

TOWN OF MOUNTAIN VILLAGE 2017 WATERLINE IMPROVEMENT PROJECTS



BIDDING DOCUMENTS INCLUDING:

CONTRACT DOCUMENTS
&
SPECIFICATIONS

Date: January 9, 2017

Prepared by
Russell Planning and Engineering, Inc.
934 Main Ave., Unit C
Durango, CO 81301



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**Town of Mountain Village
INVITATION FOR BID (IFB)**

Solicitation Number: 201701

DATED: January 9, 2017

2017 WATERLINE IMPROVEMENT PROJECTS

FOR

Town of Mountain Village (TMV)

BIDS DUE:

**12:00 PM, Thursday, February 2, 2017
Town of Mountain Village
Public Works Office
ATTN: Finn Kjome
411 Mountain Village Blvd., 2ND Floor
Mountain Village, CO 81435**

OPENING OF BIDS:

**12:00 PM, Thursday, February 2, 2017
Town of Mountain Village
411 Mountain Village Blvd., 2nd Floor
Mountain Village, CO 81435**

**Project Manager
Finn Kjome
Mountain Village, CO 81435
PHONE (970) 369-8206
FAX (970) 728-6027
Email fkjome@mntvillage.org**

SCHEDULE A

INSTRUCTIONS TO BIDDER

**TOWN OF MOUNTAIN VILLAGE
2017 WATERLINE IMPROVEMENT PROJECTS**

A.1 Submission of Bids

A.1.1 Bids are to be submitted in a sealed envelope to Town of Mountain Village Public Works Office, Attn: Finn Kjome, 411 Mountain Village Blvd., 2nd floor, Mountain Village, CO 81435.

A.1.2 Date/Time: Bids shall be received on or before: **12:00 pm, Thursday, February 2, 2017**

***** **LATE BIDS WILL NOT BE ACCEPTED*******

A.2 Mandatory Pre-Bid Site Walk.

Attendance is Required in order to submit a bid. Bidders who do not have a representative at the pre bid site walk shall have their bids rejected without opening or considering such bids.

Date and time of **mandatory pre-bid site walk: Wednesday, January 18, 2017 at 1:00 pm.**

Location: 411 Mountain Village Blvd., Second Floor, Mountain Village, CO 81435

A.3 Late Bids/Late Modifications of Bids

A.3.1 Bids received in the office designated in A.1.1 above, after the exact time set for opening are considered "late bids", and will not be accepted by the Bid Opening Official. Bidders are solely responsible for insuring their bids arrive on time and to the place of bids specified in the IFB.

A.3.2 The TMV will not consider a late bid or late modification of bid unless received prior to contract award, except as follows;

(1) There is conclusive evidence that the bid was submitted to the office designated in A.1.1 above, on time and was mishandled by the TMV (i.e. lost or misplaced) personnel responsible for handling/receiving bids or;

(2) It was the only bid received.

A.4 Mistakes in Bids - Confirmation of Bid

When it appears from a review of the bid that a mistake has been made, the bidder may be requested to confirm their bid. Situations in which the confirmation may be requested include obvious, apparent errors on the face of the bid or a bid unreasonably lower than the other bids submitted. Obvious mistakes in bids may be allowed to be corrected upon a determination by the Town Manager that the bidder unintentionally made a mistake that can be quickly corrected and does not impair the competitive and sealed nature of the bid process.

A.5 Minor Informalities/Irregularities in Bids

A.5.1 A minor informality or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is considered immaterial when the effect on price, quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the

services being acquired.

- A.5.2 If the Director of Public Works (Director) determines that the bid submitted contains a minor informality or irregularity, then the Project Manager shall give the bidder an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid, or waive the deficiency, whichever is to the advantage of the TMV. In no event will the bidder be allowed to change the bid amount; however, the Project Manager may request a clarification or further breakdown of the bid amount.

A.6 Rejection of Bids

Any bid that fails to conform to the essential requirements of the invitation for bids will be rejected.

- A.6.1 Any bid that does not conform to the applicable specifications shall be rejected unless the invitation authorizes the submission of alternate bids and the items or services offered as alternates meet the requirements specified in the invitation for bids.

A.7 Estimated Quantities

If the specifications contain estimated quantities this provision is applicable. The quantities listed for each of the items in the specifications are only estimated quantities. Contractors are required to bid a firm unit price for each item specified. The actual quantities ordered may fluctuate up or down. The unit prices proposed by each bidder will remain firm and will not be re-negotiated if the estimated quantities are not met or are exceeded. For bidding purposes, if there is a conflict between the extended total of an item and the unit price, the unit price shall prevail and be considered as the amount of the bid.

A.8 Number of Copies

Bidder shall submit in its sealed and marked envelope, one (1) copy of its bid, signed in ink.

A.9 Identification of Bid

Bids must be returned in a sealed envelope; solicitation number and date for submission of offers must be clearly marked on the outside in the lower left hand corner:

Solicitation No: 2017 Waterline Improvement Projects

Due Date & Time: 12:00 PM, Thursday, February 2, 2017

Any offer that is submitted without being properly marked may be opened for identification prior to the deadline for receipt of offers and then resealed.

