traffic for construction, though typically not more than one lane of the street at the time nor more than one block. Contractor shall make every attempt to minimize time of such closures. In addition to the requirements listed above under "Disruption of Service", it shall be the responsibility of the Contractor to notify the Marshall, Sheriff, Fire, Ambulance, and other applicable emergency services at least 24 hours prior to such closures. There is no pay item for traffic control and notice. Contractor shall include these costs in the costs of the bid items to which traffic control and notice are incidental.

PROTECTION OF UTILITIES, FACILITIES, PROPERTY, AND IMPROVEMENTS

The Contractor shall contact the Utility Notification Service of Colorado at 1 (800) 922-1987 in minimum of 3 working days in advance of Work. The Contractor shall notify all utility companies and interested parties prior to commencement of Work in order to insure that there will be no unnecessary or unplanned interruptions of services during construction. Contractor shall notify the Town at least two days in advance of when Contractor needs the Town to operate its valves and other town facilities to facilitate Contractor's work.

The project plans do not address all details of construction around or near existing utilities nor are all utilities shown on the plans. Contractor shall use due care and work with impacted utilities to insure adequate protection of all utilities. The following contacts are provided for contractor convenience:

UTILITY	CONTACT	PHONE/FAX/CELL
Town of Hotchkiss Water, Sewer, Irrigation	Mike Owens	(970) 872-3663
Delta Montrose Power Assoc	Dwain Elerd	(970) 874-2367
TDS		(970) 527-4801
Black Hills Gas	Paul Fricklin	(970) 596-1122

Pothole existing utilities sufficiently in advance of work to allow for gradual adjustment of work if needed and to insure protection of existing utilities. Contractor shall notify Engineer of any conflicts before making adjustments.

The Contractor at all times shall take proper precautions for the protection of and prevent damage to public and private property including utility lines and services, and appurtenances, manholes, valve boxes, survey monuments, fences, plantings, and other structures and improvements. Hand excavation and support of existing lines shall be used where necessary. Cutting utility lines to facilitate construction is prohibited unless approved for cause in writing by the Engineer. Such approval may require special measures to insure proper restoration of any cut lines. The Contractor shall be liable for all damages to existing utilities, structures and improvements, public or private caused by his activities or in-activities, and he shall hold the Town harmless from any liability or expense for injuries, damages, or repairs to such facilities.

Utility Relocation

In the event that during construction it is determined that any underground utility conduit, including (but not limited to) electric, phone, water, sewer, gas mains and drainage structures, and any above ground utility facilities are required to be relocated, the Contractor shall notify the utility owner well in advance of his approach to such utility so that arrangements with the Town and/or owners of the affected utility can be completed without delay of the work.

Responsibility for Repair - Should any utility be damaged in the construction operations, the Contractor shall immediately notify the owner of such utility, and unless authorized by the owner of the utility, the Contractor shall not attempt to make repairs. The Contractor will be responsible for the cost of repair of underground pipes, wires or conduits damaged by them or their subcontractors.

The Contractor will restore any improvements damaged by his operation to a condition equal to or better than that existing before such damage or injury was done by repairing, rebuilding, or replacing it as may be directed by the Town or the property owner, and they shall make good such damage or destruction in a manner acceptable to the Town and the property owner.

All survey monuments disturbed or removed by the Contractor, his employees, or sub-contractors will be replaced by a land surveyor registered in the State of Colorado, at the Contractor's expense.

Public Safety and Convenience

Disruption in Service: Should it be necessary for any utility service to existing consumers to be disrupted for any reason, the Contractor shall provide as much notice as possible to those whose service will be disrupted, coordinating such activity with the Town to minimize impact on consumers and assist the Town in providing inspection. At a minimum, the Contractor shall provide written notice to each effected consumer at least one business day in advance. Notice shall be by personal contact and written notice to each structure and shall state the day, time and anticipated duration of the outage which shall be consistent with disruption limits in Division 2. When service to commercial customers will be disrupted, the Contractor and the Town shall meet with each business at least three days in advance and determine when it would be least inconvenient to have service disrupted which

may require late night work. If at all possible, the service interruption shall be at time which will have the least impact on all the consumers effected. Should construction necessitate street or road closures, advanced notice in local newspaper will also be required. When the work involves excavation adjacent to any building or wall along the work, the Contractor will give property owners due and sufficient notice thereof, in writing with a copy to the Town.

Emergency Disruption: When service is unexpectedly disrupted, the Contractor shall notify each effected consumer as expeditiously as possible and notify when service will be restored and shall use all means at his disposal to minimize the length of disruption.

Minimizing Disruptions: The length of disruption in service shall be kept to an absolute minimum. All work which can be done in advance shall be done and inspected and found acceptable by the Town and other appropriate entities before the service interruption begins. All personnel, materials, and tools shall be on site and ready prior to disrupting service. Contractor shall make use of personnel, materials, and equipment which will reduce the length of service disruption.

Phasing Disruptions: When the work which will cause the disruption can be phased, the Contractor in coordination with the Town shall work with the effected customers to determine whether one long or multiple shorter disruptions are preferable.

SITE INFORMATION

Trautner Geotech completed a Geotechnical Engineering Study for the shop site early in 2019. That report is attached as Attachment A to this section.

There may be buried and overhead utilities in the project area including water, sewer, drain, irrigation, phone, cable, gas, and power. The Contractor should be careful to not harm any of the buried or exposed utilities or improvements.

Property Limits and Access - The proposed Work is within County rights of way and Town rights of way, easements of the Town, property owned by the Town. The Contractor is reminded that he is to stay within the property lines of the site for all construction including staging, storage of materials, etc., unless additional easement is obtained for use of adjoining property at Contractor's expense. Should the Contractor obtain easements with adjoining property owners, a written and signed (by adjoining property owner and Contractor) copy of that document shall be provided to the Town and Engineer. Content of that agreement shall include language holding the Town harmless. At completion of the project the Contractor must provide a written and signed (by the adjoining property owner) release accepting the conditions the property is left in and releasing the Contractor from any obligations surrounding the use of the property. In addition to the Contractor's requirements, space may be needed for storage of materials and equipment of the Town and other contractors as well as other users of the work area. Contractor should carefully examine the work site and limited spaces available, encroachments, weather conditions, and other factors when evaluating the costs of the work and include those costs in his bid.

Groundwater & River Flows - Groundwater levels vary seasonally and in response to weather, river flows, irrigation, etc. Ground water depths have been recorded on the Trautner soils boring logs.

The Contractor is responsible for directing surface and dewatering waters away from the construction area in a manner that will not adversely impact the right of way or private property or the environment and for handling the groundwater encountered.

The Contractor is reminded that groundwater levels fluctuate and that actual field conditions can not be accurately predicted. It shall be the responsibility of the Contractor to control the groundwater level as needed for construction except under the building where the intent is to keep the soils saturated. . There is no specific pay item for this work; groundwater handling costs should be included as part as part of the work for the project. One should expect shallow groundwater table in the work area and should expect the need to dewater, stabilize trenches, and provide gravels as bedding and partial backfill.

Soils -The Contractor shall expect that the soils below the road and in the field may be soft, saturated, and incompetent. The cost of handling these conditions shall be included in the cost of the work and will NOT be paid as stabilization.

Additional Site Information - Should the Bidder feel additional information is needed to accurately bid the work, he shall make arrangements with the Owner to conduct such additional studies as he sees fit, with minimum disruption to the site and at the Contractor's expense.

Limited Use of Site Information - The Contractor is advised that the data discussed above, and any site or utility information made available by the Owner is NOT a part of the Contract and is solely for the convenience of the Contractor. It is expressly understood and agreed that the Owner assumes no responsibility whatsoever with respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein.

REQUIRED PERMITS

Contractor shall secure all required permits and comply with all their conditions and include the cost of such in the cost of the work to which it is related. At minimum he will need to secure and pay for electrical, mechanical and plumbing permits. He will also have to secure a building permit from the Town however, the Town will waive the fee for that permit. There is no pay item for permitting or permit fees. Those costs shall be included in the work for which the permits are needed.

Dewatering Permits - The Contractor will need to determine whether his proposed method of controlling ground and surface water during construction will require a dewatering permit from the State Engineer's Office and/or the Colorado Department of Public Health and Environment. If it does, Contractor shall apply and pay for and comply with such permit(s).

Colorado Department of Public Health and Environment Storm Permit - CDPHE regulations require that any construction larger than 1 acre have a storm water permit and a storm water management plan. Information and forms regarding the storm water permit is available at (303) 692-3517 and at:

www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt

The Contractor will be required to secure a storm water permit if his disturbance will exceed one acre and develop and implement a storm water management plan. Contractor shall provide Owner with copies of the storm water permit and the storm water management plan. If a permit is needed, Contractor shall be solely responsible for correctly implementing the storm water plan including closing out the permit. Even if a permit is not required, Contractor shall use best management practices in handling stormwater and other water discharges and include costs for same in the cost of the work.

Building and building related permits - Contractor shall secure a building permit for the building from the Building Official. The Town will not charge a fee for the building permit. The contractor shall secure and pay for all other permits needed in relationship to the project.

TEMPORARY FACILITIES

The Contractor shall make arrangements for any utilities he may need to accomplish the Work. Any temporary facilities and conveyances for use at the desired locations will be the responsibility of the Contractor.

The Contractor shall provide the necessary fire protection facilities to prevent and abate any fire damage that may be created because of his operation in the area. Any damage resulting from fire caused by his operation will be the responsibility of the Contractor to replace or repair to original condition at his cost.

The Contractor will be required to provide sanitary facilities for his crews. Contractor shall provide and maintain adequate water service for drinking and sanitation purposes, as well as for construction purposes at the job site throughout the duration of this Contract.

The Owner will furnish water for the Contractor's use, in quantities necessary for reasonable dust and moisture control, at locations designated by and at times convenient for the Owner. It shall be the Contractor's responsibility to transport the water to where it is needed. Unless otherwise authorized in writing, only Town employees shall operate the Town's water system. The Contractor shall conserve water and shall not waste or let streams flow unused and shall be sure that waters used for cleaning and flushing are disposed of in a manner which will not create a health, environmental, safety, or nuisance problem. The Owner reserves the right to curtail the Contractor's use of water during periods of shortage in its transmission and distribution system.

All costs of temporary facilities shall be paid for by the Contractor. There is no pay item for such facilities and their costs should be included in the work to which they are incidental.

SUBSTITUTIONS AND ALTERNATES

Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, utility or standard, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted by Engineer if sufficient information is submitted by Contractor to allow Engineer to determine that the material or equipment proposed is equivalent or equal in quality and operation to

that named. Contractor shall make written application to Engineer for acceptance thereof, certifying that the proposed substitute will properly perform the functions and achieve the results called for by the general design, be similar and of equal performance, substance, and quality to that specified and be suited to the same use as that specified. Availability of parts and services as well as maintenance requirements must also be comparable or superior to the materials or equipment specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of Substantial or Final Completion on time. If problems with available space or layout arise, contractor shall provide drawings detailing how such problems will be corrected. Contractor shall be responsible for all costs associated with the use of an "equal" or "substitute" including all changes to other components and to project design which result from such use.

Engineer will be allowed a reasonable time within which to evaluate each proposed substitute. Engineer will be the sole judge of acceptability, and no substitute shall be ordered, installed, or utilized without Engineer's prior written acceptance which will be evidenced by either a change order or approved Shop Drawing. Engineer will consider initial and long term life cycle costs to Owner in evaluating proposals for substitutes. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute. Engineer will record time required by Engineer and Engineer's consultants in evaluating substitutions proposed by Contractor and in making changes in the Contract Documents occasioned thereby. Whether or not Engineer accepts a proposed substitute, Contractor shall reimburse Owner for charges of Engineer and Engineer's Consultants for evaluating each proposed substitute.

REFERENCE STANDARDS

Reference in the specifications to standard specifications or publications of technical societies or governmental agencies such as ASTM, CDOT, NEC and the like, shall refer to the latest edition adopted and published at the time of receiving bids. It shall be understood that all manufacturers, producers, and their agents shall have such reference standards available for reference and be fully familiar with their requirements as pertains to their product, material, or equipment. In case of conflict between reference standard and codes, the one having the more stringent requirements shall govern.

MANUFACTURER'S INSTRUCTIONS

Handle, store, install, connect, clean or condition specified products in strict accord with manufacturer's instructions and in conformity with project requirements to produce best results obtainable. Contractor shall obtain, have on site, and distribute necessary copies of such instructions, including three copies to OR. No products shall be received prior to receipt of manufacturer's handling instructions.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver materials, products and equipment to the project site in undamaged condition in manufacturer's original, unopened containers or packaging, with identifying labels intact and legible. Store and handle products as prescribed by manufacturer and as specified in the specifications in a manner to protect from damage by moisture, weather, abuse, vandalism, or construction operations. Products may be stored on site where space and security constraints allow, or off-site in a bonded and

insured warehouse approved by the OR. Contractor shall pay all costs incurred for all storage facilities. Manufacturer's recommendation for handling their materials etc. shall be delivered to the Engineer in advance or with the materials.

REJECTED MATERIALS

All materials installed shall be free of defects of manufacture. Any defective or damaged materials found in the construction or on the construction site shall be marked and removed from the site. In the event the Contractor fails to remove rejected materials from the construction site within a reasonable length of time, the Owner may arrange for such removal at the expense of the Contractor.

LANDSCAPE & PROPERTY PRESERVATION

Movement of crews and equipment within the rights of way and over routes provided for access to the Work shall be performed in a manner to prevent damage to vegetation, landscaping, pavement, base, or property. All destruction, scarring, damage, or defacing of landscaping or property resulting from the Contractor's operations shall be repaired, replanted, reseeded, or otherwise corrected at the Contractor's expense. It shall be the responsibility of the Contractor to document any sub-standard conditions before his operations commence.

SUBMITTALS

After Notice to Award, the Contractor shall submit samples, drawings and data for the Engineer's approval which will demonstrate fully that the materials and equipment to be furnished will comply with the provisions and intent of these Specifications as well as funding agency requirements.

Construction Schedule - Contractor shall provide a projected construction schedule for the entire Work. The Contractor will meet with the Engineer and OR to coordinate the development of the schedule and consider the impacts of other contractors working in the same area. The Construction Schedule may be a graphic summary (bar chart) of the program the Contractor proposes to follow in the execution of the Work, and provide complete sequence of construction by activity. If, at any time during the course of the Work, the necessary progress is not being maintained, the Contractor shall make such changes in the work force employed as may be necessary to meet the Construction Schedule.

Shop Drawings and Samples - The Contractor shall furnish, without additional cost to the Owner, such quantities of construction materials as may be required by the Engineer for test purposes. Submit Shop Drawings, submittal, samples and/or manufacturer's literature on the following items as well as items requiring submittals in the technical specifications:

- Samples and test results for base and structural fill and bedding materials

- Cut sheet and specifications for piping, fittings, appurtenances

- Shop drawings for all components of all systems, including but not limited to steel building and its components, doors, windows, door hardware, insulation, plumbing fixtures & materials, electrical equipment & materials, HVAC equipment, building sheathing, pumps, heating units.

- Concrete materials data and samples where applicable

Concrete design mix with applicable test data

All samples and test results submitted must be representative of the materials to be furnished on the project. Materials or equipment of which samples are required shall not be used on the Work until approval has been given by the Engineer in writing. Approval of any sample shall be only for the characteristics or for the uses named in such approval and no other. No approval of a sample shall be taken in itself to change or modify any Contract requirement.

Failure of any material to pass the specified tests will be sufficient cause for refusal to consider under this Contract any further sample of the same brand or make of that material.

Method Statements - Method statements shall be provided by the contractor for the following:

- Concrete placement, finishing, and protection
- Steel Erection and Metal Building installation
- Insulation installation

Contractor Responsibilities - Submittals shall be made by Contractor to the Engineer, and not by suppliers, subcontractors, or manufacturers. All component of a system shall be submitted as a package. Contractor shall review, sign and date with his approval, and submit in orderly sequence all submittals required by the specifications. By approving and submitting items Contractor represents that he has verified all field measurements, field construction criteria, materials, catalog numbers and similar data, and has coordinated each shop drawing with requirements of the Project. His approval shall certify that the submittal meets the requirements of the Contract Documents and for the construction.

Notify Engineer in writing at time of submission, of deviations in submittals from requirements of the Contract Documents. Contractor's responsibility for errors and omissions in submittals, or for deviations in submittals from requirements of the Contract Documents, is not relieved by Engineer's review of submittals, unless Engineer gives written acceptance of specific deviations.

Begin no work which requires submittals until return of approved submittals with Engineer's initials or signature indicating review. Distribute required copies of submittals after final review.

Engineer's Duties - Review submittals with reasonable promptness, but only for conformance with design concept of the Project and with information given in Contract Documents. Review of separate item does not constitute review of an assembly in which an item functions. Make comments or corrections on the submittal and Shop Drawing and/or by memo, noting whether submittal is approved, approved as noted, or requires resubmittal. Submittals marked "Approved except as noted" need not be resubmitted, but the notes shall be followed.

By approving a submittal, Engineer will not be deemed to have represented an exhaustive, continuous, or detailed review or examinations has been made by Engineer to check the quality or quantity of Contractor's submittal.

Record Documents - Maintain in good condition, keep current, and have available for inspection by Engineer at any time, at project site one copy of all drawings, specifications, addenda, approved shop drawings and engineering data, field test results, change orders, field orders and other Contract Documents.

Use permanent ink pen. Do not use record documents for construction purposes. Maintain documents in clean, legible condition. Keep information current as work progresses. If survey data will not be collected continuous, mark the locations and depths of all utilities, concealed facilities, and features in a way that will preserve the data for the surveyor such as setting, labeling, and protecting labeled PVC conduits or hubs at the locations.

The Contractor shall deliver to the Engineer one complete set of final reproducible as-constructed drawings of all work completed. The dimensional scale of such drawings shall be sufficiently large to clearly depict all aspects of the construction. Also submit CAD (acad 2000 format dwg) to scale files all improvements. Such drawings shall at a minimum include:

1. Provide x,y,z coordinates using survey quality GPS for horizontal and vertical location of all underground appurtenances and utilities, found or installed, referenced to building corners or other permanent locations for each appurtenance.
2. Location of internal utilities and appurtenances concealed in construction, reference to visible and accessible features of the structure.
3. Change made by Change Order or Field Order.
4. Details not on original Contract Drawings, especially locations of buried utilities and improvements and concealed items.

Shop Drawings - Maintain as record drawings: Legibly annotate shop drawings to record changes made after review.

Submission of acceptable project record documents on paper, txt, and cad to Engineer is a prerequisite for release of retainage and for final payment.

Failure to Comply - If Contractor does not provide As-Constructed drawings or Operation and Maintenance manuals or other required submittals, the Owner may provide or contract those services (at Owner's discretion) and deduct the cost plus 10 percent of such services from payment due the Contractor. Retainage will not be released until acceptable record data is furnished.

Resubmission Requirements - Revise drawings and or provide new or additional data and samples as required from Engineer's review and resubmit as specified for initial submittal. Indicate any changes which have been made other than those requested by Engineer.

If more than one resubmittal is required to get approval of a submittal by the Engineer, the cost of engineering review of the second and additional resubmittals may be deducted by the Owner from payment due to Contractor.

QUALITY CONTROL AND TESTING

Contractor shall coordinate with laboratory, inspecting, and testing personnel, provide access to Work, as required. Contractor shall furnish preliminary representative test samples of structural fill and base materials, asphalt, and concrete to an approved independent testing laboratory and shall pay for testing to determine that the materials and work conform with the Contract Documents. Furnish casual labor and facilities to facilitate inspections and tests, obtain and handle samples at the site. Notify OR and laboratory and testing personnel sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Owner's Representative will designate the sites for testing and shall observe the testing for it to be considered a valid test. Contractor shall arrange and pay for all compaction testing at the minimum frequencies specified for the work in in table I.

Contractor shall also arrange with the Testing Laboratory or another testing lab, and pay for, additional samples and tests for Contractor's convenience. "Convenience testing" is defined as testing to assist the Contractor in developing means and methods of optimizing equipment for handling, processing, and/or compacting the materials and tests to see how the work is progressing with respect to Contract requirements. Convenience testing results shall be monitored by the OR and shall be paid for by the Contractor. Changes in material characteristics, changes in compaction methods (number of passes, depths of lifts, percent moisture, etc.) and/or types of equipment used shall warrant additional convenience testing.

The Contractor shall give the OR written notice at least two work days before the time field tests are scheduled to be performed.

If tests fail to meet specified requirements, the Contractor shall promptly remedy such deficiencies and shall be responsible for all costs associated with retesting deemed necessary by the OR to verify correction of deficiency.

CLEANING & SITE MAINTENANCE

Throughout the construction period, the Contractor shall provide all required personnel, equipment, and materials needed to maintain the site in a reasonable standard of cleanliness and in accordance with this sub-section. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws. Do not burn or bury rubbish and waste materials on project site. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or in a manner which might cause ignition. Do not dispose of wastes into streams, ponds, or waterways.

Cleaning During Construction - Maintain rights of way, work areas, and surrounding properties free from accumulations of waste, rubble, debris, and rubbish caused by construction operations. Wet down, as frequently as necessary, dry materials and rubbish to lay dust down and prevent blowing dust and debris. At reasonable intervals during progress of work dispose of waste materials, debris and rubbish in a legally allowable manner. Keep roadways, shoulders, and driveways in good usable condition. Provide on-site trash receptacles for collection and storage of waste materials in an orderly manner which will not impede normal or emergency access or people and equipment, nor obstruct drainage. Remove waste materials, debris and rubbish from the site and legally dispose of them at

public or private dumping areas. Do not encumber public trash receptacles. As Contractor completes construction work in a segment, clean up and restoration of the work area and access routes should follow close behind.

Final Cleaning - At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed and visible surfaces. Leave project and other impacted areas clean and ready for use. Restore all disturbed areas to original condition. Clean specific products or work as specified in the project documents and consistent with manufacturer's recommendations.

PROJECT CLOSEOUT

Substantial Completion - When the Contractor considers the entire Work ready for its intended use, Contractor shall notify Owner and Engineer in writing that the entire Work is substantially completed (except for those items specifically listed by Contractor as incomplete) and request Engineer issue the Certificate of Substantial completion. Within a reasonable time thereafter, OR, Engineer, and Contractor shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving reasons therefore. If Engineer and Owner consider the work to be substantially complete, Engineer will provide a certificate of substantial completion with a tentative list of items to be completed or corrected before the project will be considered ready for final inspection and final payment.

Final Inspection - Contractor shall submit written certification that he has inspected the project and found it to conform with Contract Documents; work has been tested in presence of OR and is fully operational; the work site and other impacted areas are completely clean; and Project is completed. Engineer will make final inspection within 7 days after receipt of certification. Should Engineer consider that Work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals. Should Engineer determine that Work is not finally complete, he shall promptly notify Contractor, in writing, stating reasons. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written notice to Engineer certifying that Work is complete. Engineer will re-inspect Work.

Re-inspection Costs - Should Engineer be required to perform a second inspection because of failure of Work to comply with original certifications of Contractor, Owner shall compensate Engineer for additional services, and may deduct amount paid from final payment to Contractor.

Final Adjustment of Accounts - Submit final application for payment to Engineer in accordance with requirements of the Contract Documents (subject to the provisions of C.R.S. 38-26-107). Statement shall reflect all adjustments, including Original Contract Sum, additions and deductions resulting from previous change orders, unit prices, other adjustments, deductions for uncorrected work, penalties and bonuses, liquidated damages, and re-inspection payments; Total Contract Sum, as adjusted; previous payments; and sum remaining due. Engineer will prepare final statement, reflecting approved adjustments to Contract Sum not previously made by change orders.

Closeout Submittals - Once the Engineer determined the Work is complete, he shall request the Contractor submit the following closeout submittals for review and approval by the Engineer and Owner:

Request for Final Payment (on form included in the Contract Documents)
Executed Final Quantities Change Order prepared by Engineer, if applicable
Consent of Surety
Lien releases from subcontractors and suppliers furnishing more than 5% of the work
Extended Warranties required in the Contract Documents, if applicable

Submittals shall be duly executed before delivery to Engineer.