A.10 Sales Tax

Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the work.

This is a government funded project and the Contractor shall apply to the Colorado Department of Revenue for a tax-exempt certificate for this project. The Contractor shall utilize the tax-exempt certificate and tax-exempt project number when purchasing all equipment, materials and supplies to be incorporated in this project. Contractors shall reflect this cost savings in their bid.

A.11 Preparation of Bid Offer

- A.11.1 Bidders are expected to examine the drawings, specifications, bid documents, proposed

contract forms, terms and conditions, and all other instructions and solicitation documents. Bidders are required to attend the mandatory pre-bid conference and site visit to determine all requirements and conditions that will affect the work. Failure to do so will result in the bid not being considered or accepted.

- A.11.2 The bidder certifies that it has checked all of its figures, and understands that the owner will not be responsible for any errors or omissions on the part of the bidders in preparing its bid.
- A.11.3 All items, (unless the invitation specifically states otherwise) including any additive or deductive alternates on the bid, **must** be completely filled out or the bid will be determined non-responsive and ineligible for consideration for award.
- A.11.4 The bidder declares that the person or persons signing this bid is/are authorized to sign on behalf of the firm listed and to fully bind the bidder to all the requirements of the solicitation.
- A.11.5 The bidder certifies that no person or firm other than the bidder or as otherwise indicated has any interest whatsoever in this bid/offer or the Contract that may be entered into as a result of this bid/offer and that in all respects the offer is legal and firm, submitted in good faith without collusion or fraud.
- A.11.6 By submitting a bid the bidder certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this bid.
- A.11.7 If there is a discrepancy between the unit price and the total price, the unit price shall be used to determine the applicable total price.

A.12 Basis of Award

The TMV intends to award a Contract resulting from this solicitation to the lowest, responsive, responsible bidder whose offer, conforming to the solicitation, will be most advantageous to and in the best interest of the TMV, cost or price and, best value with other factors considered not necessarily low dollar.

- A.12.1 In addition to other factors, bid/offers will be evaluated on the basis of advantages and disadvantages to the TMV that might result from offers received.
- A.12.2 The TMV reserves the right to reject any or all proposals and to waive informalities and/or irregularities in the bid offer.

A.13 Period of Acceptance

The bidder agrees that its bid offer shall remain open for acceptance by the TMV for a period of forty-five days calendar days from the date specified in the solicitation for receipt of bids.

A.14 Contract Award

The signature of the bidder indicates that within thirty (30) calendar days from acceptance of its bid offer it will execute a Contract with the TMV, furnish a project specific certificate of insurance naming the TMV as additional insured, furnish a performance bond and any other documents required by these instructions, the specifications or Contract Documents. The TMV reserves the right to waive the performance and material bond required in the Contract Documents or allow for alternate performance security. Therefore, all bidders should include any costs associated with the bond requirements as a separate line item in the bid.

A.15 Notice to Proceed

Work may not start under any awarded Contract until a written notice to proceed is issued by the TMV. The TMV may issue the notice to proceed any time after the contract is signed and, if required, insurance and bonds have been provided in accordance with A.20 below. In the event the notice to proceed has not been issued by TMV within sixty days of the execution of the awarded Contract, the Contractor may be released from the Contract.

A.16 Amendments to the Solicitation

Amendments are also referred to as addendum or addenda; and these terms shall be considered synonymous. The TMV will provide all bidders with copies of any amendments to the solicitation documents by fax or e-mail as preferred by the bidder.

A.16.1 If this solicitation is amended, then all specifications, terms and conditions, which are not amended, remain unchanged.

A.16.2 Bidders shall acknowledge receipt of any amendment to this solicitation by letter, facsimile or e-mail.

A.16.3 Acknowledged amendments must be received prior to bid opening. Bidders are encouraged to include signed amendments or initialed acknowledgment with returned bids.

A.17 Explanations to Prospective Bidder

Any prospective bidder desiring an explanation or interpretation of the solicitation documents, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the time for submission of offers. Oral explanations or instructions given before the opening of bids will not be binding. Any information provided to a prospective bidder during the bid preparation stage will be promptly furnished to all other prospective bidders as an amendment to the solicitation if that information is necessary in submitting bid offers or if the lack of it would be prejudicial to other prospective bidders.

A.18 Questions and Other Requests for Information

All questions or requests for information shall be submitted as specified below on or before January 25, 2017 at 5:00 p.m. All questions, requests for information and responses shall be sent to all potential bidders which have attended the mandatory site walk via email on January 26, 2017 by 5:00 p.m.

For all technical questions , please direct all questions in writing to:	Finn Kjome: fkjome@mtnvillage.org AND Bill Frownfelter: billf@russellpe.com
For all contractual questions , please direct all questions in writing to:	Finn Kjome: fkjome@mtnvillage.org AND Bill Frownfelter: billf@russellpe.com

A.19 Specifications and Drawings

A.19.1 No Deposit solicitations: All interested bidders may upon written request obtain one copy of the project specifications and a set of the project drawings (if applicable) at a cost of \$.50 per page.

A.19.3 Upon award of the contract, the TMV will be responsible for furnishing the selected Contractor a minimum of three (3) sets of both the specifications and drawings (if applicable). The TMV will also provide any returned sets that may be available. However,

in no event shall the TMV be required to pay for the reproduction of more than 3 sets of each.

A.19.4 Scope of Services/Plans & Specifications: Included in this solicitation.

A.20 Type of Contract

It is the intent of this IFB to award a firm fixed price Contract based on the prices offered successful bidder. Contract prices shall remain firm and fixed throughout the contract performance period. The contract included herein is an example contract only and the terms and conditions may be modified by the Town of Mountain Village prior to the execution of such contract by the successful bidder.

A.21 F.O.B. Destination

Unless otherwise specified in the IFB, all goods, materials, supplies, equipment or services covered by this solicitation shall be delivered F.O.B. destination, all freight charges prepaid and allowed, within the town limits of the TMV, Colorado, at the location indicated in the awarded contract.

A.22 Bid Results

The TMV will e-mail, fax or mail bid results or tabulations. Bid tabulations are only sent upon request. To request a copy of the bid tabulation, call Jenny Bates at (970) 369-8201.

A.23 Terms, Conditions and Special Provisions

Bidders are advised to pay special attention to Exhibits 1 and Schedules A through C attached hereto. These Exhibits may contain requirements that will have an impact on all potential bidders, such as liquidated damages, indemnification, type of contract, and delivery schedule.

**TOWN OF MOUNTAIN VILLAGE
PUBLIC WORKS OFFICE
ATTN: Finn Kjome
411 Mountain Village Blvd. 2nd Floor
Mountain Village, CO 81435**

**Schedule B
BID FORM FOR SOLICITATION NO: TOWN OF MOUNTAIN VILLAGE
2017 WATERLINE IMPROVEMENT PROJECTS**

Read & Complete Carefully

Description: Install waterline as per Plans and Specifications, 2017 Waterline Improvement Projects, Job No. 201701

Term of Contract: Date of Award through Substantial Completion as defined in these bid documents.

Important: ALL pages of this form, Sections 1 through 3 must be completed, signed and returned by the bidder as part of the bid package. Failure to submit all pages of this form constitutes grounds for rejection of your bid.

Section 1 of 3 - Bidder Information			
Complete Bidder Legal Business Name		Taxpayer ID# (TIN): <input type="checkbox"/> SSN <input type="checkbox"/> FEIN Write/Type SSN/FEIN Number Above	
Business Name, Trade Name, Doing Business As (If Different From Above)			
Business Entity: <input type="checkbox"/> Corporation <input type="checkbox"/> LLC Corporation <input type="checkbox"/> LLC Partnership <input type="checkbox"/> LLC Single Member Entity			
NOTE: If Individual /Sole Proprietor, Individual's Name (As Owner) Must Appear In The Legal Business Name Block Above			
NOTE: If Your Business is a <i>Partnership</i> You MUST Attach The Names And Titles Of All Partners to Your Bid Submission			
NOTE: If Your Business is a <i>Corporation</i> , In Which State Are You Incorporated?			
Bidder Address:		Street	
City		State	Zip Code
Bidder E-Mail Address		Bidder Web Site (If Applicable)	
Remittance Information: Indicate Below The Remittance Address Of Your Business: <input type="checkbox"/> Same As Bidder Address Above			
Does your business currently qualify as a Disadvantaged Business Enterprise(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO			
Length of time in Business: ____ Years ____ Months		Annual Gross Receipts of Business: \$ _____.	

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Section 1 of 3 – Bidder Information (Continued)		
Name (Type or Print):		
Business Phone:	Ext:	Home Phone:
Fax Number:	Cellular:	
Please Select Preferred Distribution Method: 1) Check Only One Box Below		
<input type="checkbox"/> E-Mail	<input type="checkbox"/> Fax	<input type="checkbox"/> USPS Mail

<p>Signature of Person Authorized to Sign bids on Behalf of The Above Named Bidder</p> <p style="text-align: right;">⇐SIGN HERE</p>	
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Date Executed

Section 2 of 3 - Important Information For Bidders

Affirmation of Bidder: The above-signed bidder affirms and declares:

1. Bidder declares that it has carefully examined the bid information and complete solicitation (the term Solicitation means the complete IFB) in submitting a bid for “2017 Waterline Improvements”. The bidder’s signature will be considered the bidder’s acknowledgment of understanding and ability to comply with all items in this solicitation. If a bidder makes any changes or corrections to the bid documents (such as white out, or writing over a figure, etc.) such changes or corrections must be initialed and dated by the person signing the offer prior to its submittal.

2. **Total bid will be on the basis of a line item, unit price bid and** will be evaluated and awarded as follows:

The TMV generally awards a Contract for the lowest responsible and responsive bidder, unless the Town Manager determines that a bid other than the lowest responsible and responsive bidder is to be awarded based on such bid having the best value and being in the best interest of the Town despite not being the lowest dollar amount. Failure to provide pricing in all areas of the bid schedule will result in the determination that your bid is non-responsive.