SECTION 02200 - SITE PREPARATION, EXCAVATION, BACKFILL, AND COMPACTION

PART I - GENERAL

These specifications are general in nature and are designed to cover excavation and backfill for any purpose. Additional requirements for a particular type of construction or use may also be covered in the specification for the specific application e.g. "Pipe Line Construction". Where requirements for structures, embankments and/or piping are more stringent in other sections of these technical specifications than the requirements herein, these requirements shall be deemed to be superseded.

A Contractor shall comply with all applicable laws and regulations including "Rules and Regulations Governing Excavation Work" of the State of Colorado.

DESCRIPTION

Work under this section includes clearing and grubbing, excavation including excavation stabilization plan, dewatering, groundwater, surface water and seep control for structures and pipe lines, backfilling, with moisture control, and grading, and compaction to specified density and elevations needed for construction of the structures, pipelines, and appurtenances for this project. Also included are stockpiling excavated material to be used as fill and removal of unsuitable and excess soils from site and furnishing and installing flowable fill.

RELATED WORK SPECIFIED ELSEWHERE

Section 03000 - Concrete

SITE INFORMATION

Site information is presented in Section 01000.

MEASUREMENTS AND LEVELS

Contractor shall verify all drawing measurements and levels in relation to existing elevations, grades, and adjacent structures, and determine conditions and requirements for excavations, fill, backfill, and all sheeting, shoring, bracing, and protection of the premises and buildings. Carefully and accurately lay out all lines and levels of the new construction before proceeding with any Work.

CONFORMANCE TESTING

All testing shall be performed and arranged and paid for by the Contractor. OR will determine location and frequency of such tests to insure that minimum requirements are met at all locations. At Owner's discretion, OR may arrange for or may perform additional such tests. Each lift shall be tested for compaction and moisture content at two inspector designated locations per 150 LF of trench or 400 square foot area and no less than one per trench where trenches are less than 150 LF. Results shall be approved by the OR before the next lift is placed. If tests fail to meet the specified density or moisture content, or to pass proofrolling tests, additional tests will be required in the vicinity of the failed test to determine the extent of the inadequate compaction, then corrective actions shall be taken by the Contractor. After the deficiencies have been corrected, additional tests will be taken in approximately the same location and number as was used to determine the extent of the failed area to demonstrate conformance with the specifications. The cost of all testing required due to failed tests and as needed to determine compaction methods shall also be paid by the Contractor.

Tests for density control to verify the compaction of the materials in any area of backfill will be in accordance with the requirements of ASTM D 2922 - Density of Soil and Soil Aggregate In-Place by Nuclear Methods, or ASTM D 1556 - Density of Soil In-Place by the Sand-Cone Method. The Engineer will also use visual observations of compaction methods and/or deflection (proof-rolling) to determine the adequacy of moisture control and compaction.

CONVENIENCE TESTING

In place materials density and/or optimum moisture field testing for the Contractors convenience will be the sole responsibility of the Contractor at no additional cost to the Owner.

PART II - PRODUCTS

MATERIALS

Submittals

Contractor shall furnish preliminary representative test samples of native, capillary barrier, and base materials to an approved independent testing laboratory and shall pay for testing to determine that the materials conform with the Contract Documents and to determine proctor and optimum moisture values for each earthen and base material proposed for use on the project. Appropriately labeled samples of each material tested shall be kept on site in a one gallon zip lock bag for comparison with materials being placed. The OR will determine which test results will be used as basis for density control of compaction operations based on comparison to these samples.

Submittal information for materials specified by CDOT tables or maximum gradation requirements will require sieve analysis and other test results to demonstrate conformance with CDOT table data and notes and these specifications. Submittal information for other materials shall include optimum moisture density curve for each type of material or combination of materials encountered or utilized and Atterburg limits for each clayey materials. Owner will use test results as basis for density control of compaction operations.

All fill and backfill material must be tested and proctor curves, and other required lab test results shall be available on site and approved by the Engineer before fill and backfill is started. Materials for foundation(s) shall meet the requirements in the approved foundation submittal.

Conduct tests for determination of maximum density and optimum moisture in accordance with the requirements of ASTM 698 - Moisture density relations of soils using a 5.5 lb. hammer and 12-inch drop for native materials and ASTM 1557 Modified Proctor for structural and road base materials. With ASTM 698 use method A, B, C, or D as appropriate, based on soil condition and judgment of qualified party conducting tests. When appropriate, determine the correct rock correction. Samples tested shall be representative of materials to be placed.

Materials specified to have minimum organic contents shall have organic content test results submitted. Organic content test results shall represent organics by percent of volume and by weight.

General Use Materials

On site materials obtained from excavation, free of any unsuitable materials (see below), shall be deemed acceptable for general use. On site materials encountered during excavations which are appropriate for specific uses shall be separated and stockpiled for their later intended use (i.e. topsoil, fine bedding, etc.).

Imported and on site material for general use shall be non-expansive soil, pit run, or bank run sands and gravels with 4" maximum rock size, adequate binders, capable of being compacted and tested as specified herein unless other material is specified for the particular structure or work.

Imported materials for general use shall be taken from borrow areas acceptable to the Engineer. All borrow materials shall meet the same quality criteria as is required herein for on site materials to be used as fill.

Engineer reserves right to reject any material he finds to be unacceptable.

Bedding and Pipe Zone Materials Classification

Pipe zone area is defined as the backfill placed within twelve (12) inches of the pipe. All pipe zone materials must be free of sharp edges and other matter which could damage the pipe.

Class A Flowable fill shall have one half sack of cement per cubic yard of concrete. Aggregates and sands shall meet the requirements for concrete in Section 03000.

Class C Selected soil of low permeability free from clods and stones greater than 3/4 inch in maximum dimension and free of all unsuitable materials as defined below.

Class D Screened or Washed Rock, of single grade 1-1/2" or less, free of clay and fine particles (for all trenches within the building and under concrete).

Road Construction Materials

Road construction materials are those used for road sub-base, base and finished road surfaces. Class 2 materials shall be well graded natural or crushed aggregate with sufficient filler or binding materials which when placed and compacted result in a firm, dense, unyielding foundation. Class 6 materials shall consist of crushed gravel or crushed stone base course material of hard, durable particles or fragments of stone or gravel crushed to required size and a filler of sand or other finely divided mineral matter. Not less than 60% by weight of the coarse aggregate particles shall be particles having at least one fractured face. The composite base course material shall be free from vegetable matter, expansive materials, and lumps or balls of clay. The class 2 and 6 materials shall meet the following requirements:

Gradation (% Passing)	Class 2	Class 6
4"	100%	-----
3"	95-100%	-----
2"	-----	-----
1"	-----	-----
3/4"	-----	100%
No. 4	-----	30-65%
No. 8	-----	25-55%
No. 200	3-15%	3-12%
Liquid Limit	35 Max.	30 Max. (nonplastic)

Plasticity Index	6 Max.	6 Max.
Resistance Value	75 Min.	78 Min.

Inclusion of fractured concrete and/or recycled asphalt pavement is prohibited.

Structural Subgrade and Backfill Materials

Structural subgrade and backfill materials are defined as those materials used to prepare for structural construction.

Class 6 Meeting the requirements of Class 6 specified above for "Road Construction Materials." where allowed on the plans

Class D Washed Rock, of single grade 1-1/2" or less, free of clay and fine particles. (not for use around pressured pipe lines)

On site and borrow area sand and gravels if available may be used for structural backfill material except where special foundation material is otherwise specified.

Unsuitable Materials

Expansive materials and material that contain trash, debris, roots, organics, sludge, other deleterious substances, or frozen materials, stone or concrete having a maximum dimension larger than 4" or materials that are otherwise unsuitable for providing fill, backfill, foundation or subgrade material for pipes, structures, or surfaces shall be classified as unsuitable. Materials with insufficient fines to prevent nesting of rocks and/or with more than 25% rock and those which can not be compacted to the required density shall also be considered unsuitable (unless graded clean rock is specified). Otherwise suitable material which is unsuitable due to excess moisture content will not be classified as unsuitable unless it cannot be dried by manipulation, aeration, or blending with other materials satisfactorily to meet moisture limits for proper compaction.

Topsoil

Topsoil shall consist of loose friable loam reasonably free of admixtures of subsoil, refuse, stumps, roots, rocks, brush, weeds and weed seed, heavy clay, hard clods, construction debris, toxic substances or other material which would be detrimental to the proper development of vegetative growth.

Spot Subgrade Reinforcement and Sub-Grade Stabilization

Material includes sound, tough, durable crushed stone, or gravel, consisting of angular pieces varying from 1 inch to 4 inches in maximum diameter or other approved material, with necessary filler in dry conditions, and when a geotextile is used. In wet conditions, and without geotextile, rock shall be without fines. When a smaller material is necessary for filler, screened gravel, or sand may be used to completely fill all voids.

Geotextiles

Geotextiles and geogrids used for stabilization shall be designed specifically for stabilization and/or soil reinforcement and a type recommended by the manufacturer for the application. Geotextiles for stabilization shall be a woven material such as Mirafi RS380i, or approved equal. Geogrids shall be at least equal to Miragrid or Tensar SS with a tensile strength of 200 x 134 psi. The grid shall have sufficiently large openings which are capable of interlocking with the on-site soils. Geotextile used to separate rock and gravel from native materials and for drains shall be non woven 10 oz/sy filter fabric, Mirafi 1120N or approved equal.

Capillary Water Barrier Material (CWB)

Clean, crushed stone, crushed or uncrushed gravel composed of hard, durable particles, uniformly graded with 1-1/2 inch maximum particle size and not more than three percent of minimum particle size passing a No. 4 sieve.

Seed, Mulch, and Tackifier

All seed shall be furnished in sealed bags or containers showing the name and address of the supplier, the seed name or mix, the lot number, net weight, % of weed seed content, and the guaranteed percentage of purity and germination. All seed furnished must be certified as free from weeds as defined by local, state, BLM and USFS. Seed shall be harvested from a location of not more than 250 mile radius of the site. Seed which has become wet, moldy, old, or otherwise damaged will be rejected. The Contractor shall furnish a signed statement certifying that the seed furnished is from a lot that has been tested by a recognized laboratory for seed testing within six months prior to the date of delivery and shall be weed free. Seed mix shall be a mix approved by BLM or CSU for the micro-climate where the seed is being placed.

Materials for straw mulching shall consist of straw from native grasses and shall be certified weed free in accordance with State and Federal requirements for weed free straw. Straw in such an advanced stage of decomposition as to smother or retard the normal growth of grass will not be accepted. Old, dry straw, which breaks instead of bending will not be accepted. Mulch tackifier shall be consistent with CDOT section 213. Spray on blanket mulch shall meet the requirements of the CDOT Standard Special 213 Mulching dated 4/26/12.

PART III - EXECUTION

PREPARATION AND LAYOUT

Engineer will provide benchmark and monuments for horizontal and vertical control as provided for in Article 10.11 of the Section 00500. Contractor shall maintain benchmarks and monuments and establish all lines and grades required for construction.

TOLERANCES

Complete excavations and fills with suitable equipment to line and grades as shown on the plans within a horizontal tolerance of ± 0.20 ft and a vertical tolerance of ± 0.1 ft unless otherwise noted on the plans or specified for a specific location or application.

Subgrade excavations for structures shall be within a horizontal tolerance of ± 0.10 ft and a vertical tolerance of ± 0.02 ft unless otherwise noted on the plans or in an approved submittal.

Pipelines shall be installed to within a horizontal tolerance of ± 0.20 ft and a vertical tolerance of ± 0.01 ft and structures shall be installed to within a horizontal tolerance of ± 0.10 ft and a vertical tolerance of ± 0.01 ft unless otherwise noted on the plans or required by an approved foundation and/or structures submittal.

CLEARING AND GRUBBING

The area to be occupied by permanent construction, including earthwork, shall be cleared and grubbed of trees, stumps, roots, brush, miscellaneous organics, rubbish, and other objectionable matter to the extent necessary for orderly performance of the work and to a depth sufficient to remove organics and other materials unsuitable for the intended purpose. Unstable saturated materials shall be removed or stabilized. All clearing limits shall be staked by the Contractor and approved by the Engineer prior to any construction. The Contractor is responsible for and shall exercise care in his work area. If there is disturbance to improvements or vegetation outside the

clearing limits, the Contractor shall take remedial action at his own expense. No trees shall be removed or injured outside the area to be occupied by the Work without the prior approval of the property owner and the Engineer.

Where present, strip existing topsoil prior to excavating operations. Depth of stripping shall be determined by the Engineer based on depth of the topsoil and roots. Stockpile topsoil material for replacement after all backfilling and compacting operations are completed.

Removal of Cleared and Unsuitable Materials

Unneeded materials from the clearing operations shall become the property of the Contractor and shall be removed from the site of the work and disposed of in a manner satisfactory to the Owner, and in accordance with state and local regulations at the expense of the Contractor. The Contractor shall make an effort to channel materials of value from the clearing and grubbing to beneficial use.

During the process of clearing or excavating, saturated soils, soils such as peat, soft clay, shales, quicksand, large rock, or other materials which are unsuitable for bedding or foundation may be encountered. If these materials are encountered, it shall be called to the attention of the Engineer who will direct their removal. With Engineer approval, these materials shall be removed from the site and disposed of by the Contractor at his expense. If removal of unsuitable materials results in excavation below the grade required, the area shall be backfilled to grade with suitable bedding or fill materials complying with the provisions of applicable specifications for the work being constructed. This shall not entitle the Contractor to additional payment unless otherwise specified in these Documents unless agreed to in writing by the parties prior to over-excavation.

ACCESS ROADS AND BYPASSES

The Contractor shall be responsible for providing all additional access roads required to get materials and equipment to the work areas. When required, the Contractor shall construct and maintain detours or bypasses around portions of the work that conflict with traffic, including Town's access to their existing facilities and infrastructure. When necessary, the Contractor shall provide suitable bridges at crossings where traffic must cross open trenches. Construction of access ways on private or government property must have written approval of the effected property owner prior to commencing construction.

No road will be completely closed. If a detour around the construction is not feasible, then the installation across the road will be made one-half at a time to allow through traffic around the construction. Adequate traffic control and signage must be provided by the Contractor. Costs for such accesses and closures shall be included in the cost of the work for which its needed.

DUST CONTROL

The Contractor will be required to furnish and apply an environmentally acceptable dust palliative to control dust on the project sites and along haul routes. Dust control may consist of water or other substances found not to be detrimental to the work or the surroundings as approved in writing by the Engineer. Spreading of water or water mixture shall be done with acceptable sprinkling equipment. Such equipment shall be a type which insures uniform and controlled distribution of the palliative without ponding, washing, or adverse impacts to the public or the environment.

DRAINAGE

Maintain the excavations, borrow areas, and site free from water throughout the work. Shape excavations and surrounding areas to minimize the entrance of water. Drain surface water or seepage by gravity or temporary pumps or other approved means. Discharge such waters in a manner which conforms with all federal, state, and local requirements and not impact private property. Use drainage methods which will prevent softening or undercutting of foundation bottoms, or other conditions detrimental to proper construction procedures. . Remove any water encountered to the extent necessary to provide firm subgrade. If the trench or foundation bottom or other excavation becomes unstable due to the entrance of surface water into the open excavation, the saturated soil shall be removed and suitable backfill placed and compacted to grade at Contractor's expense. Handling of drainage, live flow, seepage, groundwater, runoff and other water shall be included in the scope of work to which its related and included in the Contractor's project implementation plan.

EXCAVATION

Perform excavation of every description to lines and grades indicated regardless of material encountered within the grading limits of the project. Do NOT dig through into the shale. If shale is encountered notify engineer and cease excavation. Should Contractor excavate into the shale he will be responsible for the costs to remedy the problems identified by the geotechnical engineer. Minimize disturbance to all surrounding areas. The Owner makes no representation as to the materials to be encountered. All trenching and excavation, regardless of materials encountered or equipment or methods required, shall be unclassified. Utilize all suitable materials removed from the required excavation in the formation of embankments, and/or for bedding or fill. Care shall be taken to not excavate below the indicated grade, except when approved by Engineer to remove unsuitable material. Foundation and structure subgrade materials are intended to be placed on undisturbed ground whenever topographically and geotechnically possible unless otherwise specified or called for on the plans.

All necessary precautions shall be taken to preserve the material below and beyond the established lines for all excavation in the soundest possible condition. Material removed below depths indicated without specific direction of the Engineer is to be replaced, at no additional cost to the Owner, to the indicated excavation grade with suitable material and compacted as specified, except that foundations and footings may be increased in depth to the bottom of the overdepth excavations (to make depth and bearing surface uniform) at no additional cost to Owner.

Make excavations for footings, foundations, and similar work of adequate size to allow for placing, inspection and removal of forms, installation of any piping and/or reinforcement, and observations of the work. Contractor shall form sides of foundation footings unless depositing concrete directly against earth has been approved by Engineer or is called for on the plans. For direct-deposited concrete, trim banks to one inch wider on each side than dimensions indicated on the plans

Contractor shall protect the bottom and sides of excavations and soils around and beneath foundations from frost.

The Engineer must be allowed to inspect all foundation material after excavation and review all test results before the Contractor shall pour footings, foundations, and slabs.

If pumping, low density, or saturated pockets are encountered in excavations, they shall be removed under the structural and geotechnical engineers' direction. The type of fill to be placed in such pockets shall be based on the location and must be approved by the Engineer in advance of any construction (see also "Spot Reinforcement" below).

Stock Piling Material

Where material is excavated from the trenches and piled adjacent thereto, it shall be piled sufficiently away from the edge of the trench to prevent caving of the trench wall and to permit safe access along the excavation. In unsupported trenches the minimum distance from the edge of the trench to the toe of the spoil bank should not be less than one half the total depth of the excavation, nor less than three feet if soil conditions allow. Greater distances shall be required where soil conditions are not adequate. With sheeted trenches, the toe of the spoil bank should be at least 3 feet from the edge of the trench.

Sheeting, Bracing, and Shoring

Do not exceed the angle of repose for the materials without providing necessary support.

Where necessary, or needed to control the width of the excavation or to be meet OSHA requirements, excavation shall be braced and sheeted to provide complete safety to persons working in or around the trenches and shall comply with applicable federal (OSHA), state, and local laws, regulations, and ordinances. The Contractor shall be fully responsible for sufficiency and adequacy of bracing excavations with respect to work under construction and to adjacent utility lines and public and private property. Remove sheeting and shoring as excavations are backfilled in a manner to protect personnel, the material, construction, and compaction and/or other structures, utilities or property. No such sheeting will be permitted to remain in the trench or excavation except when, in the opinion of the Contractor, field conditions or the type of sheeting or methods of construction used by the Contractor are such as to make the removal of sheeting unsafe. In such cases, with Engineer approval portions of the sheeting to be cut off to such depth as he may approve and permit lower portions thereof to remain in the trench.

Ground Water

Groundwater will be encountered in some excavations. Information regarding groundwater is presented in "Site Information" in Section 01000.

Keep ground water level below final pipe or foundation grade, and prevent entrance of water into excavation and pipelines. Water shall not be permitted to run through lengths of pipe already laid. Ends of pipes shall be capped or plugged to insure that water, dirt, animals, etc., does not enter the pipe. Should any groundwater, dirt, mud, etc., enter the pipe during installation, the Contractor shall flush the pipe thoroughly in the presence of the Engineer to insure complete removal of all foreign objects prior to connection to the existing system. Engineer may require Contractor at Contractor's expense to hydrojet and/or video inspect lines where mud, debris, etc have been allowed to enter lines to assure that lines have been adequately cleaned.

When groundwater or other sources of water are encountered, provide necessary pumps and other equipment necessary to completely remove the water so that work can be performed in dry conditions. Maintain dry excavations throughout construction. Dewatering activities should be controlled to avoid damage to surrounding property as well as protecting the work site and complying with state and federal regulations.

Use of Explosives

Use of explosives is prohibited for this project.

Stabilization

If pumping is a problem in the work area or along access routes, track equipment rather than rubber tired equipment shall be used. Use of rubber tired equipment that results in yielding subgrade shall be remedied at the Contractor's expense. Saturated materials shall be expected and need for stabilization shall be included in the scope of the applicable work.

Where necessary, and authorized by the Engineer, stabilize the subgrade material with the use of sub-grade stabilization material or a stabilization fabric depending on the type and location of the instability. Remove as much of the unstable material as authorized by the Engineer and directed by the OR. Earthen stabilization material, when used, shall be sized based on the type of instability and shall generally conform with the stabilization material specification listed above. The material shall be placed in uniform lifts at proper moisture and compacted in a manner which will not make the surrounding area unstable. Geotextiles shall meet the specifications listed above. Fabric shall be placed sufficiently beyond the unstable area to act as a bridge; the additional distance will depend on the type of instability and the type of fabric, but should not be less than 1 foot in any direction and will typically be 2' or more. Fabrics shall be placed on a smooth, level surface and shall have at least 12" of cover between the fabric and finished grade unless otherwise approved by the Engineer.

If piping will be placed at an elevation below the elevation of the fabric, install piping before placing fabric. If fabric is cut for any reason, a patch of fabric which extends at least 2 feet past the cut in each direction shall be placed over the cut and proper fill placed over the patch.

If the Contractor encounters he believes are unanticipated conditions, he shall promptly notify the Engineer who will determine whether the materials and condition constitute an unanticipated site condition. If the Engineer determines the condition is materially different from what is expected based on the soils and site data and not the result of Contractor's activities, the Engineer will determine how much stabilization is necessary. Only such stabilization specifically authorized by the Engineer and not a result of Contractor's activities, by written order shall entitle the Contractor to payment of stabilization.

Contractor should anticipate that the existing materials in the excavation will be wet and require reworking and should include that in his costs for the work. Soft saturated soils in excavations will not constitute an unanticipated site condition.

BACKFILL AND COMPACTION OF EMBANKMENT, PIPE LINES, AND STRUCTURES

The Contractor shall proceed with backfilling as soon as practicable, but not until Work is inspected by Engineer and any necessary tests satisfactorily completed. Do not begin backfilling until trench supports and/or forms and any debris and trash have been removed, and where applicable, concrete has cured sufficiently to prevent displacement or damage to restraints, footings, foundations, or walls (typically 7 days). Maintain optimum moisture content of backfill materials and compact to required density. Whenever practical, materials shall be brought to the specified moisture content in the borrow area rather than while being placed. Unless otherwise specified, unprocessed native materials shall be compacted to 95% standard proctor at +/- 2% of optimum moisture and processed materials (e.g. base and graded materials) compacted to 95% modified proctor at +/- 2% of optimum moisture. Compaction or consolidation shall follow as soon after the placement as is practical.

Construct fills and embankments to the lines and grades indicated on the drawings.

Immediately prior to placing fill material, scarify the entire area upon which fill is to be placed the depth indicated on the plans. The foundation for earthen fill shall also be prepared by disking or scarifying parallel to the axis of

the fill, and compacted such that the surface materials of the foundation will bond well with the first layer of fill as is specified for the subsequent layers of earthen materials.

Ensure areas on which embankment is to be place and areas to be backfilled and backfill materials are free from debris, large stones, loose materials, snow, ice, and water, other objectionable material that will cause interference with compaction, and that ground surfaces are not in a frozen condition. Do not allow the nesting of rocks. Do not backfill over existing subgrade surfaces which are frozen, porous, wet or spongy. Cut out soft areas of existing subgrade and stabilize (see Stabilization requirements below).

Compact existing subgrade surfaces if densities are not equal to that required for backfill materials.