3. Bidder hereby proposes and agrees that he will enter into and perform as indicated in a form of agreement similar to that of the Contractor’s Agreement attached hereto within Exhibit 1 and of which this proposal forms a part, and will do the construction work therein described under the terms and conditions therein set forth, and will furnish all the labor, materials, tools, equipment, transportation and services for said construction in strict conformity with the drawings and specifications and other documents forming a part of the Contract Documents, which the bidder proposed to execute at the price set on the attached bid.

4. Bidders will be considered only for all of the items included in the “2017 Waterline Improvements”. TMV reserves the right to reject any or all bids. Bidders must qualify for required licenses before commencing work.

ENTER BID TOTAL HERE _____

**SCOPE OF WORK
2017 WATERLINE IMPROVEMENT PROJECTS**

General Notes

1. All work will be performed as per Plans and Specifications, 2017 Waterline Improvement Projects Job No. 201701. See attached copy. Full sized copies are available at 411 Mountain Village Blvd, Second Floor, Mountain Village CO or at the mandatory site walk.
2. Work hours to follow the TMV construction code 7:00 am- 6:00 pm Mon. thru Sat.
3. The bidder awarded this contract must have a 2017 TMV business license and proof of insurance prior to start of construction.
4. All surveying for the project shall be the responsibility of the successful bidder.
5. All staging for the project shall be on site.
6. Contactor to pay TMV \$500 per day until completion, if substantial completion exceeds 60 days from the Notice to Proceed for each Project.
7. Civil work scheduled shall be substantially completed no later than 60 days from the Notice to Proceed for each Project.

**SIGNATURE OF AUTHORIZED PERSON IN SECTION 1 CONSTITUTES
AGREEMENT WITH ALL PROCEDURES CONTAINED WITHIN THIS SOLICITATION
PACKET.**

TOWN OF MOUNTAIN VILLAGE
2017 WATERLINE IMPROVEMENT PROJECTS
BID SCHEDULE
January 9, 2017

ITEM DESCRIPTION		UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
SCHEDULE ONE - LIFT 7/COONSKIN WATERLINE					
General					
101	Mobilization	Lump Sum	1		
102	Construction Staking/Surveying	Lump Sum	1		
104	Trail detours/relocation	Lump Sum	2		
105	Erosion Control/Stormwater Management (Pre-Construction and During Construction)	Lump Sum	1		
106	Record Drawings	Lump Sum	1		
Civil - Waterline Installation					
201a	6-inch welded steel pipe in separate trench	Linear Feet	12		
201b	8-inch welded steel pipe in separate trench	Linear Feet	80		
201c	12-inch welded steel pipe in separate trench	Linear Feet	85		
201d	12-inch welded steel pipe and 8 inch welded steel pipe in shared trench	Linear Feet	750		
202a	11.25 degree welded steel pipe 12-inch, horizontal bend	Each	2		
202b	22.5 degree welded steel pipe 12-inch horizontal bend	Each	3		
202c	45 degree welded steel pipe 12-inch horizontal bend	Each	3		
202d	90 degree welded steel pipe 12-inch horizontal bend	Each	0		
202e	11.25 degree welded steel pipe 8-inch horizontal bend	Each	1		
202f	22.5 degree welded steel pipe 8-inch horizontal bend	Each	3		
202g	45 degree welded steel pipe 8-inch horizontal bend	Each	3		
202h	90 degree welded steel pipe 8-inch horizontal bend	Each	0		
202i	90 degree welded steel pipe 8-inch horizontal bend	Each	0		
203a	11.25 degree welded steel pipe 12-inch, vertical bend	Each	3		
203b	22.5 degree welded steel pipe 12-inch vertical bend	Each	1		
203c	45 degree welded steel pipe 12-inch vertical bend	Each	4		
203d	11.25 degree welded steel pipe 8-inch vertical bend	Each	3		
203e	22.5 degree welded steel pipe 8-inch vertical bend	Each	1		
203f	45 degree welded steel pipe 8-inch vertical bend	Each	4		
203g	90 degree welded steel pipe 8-inch vertical bend	Each	2		
203h	90 degree welded steel pipe 6-inch vertical bend	Each	1		
204a	6-inch x 6-inch x 6-inch welded steel pipe tee	Each	1		
204b	12-inch x 12-inch x 6-inch welded steel pipe tee	Each	1		
204c	8-inch x 8-inch x 6-inch welded steel pipe tee	Each	1		
204d	8-inch x 8-inch x 8-inch welded steel pipe tee	Each	1		
205a	Water valve 6-inch on steel pipe	Each	1		
205b	Water valve 8-inch on steel pipe	Each	6		
205c	Water valve 12-inch on steel pipe	Each	2		
206a	Connect 12-inch welded steel pipe to existing 12-inch ductile iron pipe (connection #1)	Each	1		
206b	Connect 12-inch welded steel pipe to existing 12-inch ductile iron pipe (connection #2)	Each	1		
206c	Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (connection #3)	Each	1		
206d	Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (connection #4)	Each	1		
206e	Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (connection #5)	Each	1		
206f	Connect 6-inch welded steel pipe to existing 6-inch ductile iron pipe (connection #6)	Each	1		
206g	Connect 6-inch welded steel pipe to 8-inch welded steel pipe (connection #7)	Each	1		
206h	Connect 8-inch welded steel pipe to 8-inch welded steel pipe (connection #8)	Each	1		
206i	Connect 6-inch welded steel pipe to 12-inch welded steel pipe (connection #9)	Each	1		
308	Thrust block(s) if deemed necessar yanywhere	Each	1		
Civil - Miscellaneous					
401	Potholing	Each	7		
404	Unsuitable Material Excavation	Cubic Yard	20		
405	Fill for unsuitable material	Cubic Yard	20		
406	Stabilization geotextile fabric	SQ YD	10		
408	Trench Drain - daylight line	Linear Feet	30		
409	Trench De-watering	Linear Feet	100		
TOTAL SCHEDULE ONE					