Backfill areas to grades, contours, levels, and elevations required. Place approved excavated or imported material in successive horizontal layers of 8 inches or less loose depth for full width of cross section, bring to optimum moisture content for compaction, and compact each layer to the required density with equipment designed for compaction purposes for the type of material. Backfill systematically in continuous level layers for the full width of the cross section. Uniformly place each layer to the specified maximum lift (or less) and thoroughly blade mix during the spreading to ensure uniformity of material in each layer. The distribution and gradation of the materials throughout the earthen fill shall be such that the fills will be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or moisture from the surrounding materials. The materials, when compacted in the earthen fill, shall be blended sufficiently to secure the best practicable degree of compaction and stability. If there is a varying degree of permeability in the material the most impervious materials shall be placed in the central portion of the earthen fill and the more pervious materials shall be placed so that the permeability of the fill will be gradually increased toward the upstream and downstream slopes of the earthen fill. Testing of each lift shall be performed prior to placing the next lift in accordance with the specified testing requirements.

Structure Bedding

Bedding for structures shall be structural fill materials placed on a firm foundation. It is anticipated that subgrade below the structures will be saturated and that subgrade spot stabilization will be required. Contractor shall install and compact the subgrade reinforcement, foundation materials, and structural bedding in accordance with the approved submittal for the structure and its foundation. Subgrade stabilization for structures shall be included in the cost of the structures.

Site and Structural Fills

Backfill material shall consist of material which after placement and compaction will result in a stabilized soil condition capable of supporting the normal traffic and loads that may be encountered. Fill materials for the structures shall meet the requirements of the applicable submittal submitted by the Contractor and approved by the Engineer.

Capillary Water Barrier

Place capillary water barrier material under all interior slabs, footers and foundations, and at all locations shown on the plans or identified in the field. Place directly on subgrade after subgrade has been approved for density and elevation. Place in one layer to 6 inches thickness without segregation, and compact to maximum density or as shown on the plans.

Structure and Appurtenance Backfill and Compaction

Backfill around structures and appurtenances such as slabs, vaults, manholes, foundations, buildings, valves, valve boxes, cleanouts, miscellaneous structures with care to prevent damage to the work. Materials shall be compacted to 95% standard proctor for native materials and 95% modified proctor for processed materials both at +/-2% optimum, unless otherwise noted on the plans for a particular use, using equipment which will not damage the structures, appurtenances or surrounding construction. Whenever practical materials shall be brought to the specified moisture content in the borrow area rather than while being placed.

Compact each layer continuously over its entire area and make sufficient trips with the compaction equipment to ensure that the required density has been obtained uniformly. Backfill simultaneously on each side of foundation walls and other structures to equalize soil pressures. Do not backfill against or operate heavy equipment adjacent to walls until all structural elements are constructed, cured, properly braced, have achieved specified strengths and approved by the Engineer. Do not operate heavy equipment closer to foundations than a horizontal distance equal to height of backfill above bottom of foundation. Compact remaining area with hand tampers suitable for material being compacted. Where needed, the hand work for a lift should be done in advance of and blended into the work of the larger equipment.

Perform all compaction with approved equipment well suited to location, structure, and materials being compacted. Perform compaction while the material is at the specified moisture content. Moisten and aerate material as necessary to provide proper moisture content. Maintain optimum moisture content during final rolling and until compacted material is covered by subsequent construction. Remove loose material and protect material until covered.

Pipe Bedding and Backfill

Pipe installation, bedding and backfill requirements are included in Section 02725.

SURFACE RESTORATION

On completion of backfill operations and other work, the entire site shall be cleared of all debris, and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workman-like appearance. The final grade will be graded to match existing grades without producing drainage or maintenance problems. Areas which are to receive pavements, surfacing, topsoil, or landscaping shall be graded as required to allow installation of the specific surface treatment. Restoration, or replacement as needed, of grass, shrubs, and other plants shall be done to the extent required to restore the damaged or disturbed areas to a condition as close as practical to that which existed prior to construction. Tree and other vegetative damage shall be repaired in accordance with good horticultural practice.

The finished surface of roads impacted directly or indirectly by the project will be restored to their original or better condition as determined by the owner(s) involved. Asphalt damage shall be repaired with hot mix asphalt (3" minimum depth), and damaged concrete, repaired with concrete by cutting and replacing to the closest control joints. The Town, County, or State Road Department as applicable, shall be notified two working days prior to repair so that inspection can be provided.

The respective property owner shall be the final judge of the acceptance of restoration work. The Contractor shall be responsible for returning all roadways traversed with his equipment to conditions at least as good as existed prior to commencing construction. Again, in cases where sub-standard conditions existed prior to

beginning construction, it shall be the Contractor's responsibility to have documented such conditions or to restore the site to standard conditions acceptable to the Engineer and Town.

TOPSOILING

Conservation

Obtain acceptable topsoil from excavation to extent available. Designate as topsoil when stockpiling for future placement. Topsoil material is subject to approval. Conserve, or import if necessary, sufficient topsoil to cover a depth of 6" all disturbed areas which are not covered by riprap, roadbase, or a structure.

Clearing

Prior to placing topsoil remove vegetation and clear ground surface of all other materials that would hinder proper grading, tillage or subsequent maintenance operations.

Placing Topsoil

Place topsoil on all disturbed areas which are not access or road ways, or designated to be ripped. Prior to placing topsoil, prepare previously constructed grades as required such that when topsoiling is completed the proper grade will be achieved. After grading, scarify areas to be topsoiled to a depth of at least six (6) inches. Perform work only during periods when beneficial results are likely to be obtained.

Perform spreading so that planting can proceed with little additional soil preparation or tillage.

Do not place topsoil when subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or proposed planting.

REVEGETATION

Prior to commencing construction it will be necessary to determine the amount and type of vegetation which naturally occurred on the areas to be disturbed. This will be done by counting the quantity of each type of vegetation in randomly selected representative quadrants of the site to be disturbed. Quadrants shall be either a square foot or a square yard depending on the density of the vegetation. Assessment shall be completed in accordance with the Contractor's Storm Water Management Plan.

Disturbed areas that are to be revegetated shall be left in a roughened condition at all times during construction. Roughen vertical depth shall be approximately 2". Roughening shall be completed with undulations running parallel to contouring. Use erosion control logs, silt berms, silt fence, or other suitable means to limit erosion prior to revegetation.

Preparatory to seeding, the top 4" of the topsoil shall be tilled into an even and loose seed bed 4" deep, free of clods in excess of 3" diameter and brought to desired line and grade. Reseeding shall be done in accordance with specifications, requirements of the landowner, or if not specified, the recommendations from CSU Extension, BLM, and good horticultural practice for the areas being revegetated. Seed mix on private property shall be selected by the land owner.

In all areas where the slope is 3:1 or flatter, seeding will be accomplished in general conformance with CDOT Section 213. In larger areas use an approved mechanical power drawn drill followed by packer wheels or drag chains. The drill shall be operated in a direction generally perpendicular to the direction of the slope. Drill seed 1/2" deep with rows spaced no more than 4" apart. Seed that is extremely small shall be sowed from a separate

hopper adjusted to the proper rate of application. Hydromulching will be allowed only if adequate water will be applied to the seed to keep the mulch continuously moist until the seedlings are established.

On all slopes steeper than 3:1, seed shall be applied by means of a mechanical broadcaster at double the rate required for drill seeding. The surface shall be cat tracked up and down the side slope prior to, or just after seeding to create depressions to help hold seed and moisture. All seed sown by mechanical broadcasters shall be raked into the soil to a depth of 1/2" prior to cat tracking.

Seed shall not be placed in windy weather or when the ground is frozen or likely to freeze in the next 48 hours. Seeding shall only take place in the fall or early spring. Hand broadcasting of seed will only be permitted for small areas which are not accessible to machine methods. In places where the seed is not drilled, the application rate of the seed shall be doubled.

Unless more stringent requirements are specified in the storm water management plan, weed free native grass straw shall be applied at the rate of two tons per acre. It shall be uniformly crimped in with a crimper or other approved method to a minimum depth of 3". The seeded areas shall be mulched and crimped within 24 hours after seeding. Alternately a mulch with tackifier (200#/Ac) may be used. Jute, soils blanket, or other suitable covering shall be secured to all slopes steeper than 3:1 as soon after mulching as practical. The material shall be applied smoothly but loosely on the soil surface without stretching. Workers shall minimize the amount of walking of the seedbed even after the jute is applied. The upslope end of each piece of jute mesh shall be buried in a narrow trench about 6" deep. The jute shall be secured in the trench with compacted dirt fill. Where one roll of jute ends and a second begins, the upslope piece should be brought over the buried end of the second roll with a 12" overlap to form a junction slot. Where two or more widths are side by side the overlap shall be at least 6".

Seeded areas that have been disturbed prior to or during mulching operations shall be reseeded. Areas not properly mulched or that area damaged shall be repaired or remulched to meet the standards specified herein. Mulching activities shall not occur during windy weather.

Where shrubs or trees were present prior to the disturbance, it is recommended that the same type shrubs and trees be re-planted at approximately the same density as originally present, unless the slope prohibits such plantings. Protect such plantings from wildlife damage with protective fencing.

SECTION 02725 - PIPING

PART I - GENERAL

DESCRIPTION

Work specified in this Section includes furnishing, installing, and testing of sewer mains, pipe lining materials, drain lines, manholes, valves, cleanouts, appurtenances, and manholes, and testing requirements for drain, sewage and process piping systems. In addition to the requirements herein, pressurized lines shall comply with applicable portions of the Town's water line standards.

Contractor shall follow manufacturer's recommended procedures in all handling and installation operations.

The Contractor shall make such excavations in advance as are necessary to determine the exact location of existing utilities which affect new construction. Where practical, new lines shall be routed to facilitate installation and to minimize present and future construction problems.

Related Work Specified Elsewhere

Section 02200 - Trenching, Backfilling and Compacting

Section 03000 - Concrete

PROTECTION OF WATER SUPPLIES

There shall be no physical connection between a public or private potable water supply system and a sewer, or appurtenance thereto which would permit the passage of any sewage, non potable, or polluted water into the potable supply directly or through contamination of the surrounding soils.

Buried potable water lines shall not be laid closer horizontally than 10 feet from non-potable lines and the water lines shall be at a higher elevation than the non-potable. If this is not possible, separate trenches will be required and the water line shall be at least 18" above the non-potable and a pipe with a water tight welded joint such as HDPE shall be used. When water and non-potable lines cross each other, the water line shall be at least 18" above the non-potable. If this condition is not met, then where practical, the non-potable line shall be encased with a 20' PVC casing pipe centered around the water line crossing. If is not practical to case the non-potable line, the potable line shall be so cased. Should the non potable line be above the water line, then the casing pipe shall be sealed to the carrier pipe with no-hub reducing couplings, Link-Seal or other approved method to provide a water tight seal between carrier and casing

No water pipe shall pass through or come within ten feet of a sewer manhole unless absolutely unavoidable, in which case adequate protection as approved by the Engineer must be provided. Force main sewers require a separation from the water main of at least 10 ft measured horizontally unless both pipes are encased in and properly supported with pipe joints as far apart as possible. There shall be a 2' vertical separation at crossings or a watertight casing shall be provided around a force main.

There shall be a minimum clear distance vertically of 8" between the uppermost part of the lower utility and the lowermost part of the upper utility including casings to allow for proper bedding. In all cases, suitable backfill or other structural protection shall be provided to preclude settling and/or failure of any of the pipes.

EXPERIENCE REQUIREMENTS

In addition to requirements elsewhere in the contract documents, Contractor's on site project superintendent shall have experience in experience installing pipelines in areas with numerous utilities.

SUBMITTALS

Submittals shall comply with Section 01000 - Submittals as augmented herein. Submittals shall be provided for all materials proposed for use on the project.

In addition, furnish manufacturer's certifications that materials were manufactured and tested in accordance with applicable ASTM designations, together with a report of all test results.

PART II - PRODUCTS

All materials shall be new, unused, and of the best standard quality available for the purpose intended. Where materials are specified by brand names, materials of equal quality may be substituted if the Contractor submits adequate technical and descriptive data and secures the approval of the Engineer. The Engineer shall be the sole judge of the suitability and acceptance of materials as specified in Sections 01000.

PIPE MATERIALS

Ductile Iron Pipe

Conformance	AWWA C151
Thickness	Class 52
Pressure Rating	150 PSI
Joints	Neoprene Gasket AWWA C111 Mechanical joint or push on joint as required, both with conductivity strap
Fittings	ANSI/AWWA C153 or C110 as shown on plans
Coating	Wrap pipe in polyethylene tubes and seal

POLYVINYL CHLORIDE (PVC) PIPE

Service	Open channel gravity lines
Conformance	SDR 35, 3034 PVC sewer
Pressure Rating	Gravity
Joints	Unibell bell and spigot
Deflection	<1/2" in 13'
Service Connections	SDR 35, PVC full bodied wye where practical Dual strap flexible tap saddle (Fernco or equal) where wye impractical

POLYVINYL CHLORIDE (PVC) PIPE - 4" and Larger

Service	Buried pressure applications
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Conformance	AWWA C900 or C909 DI equiv (Use SDR 21 CI200 under 4")
Thickness	DR 18
Pressure Rating	Formerly 150 PSI, reclassified to 235 psi
Joints	Rubber Gasket, integral bells
Fittings	ANSI/AWWA C153 or C110 as shown on plans
	Under 4" conform w/general quality requirements of AWWA
Restraints	Concrete and Megalug 2000 series or equal
Service	Pressure applications in crossings or encasement
Conformance	ASTM 1784, 2241 SDR 21, Yelomine or equal restrained joint
Pressure Rating	00 psi working pressure
Joints	Rubber gasket meeting ASTM F477, restrained joint, Certa-Lok OAE
Fittings	AWWA C151/A21.51 Megalug or Certa-Lok or equal restraint

POLYVINYL CHLORIDE (PVC) PIPE - Less than 4"

Service	Submerged and pressure applications less than 4"
Conformance	ASTM 2241 SDR 21 or Schedule 40
Pressure Rating	200 psi working pressure
Joints	Unibell bell and spigot, solvent weld for fittings and schedule 80

Cost for fittings needed to adjust between pipe types shall be included in the cost of the lineal foot cost of the pipe.

GATE VALVES

Conformance	AWWA C509
Material	Iron Body, bronze mounted
Type	Resilient seat, non-rising stem
Pressure Rating	150 PSI
Coating	Epoxy inside
Joints	Flange or Mechanical Joint end as specified
	Typically flanged to fitting, mechanical joint to pipe
Operating Nut	2" Square, (buried)
	Handwheel (non buried service)
Operation	Open by turning counterclockwise
Acceptable Models	Mueller RS, Kennedy. or Waterous RW (Only these products will be accepted by Owner)

VALVE BOXES

Location	All buried valves, not in vaults
Type	Slip type, two piece, adjustable
Material	Cast iron, 1/4-inch minimum thickness
Size	5-inch minimum diameter. Depth as required by cover.

Provide	Suitable cast iron bases and covers
Coating	Bituminous varnish, plastic wrapped
Service Designation	Cast appropriate name in cover
Operator Extension	1" dia cold rolled steel rod (where depth greater than 5 ft)

Flushing Hydrants

Conformance	NSF/ANSI 372
Service	Potable water, frost free, self draining, with vacuum breaker
Size	Inlet 2" or same as existing line, outlet 2-1/2" NST Bury match existing water line typically 5-6'
Type	Breakaway traffic w/easily replaced flange
Joints	Megalug 2000 series restraints on mechanical joints
Outlets	1 - 2 1/2" hose nozzle w/ National Standard Thread
Interior Operating Parts	Brass, bronze, and shall be removable for service and replacement without excavating the hydrant.
Exterior Casing	Ductile Iron
Operating Nut	1 1/2" National Standard hex, open counter-clockwise
Main Shut off	Gate valve per spec. above
Model	M&H 233 or approved equal.

Yard Hydrants

Service	Potable water, frost free, with vacuum breaker
Size	3/4" NPT inlet, 3/4" hose bib lockable, 5' bury
Valve	Clayton Mark 5440 or equal

REDUCED PRESSURE BACKFLOW PREVENTOR

Pressure Rating	Non-shock cold water - 150 PSI
Conformance	Cross Connection Control Institute
Acceptable Models	Febco, Watt
Connections	125 lb. ASA flanged
Materials	
Accessories	Outside lever w/ spring
Valves	Isolation gate valves on each side
Testing	Provide testing valves and ports to properly test function integral with valve

Non-Shrink Grout

Commercial factory-mixed product made especially for intended use including a corrosive environment.

Compression Couplings - Compression couplings 2" or smaller shall be Mueller or Ford.

Service Pipe - Pipe for water service shall be 1" Pure-Core or approved equal unless another material or size is shown on the plans or directed in the field.

Non-Shrink Grout

Commercial factory-mixed product made especially for intended use including a highly corrosive environment.

Plastic Gasket Joints

Type Preformed flexible plastic

Conformance Fed. Spec. SSS-S-00210 (GAS-FSS), Type I Rope & Form ASTM C433

Bolts and Hardware - All bolts, nuts, and small miscellaneous hardware shall be stainless steel or Cor-Blu unless specifically noted. In aggressive soils, Cor Blu will be required even on flange fittings.

Tracer Wire and Marking Tape

Tracer wire shall be insulated 10 gauge. Tracer wire shall be fastened to all buried non-metallic pipes including service lines and shall be fastened to and brought to the surface on the outside of each manhole and cleanout, and cross through the grout of the frame and cover. Service line wire and any breaks in wire shall be connected by watertight connections.

Marking (warning) tape at least 4" wide labeled and color coded for the utility shall be placed 12" above pipes of all materials.

Exposed Interior Piping

Exposed piping shall be colored coded to match the pipe's use in accordance with the CDPHE drinking water design criteria.

Gauge Piping

All gauge piping shall be brass or bronze with threaded brass fittings. The brass pipe for gauge piping shall be "regular" seamless red brass conforming to ASTM B43.

Pipe Supports

Floor supports for pipes shall either be a cradle shaped concrete pedestal or for pipes 4 inches and smaller, cast iron adjustable pipe saddle, locknut nipple, floor flange and concrete pier to steel support.

Vertical supports shall be steel riser clamps. Wall supports for pipes 3" and smaller shall be cast iron hooks. Hangers shall be adjustable wrought steel clevis. Hanger rods shall be steel iron rods threaded both ends. Chain, wire, or perforated straps will not be permitted. Design hangers to impede disengagement by movement of supported pipe. Provide copper plated hangers and supports for copper piping.

PART III - EXECUTION

PREPARATION

Earth Excavation

The Contractor shall do all excavation of whatever substances encountered to depth shown on drawings in accordance with Section 02200. Excavation for manholes and other accessories shall have 15" minimum clearance on all sides.

INSTALLATION

Except where more stringent requirements are provided below, pipe installation shall conform with the requirements of Section 02200 and the Town standards.

Pipe shall be thoroughly inspected prior to installation. The groove in the bells of the pipe shall be full and continuous or the pipe will be rejected. Damaged pipe or pipe which does not meet the deflection tolerances for gravity pipe, shall be rejected. Defective pipe or fittings shall be removed from the job site within 24 hours of notification by the Engineer.

All foreign matter or dirt shall be removed from the interior and ends of the pipe before they are lowered into position in the trench and prior to connection.

Excavation to Grade for Pipelines

Excavation for pipe shall generally be by open trenches unless otherwise specified, required on the plans, or approved by the Engineer. The trench shall be excavated using conventional methods. Methods other than standard cut and cover must receive prior approval of the Engineer. The banks of the trench shall be kept as nearly vertical as soil conditions will permit, but shall not exceed the angle of repose of the soil. Boring and pipe bursting methods where specified or authorized must be approved in advance by the Engineer.

Excavation for all pipe lines shall be to a depth sufficient to provide for bedding of the pipe and a minimum cover below finished grade of the depth listed in the pipe line specifications or shown on the Drawings with appropriate bedding.

Alignment of trenches shall be carefully controlled so that the pipe will be laid with adequate space for compaction of backfill between the pipe and trench walls. All excavation shall be of sufficient width to provide ample room for proper joining and compaction of pipe and fittings, typically 16" plus pipe OD. Minimum trench width shall be twelve (12) inches plus pipe OD assuming proper compaction can be provided. Maximum trench width will be restricted to pipe diameter plus two feet unless otherwise approved by the Engineer. If the maximum trench width is exceeded, provide special bedding, encasement, or higher strength pipe as approved by the Engineer.

Laying Pipe

All installation work shall conform with applicable portions of ASTM C-12, pipe manufacturer's installation instructions and recommendations, and with this section and referenced sections of the contract documents. If there are conflicts, the more stringent specification shall apply.

Every precaution shall be taken to prevent foreign material and trench water from entering the pipe and fittings. During construction, the Contractor shall provide and maintain adequate equipment to properly remove and dispose of all water entering the trench and any other part of the work. Trench water shall not be allowed to flow through the pipe.

Begin pipe laying at the lowest point, unless otherwise directed by the Engineer, and install the pipe with the spigot ends pointing in the direction of flow. A firm bed must be prepared for each pipe and the bedding material hollowed out underneath the bell so that the body of the pipe shall be supported for its entire length upon the bed so prepared.

Lay all pipes straight between changes in alignment and at uniform grade between manholes, unless directed otherwise by the Engineer. All pipe shall be placed true to line and grade and carefully centered and with a smooth invert at the joint. The joint shall be made in a workmanlike manner and shall be watertight. Immediately before joining two lengths of pipe, the inside of the bell and the outside of the spigot end and the gasket shall be thoroughly cleaned. Caution shall be exercised to ensure that the correct type of gasket is used. A thin film of gasket lubricant shall be applied to the inside face of the gasket and the spigot end of the pipe. The spigot end of the pipe shall be placed in the bell with care to prevent the joint from contacting the ground. The joint shall be completed by pushing the pipe home by hand with a slow steady pressure, without jerky or jolting movements. Pipe furnished without a depth mark shall be marked before assembly to ensure insertion to the full depth of the joint. The pipe shall then be properly set and brought to correct line and grade. The pipe shall then be secured in place by installation of bedding material and backfill, in accordance with the plans and Section 02200 of these specifications. Place and secure tracer wire on the pipe prior to bedding.

HDPE pipe shall be installed in strict accordance with manufacturer's recommendation. All workers welding HDPE pipe must be trained and approved by the manufacturer for welding pipe of the size and DR being used on this project. At the beginning of welding each day, each worker who will be welding pipe shall demonstrate his qualifications by successfully completing a bend back test prior to welding any pipe for use on the project. All welds shall be full depth and shall have a uniform bead around the joint.

If, in making any joint, previous lengths of pipe are disturbed, such lengths must be uncovered and relaid. Any section of pipe, fittings, valves, or appurtenances already laid and found to be defective shall be taken out and replaced without additional expense to the Owner.

Flange and mechanical joints shall be made with properly sized machine bolts and nuts. All nuts and bolts utilized in underground connections shall be stainless steel or Cor-blue, unless high strength cast iron, or high strength wrought iron are required by soil conditions and approved by Engineer. Use anti-seize with all stainless bolts. All components of these types of joints shall be cleaned before jointing. Only one (1) gasket will be permitted in a flange joint. In a mechanical joint, the plain end pipe shall be fully seated before the gland and gasket are slipped up to the bell; care shall be taken to locate the gasket evenly around the entire joint. All nuts on both types of joints shall be tightened by hand first then by alternating nuts 180° apart. Final tightening shall be of uniform torque as required by the manufacturer in the same alternating sequence. All fittings and their connections shall be wrapped in a 10 mil polyethylene plastic and taped closed. Deflection at a mechanical joint shall not exceed either the manufacturer's recommendation or Table 1 in AWWA C600.

When work is not in progress, open ends of pipe and fittings shall be securely closed by a watertight plug to prevent entry of foreign materials and/or water. If there is water in the trench, the seal shall remain in place until the trench is pumped completely dry. Whenever water may rise in the trench, enough backfill shall be placed on the pipe to prevent floating. Should any foreign material be allowed to enter the line or to remain in the line after installation, the Contractor shall remove such accumulation with a pipeline scraper or other approved means.

Sequencing

The Contractor shall excavate in advance of pipe laying only a sufficient length to assure steady progress in the installation of pipe. No more than 100' of trench shall be open at a time unless specifically authorized by the OR. The length of open trench shall be limited where necessary to accommodate traffic, public safety, minimize service disruptions or as required by the Engineer and/or other entities with authority, in vicinity of the work being performed. All open trenches shall be appropriately barricaded. No more than 20 feet of trench may be left open over night.

PIPE BEDDING

The bottom of the trenches shall be accurately graded to provide uniform bearing and support throughout the full pipe length without placing stress on the pipe or allowing voids under the pipe. Excess loading of the bell will not be permitted under any circumstances. Dig bell holes and depressions for joints after trench bottom has been graded. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. The use of earth mounds for bedding the pipe will not be permitted.

All sharp stones, trash, and other materials which may damage the pipe or interfere with the proper bedding of the pipe and the placement and compaction of the backfill shall be removed from the trench. The soil in the bottom of the trench shall be slightly loose, and at optimum moisture, so that uniform bedding and compaction around the pipe is easily obtainable. Should any material be encountered which would prevent the obtaining of suitable bedding, e.g. rock, wet, unstable material, etc., the trench shall be over-excavated to a depth of 6 inches minimum below the outside bottom of the conduit, except at points of rock and earth transitions, at which point the rock shall be excavated to a minimum of 12 inches below the outside bottom of the conduit as shown on the typical drawing for pipe bedding. Backfill any over-excavation, required or inadvertent, with materials equivalent to, and compacted as specified for haunching materials according to these specifications. Bedding and materials in the pipe zone, where flowable fill is not required, shall conform with materials specified in Section 02200 for bedding using Class C for water and Class D for sewer.

No extra payment will be made for sub-grade over excavation. It should be assumed that most pipes will be installed in saturated soils, some gravels and clay type materials and will require installation of bedding below the pipe.

Whenever flexible pipe is used, special care shall be employed in the pipe bedding to properly support the pipe. Flexible pipes include PVC pipe, lightweight steel pipe, copper, purecore, high density polyethylene pipe, and other similar pipes. Conform to recommendations of (1) AWWA C 900 Appendix A Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch Through 12 inch for Water, (2) Unibell PVC Handbook and relevant Unibell recommended practice manuals, and (3) ASTM Designation D 2321 Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

At the top of the pipe zone, install geotextile on top of the Class D fill materials. Install warning tape at the top of the pipe zone bedding or geotextile.

BACKFILL AND COMPACTION OF PIPE LINES

The Contractor shall proceed with backfilling as soon as practicable, but not until Work is inspected by Engineer and any necessary tests satisfactorily completed. Do not begin backfilling until forms have been removed,

underground utility systems have been tested, and where applicable, concrete has cured sufficiently to prevent displacement or damage to restraints. Maintain optimum moisture content of backfill materials and compact to required density. Whenever practical materials shall be brought to the specified moisture content in the borrow area rather than while being placed. Unless otherwise specified, unprocessed materials shall be compacted to 95% standard proctor at +/- 2% of optimum moisture and processed materials (e.g. base materials) compacted to 95% modified proctor at +/- 2% of optimum moisture. Compaction or consolidation shall follow as soon after the placing as is practical.

Ensure areas to be backfilled and backfill materials are free from debris, large stones, loose materials, snow, ice, and water, other objectionable material that will cause interference with compaction, and that ground surfaces are not in a frozen condition. Do not allow the nesting of rocks. Do not backfill over existing subgrade surfaces which are frozen, porous, wet or spongy. Cut out soft areas of existing subgrade and stabilize (see Stabilization requirements below).

Compact existing subgrade surfaces if densities are not equal to that required for backfill materials. Plow, step, or bench sloped surfaces steeper than 4 to 1 on which backfill is to be placed in such a manner that fill material will adequately bond with existing surfaces. Scarify where necessary to ensure uniform compaction and good bonding between lifts.

Backfill areas to grades, contours, levels, and elevations required. Place approved excavated or imported material in successive horizontal layers of 8 inches or less loose depth for full width of cross section, at optimum moisture content for compaction, and compact each layer to the required density with equipment designed for compaction purposes for the type of material. Backfill systematically in continuous level layers for the full width of the cross section. Uniformly place each layer to the specified maximum lift (or less) and thoroughly mix during the spreading to ensure uniformity of material in each layer. Testing of each lift shall be performed prior to placing the next lift in accordance with the specified testing requirements.

Cutting of Pipe - The pipe shall be cut in a neat and workmanlike manner in accordance with manufacturer recommendations. No damage shall be done to the pipe or any lining or coating and the cut shall leave a smooth end at right angles to the axis of the pipe. Flame cutting of iron pipe torch shall NOT be allowed.

Connection to Existing Lines - Connections to existing lines shall be made at the locations shown on the plans. Expose existing line ahead of pipe laying to allow adjustments in line and grade as needed. Coordinate timing of the cut of the existing line with pipeline Owner, and provide required notice to affected customers. In cutting the existing pipe, take great care to prevent contamination of existing line. Keep water level in the trench below the level of the pipes. Make connection using required fittings and restrain all joints. Cut off and seal shut all abandoned sections.

Setting of Fittings and Valves

All valves, plugs, caps, and fittings shall be provided as shown on the plans and set and joined to the pipe in the manner specified herein for cleaning, laying, and joining pipe. Whenever practical, flanged fittings shall be used and gate valves bolted directly to crosses and tees as applicable.

Valves and Valve Boxes - Buried valves shall be installed as shown on the typical drawing at the locations shown on the plans. Follow the published instructions of the manufacturers of all items furnished.

Care shall be taken to assure that the valve and box are plumb and that the valve box is properly adjusted for the correct finished grade. Insure that proper seal is provided and that valves and appurtenances operate smoothly and freely without putting undo force on the valve, piping or the structure. A box shall be provided for each buried valve and shall be centered over the operating nut. The box shall not transmit shock or stress to the valve or connected pipe.

Cleanouts, Risers, Stubs and Wyes

Place cleanouts, risers, stubs and wyes as shown on the plans.

Deflecting Pipe

Wherever necessary and approved by the Engineer, to deflect pipe from a straight line, either in a vertical or horizontal plane, to avoid obstructions or where there is an existing deflection that can not be corrected, the degree of deflection shall be approved by the Engineer in advance on installation. In general, the maximum allowable centerline deflection at joints shall be no more than that recommended by the manufacturer.

Service Connections

Water and sewer service connections shall be complete in accordance with the Town Standards.

DISINFECTION OF POTABLE WATER LINES

General - Flushing and disinfection of potable water lines shall be done in accordance with the procedure set forth in AWWA C601 Disinfecting Water Mains. All water lines and sections of water line which have been exposed including lines owned by other parties must be disinfected. The Contractor shall provide all temporary blowoffs, pumps, chlorination equipment, chlorine and all other necessary apparatus required. The placement of powder chlorine in each joint of pipe will NOT be allowed.

Preliminary Flushing - The pipeline shall be flushed prior to disinfection, except when the tablet method is used, to remove all remaining foreign material. The flushing operation shall develop a minimum velocity of 5 ft./sec. for 5 minutes minimum at the farthest point in the line. If dirt can not, in the opinion of the Engineer, be removed by flushing, the pipe shall be cleaned and swabbed with a 5% hypochlorite disinfecting solution. Preliminary flushing is deleted with the Tablet Method. Contractor must take care to prevent any damage as a result of flushing activity.

Chlorine Application

Typically, chlorine shall be applied using the continuous feed method. The tablet method may be used on short extensions (up to 2500 ft.) of small diameter mains (12-inch and smaller).

Continuous Feed Method - Introduce water into the line at a constant rate while adding chlorine to maintain a concentration of at least 50 mg/l. Maintain the chlorinated water in the pipeline for a minimum of 24 hours after which period the treated water shall contain no less than 25 mg/l of chlorine throughout the entire length. Repeat the above procedure if the residual at the end of the 24 hours fails to meet the 25 mg/l minimum concentration.

Tablet Method - This method shall not be used if trench water or foreign material has entered the line or if the water is below 5° C (41° F). Because preliminary flushing cannot be used with this method, tablet method shall

only be used when scrupulous cleanliness has been exercised. Even if tablets have been placed, if the line has become dirty, the line will need to be flushed as required above and a different method of disinfection utilized. If this method is allowed, place tablets in each section of pipe in sufficient number to produce a dose of 50 mg/l. Refer to Table 3 of AWWA C601 for the required minimum number of tablets (2 3-3/4 g tablets for 6" and 3 for 8" pipe in 20' joints). All tablets must be attached at the top of the pipe with an adhesive appropriate for potable water. Introduce water into the pipeline at a rate no greater than 1 ft./sec. and retain the water in the pipeline for a period of 24 hours and the residual chlorine concentration after 24 hours must exceed 25 mg/l. If the residual is less, disinfection must be repeated using the continuous feed method.

Final Flushing

After the required retention period, flush all heavily chlorinated water from the main until the chlorine concentration is no higher than that prevailing in the system, or less than 1 mg/l. When the tablet method has been used, provide a flushing velocity equal to that of the preliminary flushing specified above. Treat and dispose of any super-chlorinated water and flushing water in a legally acceptable manner with no damage to property and consistent with CDPHE's Low Risk Discharge Guidance – Discharges of Potable Water. A copy is appended to this sub-section and available at:

https://www.colorado.gov/pacific/sites/default/files/LOW_RISK_POTABLE_2016-1.pdf

Bacteriologic Tests

After completion of the final flushing and prior to placing the pipeline in service, collect samples from the end of the line and test for bacteriologic quality to show the absence of coliform organisms. The number and frequency of samples shall conform to the requirements of the public health authority having jurisdiction but in no case shall the number be less than one per 500 feet of 12" line for chlorinated supplies and two collected 24 hours apart for unchlorinated supplies. Collect samples in sterile bottles from a standard corporation stop installed in the main. Do not collect samples using a hose or fire hydrant. Sterilize the corp stop prior to sampling.

Repetition of Procedure - If the original disinfection fails to produce satisfactory samples, remove the line from service and repeat the disinfection procedure until satisfactory results are obtained.

Disinfecting Repairs and Existing Mains

The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure which in the opinion of the Owner present little danger of contamination will require no disinfection other than disinfection of the clamp.

When an existing line is opened, either by accident or by design, the excavation is likely to be wet and could contaminate the interior. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

The following procedure is considered as a minimum that may be used.

Swabbing with Hypochlorite Solution - The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a 5% hypochlorite solution before they are installed. In addition the opened line being repaired shall be swabbed with 5% hypochlorite solution.

Flushing - Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated and the water being discharged has a comparable residual to water in the distribution system. Discharge of chlorinated water shall be consistent with the CDPHE guidance referenced above.

Where practicable, in addition to the above procedures a section of main in which the break or other repair is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described for new lines, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as 1/2 hour. After chlorination, flushing shall be resumed and continued until discolored water is eliminated, and chlorine concentration is equal to that in the system, following CDPHE guidance for discharge of chlorinated waters.

Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break and/or repair.

FIELD QUALITY CONTROL (TESTING)

General

Contractor shall provide all the tools, equipment, labor, and monitoring necessary to carry out the testing described below and shall perform the testing except when said testing is specified to be performed by in an independent testing agency in which case the requirement of Section 01000 shall apply. In either case, the cost of all testing to demonstrate conformance with the specifications shall be paid by the Contractor. Contractor shall provide notice of schedule of tests in conformance with the requirements of Section 01000 and all testing in order to be valid must be observed by Engineer.

WATER - HYDROSTATIC TESTING

The Contractor shall be required to perform hydrostatic tests on all water mains, laterals, valves, hydrants, dead ends, and service lines in accordance with AWWA specifications C600. Prior to making the test, the Contractor shall advise the Engineer of the time and place of a test so that adequate inspection can be provided. The test shall be conducted in the presence of the Engineer.

Prior to performance of the test all air shall be bled from the lines. Use air relief valves, hydrants, taps, or other means. Wherever necessary, the Contractor shall install corporation cocks at such high points so the air can be expelled as the line is filled then the corporation stop closed.

The testing of the lines shall be done without being connected to existing lines unless approved by the Owner. All necessary apparatus for pressure testing including the pump, pipe connection, gauges, and measuring devices shall be furnished by the Contractor at no cost to the Owner. If connections to the existing lines are allowed by the Owner, it is with the understanding that the Contractor assumes any and all responsibility in case of damage or

failure of the existing system. Leakage through connections to the existing system, leaks in the existing lines, or leaking valves under the test pressure will invalidate the test and necessitate retesting at Contractor's expense.

The lines shall be tested at 150 psi or 1.5 times the normal working pressure of the lines, whichever is greater, for not less than two (2) hours. Test pressure shall be measured at the high point in the line. All taps, gauges (3" face, 0 - 200 psi, at least 5 psi gradations), and necessary equipment shall be provided by the Contractor as approved by the Engineer; however, the Engineer may utilize his own gauges if he so elects. Each section of the new line, between valves shall be tested to demonstrate that each valve as well as the lines in between will hold the test pressure. No pipe installed will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{N * D * \sqrt{P}}{7400}$$

where: L = allowable leakage (gal/hr)
N = number of joints in the line
D = nominal pipe diameter (in.)
P = test pressure (psi)

Nor shall leakage exceed 5 gallons per inch diameter per mile per 24 hours. During the test, the test pressure shall not lose more than 5 psig without being pumped back up to the test pressure. The total of the gallons of water required to keep and/or return the line to the test pressure at the end of the test period is the total leakage. If the total leakage is less than the allowable, the line can be given preliminary acceptance. All visible leaks will be repaired regardless of the amount of leakage. If leakage exceeds that allowed based on the above criteria, Contractor shall identify problems, make repairs, and repeat the test until the leakage is less than the allowable leakage and all visible leaks are repaired.

Manhole leakage testing shall be completed ASTM vacuum testing procedures.

SEWER TESTING

Infiltration/Exfiltration

The finished non-pressurized lines shall be of such tightness that leakage will not exceed 10 gallons per day per inch of diameter per mile when field tested by actual infiltration/exfiltration conditions. Any line or section of line not meeting the above limits shall be corrected by the Contractor at his expense. In addition the line should be air tested as described below.

Soil Compaction Tests

Conduct compactions tests in accordance with Section 02200.

Tests for Displacement of Sewers

Check sewer mains to determine whether any displacement of the pipe has occurred after the trench has been backfilled to two feet above the pipe and tamped as specified. Test as follows: Shine a light between manholes, boxes, and/or bends (if authorized by Engineer) by means of a flashlight or by reflecting sunlight with a mirror. If illuminated interior of pipeline shows poor alignment, displaced pipe, or any other defects, remedy defects until acceptable to the Engineer. Misalignment shall be less than 3% of pipe diameter.

Video Inspection of Line Interior

At the completion of segments of sewer lines, the lines shall be jetted with water. After water ceases to flow, Contractor shall video each segment to demonstrate cleanliness, proper jointing, conformance to alignment and grade, and proper roundness. Video work shall be done in coordination with ovalation testing so the video records the testing results of the "Go-No Go" gauge. No line shall be put into service prior to the Engineer accepting the results of the video and leakage tests.

Tests for Pressure Lines

Test sewer lines which will be subject to positive pressures in accordance Water Testing above.

Air Test - Gravity Flow Lines

Where practical conduct an air test on gravity lines in conformance with Uni-Bell publication B-6-90. Special attention shall be paid the safety admonishments provided in that publication.

Preparation for tests: Flush and clean the line prior to testing in order to wet the pipe surfaces and produce more consistent results. Plug and brace all openings in the line and the upper end of any connections. Check all pipe plugs with a soap solution to detect any air leakage. If leaks are found, release the air pressure, eliminate the leaks and start the test procedure over again.

Procedure of Test: Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average backpressure of any groundwater above the pipe, but not greater than 8.0 psig. Allow sufficient time for the air temperature to come to equilibrium with the temperature of the pipe and the pressure to stabilize. Refer to the UniBell publication for adjustments of required pressures due to groundwater.

After the temperature has stabilized, and the pressure is stabilized at 4.0 psig greater than the average groundwater back pressure, the air hose from the control panel to the air supply shall be shut off or disconnected. Continuously monitor the pressure gauge. Once the reading has stabilized, begin the test. The pressure reading shall be observed and the timing shall commence with a stop watch or other timing device that is at least 99.8% accurate.

If the time lapse (in seconds) for the allowable pressure drop exceeds that shown in at the end of this section, the pipe shall be presumed to be within the acceptable limits for leakage.

If the time lapse is less than that shown in the table, the Contractor shall make the necessary corrections to reduce the leakage to acceptable limits. All visible or audible leaks shall be fixed even if leakage is within acceptable limits.

Safety: The air test may be dangerous if proper precautions are not taken. All plugs must be sufficiently braced to prevent blowouts and the pipeline must be completely vented before attempting to remove the plugs.

As a safety precaution, pressurizing equipment shall be provided with a regulator set at 8 psi to avoid over-pressurizing and damaging an otherwise acceptable line.

Ovalation of Flexible Conduits

All gravity lines constructed of flexible conduit shall be tested for ovalation. Such testing shall be performed by the Contractor using a mandrel, "Go - No Go" gauge, or by other instruments which will measure and record actual pipe deflection. Deflection shall not be measured less than 30 days after backfill is completed and shall not exceed 5% of the pipe diameter. Sections of pipe not meeting this specification shall be excavated, pipe bedding replaced, and trench again backfilled, compacted, and retested for all the tests of this sub-section. Should it still fail to meet these ovalation requirements, the section of line shall be replaced. The Owner may elect to perform this test again at any time during the one year warranty. The Owner will notify in writing the Contractor if problems are detected. The Contractor shall promptly make arrangements to correct the problem in accordance with the warranty provisions of this contract.

TABLE I
MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 Pipe Diameter (in.)	2 Minimum Time (min: sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)								
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	17:48
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	25:38
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	40:04
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	57:41
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	78:31
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	102:33
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	129:48
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	160:15
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	193:53
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	230:46
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	

UNI-B-6-90

SECTION 03000 - CONCRETE & FLOWABLE FILL

PART I - GENERAL

Scope of Work

Work covered by this section of the specifications consists of all the concrete work specified on the plans and detailed in other sections of these specifications. Scope includes providing all the materials, labor, equipment necessary to place all of the concrete indicated in these contract documents.

All work shall conform with most recent edition of ACI standards unless more stringent requirements are contained herein.

Related Work Specified Elsewhere

Section 02200 – Sitework, Excavation, Backfill, and Compaction

Section 02722 - Piping

Section 07150 - Dampproofing

Section 07900 - Sealants and Caulks

Section 1300 - Metal Building

Submittals

Contractor shall furnish test data to demonstrate that the materials (including sands, gravels, and water) provided for the concrete and the concrete itself meets the requirements of the Contract Documents. Submittal data shall also be furnished for all admixtures proposed for use in the Project along with test data that the admixtures are appropriate for use with the application and design mix. At a minimum, the product submittal shall include: the mix design (as detailed in "Concrete Proportioning" below) of each material submitted for the Work. The mix shall include admixtures and additives, source of water, if potable or test results if not potable, 28 day cylinder break test results of each material submitted which is representative of the material with all additives and admixtures, from the batch plant and gravel source to be used for the project, and manufacturers recommended usages and dosages of all additives and admixtures. Note that the slump and water content in the sample breaks will be the maximum allowed in the design mix for this project. Concrete design mix shall be approved by Engineer prior to scheduling or placing concrete. Mixes that arrive on the site that do not meet the approved mix design will be rejected. For sacked concrete (sackcrete), the Contractor shall provide documentation on the brand and type of material proposed. Contractor shall provide a methods statement documenting how the Contractor proposes to mix, in what proportions, and with what equipment, for the use proposed which will meet the manufacturer's mix design.

Contractor shall submit a concrete placement (pour) and a curing schedule for each of the structures which is consistent with these specifications.

PART II - PRODUCTS

MATERIALS

Cement

Cement for concrete shall be a standard brand of portland cement conforming to Standard Specifications for Portland Cement, Designation C-150, of the American Society for Testing and Materials and Section 701 of the Colorado Department of Transportation Specifications. The type to be used shall be:

Type I/II all locations except noted otherwise on plans and details

When suitable facilities (such as those recommended by the Concrete Plant Manufacturers' Bureau and/or approved by the Engineer) are available for handling and weighing bulk cement, such facilities shall be used. Otherwise, the cement shall be delivered in original unopened bags of the manufacturer and the type of cement plainly marked thereon, each bag to contain 94 pounds of cement.

Cement shall be stored in such manner as to permit ready access for the purpose of inspection and identification and so as to be suitably protected against damage by contamination or moisture. Cement should be free of lumps or indications of other possible impurities. Should any lot of bulk cement delivered to the batch site show evidence of contamination, the Engineer may require that such lot be removed from the site.

Sand and Aggregate

Aggregate shall conform to ASTM Standard Specifications for Concrete Aggregates, Designation C-33. Prior to delivery of the aggregates, the Contractor will be required to furnish samples for testing and shall notify the Engineer as to when and where they will be available. Samples shall be taken in the presence of the Engineer.

Aggregates which are found to have a silica released to alkali reduced ratio greater than one, when test in accordance with ASTM C289 shall be used only, when approved by the Engineer, provided low-alkali cement is used. Low alkali cement shall conform to the requirements for portland cement as specified in ASTM C150 and in addition, shall contain no more than 0.60 percent by weight of alkalis and calculated as Na_2O plus $0.659 \text{ K}_2\text{O}$. The use of reactive aggregates shall be considered as solely for the benefit of the Contractor and no additional allowance will be made for the use of Low-alkali cement.

For all concrete work, the nominal size of the coarse aggregate shall not exceed three-fourths inch (3/4"). Gradation shall meet the limits specified in Table 2 of ASTM C 33. (See also Table 703-2, CDOT Standard Specifications for Road and Bridge Construction).

Air Entraining Agent

An air entraining agent shall be used and provide the concrete with entrained air in the amount specified in "Concrete Proportioning" below. Air entrainment shall be by means of an admixture conforming to ASTM C 260. Air content shall be determined by a pressure method in accordance with ASTM C 231. If air entraining agent has frozen it will be rejected.

Miscellaneous Admixtures

Other admixtures, if used, shall have the written approval of the Engineer and shall conform with appropriate ASTM standards. Design mix shall be tested with any proposed admixtures in the test mix.

Reinforcement Material

Steel reinforcement bars shall conform to Standard Specifications for Concrete Steel Reinforcing Bars, Designation A-615, Grade 60, and A-305, of ASTM. (epoxy note deleted) Should the coating be damaged in any way, coating shall be reapplied in the field in a manner that firmly bonds to the rebar. Deformations of reinforcing steel bars shall comply with the latest revision of ASTM A 305. The use of cold twisted bars will not be permitted. Welded wire fabric where called for shall be electrically welded and meet the requirements of ASTM A-185 for Welded Steel Wire Fabric for Concrete Reinforcement.

Water

Water shall be from a source known to be of potable quality unless otherwise approved by the Engineer. Non potable water shall be tested in accordance with, and shall meet the suggested requirements of AASHTO T 26

and in addition, the total dissolved solids shall not exceed 400 mg/l. In all cases water shall be free from oil, vegetable matter, salt, acid, alkali, and other deleterious substances.

Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials. Water shall not contain amounts of impurities that will cause a change in time of setting of portland cement of more than 5% nor a reduction in the compressive strength of mortar of more than 3% compared to results obtained with distilled water.

Expansion Joint Material

Expansion joint material shall be non-extruding preformed joint filler and shall conform to ASTM Specification D1751 or D1752.

Curing Compound

Membrane curing compounds for concrete shall be the pigmented type conforming to the requirements of AASHTO-M-148 and/or ASTM-C-309.

Water Stop

Waterstop in structures shall be extruded multi-rib elastomeric PVC as manufactured by Waterseals Inc, Chicago, IL, Greenstreak Plastic Products, St Louis, MO or equal. Unless otherwise specified the water stop shall be 6". Water stop around the pipes shall be ribbed elastomeric gaskets sized for the particular size and dimension ratio of the pipe.

Snap Ties

Snap ties shall all be cone style.

Non-Shrink Grout

Commercial factory-mixed product made especially for intended use, and an approved type.

Wall Sleeves and Waterstop

Calpico Pipe Linx type CSL and Model PPS, plastic, wall sleeve or equal.