ITEM DESCRIPTION		UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
SCHEDULE TWO - TOUCHDOWN DRIVE WATERLINE					
OPTION A - Waterline in all trench					
<i>General</i>					
101	Mobilization	Lump Sum	1		
102	Construction Staking/Surveying	Lump Sum	1		
103	Traffic Control - Touchdown Drive	Lump Sum	1		
105	Erosion Control/Stormwater Management (Pre-Construction and During Construction)	Lump Sum	1		
106	Record Drawings	Lump Sum	1		
<i>Civil - Waterline Installation</i>					
206j	Connect HDPE to existing ductile iron pipe (connection #10)	Each	1		
206k	Connect HDPE to existing ductile iron pipe (connection #11)	Each	1		
301a	6-inch HDPE in trench (Fire hydrant)	Linear Feet	4		
301b	8-inch HDPE in trench	Linear Feet	410		
303	8-inch x 8-inch x 6-inch HDPE pipe tee (include flanges on all sides)	Each	1		
304	8-inch gate valve	Each	2		
305	Remove old fire hydrant	Each	1		
306	Install Fire hydrant (new)	Each	1		
307a	22.5 degree HDPE pipe 8-inch bend	Each	2		
307b	45 degree HDPE pipe 8-inch bend	Each	1		
308	Thrust block(s) if deemed necessary	Each	1		
309	8-inch Hymax Grip Coupler	Each	2		
<i>Civil - Miscellaneous</i>					
401	Potholing	Each	2		
402	Cut and remove existing asphalt	SQ YD	20		
403	Asphalt patching of trench	SQ YD	20		
404	Unsuitable Material Excavation	Cubic Yard	20		
405	Fill for unsuitable material	Cubic Yard	20		
406	Stabilization geotextile fabric	SQ YD	60		
407	Flowfill	Linear Leet	80		
408	Trench Drain - daylight line	Linear Feet	50		
SUBTOTAL SCHEDULE TWO (Option A) - Open trench					
SCHEDULE TWO - TOUCHDOWN DRIVE WATERLINE					
OPTION B - Boring					
<i>General</i>					
101	Mobilization	Lump Sum	1		
102	Construction Staking/Surveying	Lump Sum	1		
103	Traffic Control - Touchdown Drive	Lump Sum	1		
105	Erosion Control/Stormwater Management (Pre-Construction and During Construction)	Lump Sum	1		
106	Record Drawings	Lump Sum	1		
<i>Civil - Waterline Installation</i>					
206j	Connect HDPE to existing ductile iron pipe (connection #10)	Each	1		
206k	Connect HDPE to existing ductile iron pipe (connection #11)	Each	1		
301a	6-inch HDPE in trench (Fire hydrant)	Linear Feet	4		
301b	8-inch HDPE in trench	Linear Feet	95		
302	8-inch HDPE in Boring	Linear Feet	315		
303	8-inch x 8-inch x 6-inch HDPE pipe tee (include flanges on all sides)	Each	1		
304	8-inch gate valve	Each	2		
305	Remove old fire hydrant	Each	1		
306	Install Fire hydrant (new)	Each	1		
307a	22.5 degree HDPE pipe 8-inch bend	Each	2		
307b	45 degree HDPE pipe 8-inch bend	Each	1		
308	Thrust block(s) if deemed necessary	Each	1		
309	8-inch Hymax Grip Coupler	Each	2		
<i>Civil - Miscellaneous</i>					
401	Potholing	Each	2		
402	Cut and remove existing asphalt	SQ YD	600		
403	Asphalt patching of trench	SQ YD	600		
404	Unsuitable Material Excavation	Cubic Yard	20		
405	Fill for unsuitable material	Cubic Yard	20		
406	Stabilization geotextile fabric	SQ YD	60		
407	Flowfill	Linear Leet	80		
408	Trench Drain - daylight line	Linear Feet	50		
SUBTOTAL SCHEDULE TWO (Option B) - Boring					
Discount for performing both Mountain Village waterline improvement projects					
		Lump Sum	1		