Pultruded Angle

2" x 2" x 1/4" Pultex 1500 or approved equal.

Filler

Asphaltic paint or premolded asphaltic filler used in joints shall be in accordance with ASTM D 994 for premolded joint suitable for its intended function and subject to submittal review and approval by the Engineer.

Sealants and Caulks

Exterior Joint Sealant

Type	One-component self-priming polyurethane sealant
Conformance	Fed. Spec. IT-S-00230, Type II, Class A
Consistency	Gun grade, non-sag
Manuf. Type	Sikka Chemical Corp "Sikaflex-la," Sonneborn-Contech "Sonolastic NPI", or equal
Colors	As selected by the Owner for the particular use

Type	Silicone
Conformance	100% Silicone
Consistency	Gun grade, non-sag

Manuf. Type GE Silicone II or equal
Colors As selected by the Owner for the particular use

Backstop Materials

Resilient open cell polyurethane foam rod, closed cell polyethylene foam rod, or other closed cell compressible material recommended by the sealant manufacturer as nonabsorbent, oil-free and compatible with the sealant used, sized to control sealant depth.

Bond Preventive Materials

Polyethylene tape with pressure sensitive adhesive on side, as recommended by the sealant manufacturer.

Anchor Bolt Adhesive

All weather Epoxy acrylate (A/B) anchoring Gel ICC ES report #ESR-1884 for use in concrete. Unitex Pro-poxy 400 or equal.

PART III - EXECUTION

Tolerances

All concrete work shall be completed the lines and grades on the plans within these tolerances unless more stringent requirements are listed on the plans or details:

Variation of the constructed linear outline from the position in plan or from the level or grades shown or variations from plumb or finished surface. In 10': +/-1/4"
In 20' or more: +/-1/2"

Variation in the thickness of slabs and walls. Minus 1/4", Plus 1/2"
Variation in the locations and sizes of slabs and wall openings. Plus or Minus 1/4"

Concrete Proportioning

The determination of the concrete design proportions and its workability shall be solely the Contractor's responsibility and shall be established, using the cement and water contents provided herein, on the basis either of laboratory trial batches designed in accordance with the latest revision of ACI 211.1 (Recommended Practice for Selecting Proportions for Normal Weight Concrete) or of field experience with the materials to be employed.

The concrete, whether ready mixed or site batched, shall have a compressive strength of not less than four thousand (4,500) pounds per square inch at twenty-eighth (28th) day after pouring. The minimum cement content of this concrete shall be seven (7) standard 94-pound sacks of cement per cubic yard of concrete. Flyash (pozzolan) maybe only be used to replace up to 15% of the seven standard sacks of cement. The water-cement ratio shall not exceed 0.40 including moisture in aggregates and water added in field adjustments. Nor shall the water cement ratio exceed the ratio in the test mix for design mix approval. Slump shall not exceed 3.5" when half the concrete in the truck has been placed. If greater slump is required (and approved in writing by the Engineer), additional water may be added with a proportional increase in cement to maintain the same water-cement ratio or the use of water reducing agents may be proposed, with sufficient support data, for review and approval by Engineer. Entrained air shall be between 5-8%. Include fiber mesh in all concrete flatwork. Where concrete is to be subject to traffic, compaction, or other loads in less than 10 days, concrete mix shall be designed to achieve a laboratory compressive strength of at least thirty six hundred (3,600) psi in 72 hours. Contractor shall

submit a design mix and test results to demonstrate that said mix when tested with all admixtures proposed meets the requirements of these specifications.

Contractor shall select his design mix keeping in mind workability of the mix in general as well as how the mix will be conveyed to the site and to its final location (e.g. if a pumper truck will be used, the mix needs to account for the reduction of workability during conveyance).

Use of calcium chloride is prohibited.

Ready-mix shall be mixed and delivered in accordance with the ASTM Specifications for Ready-Mixed Concrete, Designation C94 and shall meet the requirements for air entrainment set forth herein.

The Contractor shall, prior to actual delivery of any concrete, furnish a statement to the Engineer, giving the dry weights of fine and coarse aggregate gradation and quantities, types, and name of admixture (if any) and of water per cubic yard of concrete that will be used in the manufacture of each class of concrete to be provided by the Contractor. He shall also furnish evidence satisfactory to the Engineer that the materials to be used and proportions selected will produce concrete of the quality specified when placed. Whatever strengths are attained, the quantity of cement used shall not be less than the minimum specified. The cost for furnishing this information and the related testing shall be borne by the Contractor and included in the costs for concrete work.

Flowable fill shall be designed with one half sack of concrete per cubic yard. Sand and coarse aggregate in the mix design shall be the same as for concrete.

Batching and Mixing

The sand and coarse aggregate shall be weighed and shall be proportioned on the basis of integral bags of cement unless the cement is weighed. Weighing equipment of the beam type may be used. The supplier or contractor shall provide equipment and shall maintain and operate the equipment as required to accurately determine and control the amount of each separate ingredient entering the concrete. Batching shall be such that combined inaccuracies in feeding and measuring the materials will not exceed 1-1/2 percent for water and weighed cement and 2 percent for sand and each size of coarse aggregate.

Batching and mixing shall be in accordance with ASTM C94, Specifications for Ready Mixed Concrete and CDOT Section 412. Job mixed concrete will not be accepted except for volumes of less than 1/2 cubic yard. The concrete shall be uniform in composition and consistency throughout the mixed batch, and from batch to batch, except where changes in composition or consistency are directed. The stationary mixing (prior to adding water) time shall be between 50-90 seconds. Excessive overmixing requiring the addition of water to preserve the required consistency will not be permitted. From the time water is added to the mix or cement comes in contact with aggregate, until the concrete is deposited in place, shall not exceed 45 minutes if hauled in non-agitating trucks, and 90 minutes if hauled in agitating or mixing trucks.

A mix ticket in accordance with Colorado Department of Transportation standards must accompany each truck of concrete and a copy provided to the Inspector upon arrival on the project site. The minimum information on the ticket shall include: date, mixing plant, truck number, class of concrete or mix design number, time charged, mixing and batching times, yards of material in truck, pounds of cement (per yard & total), pounds of sand (per yard & total), pounds of aggregate (per yard & total), gallons of water (per yard & total), % of moisture in sand, % of moisture in aggregate, ounces of air entrainment (per yard & total), ounces of admixture for each admixture or additive (per yard & total) and batch plant inspector's signature. Measurements of moisture in sand and rock shall be conducted with sufficient frequency to insure that numbers on the ticket are representative. Any water added at the jobsite must be metered and the quantity added noted on the mix ticket. If water is added at the site, the water/cement ratio shall be recalculated and presented on the mix ticket. Field air entrainment, slump,

and temperature results shall be written on the mix ticket. If compressive test cylinder samples are taken that shall also be noted on the associated mix ticket. Contractor shall be responsible for all testing and reporting associated with each truck mix ticket. A copy of the completed ticket shall be provided to the Engineer when the truck leaves.

Truck mixers will be permitted only when the mixers and their operation are such that the concrete throughout the mixed batch and from batch to batch is uniform with respect to consistency, grading, and strength.

Any concrete retained in truck mixers so long as to require additional water to permit satisfactory placing shall be wasted.

If concrete arrives on site which is too stiff for placement, before placing any concrete from a truck, at the Contractor's request and approval of the concrete supplier, the concrete may be remixed with a small amount of water under careful supervision only if all the following conditions are met: 1. maximum allowable water cement ratio is not exceeded, 2. maximum allowable slump is will not be exceeded, 3. maximum allowable mixing and agitating time (or drum revolutions) are not exceeded (maximum is 300 revolutions from initial addition of water); and 4. concrete is remixed for at least half the minimum required mixing time or number of revolutions (minimum revolutions is 70 so minimum of 35 are required for remixing). The mix ticket must contain adequate accurate information to know whether the above conditions will be met.

Retempering of any concrete is prohibited.

If plasticizers are to be used, they must be approved as part of the design mix during submittal process. If approved for use, they should be added in the field only after air and slump tests have been run and prior to beginning the pour from the truck.

Job mixed concrete (less than 1/3 c.y.) shall be mixed a mixer. The mixer shall be rotated at a speed recommended by the manufacturer. If mixer performance tests are not made, each batch of 1/3 c.y. or less shall be mixed for at least 1 minute after all materials are in the mixer.

Forms

Forms shall be of suitable material and of type, size, shape, quality, and strength to enable construction as designed. The forms shall be true to line and grade, mortar tight, and sufficiently rigid to resist any appreciable amount of springing out of shape during placing of concrete. The responsibility for the adequacy shall rest with the Contractor. All dirt, chips, sawdust, nails, and other foreign matter shall be completely removed from forms before any concrete is deposited therein. The surfaces of forms shall be smooth and free of irregularities, dents, sags, and holes that would appreciably deface the finished surface. Forms previously used shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being reused, and the reuse of forms shall be subject to approval of the Engineer. Where practical, all forming shall be done with plywood or simons or equal forms.

Forms for all surfaces that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber or material which will provide a surface at least equally satisfactory. Any lumber or material which becomes badly checked or warped prior to placing concrete will be rejected.

Forms, clamps, and/or bolts approved by the Engineer shall be used to fasten forms. The use of twisted wire loop ties to hold forms in position will not be permitted, nor shall wooden spreaders be used unless authorized by the Engineer. Clamps or bolts shall be of sufficient strength and number to prevent spreading of the forms. They shall be of such type that they can be entirely removed or cut back 1 inch below the finished surface of the concrete (cone shape) and in watertight applications should have waterstops on the snap tie. Forms for outside surfaces shall be constructed with stiff wales at right angles to the studs and all form clamps shall extend through

and fasten such wales, all based on the rate and force of concrete pour. Forms shall be so constructed that portions, where finishing is required, may be removed without disturbing portions of form to remain.

Before concrete is placed in forms, all inside surfaces of the forms shall be thoroughly treated with an approved releasing agent that will leave no objectionable film on the surface of forms that can be absorbed by the concrete. Care shall be exercised that no releasing agent is deposited on previously placed concrete.

Unless otherwise designated on the plans, all exposed edges shall have a 3/4 inch chamfer. Forms for curved surfaces shall be so constructed and placed that the finished surface will not deviate appreciably from the arc of the curve.

Reinforcement

Unless specifically detailed or noted otherwise reinforcement shall be consistent with the following:

Bars shall be accurately positioned in accordance with ACI standards and as shown on drawings, terminating 2" (3" if formed against earth or submerged) away from edges and expansion joints unless otherwise specified on the plans, and shall be firmly and securely held in position by wiring at intersections and elsewhere as needed to prevent shifting of bars, with wire not smaller than No. 16 and by using concrete, plastic, or metal chairs, spacers, metal hangers, supporting wires, and other approved devices designed for that purpose and of sufficient strength to resist crushing under full load. The use of wooden supports will not be permitted.

Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted. Before placing reinforcing steel in forms, the reinforcing steel shall be thoroughly cleaned of mortar, oil, dirt, loose mill scale, loose or thick rust, and coatings of any character that would destroy or reduce the bonds. No concrete shall be deposited until the placing of the reinforcing steel has been inspected and approved.

Support of rebar in the forms shall not rest or be in contact with form ties. Bundled bars shall be tied together at not more than six foot centers. Bars shall overlap at least 36 bar diameters and also be securely tied or otherwise secured so that there is no possibility of displacement when concrete is poured. Splices of bars shall be made only where shown on the plans or as approved by the Engineer. Welding of reinforcing steel will be permitted when authorized in writing by the Engineer and shall be in accordance with American Welding Society Standard Specifications for Highway and Railroad Bridges.

Bends and hooks in bars shall be made in the manner prescribed by the American Concrete Institute. Bars shall not be bent nor straightened in a manner that will injure the material. Bars with kinks or unspecified bends shall not be used.

Welded wire fabric shall be held firmly in place and shall be spliced not less than two meshes. Lifting fabric into place as concrete is placed is not allowed.

Reinforcement materials at time of concrete pouring shall be free of loose, flaky rust and other coatings or films that could interfere with bonding to the concrete. Epoxy coating that is damaged and ends that are cut shall be touched up in the field as needed to insure a continuous coating.

Placing Concrete and Flowable Fill

Where a schedule for pouring concrete is shown on the plans, no deviation will be permitted there from unless approved in writing by the Engineer. The placing of concrete for a given pour shall start at the low point and shall proceed upgrade, unless otherwise permitted by the Engineer.

Prior to placing concrete contractor shall verify rebar sizes, placement, rebar tie, support, and clearances. Contractor shall if necessary restore base course grade, shape, and compaction and rebar placement.

Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of materials, or slump in excess of one inch in the concrete as it is delivered to the job. Any concrete which has become so stiff that proper placing can not be assured shall be wasted. Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation or segregation of materials.

Fresh concrete shall not be permitted to fall from a height greater than 4 feet without the use of adjustable length pipes or "elephant trunks".

The use of chutes in conveying or depositing concrete will be allowed only at the discretion of the Engineer; and whenever they are used, they shall be laid at such inclination as will permit the flow of concrete of such consistency as required. The use of additional water in mixing the concrete to promote free flow in chutes of low inclination will not be allowed. Where necessary in order to prevent segregation, chutes shall be provided with baffle boards or a reversed section at the outlet. Columns and tall walls shall be poured preferably through pipes of adjustable length and not less than six (6) inches in diameter.

If the Contractor intends to use a pumper to place the concrete, he should notify Engineer in advance, and the design mix should take into account the reduce workability of pumped concrete.

Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Formed concrete shall be placed in continuously approximately horizontal lifts, with depths generally not to exceed 20 inches per lift. Concrete shall be placed at such a rate that it is at all times plastic and flows readily between bars. If additional concrete is to be placed, care shall be taken to remove all laitence and to roughen the surfaces of the concrete to insure that fresh concrete is deposited upon sound concrete surfaces. Concrete which is contaminated by foreign materials shall not be used, nor shall retempered concrete be used.

All concrete and flowable fill shall be thoroughly consolidated during placement to obtain maximum practicable density, free from rock pockets of coarse aggregate, and snugly closed against all surfaces of forms and embedded materials. Concrete shall be thoroughly worked around reinforcement and waterstops and into the corners of the forms.

The maximum time allowed from the start of batching (water addition) of a load to complete placement of the load shall be 90 minutes. When long hauling times are necessary, water shall not be added until the truck reaches the job site. In such cases, delivery trucks shall be capable of providing adequate mixing to insure the same quality product as if it had been batched at the plant. Concrete when deposited shall have a temperature of not more than 85° F and not less than 40° F in moderate weather and at least 50° F when the mean daily temperature drops below 40° F.

Mixed concrete, after being deposited, shall be consolidated until all voids are filled and free mortar appears on the surface. With the exception of concrete placed in slope paving and aprons and concrete placed under water, all concrete shall be compacted by means of high-frequency internal vibrators of a type, size, and number appropriate for the particular pour. The number of vibrators employed shall be ample to consolidate the incoming concrete to a proper degree within 15 minutes after it is deposited in the forms. In all cases at least 2

vibrators of adequate length to easily reach the bottom of the forms shall be available at the site of the work in which more the 2 c.y. of concrete is to be placed. The vibrators shall not be attached to or held against the forms or the reinforcing steel. The locations, manner, and duration of the application of the vibrators shall be used such as to secure maximum consolidation of the concrete without causing segregation of the mortar and coarse aggregate and without causing water or cement paste to flush to the surface. The use of vibrators for shifting of the mass of fresh concrete is prohibited. Layers of concrete shall not be tapered off in wedge-shaped slopes but shall be built with square ends and level tops.

The use of approved external vibrators for compacting concrete and flowable fill will be permitted only when approved in advance by the Engineer, for concrete that is inaccessible for adequate consolidation, and provided the forms are constructed sufficiently rigid to resist displacement or damage from external vibration.

During the placing of concrete and flowable fill, care shall be taken that methods of compaction used will result in a surface of even texture free from voids, water, or air pockets, and that the coarse aggregate is forced away from the forms in order to leave a mortar surface. Spades or broad-tined forks shall be provided and used to produce the desired results if necessary.

Exposed surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonable smooth wood-float or steel-trowel finish as directed.

Horizontal members or sections shall not be placed until the concrete in the supporting vertical members or sections has been consolidated and settlement has occurred.

Protection Against Effects of Rain

In order that concrete may be properly protected against the effects of rain (or snow) before the concrete is sufficiently hardened, the Contractor will be required to have material available on the pour site at all times for the protection of the edges and surfaces of all unhardened concrete. Such protective material shall consist of material which will protect the surfaces from finish damage or a local shift in cement water ratio. When rain appears imminent, all placement operations shall stop, forms shall be placed against the sides of work and protective covering shall be placed over the surface of the unhardened concrete. If a forecast of rain or snow and or signs of rain or snow are apparent prior to the pour, the Contractor shall lay out the protection materials adjacent to the work in preparation of deployment.

Depositing Concrete Under Water

Concrete shall not be deposited under water.

Joints

The work shall be so executed that construction joints will occur at designated places shown on drawings unless specifically permitted otherwise by the Engineer. The Contractor shall complete, by continuous depositing of concrete sections of work comprised between such joints. The joints shall be kept moist until adjacent concrete is placed.

Expansion and contraction joints in the concrete shall be formed where shown on the drawings, where specified, and as directed. In general, such joints shall have smooth abutting surfaces, painted, or separated and sealed as detailed on the drawings. No reinforcement shall be extended through the joints except where specifically noted or detailed on the drawings.

All construction joints at the bottom of walls or arches, at the top of walls, and all longitudinal construction joints having a keyed, stepped, or roughed surface shall be cleaned by sand blasting prior to pouring the adjacent concrete. Any quality of sand may be used which will accomplish the desired results. Other methods of cleaning joints may be used provided the method results are approved by the Engineer.

Joint cleaning operations shall be continued until all unsatisfactory concrete and all laitance, coatings, stains, debris, and other foreign materials are removed. The surface of the concrete shall be washed thoroughly to remove all loose material. The concrete surfaces shall be such that waste water will not stain, discolor, or affect exposed surfaces of the structures. The method of disposal will be subject to approval of the Engineer.

Cold joints shall be moist when covered. Install expansion joint material when the new concrete could put pressure on the existing concrete or structures.

All joints in foundation walls shall be keyed unless otherwise shown on the plans. All reinforcement shall continue through all such joints. Provide waterstop between cold joints in submerged or saturated structures to protect the reinforcement and prevent leakage.

All horizontal construction joints or those of slight slopes shall be covered with mortar.

When the plans show new concrete to be jointed to existing concrete by means of bar reinforcing dowels placed in holes drilled in the existing concrete, the diameter of the holes shall be the minimum needed to place nonshrinking grout or epoxy grout and the dowel. Immediately prior to placing the dowels, the holes shall be cleaned of dust and other foreign material and sufficient grout placed in the holes so that there are no voids in the drilled holes after the dowels are inserted.

Asphaltic paint or premolded asphaltic filler used in joints shall be in accordance with ASTM D 994 for premolded joint suitable for its intended function and subject to submittal review and approval by the Engineer.

Removal of Forms

To facilitate satisfactory progress with the specified curing, and enable earliest practicable repair of surface imperfections, forms shall be removed as soon as the concrete has hardened sufficiently to prevent damage by careful form removal. Forms on upper sloping faces of concrete such as forms on the water sides of warped transitions, shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging.

Forms may be removed from box sections and inside wall forms of box sections which do not support slab forms no less than 24 hours after the pour. Other sections of concrete supporting a load shall be removed in a period recommended by ACI unless otherwise specified. The periods of time at which the Contractor may remove forms as specified herein are permissive only and subject to the Contractor assuming all risks that may be involved in such removals.

To avoid excessive stresses in the concrete that might result from swelling of the forms, wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete. Forms for the openings shall be constructed so as to facilitate such loosening. Forms for conduits and tunnel linings shall not be removed until the strength of the concrete is such that form removal will not result in perceptible cracking, spalling, or breaking of edges or surfaces, or other damage to the concrete. Forms shall be removed with care so as to avoid injury to the concrete, and any concrete so damaged shall be repaired in accordance with the provisions for repair of concrete. Any needed repairs or treatment required on such sloping surfaces shall be performed at once, and be followed immediately by the specified curing.

At his option, the Contractor may leave the forms in place for such longer periods as are, in his opinion, required or desirable for the Work quality.

The falsework supporting any span of a continuous or rigid frame structure subject to binding stress shall not be released until after the last concrete placed in the span and in adjoining spans (excluding concrete above the deck slab) has attained a compressive strength of not less than 80% of the designated 28 day strength.

Surface Finish

Concrete slabs shall be carefully spread, consolidated, floated to the grades indicated on the drawings and after floating be uniform in grade so as to contact a ten (10) foot straightedge within a plus or minus of one-eights inch (1/8"). A float finish shall be achieved by placing an excess of material in the form and removing or striking off the excess with a template, forcing the coarse aggregate below the mortar surface. Creation of concave surfaces shall be avoided. After the concrete has been struck off, the surface shall be thoroughly worked and floated with a suitable hard trowel. After having taken initial set sufficient to bear the weight of cement finishers, the surface shall be finished to a texture that conforms to requirements of the use of the surface. Unless otherwise noted finishes shall be a light broom finish.

The use of water to facilitate finishing work is prohibited as is plastering, dusting or topping of the surface. The Contractor shall schedule his pours to allow for proper finishing without the need to add water in the finishing process. Any activity which will alter the water cement ratio so as to dilute the concentration of cement in a given location is prohibited. If there is a need for mortar to finish the concrete, Contractor shall mix cement and water in the same water/cement ratio as is in the ready mixed concrete. Finishing aids, if submitted and approved in writing by the Engineer, may only be used in accordance to manufacturer's instructions.

Remove fins and form marks from all surfaces. All exposed surfaces shall be rubbing of mortared surfaces to a uniform color for cosmetic purposes. Surfaces shall be sufficiently smooth to facilitate application of the required insulation and dampproofing, and to seal the surface.

Immediately after the forms have been removed, all form bolts shall be removed to a depth of at least 1 inch below the surface of the concrete and the resulting holes or depressions cleaned and filled with mortar. Mortar shall consist of 1 part by volume of cement, 2 parts of sand, and sufficient concrete glue to aid adhesion. Mortar shall be mixed approximately 45 minutes in advance of use. Care shall be exercised to obtain a perfect bond with the concrete. After the mortar has thoroughly hardened, the surface shall be rubbed with a carborundum stone in order to obtain the same color in the mortar as in the surrounding concrete. All fins caused by form joints and other projections shall be removed and all pockets cleaned and filled. Mortar for filling pockets shall be treated as specified for bolt holes.

All porous and fractured concrete shall be removed by chipping openings into the concrete as directed, and the chipped openings shall be filled with drypack, mortar, or concrete as directed. In the judgment of the Engineer, if rock pockets or other defects are of such extent or character as to affect the impermeability or strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require more significant corrective actions or the removal and replacement of the structure affected.

Curing

As soon after the completion of the finishing operations as the condition of the concrete will permit, without danger of consequent damage thereto, all exposed surfaces shall be sprayed with a curing compound conforming to ASTM C 309 and C 156 and approved by the Engineer, unless the temperature during curing is expected to exceed 75°F in the first 24 hours. In the latter case, the hardened concrete shall be kept continuously moist for the first 24 hours (using moisture, not curing compound), in accordance with the Engineer approved curing schedule, and then the curing compound applied. The impervious membrane forming curing compound shall be

applied under pressure through a spray nozzle in such a manner and quantity as to entirely cover and seal all exposed surfaces of the concrete with a uniform film. In no case shall the coverage required be so great that the compound forms more than a continuous, unbroken film when applied to the work; nor should coverage exceed 150 sq. ft. per gallon. Use of other curing methods must be approved by the Engineer in writing.

The membrane, however, shall not be applied to any surface until all of the finishing operations have been completed, such surfaces being kept damp until the membrane is applied. All surfaces of which a bond is required, such as construction joints, shear planes, reinforcing steel, and the like, shall be adequately covered and protected before starting the application of the sealing medium thereon; and any such surface with which the seal may come in contact shall immediately thereafter cleaned. Care shall be exercised to avoid and prevent any damage to the membrane seal during the curing period. Should the seal be broken or damaged before the expiration of 10 days after the placing of the concrete, the break shall be immediately repaired by the application of additional impervious membrane over the damaged area.

When tops of walls are cured by membrane sealing method, the side forms, except metal forms, must be kept continuously wet for the 10 days following the placing of the concrete. If wall forms are removed prior to the expiration of the 10 days curing time, a curing membrane shall be applied to the exposed concrete immediately upon the removal of the forms. All concrete shall be kept continuously moist for at least ten days after the concrete has been placed.

Exposed surfaces of concrete shall be protected from the direct rays of the sun for at least three days.

If, due to weather conditions, materials used, or for any other reason, there is any likelihood of the fresh concrete checking or cracking or becoming too dry to properly finish prior to the commencement of the curing operations, it shall be kept damp by use of an approved admixture such as ConSpec's Aqua-Film (or equal) applied at a rate of not more than 0.05 gal/sf until finishing is completed and all danger of such checking or cracking is past or until the curing operations are started in the particular area affected.

When air temperatures on the concrete below 35° F. are anticipated, new concrete work shall be covered and heated to a temperature of not less than 45° F. Such heating shall be maintained for the duration of the cold weather, or 72 hours, whichever is less. When air temperatures below 5° F. within 96 hours of placement are anticipated, all concreting shall cease. When artificial heating is employed, special care shall be taken to keep the concrete from drying out. When freezing temperatures are anticipated, the Engineer, at his discretion, may require two additional test cylinders to be left on site and protected as the structure for 5 days, then cured and tested at 7 days. If test indicates that the concrete in the cylinder has frozen, the Engineer may require additional testing of the concrete in the pour to determine if that concrete froze. If it determined that the concrete in the Work has frozen, the concrete shall be replaced at no additional cost to the Owner.

Construction Joints

Construction joints, unless otherwise specified or approved by submittal, shall be saw cut into concrete slabs as soon as the concrete has cured sufficiently to allow saw cutting without fraying the edges or damaging the set of the concrete.

Contraction Joints

On outside slabs, contraction joints shall be saw cut or created using of zip-strips. Depth of contraction joint shall be one third of the depth of slab. Inside slabs shall either be zip-strip or be saw cut. Saw cutting shall be performed right at the time the concrete has set to the point that when the saw cuts the concrete, it does not ravel the surface. No earlier, and no later.

Protection from Damage

The Contractor shall be responsible to protect all placed and finished concrete from damage including but not limited to vandalism until such time as the concrete has cured. It will be the responsibility of the Contractor to communicate and coordinate with any effected parties to adequately protect the concrete until it has adequately cured.

Testing and Strength

Each truck shall arrive on site with a certified mix ticket providing the information required above (Batching and Mixing sub-section). Prior to placing any concrete, a copy of the mix ticket shall be furnished to the OR. Lack of a certified mix ticket shall allow the OR to reject the batch immediately. Air entrainment, slump, and temperature tests shall be performed on all loads representing the mix incorporated in the project.

Compression test cylinders and slump and air entrainment tests shall be made as work progresses with at least one load per day being tested for a day when more than 2 cy are being placed and once a week for a week in which at least two trucks are utilized. All costs for testing should be included in the cost of the concrete. Contractor may, at his expense, run any additional tests he desires for his convenience. (Convenience testing is defined in Section 01000.) Owner may arrange for independent testing when it feels it is in its interest. Any concrete which fails to meet the air or slump specs will be rejected immediately and the entire batch of concrete shall be removed from the site and properly disposed of at the Contractor's expense unless the load can be corrected in accordance with the requirements above for field adjustment of the concrete.

A minimum of 5 cylinders shall be taken for each 20 cubic yards of concrete placed each day. Test cylinders shall be made in the manner required in ASTM C 31. Specimen shall be cured and tested in accordance with ASTM C 192, C 39, C 78, and C 93 as applicable. The test specimen shall not be disturbed for 24 hours after they are taken and shall then be delivered to a testing facility which is mutually satisfactory to the Contractor and Owner. Of the five cylinders taken, two shall be tested at 7 days and the other 3 at 28 days. If Contractor wants breaks at additional times, he shall arrange for additional cylinders to be cast and tested. The Owner may have additions cylinders molded to leave in the field to insure the concrete in the field meets strength. The 7 day specimen shall have a minimum strength of 80 percent of the design 28 day strength and 100% of strength shall be achieved by 28 days. Contractor shall pay for all tests required to demonstrate the work meets Contract requirements and shall arrange for and pay for all concrete testing needed to determine design mixes and tests for Contractor's convenience. All such costs shall be included in the cost of the work that requires the concrete.

Concrete which fails to meet the strength requirements as indicated by the cylinders tests shall be cored at the Contractor's expense or nondestructive testing may be approved by the Engineer. If further tests indicate that the concrete is less than 100% of the rated strength required by the plans and specifications, the Owner may require the Contractor to replace all inadequate concrete at the Contractor's expense, or may require an extended warranty, with bond, and/or pay a reduced price for the work based on the problems the Owner expects to encounter. Typically the Owner will pay 90% of bid price for work which tests at 95-99% of rated strength and 80% for work which is at 90-94% of specified strength, 60% for concrete at 85-89% required strength. Below 85% the work will be rejected or if allowed to remain, not compensated.

Surface Smoothness

Should the finished concrete fail to meet the surface smoothness required, the Owner may deduct from the monies due to the Contractor, the following percentages based on the lineal feet which fail to meet the requirement:

1/4-1/2" in 10'	20%
1/2-3/4" in 10'	40%
3/4- 1" in 10'	60%
Greater than 1"	100%

Owner may require replacement at Contractor's expense if greater than 1" variation.

Pre-Cast Concrete Structures

If concrete work is performed at a site other than the site of the project, the Contractor will be required to reimburse the Owner for the additional costs the Owner incurs observing and testing the off-site concrete work.

Caulk and Sealants

All concrete joints shall be sealed. Coordinate timing of joint sealing with Owner to insure Owner has time to place the floor finish before joints are sealed. Sealants and caulking shall be applied by skilled workmen in strict accordance with manufacturer's printed instructions and recommendations and shall be installed in a manner which will provide a long term bond and seal.

Clean all joints free of moisture, dust, dirt, oil, grease, protective coatings, paint, loose aggregate, mortar, rust or mill scale, or other foreign substance which might adversely affect adhesion of the sealant. Immediately after cleaning, mask facing surfaces on each side of joint. Apply primer to sides of joints where required by sealant manufacturer's instructions.

Joint widths shall be 1/4" minimum to 3/4" maximum. Make depth of joint equal to width, except do not exceed 1/2" depth. Use backstop material or bond preventive material to control depth of joint and to assure that sealant will bond one side only, not on back of joint. Use a blunt instrument to install backing material to avoid puncturing or twisting.

Apply sealant compounds using pressure guns with nozzles of proper size to fit width of joint, and force into grooves with sufficient pressure to expel air and fill the groove solidly to the indicated depth without gaps or air pockets. Immediately tool joints slightly concave, smooth and free of wrinkles.

SECTION 05100 - STRUCTURAL AND MISCELLANEOUS METALS

PART I - GENERAL

DESCRIPTION

Work of this Section includes, but is not necessarily limited to, the following:

Metal panels for buildings,

Metal grate.

Handrail (metal and non-metals options)

Exterior Stairs

Miscellaneous angles, plates, channels, pipe sleeves, anchor bolts, weld plates and anchor plates as indicated or required for cast-in-place concrete precast structural concrete, masonry, etc.

See drawings, schedules and details for items of miscellaneous metals required. Furnish all anchors, sleeves, bolts, brackets, clips, inserts, angles, tubing, bar stock plates, brake metal and other metal items not distinctly specified but necessary to complete each item although such work may not be shown or specified.

RELATED WORK SPECIFIED ELSEWHERE

Section 02725 - Piping

Section 03000 - Concrete

Section 13000 - Metal Building

REFERENCED STANDARDS

Conform to current editions of the following standards and specifications relating to work of this Section:

American Institute of Steel Construction (AISC)

Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings with Commentary and Supplement No. 1.

American Welding Society (AWS)

D1.1 Structural Welding Code

American Society for Testing and Materials (ASTM)

Standards as referenced hereinafter

QUALITY ASSURANCE

Qualification of Welders

Provide certification that each welder is qualified in accord with AWS Code D1.1, and has been performing welding of type required for substantially the last 6 months. Retest and recertify any welder when the work of the welder creates reasonable doubt as to his proficiency. Conduct tests at no additional expense to the Owner. Submit recertification of the welder only after the welder has taken and passed the required retest.

SUBMITTALS

Submit the following for approval in accordance with Section 01000 - Submittals sub section:

Shop Drawings - Include location of each item, pertinent dimensions, affecting construction, description of materials, and connections. Connection details shall show size and locations of bolts, and size, shape, and length of each weld. Indicate welds by AWS Standard Welding Symbols.

Samples - If requested, provide samples.

Product Data - Catalog cuts or brochures on various manufactured items specified.

Certifications - Submit certification of each welder, in accord with AWS Code D1.1, giving name, time and place of certification.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver anchorage devices to be embedded in concrete or masonry to the project site in ample time to be installed before start of concrete or masonry operations. Provide all necessary setting drawings, templates, and directions for installation of anchorage devices.

Store steel members above ground on platforms, skids, or other devices, and protect from corrosion. Store other materials in a dry, weathertight location until ready for use. Store packaged materials in original unbroken packages or container.

PART II - PRODUCTS

MATERIALS

All metals in potential contact with sewage or sewage aerosols shall be aluminum or stainless steel.

Structural and Miscellaneous Metal Materials

Stainless Steel	ASTM 316
Structural Shapes	ASTM A36, steel shapes, angles, plates and bars of size indicated on the drawings
Steel Plates	ASTM A283
Structural Tubing	ASTM A500, Grade B, sizes and thickness as indicated on the drawings

Aluminum Shapes	ASTM B221, aluminum alloy extruded bars, rods, wire, shapes, tubes, and plates as indicated on the drawings and specified herein
Steel Pipe	ASTM A53, Type S, Grade B, Standard weight, sizes as indicated on the drawings
Fasteners	Anchor Bolts: ASTM A307, Section 1.3 Common Bolts: ASTM A307, Grade A Plain Washers: ANSI B18.22.1 Beveled Washers: ANSI B18.23.1 Expansion Shields: Fed. Spec. FF-S-325 Toggle Bolts: Fed. Spec. FF-B-588C
Filler Metal for Welding	Shielded Metal-Arc Welding: AWS A5.1 or A5.5 Submerged Arc Welding: AWS A5.17
Metal Primer	Fed. Spec. TT-P-86G, Type I alkyd modified oil base primer compatible with finish paint
Bituminous Primer	Asphalt varnish conforming to Fed. Spec. TT-V-51F
Aluminum	Shall be cold rolled wrought mill products of particular alloys and finishes as herein specified for each particular application.
Paint	Shop coated items shall be a zinc chromate primer.

Aluminum Grate

Type	Aluminum, I-bar or pultruded UV resistance plastic meeting the structural and functional requirements listed herein.
Quality	Comply with latest edition of Metal Bar Grating Manual
Model Type	Mechanically interlocking cross bar with standard bearing bar spacing, all open ends to be banded. Grating and bearing bar to be as follows for aluminum (adjust sizing of plastic to provide same strengths):

<u>Grating Span, feet</u>	<u>0' to 3'6"</u>	<u>3'7" to 4'6"</u>	<u>4'7" to 5'6"</u>	<u>5'7" to 6'0"</u>
Bearing Bar Size	1" x 3/16"	1-1/4" x 3/16"	1-1/2" x 3/16"	1-3/4" x 3/16"

Cross bars shall be spaced at 4 inches on-center and shall have a minimum depth of one-half of the main bar. Main bars shall be spaced at 1-3/16 inches.

Provide accessories such as frames, support angles, anchor bolts (stainless 304), and fasteners to complete work.

Grates shall be furnished in pieces that allow the grates to be easily removed and replaced without having to remove appurtenances. If such pieces require additional support, those shall also be included at no additional cost to Owner and should be included on the shop drawings in the submittal package.

Provide fastening devices for grating adjacent to removable sections and locations where lateral movement of gratings is not restrained. Do not fasten sections of grating designated to be removable. Fasteners for anchoring to beam and channel flanges shall be aluminum universal clip type with 1/4 inch bolts and nuts. Minimum of four per panel.

Metal Panels

Type	Rib steel panels
Material	Cold formed steel, 50,000 psi minimum yield steel (ASTM A446, Grade D) with G90 zinc coating (ASTM A525) with polyester enamel finish, 24 gauge with 1.34 pounds per pound.
Fasteners Connections	of panels to structural members appropriate length #12 self drilling carbon steel screws with coating to match panels or with 1/2 x 14 x 3/4" sidelap stitch fasteners with matching coating.
Finish	Owner will select color from color chart provided by Contractor.
Closures	Rib closures shall be solid or closed cell ethylene propylene terpolymer (EPT), preformed to match the contours of the panels, and shall be installed between roof panels and eave struts, at gable fascia, at base, and at accessories as required to provide weather tightness.

Handrail Handrail shall be nominal 1-1/2" diameter schedule 40 aluminum pipe or pultruded, UV resistant plastic. Toeboards shall be 4" in height and not more than 1/4" off the working surface. Design and installation of handrail shall at a minimum conform with OSHA requirements.

Hinges Ball bearing type

PART III - EXECUTION

GENERAL

Workmanship

Construct all items of sizes, shapes and with materials as indicated and specified. Fabricate structural steel in accordance with Section 1.23 of the AISC Specifications, with modifications and additional requirements specified hereafter. Perform fabrication and assembly in the shop to the greatest extent possible. Form materials with sharp angles or lines, free from bends, twists, or open joints. Shear and punch clean, true lines and surfaces. Thickness of metals and details of assembly and supports shall provide ample strength and rigidity. Weld or bolt all permanent connections. Erect all work true to lines and planes, with vertical lines plumb and horizontal lines level. Verify all measurements before fabricating any item.

Welding

Perform all welding in the shop and in the field with welders qualified under the AWS Welding Code D1.1 for class of work employed. Protect adjacent construction and materials against damage. Neatly and symmetrically make all welds. Fill or grind to a uniform, smooth shape. Where required to present a uniform appearance, fill the space between welds and weld irregularities with a suitable metal putty or compound made for this purpose. Prepare surfaces for painting by sandblasting, and priming.

Fastenings

Provide concealed fastenings wherever possible. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Make threaded connections tight so that threads will be entirely concealed by fittings.

Galvanizing

Steel items specified to be galvanized shall be hot-dip processed after fabrication. Galvanizing shall be in accordance with ASTM A123, A386, or A525, as applicable.

Shop Painting

Except for items indicated to be galvanized or factory finished, clean all ferrous metal with solvents to remove grease and oil, and power wire-brush or sand-blast to commercial blast to remove loose rust, loose mill scale, and other foreign substances. Materials shall be given a shop prime coat as specified by the Manufacturer, with a minimum dry film thickness of 3.5 mils.

Where items are not scheduled to be finish painted, provide a second shop prime coat with a minimum dry film thickness of 3.0 mils (6.5 mils total).

Protective Coatings

Contact surfaces between dissimilar metals and aluminum surfaces in contact with concrete, masonry, pressure-treated wood, or absorptive materials subject to moisture, shall be given a protective coating of bituminous primer.

FABRICATION AND INSTALLATION

General

Steel and aluminum (and pultruded plastics where applicable) shall be well formed to shape and size with sharp lines or angles. Shearing and punching shall leave clean true lines and surfaces. Curved work shall be evenly sprung. Weld permanent shop connections. Continuous weld and grind smooth welds that will be exposed to view. Do not leave dangerous sharp edges. Conceal fastenings where possible.

Fabricate supplementary parts necessary to complete each item. Furnish to appropriate trades all anchors, sockets or fastenings required for securing work to other construction.

Shop Fabricated Items

Bolts, brackets, anchors, clips, and insets of size and type as required to rigidly secure members for which they are used.

Steel support frames as detailed including all anchors and fasteners for a complete installation.

Miscellaneous angles, plates, tubing bar stock, flashing, drip edge, corner channel, brake metal as required for proper installation of various items throughout the building if not otherwise furnished.

Metal Panels

Metal siding and roofing shall be installed in conformance with manufacturer recommendations. Special care shall be given to protect the factory coating. Any damage to the coating shall be repaired at Contractor's expense.

Miscellaneous Plates and Shapes

Provide all miscellaneous steel items such as lintels, sill angles, frames, soffits, vents, equipment mountings, hangers and braces as indicated on the drawings or required to complete the Work. Miscellaneous steel plates and shapes shall conform to ASTM A36-84a. Include welded anchors on embedded items where detailed.

Field Touch-Up Painting

After erection of steel, thoroughly clean and touch-up field bolt heads and nuts, field welds, and abrasions in the shop paint coating with the same metal primer used for shop painting. Where galvanized surfaces need field repair, use a galvanizing repair compound conforming to Mil Spec. DOD-P-21035A, applied in accordance with the manufacturer's printed directions.

Clean ferrous metals of scale, rust, oil and apply one shop coat of paint. Retouch in field as required after installation.

Shop paint will not be required for stainless steel and aluminum items.

SECTION 06100 - CARPENTRY

PART I - GENERAL

Description

Work of this Section includes furnishing and installing all items of carpentry as indicated on the drawings and specified herein.

Related Work Specified Elsewhere

Division 3 – Concrete
Section 05100 - Structural and Miscellaneous Metals
Section 07200 - Building Insulation
Section 07900 – Sealants and Caulks
Section 08520 – Windows
Section 08510 - Hollow Metal Doors
Section 08560 - Section Overhead Doors

TEMPORARY WORK

Provide all temporary scaffolding, bracing, shoring, barricades, ladders, safety railing, etc., wherever required to complete the work. Construct temporary work to properly and safely perform its function. Remove temporary work when no longer required. All temporary work shall at a minimum meet OSHA requirements.

WORKMANSHIP AND STANDARDS

All framing shall be performed to the highest standards by experienced carpenters with skills appropriate for the work being performed. All materials and workmanship shall conform to the International Building Code (2016 Edition) unless a more stringent specification is noted on the drawings or contract documents.

QUALITY ASSURANCE

Grading and Marking

Lumber shall bear the grademark, stamp, or other identifying marks indicating grades of material and rules or standards under which it is produced. Grades for standard framing lumber shall conform to the Standard Grading Rules of the WCLIB or WWPA.

Plywood shall conform to Product Standard PS 1. Each panel shall be identified with the American Plywood Association "APA" grade trademark.

Oriented strand board shall be plywood rated. OSB may only be used as a substitute for plywood where noted on the plans

Sizes

Conform to Product Standard PS 20, surface four sides (unless indicated as rough) sound and free from warp that cannot be corrected when secured. Size references are nominal sizes, actual sizes are to be within manufacturing tolerances allowed by PS 20 and the specific standard under which the product is produced.

Moisture Content

"S-Dry" (12% to 19% maximum) or air dried, thoroughly seasoned.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver materials to the site in undamaged condition free from objectionable warp. Material will be subject to rejection if amount of warpage exceeds recommendations of PS 20. Protect materials from extreme change in temperature and humidity. Store all lumber, plywood, and other sheet materials on blocking, away from the ground, fully covered, protected and ventilated. Store glu-lam members and wood trusses in an upright position in original factory wrapping or bundles.

PART II - MATERIALS

Lumber

All dimensional lumber shall be kiln dried to a maximum moisture content of 19% or less and shall be stamped "S-dry". All 2 x framing material (including studs) shall be Hem-Fir #2 as graded by the WWPA. Lumber must be sound, thoroughly seasoned, mill manufactured, and free from warp.

Laminated Veneer Lumber (LVL) headers shall conform to structural notes.

Parallel Strand Lumber (PSL) columns shall conform to structural notes.

All rough lumber installed exterior to building walls or used in connection with roofing, flashing or sheet metal backing shall be preservative treated with alkaline copper quat (ACQ) preservative other OR approved preservative not containing arsenic, chromate or other toxic materials.

Concrete formwork shall be consistent with requirements in Division III.

Connectors

All lumber to lumber connectors shall be Simpson (or approved equal) and installed as required by the manufacturer. Connectors shall be as shown on the plans and details. If connections are not specified, a proper connector shall be chosen for the connecting members and verified with Engineer.

General framing and dimensional lumber 4" or less in width shall be No.1, Structural Light Framing.

Plywood

Construction plywood shall be APA grade-trade marked of the size and grade shown on the plans. Plywood for the mezzanine floor shall be BCX.

Rough Hardware

Provide all nails, spikes, screws, bolts, and similar items of types and sizes sufficient to draw and rigidly secure members for which they are to be used.

Mopboards and Trim

1 X 4" Pine with sharp edges sanded round shall be used for trim. Trim shall be sanded, sealed, stained (natural or golden oak) and finished with polyurethane in satin finish. Mopboard shall be vinyl manufactured from partial preconsumer waste, minimum 4" tall. Provide color chart from which owner can select color.

Interior door and window trim shall be 4" or larger pine molding sanded, sealed, stained (natural or golden oak) and finished with polyurethane in satin finish.

Interior Finish

In Rooms 1,2, 4,5, the hallway and the mechanical area below the stairs interior finish shall be **5/8" Type "X" Gypsum throughout** 1/2" sheetrock except as noted below. In the bathroom (Rm 3), interior finish shall be moisture resistant (green) board type sheetrock. Place green board a minimum of 4' past the emergency shower full height and 3' past the utility sink full height . Install cement board where required by code.

Floor Covering

Mezzanine: **7/8" OSB unfinished.** ~~Uniclic Multifit 12" x 24" x 6.5 mil tiles (article number 63802 260.1244 VT) or equal.~~

~~Stairway: Slip resistant Armstrong commercial rubber tiles, color to be owner selected~~

Owner will furnish and install floor coverings except in the bathroom, ~~stairway, and mezzanine.~~

PART III - EXECUTION

Building shall be constructed to minimize air infiltration and to keep the building mouse proof.

Perform work in accordance with the best standards of practice relating to the trade and in accordance with the referenced IBC. Plan and lay-out work carefully as required to carry out the intent of the drawings and to properly accommodate the work of other trades. Verify all dimensions and confirm rough opening requirements for the specific appurtenances to be furnished.

Saw cut accurately all lumber and fit into the respective locations, true to line, grade, plumb and level. Secure permanently in proper position with proper fastenings to render all parts rigid. Bore holes for

bolts true to line and of the same diameter as bolts for a tight fit. Provide plates or washers as required.

Form nailing blocks and bucks to the shapes and dimensions indicated or as required to suit the particular purpose. Secure blocking firmly in precise position required to receive support and engage the several parts of the work.

Cut and frame all timbers and woodwork required by other trades for completion of their work. Consult plumbing, heating, ventilating, air-conditioning, electrical and other trades and erect all backings, ground, furring, etc. as necessary for the proper support of their fixtures and work.

Do all cutting, fitting, fabricating, erecting, edging, blocking, nailing and securing of all items of rough woodwork, throughout, including all furring, blocking, screws, nailers, etc. Build in items where indicated on the drawings or required for the attachment of finish work. Shape and install work to provide solid and adequate surfaces for securing and connecting work in its proper position.

Frame, anchor, tie and mutually brace all members to develop the strength and rigidity required for the purpose for which they are to be used. Do not stress members in excess of the designed strength.

Upon completion of work, repair or replace defective materials and damaged work.

Lumber Framing

Locate and space all studs, joists, trusses and framing members as indicated on the drawings and required by code whichever is more stringent. Properly install members closely fitted, accurately set to required lines and levels and rigidly secured in place.

Nailing shall conform to the IBC. Where nailing requirements are not indicated, use nail size and spacing sufficient to develop adequate strength for the connection without splitting members.

Set treated foundation sill plates level and square and anchor bolt at not more than 4'-0" on centers and not more than 12" from ends of each piece. Provide a minimum of two anchor bolts for each piece.