	PROJECT TOTAL with Schedule 2, Option A (If Both Schedules Awarded)		
	PROJECT TOTAL with Schedule 2, Option B (If Both Schedules Awarded)		

SCHEDULE C

EXHIBIT 1

TOWN OF MOUNTAIN VILLAGE 2017 WATERLINE IMPROVEMENT PROJECTS

List of Exhibits

This section includes Exhibits to the solicitation packet and by inclusion herein are incorporated into and made part of the solicitation packet:

Contractor Agreement
Bidder's Qualification Statement (Pages. 1 to 4, inclusive)
Notice of Intent to Award (Pages. 1 to 1, inclusive)
Performance and Payment Bond (Pages. 1 to 2, inclusive)
Notice to Proceed (Pages. 1 to 1, inclusive)
Application For Payment (Pages. 1 to 2, inclusive)
Lien Release Forms (Pages. 1 to 1, inclusive)
Change Order Form (Pages. 1 to 2, inclusive)
Special Provisions– (Pages. 1 to 15, inclusive)
Specifications
Drawings

CONTRACTOR AGREEMENT

This Agreement is made and entered into this ___ day of _____, 20_, by and between the Town of Mountain Village, a political subdivision of the state of Colorado, (the "Owner") and _____, a Colorado _____, (the "Contractor").

RECITALS

- A. The Owner owns and operates a municipal infrastructure within the Town of Mountain Village.
- B. The Owner desires to have the Contractor install perform general waterline improvements for the Town of Mountain Village.
- C. The Contractor has the expertise and knowledge to perform the work described in the IFB and Scope of Work

Nowtherfore, in consideration of the mutual promises and conditions set forth herein, the parties agree as follows:

1. Contract Documents. The Contract Documents are defined as:

a. Standard Contract Forms

- i) Instructions to Bidder
- ii) Bid Form (Pages. 1 to 2, inclusive)
- iii) Bid Schedule
- iv) Bidder's Qualification Statement (Pages. 1 to 4, inclusive)
- v) Notice of Intent to Award (Pages. 1 to 1, inclusive)
- vi) Contractor Agreement (This document)
- vii) Performance and Payment Bond (Pages. 1 to 2, inclusive)
- viii) Notice to Proceed (Pages. 1 to 1, inclusive)
- ix) Application For Payment (Pages. 1 to 2, inclusive)
- x) Lien Release Forms (Pages. 1 to 1, inclusive)
- xi) Change Order Form (Pages. 1 to 2, inclusive)

b. Special Provisions – (Pages. 1 to 15, inclusive)

c. Specifications

d. Drawings

The Contractor acknowledges that it is fully familiar with all of the terms of the Contract Documents, as defined herein, the location of the job site, and the conditions under which the contract work is to be performed. The Contract Documents are incorporated into this Agreement.

2. Work. The Contractor agrees to perform the work in a good and workmanlike manner as set forth in the Contract Documents. Contractor agrees to furnish all labor, materials (not including the materials provided by the Owner as outlined in the IFB), equipment, tools and other facilities required for the prompt and efficient execution of the work described herein and to perform the work necessary or normally performed by the Contractor's trade or incidental to complete the work as described in the Contract Documents (the "Project").

3. Contract Price. The Owner shall pay the Contractor the lump sum of _____ Dollars (_____.00) for the completion of the Project (the “Contract Price”) subject to Change Orders as directed by the Owner in accordance with section 8 of this Agreement.
4. Progress Payments. The Contractor shall submit requests for payment to Owner on a bi-weekly basis for progress payments in accordance with the percentage of work completed. The Owner shall review the request for payment and either make payment or notify the Contractor of the rejection of the request for payment within twenty (20) days of receipt of the request for payment. Rejection of a request for payment shall not constitute a default of this Agreement, nor shall it constitute a reason to suspend work on the Project. The Owner shall retain ten percent (10%) of each invoice prior to completion of fifty percent (50%) of the Project and five percent (5%) thereafter. Such retainage shall be included in the final payment made under section 5 of this Agreement.
5. Final Payment. Upon substantial completion of the Project, Contractor shall submit a final request for payment. Upon submission of the final request for payment by the Contractor, Owner shall conduct a thorough inspection of the Project (the “Final Inspection”). Upon completion of the Final Inspection, Owner shall prepare a punch list (the “Punch List”) of items to be completed by Contractor. After completion of the Punch List items, Owner shall publish a notice of final payment in accordance with C.R.S. 38-26-107 and make final payment in accordance with the procedures set forth in C.R.S. 38-26-107.
6. Time of Completion. The commencement date of the Project shall be _____ 20_. The completion date of the Project shall be _____, 20_. Work hours shall be from 7:00 a.m. to 6:00 p.m. Monday through Saturday. No work shall be allowed during other hours and is prohibited on holidays as set forth in the Town’s Community Development Code. Time is of the essence of all obligations of Owner and Contractor hereunder. Failure to complete the Project by the Completion Date shall subject the Contractor to a One Thousand Dollar (\$1000.00) a day penalty to be deducted from the Contract Price. Contractor shall submit to Owner, prior to commencement of the Project, a schedule of completion.
7. Delay. In the event Contractor is delayed in the prosecution or completion of the Project by the act, neglect or default of Owner or should Contractor be delayed waiting for materials, if required by this Agreement to be furnished by Owner, or by damage caused by fire or other casualty for which Contractor is not responsible, then the time herein fixed for the completion of the work shall be extended the number of days that Contractor has thus been delayed, but no allowance or extension shall be made unless a claim therefore is presented in writing to Owner within forty-eight (48) hours of the commencement of such delay, and under no circumstances shall the time of completion be extended beyond two (2) weeks per occurrence. Whether the Contractor is entitled to an extension of time shall be determined at the sole

discretion of the Owner. In the event that the Contractor is rewarded an extension pursuant to this section 7, the Contractor shall be entitled to an equitable adjustment of the Contract Price.

8. Change Orders. Contractor may be requested in writing by Owner, without invalidating this Agreement, to make changes to the Project within the general scope of this Agreement consisting of additions, deletions or other revisions (Change Order). Contractor's written response for each Change Order shall indicate the adjustments which it will make to the Contract Price to be made for the Change Order and the Time of Completion. Contractor will undertake no additions, deletions or other revisions to the Project, which is not provided for in this Agreement unless requested by Owner with a Change Order and written approval of any adjustments in the Contract Price and Time of Completion
9. Contractor's Default. If Contractor should default in performance of its work or should otherwise commit any act which causes delay to the Project, Contractor shall be liable for all losses, costs, expenses, liabilities and damages, including consequential damages and liquidated damages, sustained by the Owner or for which Contractor may be liable to any other party because of Contractor's default.
10. Bonding. Concurrently with the execution of this Agreement, Contractor shall execute a bid bond in an amount equal to five percent (5%) of the Contractor's Bid and a performance bond, in an amount equal to fifty percent (50%) of the Contract Price. The bonds required by this Agreement shall be executed by a corporate surety acceptable to Owner and shall be in a form satisfactory to Owner. Contractor shall pay the premium on said bonds unless otherwise provided herein. No change, alteration, or modification to or deviation from this Agreement whether made in the manner provided in this Agreement or not, shall release or exonerate, in whole or in part, any bond or any surety on any bond given in connection with this Agreement, and no notice is required to be given to such surety of any such change, alteration, modification, or deviation.
11. Liens. Contractor shall promptly pay all bills for labor and material performed and furnished by others in connection with the construction, furnishing and equipping of the improvements and performance of the work. Provided that Contractor has been paid by Owner all sums (or the applicable portion thereof) due to Contractor pursuant to this Agreement. Colorado Statutes do not provide for any right of liens against public entities and structures. In lieu thereof, C.R.S. 38-26-107 provides for adequate relief for any claimant.
12. Conformance of Work. The Owner agrees that the Owner will have the authority to supervise, inspect and approve or reject the Contractor's work, which does not conform to this Agreement and/or any Change Orders issued by the Owner. Contractor represents, warrants and agrees, for the benefit of Contractor, it will promptly repair or replace, whichever is necessary as reasonably determined by Contractor, (i) any rejected Contractor's work, (ii) any defect in

Contractor's work, including defects in materials and workmanship, and (iii) any Contractor's work that does not meet the Governmental Requirements, first-class workmanship, and the applicable warranty specifications, with which Contractor hereby represents that it is familiar.

13. Notice to Cure. If Contractor at any time refuses or neglects to supply enough properly skilled workers and proper materials, or fails to correct non-conforming work or defects in the work, or fails to properly and diligently prosecute the work covered by this Agreement, or fails to make prompt payment to its workers, subcontractors or suppliers or is otherwise guilty of a material breach of a provision of this Agreement, and fails within five (5) business days after receipt of written notice to commence and continue satisfactory correction of such default with diligence and promptness, then Owner, without prejudice to any rights or remedies, shall have the right to declare a default of this Agreement by Contract and proceed with any remedy available to the Owner including contracting with another entity to perform the work.
14. Termination. If Contractor fails to commence and satisfactorily continue correction of a default within five (5) business days after receipt by Contractor of the notice issued under section 13, then Owner may terminate Contractor's right to perform under this Agreement and use any materials, implements, equipment, appliances or tools furnished by or belonging to Owner or complete Contractor's work without any further compensation to Contractor for such use. In such case, Contractor shall be entitled to no further payment until the balance of Contractor's work has been completed. At that time, all of the costs incurred by Owner in performing Subcontractor's work, including a markup of fifteen percent (15%) for overhead and profit on such expense, plus actual attorneys' fees, shall be deducted from any monies due or to become due to Contractor. Contractor shall be liable for the payment of any amount by which such expenses may exceed the unpaid balance of the Contract Price.
15. Termination for Convenience. Owner may at any time and for any reason terminate Contractor's services and work at Owner's convenience. Cancellation shall be by service of written notice to Contractor's place of business. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement, and shall, if requested, make every reasonable effort to procure cancellation of all existing orders or contracts upon terms satisfactory to Owner or, at the option of Owner, give Owner the right to assume those obligations directly, including all benefits to be derived therefrom. Contractor shall thereafter do only such work as may be necessary to preserve and protect the work already in progress and to protect material and equipment on the job site or in transit thereto. Upon such termination, Contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement, plus (2) such other costs actually incurred by Contractor and approved by Owner, plus (3) ten percent (10%) of the cost of the work referred to in items (1) and (2) above for overhead and profit. There shall be deducted