Unless otherwise indicated, 2 X 6 studs shall be spaced at 16" on centers. Provide single bottom and top plates for non-load bearing partitions, double top plates for load bearing partitions, 2" thick x width of studs. Secure bottom plates to concrete structure with anchor bolts, expansion anchors or power driven threaded studs spaced 4'-0" on center maximum. Toenail studs to bottom plate and end nail to lower top plate. Lap top plates at least 48" and securely spike together. Provide double studs at openings under 5 feet width, triple studs at openings 5 feet and over, and at corners and partition intersections unless more stringent requirements are shown on the plans. Anchor studs abutting concrete or masonry with expansion bolts at maximum spacing of 4'-0" on centers. Provide headers for openings made of a minimum of 2 pieces of lumber glued and nailed to a plywood center set on edge and of the depth required for the span, or solid lumber of equivalent size or as required on the plans.

Set beams, headers, and joists with crown up. Provide not less than 4" bearing on concrete or masonry, 1-1/2" bearing on wood or metal. Secure beams, headers and joist framing into carrying members at same relative levels with joist hangers. At bearing, lap and spike joists or butt end-to-end with scab ties at joints and spiked to plates. Frame openings in floors and roofs with headers and trimmers, and double headers carrying more than two tail joists, unless otherwise indicated. Bridge or block all members at 8'-0" on centers maximum. For frame members for passage of ducts and pipes, do not cut, notch or bore more than 1/4 of member depth without adequate approved reinforcing.

Provide adequate blocking and nailers for all wall cabinets, fixtures, ADA assist bars, plumbing, casework, vertical wood siding, trim and wall mounted specialty items etc. as specified in other sections of these specifications or required for installation of same.

Interior Finish

Finish for walls shall be as provided in the steel building specifications or on the plans

Place mopboards around perimeter of walls except at doors and heaters.

~~Trim around windows and doors with butt joint 1 x 4 #2 pine sanded, sealed, stained and finished.~~ 5/8"
Gypsum Type "X" drywall wrap / return at doors and windows in finished areas.

Tape all sheetrock and finish with a light texture. Paint with primer and finish with a top coat of interior latex paint. Flat white for ceilings. Eggshell finish for walls. Provide color chart to Owner for color selection.

Completion

Upon completion of work, repair or replace defective materials and damaged work.

SECTION 07150 – WATERPROOFING /DAMPPOOFING

PART I - GENERAL

Description

Work of this Section includes furnishing and installing hot or cold application rubberized asphaltic emulsion type waterproofing / dampproofing on all buried exterior foundations and structure walls and submerged interior surfaces as specified herein.

Related Work Specified Elsewhere

Section 02200 - Site Preparation, Excavation, Backfill, and Compaction

Section 03000 - Concrete

Section 07900 - Sealants and Caulking

PART II - PRODUCTS

Dampproofing Materials

Material shall be an asphaltic elastomeric material that cures to provide a heavy duty “seamless” rubber-like membrane on the concrete. Material shall be greater than 70% solids by weight with a water permeance of 0.05 per ASTM E 96. Material shall specifically be designed for waterproofing concrete above and below grade.

PART III - EXECUTION

Install in accordance with manufacturer’s recommendations and the requirements below.

Surface Preparation

Remove fins and loose material from surfaces to be treated. Clean all surfaces so are free of dirt, dust, loose material, oil, grease, rust, form release agents and any other foreign materials and consistent with manufacturer’s recommendations. Surface preparation shall be consistent SSPC-SP13. Caulk around all items penetrating dampproofing coatings with materials and methods specified in Section 07900 - Sealants and Caulking.

Dampproofing Application

General - After proper preparation, install on all exterior surfaces of foundation and structure walls which are below grade on the exterior and as indicated on the drawings. Apply coating when substrate and air temperatures are between 50° and 120° F to all surfaces to be waterproofed at the rate of approximately one gallon per 50- 100 square feet. Allow for full cure before applying second coat. Schedule dampproofing so that full curing will be accomplished prior to placement of insulation and backfilling and so that backfilling will be accomplished as soon as possible after curing.

Extend coatings from outside face of footings, over top of the footing forming a cove at the juncture of

footing and foundation wall, and up the wall to 2" below finish grade. Fill in all crevices and cracks, spread around all joints, and into corners and reveals to provide a continuous coating free from breaks and pinholes.

Backfilling - Do not place insulation, fill, or backfill against dampproofing surfaces for at least 24 to 48 hours after dampproofing application, and where possible, within 7 days after application. Exercise care when placing insulation and backfill not to rupture or damage coating or cause coating to be displaced on the coated surfaces.

SECTION 07200 - INSULATION

PART I - GENERAL

Description

Work of this Section includes furnishing and installing rigid structural perimeter insulation, insulating wall sheathing, and thermal and sound attenuation batts as indicated on the drawings and specified herein.

Related Work Specified Elsewhere

Section 03000 - Concrete

Section 06100 - Carpentry

Section 13000 - Metal Building

Submittals

Comply with Section 01000 and in addition submit following for approval:

Product Data

Manufacturer's standard literature on each insulation type, including specifications, thermal and physical properties, certification that materials furnished comply with the reference standards specified, and storage, handling, installation and fastening recommendations. Include relative thickness table for R-values specified.

Product Delivery, Storage and Handling

Deliver materials to the site in original unopened packages or wrapping, clearly marked with manufacturer's name, brand name, type, R-value and thickness. Store materials in a clean, dry, well-ventilated area in accordance with the manufacturer's recommendations. Protect materials from moisture and other damage due to weather, handling or construction operations before, during and after installation. Do not expose foam insulation to flame or other ignition source. Minimize exposure to sunlight.

PART II - PRODUCTS

Rigid Insulation

Polystyrene Insulation Board

Location

Perimeter insulation

Type board

Structural high strength rigid extruded closed-cell polystyrene. "Foamular XPS 250," or equal for vertical foundation walls and XPS 400 for horizontal installations

Conformance

ASTM C 578 Type VII

Long Term	
Thermal Resistance	10.6
Comp. Strength	60 psi minimum ASTM D1621
Size	2" thick unless otherwise indicated on drawing
Adhesives	Mastic type adhesive as recommended by manufacturer

Sill Sealer

Location	Insulate under all sill plates on foundation walls.
Type	Resilient foam
Size	5-5/8" wide x 1/4" min. nominal thick

Thermal Blanket Type

Location	Insulating exterior walls and ceilings as indicated.
Type	Kraft faced mineral fiber blankets in frame walls or where covered by sheet rock or plywood Vinyl back mineral fiber blankets in exposed walls support with 2" web chicken wire
Conformance	ASTM C665 or Fed. Spec. HH-I-521, Type II, Class C
Conductance (k)	K = 0.32
Thermal Resistance	Minimum R-26 for walls, R-38 or better in ceilings and roofs
Nominal Thickness	5-1/2" for walls
Width	As required to fit framing type and spacing

Insulating Foam Sheathing

Location	May be used as part of sheathing to replace some or all batt insulation
Type	Polyurethane or polyisocyanurate insulating foam sheathing with aluminum foil facings both sides
Brand Type	Celotex "Thermax" Sheathing, Rmx "Thermasheath," Owens-Corning "Energy Shield," or approved equal.
Conformance	Fed. Spec. HH-I-1972/1, Class 1 or 2
Density	2.0 lbs./cu. ft. nominal
Comp. Strength	25 psi minimum
Aged R-Value	R=5.0 / inch minimum through sheathing only, 40° F mean temperature, 6 months minimum aging
Thickness & Size	4'0" wide x length required to minimize horizontal joints of thickness needed to achieve "R" value specified.

PART III - EXECUTION

CONDITIONS OF SURFACES

Examine surfaces to which rigid insulation is to be applied for defects or conditions that will adversely affect quality of work. Concrete or masonry surfaces must be level and plumb, true to dimension, and

free of form oil, grease, wax or other bond preventing residues. Do not install adhesives when outdoor temperatures are 35° F or below.

INSTALLATION

Perimeter Insulation

Install insulation board on the outside face of exterior foundation walls to the depth and alignment indicated on drawings. Apply board vertically where shown on the plans against the wall as backfill is placed, and bond to wall with spot applied adhesive compatible with the dampproofing materials. Horizontal perimeter insulation shall be installed with bedding above and below to uniformly support the insulation and backfilled with care to required density.

Thermal Blanket Insulation

Provide insulation at all exterior walls and in frame walls **and ceilings that are not otherwise insulated by the building insulation (interior walls and ceilings in the restroom, office, and breakroom.**

Do not install insulation until construction has progressed to the point that inclement weather will not damage or wet the insulation materials and all required inspections have been satisfactorily completed and as built conditions documented. Install insulation blankets in between framing members after all piping and wiring is in place, with batts on the exterior side of all piping. Keep the vapor barrier side toward the "warm-in-winter" side. Provide a snug fit from plate to plate for complete coverage free of voids. Fit batts between framing with flanges stapled to sides of members every 8" to 12" to prevent gaps along the edge of the vapor barrier.

At the Contractor's option, the wall and ceiling insulation can be placed as blanket, rigid, or a combination of the two insulation materials to achieve the insulation values of R-19 in the walls. The R value on rigid insulation will be based on the aged value not the new value of the insulation. In all cases the insulation shall be carefully installed to be sure that the materials are installed uniformly with complete R value coverage being provided over the entire surface area being covered.

Sill Sealer

Unroll over top of foundation walls and punch anchor bolts through material so that when sill plate is installed, sill sealer will compress between concrete and sill plate. Insure that top of concrete is adequately uniform that sill sealer will provide a tight seal.

Exterior Wall and Roof Insulation

Insulation system shall be compatible with steel building supplier's building system. The building insulation package shall include all insulation, fabric, banding, clips hangers, adhesives and all other items for a complete insulation system. Such system shall include proper venting for the insulation. The system shall include a double layer of insulation that includes at least one layer forming a complete envelope around the outside of all steel. Fabric exposed in the building interior shall be white in color. Specifically, roof insulation shall be a liner system with thermal blocks designed to

provide R-38 minimum system in two layers of mineral fiber insulation that criss cross each other and leaves no area uninsulated. The walls shall have a criss crossed double layer of mineral fiber insulation with an R-26 rating minimum. Vapor barrier shall only be provided on the inside of the insulation layer closest to the building interior. Vapor barrier on the inner layer of insulation will not be allowed. The building insulation envelope shall meet ~~2018~~ 2012 IECC (International Energy Conservation Code) as verified using COMcheck software and demonstrating the design is at least 2% better than code.

SECTION 07900 - SEALANTS AND CAULKING

PART I - GENERAL

DESCRIPTION

Work of this Section includes furnishing and installing all sealants and caulking wherever indicated on the drawings, specified herein, or required to make structures, buildings, etc., airtight and weathertight.

REFERENCE STANDARDS

Conform to current editions of the following standard specifications relating to work of this Section:

Federal Specifications (Fed. Spec.)

TT-S-00230C Sealing Compound: Elastomeric Type, Single Component (For Sealing, and Glazing in Buildings and Other Structures)

TT-S-001543A Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)

SUBMITTALS

In accordance with the requirements of Section 01000, submit following for approval:

Product Data

Manufacturer's published literature on sealants, caulking and backing materials, including specifications, physical properties, test data, recommendations as to use, and installation instruction. Submit manufacturer's certification that each material complies with specification requirements and is intended for application indicated.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver materials to the site in manufacturer's original, tightly sealed factory labeled containers with name of manufacturer, supplier, product identification, specification and lot number, date of manufacture, shelf life, color, mixing instructions and curing time. Handle products carefully and store in original containers as recommended by manufacturer. Do not use outdated materials as indicated by date and shelf life or materials which have not been stored properly (e.g. materials which have been allowed to freeze).

ENVIRONMENTAL CONDITIONS

Apply materials only when ambient and surface temperature is between 40°F and 90°F. Do not work when weather conditions or surfaces are such as would produce injurious effects in the finished work.

PART II - PRODUCTS

MATERIALS

Exterior Joint Sealant

Type	One-component self-priming polyurethane sealant
Conformance	Fed. Spec. IT-S-00230, Type II, Class A
Consistency	Gun grade, non-sag
Manuf. Type	Sikka Chemical Corporation "Sikaflex-la," Sonneborn-Contech "Sonolastic NPI", or equal
Colors	As selected by the Owner for the particular use

Interior Sanitary Sealant

Type	One-component mildew-stain resistant silicone sealant
Conformance	Fed. Spec. TT-S-001543, Class A
Consistency	Gun grade, non-sag
Manuf. Type	General Electric "Silicone Sanitary Sealant", Dow Corning "786 Mildew Resistant Silicone Sealant", or equal
Color	White

Primers

Nonstaining primers as recommended by sealant manufacturer.

Backstop Materials

Resilient open cell polyurethane foam rod, closed cell polyethylene foam rod, or other closed cell compressible material recommended by the sealant manufacturer as nonabsorbent, oil-free and compatible with the sealant used, sized to control sealant depth.

Bond Preventive Materials

Polyethylene tape with pressure sensitive adhesive on side, as recommended by the sealant manufacturer.

PART III - EXECUTION

USE LOCATIONS

Use Exterior Joint Sealant where indicated on drawings and for the following:

Around perimeter of all exterior door, vents, and louver frames.

Around perimeter of all mechanical and electrical devices, conduit, pipes, and other items built into or penetrating walls and structures.

As otherwise required to make structures airtight, weathertight, and insect-tight.

Use exterior joint sealant at both exterior and interior surfaces of all penetrations.

INSPECTION

Examine joints to be sealed for proper joint widths and for construction defects which would adversely affect permanence or quality of the work. Ensure that masonry and concrete have cured for a minimum of 28 days. Do not start work until conditions are satisfactory.

INSTALLATION

Sealants and caulking shall be applied by skilled workmen in strict accordance with manufacturer's printed instructions and recommendations and shall be installed in a manner which will provide a long term bond and seal.

Clean all joints free of moisture, dust, dirt, oil, grease, protective coatings, paint, loose aggregate, mortar, rust or mill scale, or other foreign substance which might adversely affect adhesion of the sealant. Immediately after cleaning, mask facing surfaces on each side of joint. Apply primer to sides of joints where required by sealant manufacturer's instructions.

Joint widths shall be 3/16" minimum to 1/2" maximum. Make depth of joint equal to width, except do not exceed 1/2" depth. Use backstop material or bond preventive material to control depth of joint and to assure that sealant will bond one side only, not on back of joint. Use a blunt instrument to install backing material to avoid puncturing or twisting.

Apply sealant compounds using pressure guns with nozzles of proper size to fit width of joint, and force into grooves with sufficient pressure to expel air and fill the groove solidly to the indicated depth without gaps or air pockets. Immediately tool joints slightly concave, smooth and free of wrinkles.

CLEANING and REPAIR

Remove masking tape and clean surfaces adjoining joints of all smears or other soiling resulting from sealing or caulking applications as the work progresses. Remove droppings and smears of compound before curing by cleaning with solvent recommended by the compound manufacturer.

Promptly repair or replace any defects due to faulty materials and/or workmanship.

SECTION 08520 - WINDOWS

PART I - GENERAL

Furnish all necessary materials, labor and equipment for the installation of vinyl windows and framing as shown on the drawings and specified herein. Furnish all air, vapor and moisture sealing materials, trim, closures, window surrounds, anchors and fasteners required. Insure that window systems furnished are compatible with the metal building being furnished.

Submit shop drawings of all materials furnished under this section. Confirm rough opening dimensions prior to framing.

Windows shall be double pane with insulating argon filled space with one pane low E glass that blocks at least 75% of the sun's UV rays. Windows shall meet or exceed AAMA/NWWDA 101/1.S2-97 and AAMA 1701.2-85 and shall meet the 2018 IECC guidelines for thermal efficiency in all climate regions and meeting AAMA/NWDA "no leakage" standards for water infiltration. Windows shall be energy star rated.

Windows shall also meet AAMA 1302.5-76 or CMBSO/CAWM 301-90 Forced Entry Resistance Test requirements.

Warranty - All windows shall be warranted for a minimum of 10 years. The warranty shall be non-prorated and include parts, glazing unit seal, and labor.

PART II - MATERIALS

Windows shall be constructed of multi-chambered, PVC extrusion with an average wall thickness of 0.080 inches. High impact, UV resistant PVC extrusions shall be used that are AAMA Gold labelled and tested per ASTM D 4726.

Windows shall be glazed with IG units that conform to ASTM E774 Class A requirements with minimum 1/2" airspace, argon fill, desiccant and hot melt butyl sealant.

Both panels of slider windows are to be operable.

Hardware shall be a corrosion resistant material such as stainless steel. Powder coated or baked enamel finishes shall be color coordinated with all exposed hardware. Wide brass rollers (minimum 11/32" wide by 7/16" diameter) shall be used on horizontal sliders.

Window frames shall have thick, multichambered vinyl construction with fusion welded corners.

Windows shall have weatherstripping on frames and sashes to provide a tight seal against air and water infiltration. Weatherstripping shall be silicon treated, fungus, mildew and moth resistant poly bond fin seal.

Window shall be exterior glazed using double backed foam tape and applied PVC glazing bead. All cavities around glazing shall be designed to readily weep water away from insulating glass unit.

Weather-stripping - All window gaps between main frame and sash members shall be weather-stripped to prevent air infiltration. Weather-strip shall be a poly pile type with an integral polyethylene fin and shall conform to AAMA 701-92 and 702-92.

Finish

All exposed surfaces shall be free of scratches and other blemishes. All window members shall have an integral beige color throughout the profile.

Screens

Provide insect screens in all ventilators of extruded frames with 18 X 16 mesh aluminum. Screens shall conform to ANSI/AAMA 1004.

Locks

Windows shall be factory equipped with an automatic lock made of non corrosive materials.

PART III - EXECUTION

Windows shall be installed, glazed and adjusted by experienced workmen in accordance with manufacturer's instructions and approved shop drawings and in a manner that insures the infiltration of water and air are kept to an absolute minimum.

After installation all surfaces shall be cleaned.

SECTION 08540 - PASSAGE DOORS AND FRAMES

PART I - GENERAL

Furnish and install hollow metal work of sizes and to details as required by the drawings, as shown in the schedules and as further described herein for exterior doors and solid core wood interior passage doors. Coordinate with Metal Building Supplier to insure exterior doors furnished are compatible with all trim and framing members and integrate with the metal building insuring a weather-tight installation.

Labeled openings where shown on the drawings shall meet the requirements of and recommendations of the applicable standards of Underwriters Laboratory, Inc., UL, and both door and frame shall bear the required UL label.

Submit shop drawings showing typical construction of all items including details of door and frame construction, reinforcing, cutouts, anchors, etc. Shop drawings shall show conditions of frames within various wall materials and a schedule listing location of each door and frame.

PART II - MATERIALS

Steel for doors and frames shall be best quality, open hearth, sheet steel furniture stock, pickled and oiled, cold rolled, annealed and stretcher leveled, free from scale, rust, pitting and other defects.

Exterior Passage Doors

- a. Frames shall be fabricated from 14 gauge galvanized steel, 5 3/4" depth, non-handed and reversible, with weather stripping.
- b. Doors shall be manufactured from 16 gauge galvanized steel, 1-3/4" thick, full flush or half glass type.
- c. Lock edge shall be square with vertical seam mechanically interlocked and have 12 gauge reinforcement for strike preparation.
- d. Hinge edge shall be square with vertical seam mechanically interlocked and have 7 gauge reinforcing plates at 4 locations with hinge preparations.
- e. Doors shall have 16 gauge steel, flush-mounted, top channel and inverted bottom channel.
- f. Doors shall be prepared for cylindrical lockset (2-3/4" backset). Doors shall be equipped with panic hardware as required by code.
- g. Half glass doors, if required, shall have glass cutout with removable glazing bead and accommodate glass up to 1/4" thick. Glass and wet glazing are not provided.

- h. Door core shall be a rigid cell, foamed-in-place polyurethane with 1.8 lbs. per cubic foot density with an R value of at least 10 based on ASTM C518 and greater than 2.55 based on ASTM C1363. Insulation core shall be chemically bonded to all interior surfaces, completely seal unit and produce total surface support.
- i. Before assembly, all inaccessible surfaces shall be thoroughly cleaned and then sprayed with a rust-inhibitive paint. After complete assembly, all oil, dirt, rust and impurities shall be thoroughly removed. All tool marks and surface imperfections shall be dressed, filled and sanded to make all surfaces smooth, level and free from irregularities. Treat to insure maximum paint adhesion and apply two coats of rust inhibitive primer, each coat baked on. Paint finish shall be owner selected from standard color chart.
- j. Hinges with ball bearings shall be 4-1/2" x 4-1/2" full mortise with non-removable pin, dull chrome finish. Four required per exterior door.
- k. Lockset shall have dull chrome finish. Entry function is key outside with turn button inside and shall meet the IBC requirements for egress (panic hardware).
- l. Threshold shall be provided in one-piece unit.
- m. An Astragal Kit shall be provided to reduce the opening between a pair of doors and to protect the lock from tampering. A filler plate shall be provided to cover the lock preparation on the inactive leaf.
- n. Surface Bolts shall be provided for use on inactive leaf of double doors.
- o. Closer shall be completely non-handed with parallel arms and be UL listed.
- p. ~~Panic Device shall be a low profile rim type with horizontal push bar and be UL rated.~~ Outside and inside handle is lever type with outside to have key and key pad entry function. Finishes shall be baked enamel for the push bar and dull chrome for the outside lever handle and trim..

Interior Passage Doors

- a. Solid core pine or douglas fir wood flat panel with design to be selected by owner. Oak also an option.
- b. Door face shall smooth for transparent finish.
- b. Metal jamb, lever type hardware
- c. Sealed with at last two coats of satin polyurethane finish

PART III - EXECUTION

Frames shall be reinforced, drilled and tapped for all mortise hardware in accordance with approved hardware schedules and template. Frames shall be reinforced only for surface hardware.

Provide 26 gauge plaster guards at all mortise hardware. Before shipment, install a temporary spreader at bottom of frames; do not remove spreader until frames are secure in place.

Clearances around the door opening shall not exceed 1/4" between the door and threshold and 1/8" between the door and the frame, and the head and jambs.

Installation

Erection and installation of doors and frames shall be done by a competent door erector in accordance with door manufacturer's instructions. Frames shall be set plumb and true, generally with 4 inches minimum from door rabbet to finish adjacent wall.

All hardware shall be installed in accordance with manufacturer's instructions, properly adjusted and left in good working order.

Install weather stripping and door sweeps on all exterior doors to provide a weathertight installation and minimize air infiltration.

SECTION 08560 - SECTIONAL OVERHEAD DOORS

PART I - GENERAL

Furnish all necessary materials, labor and equipment for the installation of upward acting sectional doors.

Provide sectional steel door with full row of full view double low e glazing for each of the south facing doors. (Note no glazing is required in the north facing door.) All other sections shall be insulated panel per the specifications below with electric operator & with manual button stations as well as being able to be manually operated, complete with weatherstripping, hardware, tracks, mounting pads and plates, anchors and all materials for a complete finished opening. Provide shop drawings of all doors and equipment including framing requirements. Incorporate framing requirements into the framing shop drawing.

Related Work Specified Elsewhere

Section 13000 - Metal Building

PART II - MATERIALS

Sectional door assembly shall be a metal, foam, metal sandwich panel construction.

Sectional Door Assembly: Steel/polyurethane/steel sandwich panel construction, with ribbed design with rounded water channels and with EPDM rubber tube seal weatherstripping fitted inside joints between sections. Bottom section shall include a full length pliable bulb-type gray PVC rubber weatherseal with a retainer bar. All sections are solid. Units shall have the following characteristics:

Panel Thickness: 2" minimum.

Exterior Steel: 0.015, hot-dipped galvanized.

End Stiles: 20 gauge.

Standard Springs: 10,000 cycles.

Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated.

Thermal Values: Minimum R-value of 17.5; U-value of 0.057 or better.

Air Infiltration: 0.08 cfm at 15 mph; 0.08 cfm at 25 mph.

Two coat baked-on polyester with white exterior and interior color.

Interior mounted slide tumbler keyed lock.

Exterior mounted keypad operator for each door.

Interior push buttons for start and stop.

Remote controlled door operator, two for each door.

Withstand 90 MPH wind

Track shall be as recommended by manufacturer to suit loading required and clearances available.

Hinges and roller brackets shall be heavy steel, galvanized. Rollers shall be ball bearing with case hardened races. Counter balance shall be oil-tempered helical-wound torsion springs mounted on a crossheader shaft.

Springs shall be engineered for industrial application and shall comply with durability requirements of National Association of Garage Door Manufacturers' Specification 101. Lift cables shall be galvanized aircraft cable with minimum 8 to 1 safety factor.

Windload Design: Provide to meet the Design/Performance requirements specified.

Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.

Weatherstripping:

- a. PVC retainer with dual durometer PVC bulb seal.
- b. Factory installed Flexible Header seal.

Track: Provide high lift track as recommended by manufacturer to suit loading required and designed to do interfere with other systems such as but not limited to mechanical systems.

Sectional overhead doors shall be Thermacore Series 592 or approved equal.

Overhead Door Operator

Electric Motor shall be UL listed sized to operate the doors (1 hp minimum with manual reset overload) at between 2/3's and 1 foot per second. Operator shall be factory pre-wired with motor controls, starter, reduction unit, disc brake, clutch, control devices and accessories required for proper operation. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices. Motor reduction shall be auto tensioning poly-V flex belt that does not require adjustment. Secondary reduction shall be chain and sprocket. Brake shall be disc type with selectable progressive braking for smooth stopping. duty cycle shall accommodate up to 30 cycles per hour.

Operator limit system shall be magnetic type with absolute positioning and push to set capabilities. Limit system shall remain synchronized with the door during manual operation and during power supply interruptions.

Control system shall be microprocessor based with relay motor controls. System shall be capable of monitoring and reporting current operating status, motor movement status, any current errors, all interlock status. Include a delay on reverse operating protocol. The system shall include a maximum run time in both directions which prevents the motor from continuing to run event of clutch slip or other issue. It shall also include monitoring of entrapment protection devices.

Entrapment Protection: Required for momentary contact, includes radio control operation.

- 1) Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
- 2) Electric sensing edge monitored to meet UL 325/2010.
- 3) Photoelectric sensors monitored to meet UL 325/2010

Operator Controls:

- 1) Push-button operated control stations with open, close, and stop buttons.
- 2) Security code button pad operated control stations with open, close, and stop buttons.
- 3) Two remote operators for each door.

PART III - INSTALLATION

PREPARATION

Take field dimension and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best results for the substrate under project conditions.

INSTALLATION

Install all doors in accordance with manufacturer's recommendations to fit all openings, weather tight and properly adjusted. Furnish all brackets, plates, pads or other miscellaneous items required for a complete installation. Anchor assembly to wall construction and building framing without distortion or stress. Provide all necessary framing and support for the doors. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

ADJUSTING AND CLEANING

Test sectional doors for proper operation, air infiltration requirements and adjust as necessary to provide proper operation without binding or distortion.

Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.

SECTION 13000 – METAL BUILDING

The Contractor is responsible for the selection and procurement of the Metal Building to meet the intent of the Contract Documents. Metal building supplier is responsible for all engineering associated with the metal building. Additional work not described in this Specification, that is required to complete a structurally sound and weathertight installation, is the responsibility of the Contractor.

PART 1 - GENERAL

1.01 SECTION INCLUDES

Design, fabricate and erect the metal building, including

- a. Structural steel main building frames
- b. Secondary framing including purlins and girts
- c. Roof and wall panels and trims
- d. Gutter and downspouts
- e. Overhangs
- f. Walk doors and windows
- g. Roof ventilators
- h. Skylights and Light Tubes
- i. Insulation

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

Section 03000 – Concrete
Divisions 5-8

1.03 REFERENCES

- A. AISI – North American Specification for the Design of Cold-Formed Steel Structural Members - 2007 Edition
- B. ANSI/AISC 360-05 - Specification for Structural Steel Buildings, ASD 2005, 13th Edition, and Steel Design Guide Series 3 - Serviceability Design Considerations for Low-Rise Building – second edition 2003
- C. ASTM A36 - Specification for Carbon Structural Steel
- D. ASTM A325 - Specification for Structural Bolts, Steel, Heat Treated
- E. ASTM A475 - Specification for Zinc-Coated Steel Wire Strand
- F. ASTM A529 - Specification for High-Strength Carbon-Manganese Steel of Structural Quality
- G. ASTM A572 - Specification for High Strength Low-Alloy Columbium-Vanadium Steel

- H. ASTM A1011 SS or ASTM A1011HSLAS - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- I. ASTM A792 - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process
- J. ASTM A992 - Specification for Structural Steel Shapes
- K. ASTM D1494 - Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels
- L. ASTM D2244 - Practice for Calculation of Color Differences from Instrumentally Measured Color Coordinates
- M. ASTM D4214 - Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
- N. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- O. ASTM E283 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- P. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
- Q. ASTM E1592 - Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
- R. ASTM E1646 - Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
- S. ASTM E1680 - Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems
- T. AWS A2.4 - Standard Welding Symbols
- U. AWS D1.1 - Structural Welding Code - Steel
- V. AWS D1.3 - Structural Welding Code - Sheet Steel
- W. FM4471 – Factory Mutual Research Corporation Standard 4471 Class 1
- X. IAS - International Accreditation Service, Inc.
- Y. MBMA Metal Building Systems Manual - 2006 Edition with 2010 Supplement
- Z. NAIMA 202 - Standard for Flexible Fiberglass Insulation Systems in Metal Buildings
- AA. UL 580 - Underwriters Laboratory -Tests for Uplift Resistance of Roof Assemblies
- BB. UL 790 – Underwriters Laboratory – Test Methods for Fire Tests of Roof Coverings

CC. UL 2218 Underwriters Laboratory – Impact Resistance of Prepared Roof Covering Material

DD. SSPC-SP2 - Steel Structures Painting Council, Surface Preparation Specification No. 2, Hand Tool Cleaning

1.04 SYSTEM DESCRIPTION

The building shall include all primary and secondary structural framing members, connection bolts, roof and wall covering, trim, fasteners, closures, sealer, canopies, roof extensions, windows, doors, skylights, light tubes, insulation, gutters, downspouts, snow clips or rails, louvers, ventilators and other miscellaneous items as stated in the specifications and/or shown or called for on the drawings and/or needed to meet the requirements of the contract as designed by the building supplier's licensed engineer.

- A. Primary framing shall consist of transverse rigid frames of rafters and columns with solid webs. The rigid frame shall be fabricated of shop-welded steel plate and designed for erection by field bolting. Frames shall be:
 - a. clear span
 - b. gabled or single sloped
 - c. with tapered or uniform depth exterior columns.
- B. Secondary framing shall consist of purlins, girts, eave struts, flange braces and sag angles as required by design.
- C. Horizontal loads not resisted by main frame action shall be resisted by
 - a. standard cable or rod x-bracing in the roof
 - b. standard cable or rod x-bracing, rigid portal frames, or shearwall in the sidewalls
 - c. panel diaphragm, standard cable or rod x-bracing, rigid portal frames, or shearwall in the endwalls
- D. Roof and Wall System consists of preformed steel panels, trim, and accessories as required for a complete installation.
- E. Building overall dimensions, bay spacing, post spacing, eave height, clear dimensions and roof pitch shall be as indicated on the drawings and as defined here.
 - a. The building "Width" shall be the measurement from outside face to outside face of the sidewall girts.
 - b. The building "Length" shall be the measurement from outside face to outside face of the endwall girts.
 - c. "Eave" to be determined as the line along the sidewall formed by the intersection of the planes of the roof and sidewall.
 - d. "Eave Height" is defined as the vertical dimensions as measured from the finished floor to the intersection of the planes of the roof and sidewall.

- e. The "Bay Spacing" shall be the distance between the centerlines of frames for interior bays and the distance from the outside face of endwall girt to the centerline of the adjacent interior frame for end bays.
- f. "Roof Pitch" shall be the inches of vertical rise per inches of horizontal run, expressed as inches of rise per 12 inches of run.

1.05 DESIGN REQUIREMENTS

Reference Project Documents (Plans and Notes) for Required Code Loadings

- A. Design primary and secondary structural members and exterior covering materials for applicable load and combinations of loads in accordance with the building code requested. Design loads shall be combined to produce maximum stresses within the structure in accordance with AISC and/or AISI as they apply.
- B. The design loads plus Dead Load shall be used in the structure design.
 - a. Roof Live Load shall be applied on the horizontal projection of the roof. Live Load reduction shall be applied according to the code specified above.
 - b. Wind Load shall be applied as pressure and suction in accordance with standard design criteria.
 - c. The Roof Snow Load shall be applied on the horizontal projection of the roof.
 - d. The Ground Snow Load shall be used with the exposure factor, thermal factor, slope factor and importance factor to determine the Roof Snow Load.
 - e. The metal building system shall be designed for snowdrift conditions if required based on location of the facility.
 - f. Collateral loads shall be those other than the basic design loads for which the building must be adequately designed. Loads of this type include, but shall not be limited to, suspended ceilings, sprinkler, electrical or mechanical systems, or any suspended or roof mounted HVAC units.
- C. Design building system for seismic loads based on the requirements of the IBC, local codes and the site geotechnical report as determined by the building supplier's engineer.

The building components shall be designed to the following minimum deflection requirements, unless a specific deflection is required by the building code. Deflection based on wind shall be based on a 10 year map, or 75% or the design pressure for a 50 year map.

- a. Frame rafters – L/240
- b. Frame sidesway – H/60
- c. Purlins – L/180
- d. Girts – L/120
- e. Endwall posts – L/120
- f. Roof panel – L/180
- Wall panel – L/120

1.06 SUBMITTALS

- A. Erection Drawings including:
 - a. Anchor rod setting plan, base plate details and column reactions
 - b. Roof framing plan
 - c. Wall framing elevations
 - d. Transverse cross sections
 - e. Panel layout
 - f. Exact location of factory located openings
 - g. Approximate location of field located openings
 - h. Framing details
 - i. Flashing details
 - j. Accessory details

- B. Design calculations, stamped by the building supplier's Professional Engineer registered in Colorado, including:
 - a. Stress analysis
 - b. Deflection analysis
 - c. Foundation loads for each loading case
 - d. Seismic load calculation

- C. Letter of Certification, prepared and signed by a Professional Engineer, verifying that building design meets indicated loading requirements and building code as requested.

1.07 QUALIFICATIONS

- A. The company manufacturing the products specified in this Section shall:
 - a. be a member of MBMA
 - b. be in compliance with the International Accreditation Service, Inc., Accreditation Criteria for Inspection Programs for Manufactures of Metal Building Systems (IAS AC472)
 - c. have a minimum of 10 years experience in the manufacture of steel building systems

- B. Erector's Qualifications
 - a. Minimum of 5 years experience in this or similar trade
 - b. Five similar installation references in past 5 years
 - c. Experience installing specific metal building being furnished

1.08 WARRANTY

First 5 years of all warranties shall not be prorated.

- A. The metal building manufacturer shall warrant for 5 years that components were free from defects in composition of material and workmanship and in accordance with industry standard for such components.
- B. Unpainted Galvalume® panels shall be warranted by the metal building manufacturer for 25 years against rupture, perforation, or structural failure as a result of corrosion caused by exposure to normal atmospheric conditions.
- C. The exterior silicone polyester color finish of factory coated roof panels shall be warranted by the metal building manufacturer for 25 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 7 NBS units as per ASTM D2244. Chalking shall not exceed a number 6 rating when measured per ASTM D 4214, method A.
- D. The exterior polyvinylidene fluoride (PVDF) color finish of factory coated roof panels shall be warranted by the metal building manufacturer for 35 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- E. The exterior silicone polyester color finish of factory coated wall panels shall be warranted by the metal building manufacturer for 25 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D 2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- F. The exterior polyvinylidene fluoride (PVDF) color finish of factory coated wall panels shall be warranted by the metal building manufacturer for 35 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D 2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- G. Provide the owner with a copy of all warranties. Want something to protects owner more than supplier

Part 2 - PRODUCTS

2.01 MATERIALS - STRUCTURAL FRAMING

A. General

- a. Structural steel members shall be sheared, plasma cut, formed, punched, welded and painted in the plant of the manufacturer. All shop connections shall be welded in accordance with the AWS "Standard Code for Welding in Building Construction".
- b. All structural members shall be factory primed with a primer intended for extended exposure to the elements. Surfaces shall be prepared by SSPC-SP2 or better as needed to insure proper adhesion and corrosion resistance.
- c. All framing members shall carry an easily visible identifying mark to aid the erector in the erection of the building.

- d. Field connections shall be bolted with high strength bolts and nuts.

B. Primary Structural Members

- a. The primary structural members shall be rigid framing manufactured of solid web members having tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns.
- b. Steel used to fabricate built up framing members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A1011, ASTM A572 or ASTM A529, Grade 55.
- c. Steel used for interior pipe columns, if required, shall be 35,000 PSI minimum yield point material.
- d. The building manufacturer shall have on file certified mill test reports that verify that these requirements have been met.

C. Secondary Structural Members

- a. Secondary structural framing shall distribute the loads to the primary structural system and shall include endwall columns and rafters, purlins, girts, eave struts, base support, headers, jambs, flange bracing, clips, and other miscellaneous structural framing.
- b. Steel used for cold-formed members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A1011 Grade 55.
- c. Light gauge cold-formed sections shall be manufactured by precision roll or brake forming. All dimensions shall be true, and the formed member shall be free of fluting, buckling or waviness.
- d. Endwall rafters shall be manufactured from built-up sections of adequate size and thickness as determined by the design criteria.
- e. Endwall columns shall consist of built-up sections or cold formed "C" sections of adequate size and thickness as determined by the design criteria.
- f. Purlins and girts shall be precision roll-formed 8" or 10" deep "C" sections or "Z" sections of adequate size and thickness as determined by the design criteria, minimum 16 gauge. Purlins and girts shall be either simple span or continuous span members.
- g. Eave struts shall be precision roll-formed and/or press brake formed "C" sections, minimum 14 gauge. The upper flange shall slope with the normal roof slope, and the web shall be vertical and free to receive the sidewall covering.
- h. Base support shall consist of a continuous base angle, base "C", or an 18 gauge one piece base member to which the base of the wall covering shall be attached. The base support shall be securely fastened into the concrete by the erector.

- i. Headers and jambs shall be precision roll-formed "C" sections of the same depth as the girts.
- j. Flange bracing shall consist of angle or tube members connected to the web of the purlin or girt and to the compression flange of the primary structural member.
- k. Clips shall be fabricated from 55,000 PSI minimum yield point material and be factory punched for field bolted connections.

D. Bracing

- a. Horizontal load resisting bracing shall be accomplished by diagonal cable bracing, rod bracing, portal frames, and/or diaphragm action of the roof and wall covering.
- b. All cables for diagonal bracing shall be fabricated from extra high strength Grade-7 wire Class A coating, left hand lay, galvanized steel strand, conforming to the provisions of ASTM A475. Adjustment shall be provided by an eyebolt assemble.
- c. Rod bracing shall be fabricated from minimum 5/8" diameter steel rod conforming to the provisions of ASTM A36.
- d. Portal frames shall be fabricated of built-up sections and conform to the same specifications as primary framing.

2.02 MATERIALS – ROOF SYSTEM

Roof panel shall be one of the following types:

- 1. Standing Seam
- 2. Ribbed Roof Panel Deductive Alternate

The selection of the roof system, to be used, for **each of the alternates** listed above shall be made by the Contractor and approved by the Owner's Representative. The Contractor shall submit the proposed roofing system(s) specification(s) for the base bid and for the deductive alternate with the bid package.

The selection of the roof system to be used for base bid and for the alternate should consider site conditions including resistance to wind loads and snow and ice building. The roofing system shall be compatible with the supporting structural systems, proposed insulation type and installation, flashing details and weathertightness. The Contractor shall be responsible for the coordination of all the Metal Building Systems. The following minimum requirements shall be met unless the Contractor can provide sufficient evidence that their product meet the intention of the Contract Documents including plans and specifications.

A. Standing seam roof system

- a. Rollformed profile shall be one of the following
STC (Snap Tight Construction)

MTC (Mechanically Seamed Construction)
MVF (Mechanically Seamed Vertical Leg Flat Panel)
Composite Roof System

Panels shall have an interlocking seam 3" deep spaced at 24" or 18" on center, with minor ribs between major ribs. Panels shall provide a net coverage width of 24" or 18".

- b. High ribs shall be sealed with factory-applied hot melt mastic and shall not require field seaming.
- c. Panels shall be manufactured from 24 gauge or 22 gauge, 50,000 PSI material as needed for the span.
- d. The STC roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
- e. Panels shall be one piece for slope lengths less than 51'-5". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
- f. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- g. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".
- h. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
- i. Roof system must have been tested according to the procedures in ASTM E 1592 (structural performance by uniform static air pressure differential).
- j. Panels shall be reversible end for end and no field notching shall be required.
- k. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792 or approved equal system.

~~B. Ribbed roof panel~~

- ~~a. Rollformed panel profiles shall have 1 1/8" minimum deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".~~
- ~~b. Panels shall be manufactured from 26 gauge, 80,000 PSI or 24 gauge, 50,000 PSI material minimum as needed for the spans~~
- ~~c. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.005 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.24 psf.~~
- ~~d. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.~~
- ~~e. Roof panel assemblies shall have a UL Class 30, 60, or 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".~~
- ~~e. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".~~

- ~~g. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".~~
- ~~g. Panels shall be one piece for slope lengths less than 39'-6". Endlaps, if required, shall be 8" and occur at a purlin.~~
- ~~h. Include closure strips for ends of ribbed roof panels.~~
- ~~i. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.~~

2.03 MATERIALS – WALL SYSTEMS

A. Exterior wall panel

- a. Rollformed panels shall have 1 1/8" deep minimum major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".
- b. Manufactured from 24 gauge, 50,000 PSI material.
- c. Wall panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.006 cfm/sf of fixed wall area when tested according to ASTM E283 at a static pressure differential of 6.24 psf.
- d. Wall panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E331 at a static pressure differential of 12.0 psf
- e. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
- f. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from standard color choices.
- g. Panels shall be one piece from base to eave for lengths less than 40'-0". Endlaps, if required, shall be 6" and occur at a girt.
- h. Furnish and install closure strips at exposed ends.

2.04 MATERIALS - SOFFIT

- a. Soffit materials shall be the same material, gauge, and coating as the roofing materials.
- b. Provide all material necessary to achieve finished appearance.
- c. Exterior color shall be owner selected from standard color chart.

2.05 MATERIALS – TRIM

- A. Trim shall be 26 gauge with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) typical to wall panels. The reverse side shall be coated with pigmented polyester. Exterior color to be owner selected from standard color chart.

- B. Provide all trim pieces necessary to achieve a finished appearance. Gable trim and eave trim or gutter shall have a roll formed face to maintain uniformity. Provide corner boxes to transition from gable trim to eave trim or gutter. Gutter, where required, shall have a horizontal bottom leg and the front leg shall not project above the bottom of roof panel.
- C. Provide trim at all corners of the building and for all sides of framed openings. Provide trim for base of building if required.
- D. Downspouts, where required, shall be 26 gauge with a fluoropolymer finish and shall have a minimum cross sectional area of 15.85 square inches. Downspouts shall terminate with an elbow at approximately 75° or transition to an underground drainage system.

2.06 METAL PERSONNEL DOORS AND FRAMES

Door requirements are included in Section 08540 of the contract documents

2.07 WINDOWS

Window requirements are included in Section 08520 of the contract documents

2.08 ACCESSORIES

- A. Fasteners to be manufacturer's standard long life fasteners. Exposed fastener heads to be factory painted to match the panel color. Self-drilling fasteners shall be used for panel to structural connections. Lapteks shall be used for panel to panel and panel to trim connections. Pop rivets shall be used at endlaps of eave and gable trims.
- B. Closed cell foam closure strips, die cut to match CS or AP panel configuration. Metal closures shall be used with STC or MSC panel.
- C. Mastic for roof sidelaps, endlaps, and flashings to be a non-hardening butyl tape, non-corrosive to the substrate, of 100% solids. Tape size to be minimum 3/32" x 3/4", supplied in rolls.
- D. Caulk shall be manufacturer's standard product as appropriate for the application.
- E. Thermal blocks of expanded polystyrene shall be supplied with standing seam roof systems for the requested insulation thickness. The thickness of the thermal block shall be compatible with the clip height and insulation thickness.
- F. Louvers shall be 3' x 3' self-framing and self-flashing units with insect screen. Louver frame to be minimum 18 gauge galvanized and blades to be minimum 20 gauge galvanized. Finish to be electrostatically applied polyester paint. Operator to be either hand crank or chain operator unless otherwise specified in the contract documents.
- G. Continuous gravity ventilators shall have 9" or 12" throat, supplied in 10' lengths, with birdscreen. Ventilators to be of low profile design to provide

gravity type ventilation. Include flashing for either single unit or continuous-run installation. 9" x 10' unit shall have a base ventilating capacity of 2700 and the 12" x 10' unit shall have a base ventilating capacity of 3600 CFM, assuming 10 degree temperature differential and 5 mph wind speed. Exterior parts to be minimum 26 gauge in Galvalume or painted galvanized. Interior parts to be G90 galvanized.

- H. Roof curbs shall be used at all roof penetrations except pipes 13" diameter and less. Roof curb shall have a structural subframe. Curb and subframe shall be designed to support the weight of the unit. Curb shall be designed specifically for the model number of the roof top unit. Curb shall be supplied with rib covers and all necessary fasteners and mastic for a weathertight installation. The roof curb shall be a two piece floating curb when required by building conditions.
- I. Roof Jacks shall be used at all 13" diameter and less pipes that penetrate the roof. Roof jacks shall be EPDM with a flexible aluminum base to form a weathertight seal at the roof panel.
- J. Snow clips shall be steel clips or rails that are installed so that they are isolated from the roof system and will not rub on the roof. Clips shall be compatible with the roofing system used and shall be design and integrated into the metal building manufacturer's system.

2.09 FABRICATION

- A. Fabricate built-up members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- B. Fabricate hot rolled members in accordance with AISC Specification for pipe, tube, and rolled structural shapes.
- C. Fabricate cold formed members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- D. Provide factory drilled or punched framing members for field bolted connections.
- E. All framing members shall be prepared according to SSPC-SP2 or better as needed to insure proper adhesion and corrosion resistance and be primed with a gray primer system that will withstand long term (25+ years) exterior exposure in the field at the project location.
- F. Clearly and legibly mark each piece to correspond with previously prepared erection drawings.

PART III - EXECUTION

All Installation and Erection shall be completed under the supervision of a person that is approved by the metal building supplier and has experience with the building system being installed.

3.01 ERECTION – FRAMING

- A. Erect framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- B. The erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection equipment and erection operation. Bracing furnished by the manufacturer for the metal building system cannot be assumed to be adequate during erection. The temporary guys, braces, falseworks and cribbing are the property of the erector, and the erector shall remove them immediately upon completion of erection.
- C. Do not field cut or alter structural members without written approval of the metal building manufacturer and the structural engineer.
- D. After erection, prime welds, abrasions, and surfaces not shop primed.

3.02 ERECTION – WALL AND ROOFING SYSTEM

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.

3.03 ERECTION – SNOW CLIPS, GUTTER, AND DOWNSPOUTS

- A. Install gutters and downspouts in strict accordance with manufacturer's instructions.
- B. Install downspouts from gutters to ground and extend to splash pans 10' past the roof line.
- C. Install metal snow clip /rail system per manufacturer's and metal building manufacturer's recommendations and so that the roof remains weather tight indefinitely.

3.04 INSTALLATION – ACCESSORIES

- A. Install accessories in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories weathertight.
- C. Insulation shall be installed so that all exterior surfaces are properly insulated leaving no cold spots in the insulation.

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