from such sums as provided in this subparagraph the amount of any payments made to Contractor prior to the date of the termination of this Agreement. In no event shall payment due hereunder exceed the amount due in relation to the percentage of completion of the Project.

16. Grounds for Withholding Payment. Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to the extent necessary to protect Owner from loss, including costs and actual attorneys' fees, on account of (1) defective work not remedied; (2) claims filed or reasonable evidence indicating probable filing of claims by third parties; (3) failure of Contractor to make payments properly to its subcontractors or for material, labor or fringe benefits; (4) a reasonable doubt that this Agreement can be completed for the balance then unpaid; (5) damage to Owner; (6) penalties assessed against Contractor or Owner for failure of Contractor to comply with state, federal or local laws and regulations; or (7) any other ground for withholding payment allowed by state or federal law, or as otherwise provided in this Agreement. When the above matters are rectified, such amounts as then due and owing shall be paid or credited to Contractor.
17. Bankruptcy. In the event that Contractor declares bankruptcy, or any similar event such as the appointment of a receiver for Contractor or upon Contractor making an assignment for the benefit of creditors, or if Contractor seeks protection under the Bankruptcy Code or commits any other act of insolvency, Owner may, absent any applicable legal limitation, terminate this Agreement upon giving two (2) business days written notice, by certified mail, to Contractor, its trustee, and its surety, if any.
18. Indemnification. The Contractor agrees to indemnify, defend and hold harmless, the Owner, TSG Ski and Golf, LLC, their partners, subsidiaries and affiliates, their respective agents, officers, directors, servants, employees, owners, successor and assigns of and from any and all liability, claims, liens, demands, actions and causes of action whatsoever and including reasonable attorney's fees and costs arising out of or related to any loss, cost damage or injury, including death of any person or damage to property of any kind caused by the Contractor, its employees, agents suppliers or subcontractors, while engaged in any activity associated with the Project whether contractual or otherwise.
19. Risk of Loss. All work on the Project covered by this Agreement done on site or in preparing or delivering materials, excluding materials supplied by Owner under this Agreement, or equipment, or any or all of them, to the site shall be at the risk of Contractor until the completed work is accepted by the Owner.
20. Insurance. Before any Work at the site is started, Contractor shall deliver to TMV certificates of insurance (and other evidence of insurance or any additional insured TMV may reasonably request) which Contractor is required to purchase and maintain as set forth below:

1. Workers' Compensation and Employer's Liability as required by statute. Employer's Liability coverage is to be carried for a minimum limit of \$100,000 for each accident.
2. Automobile Liability for limits not less than \$500,000 combined single limit for bodily injury and property damage for each occurrence. Coverage shall include owned, non-owned and hired automobiles.
3. Commercial General Liability for limits not less than \$2,000,000 single limit for bodily injury and property damage for each occurrence. Coverage shall include blanket contractual, broad form property damage, products and completed operations Contractor's protective endorsements.
4. Contractor must include as additional insureds TMV, and TSG Ski and Golf, LLC their agents, employees and assigns.

"Policies are primary and non-contributory for all claims arising from Contractor's work

21. Compliance. The Contractor shall comply with all applicable safety precautions used in the industry or imposed by applicable laws and regulations in order to adequately protect the Project and avoid injury and damage to persons or property. The Contractor shall be solely responsible for any damage to persons or property resulting from Contractor's failure to exercise safety precautions, negligence or misconduct of Contractor or Contractor's employees, agents, subcontractors and suppliers. Contractor shall notify Owner within twenty-four (24) hours of the occurrence of any injury or property which may occur on the Project. Contractor accepts sole responsibility for providing a safe place to work for its employees, for adequacy of and required use of all safety equipment and for full compliance with any applicable laws and regulations.
22. Hazardous Materials. Contractor shall not cause or permit "Hazardous Materials" (as defined herein) to be brought, kept or used in or about the Project except to the extent such Hazardous Materials: (i) are necessary for prosecution of the Work; (ii) are required by this Agreement; and (iii) have been approved in writing by Contractor. Hazardous Materials allowed on the Project shall be used, stored and disposed of in compliance with all laws relating to such Hazardous Materials. Unused or surplus Hazardous Materials, as well as other Hazardous Materials placed, released or discharged on the Project by Contractor or its employees, agents, suppliers or subcontractors, shall be removed from the Project at the earlier of: (i) completion of the Work requiring the use of Hazardous Materials; (ii) completion of the Work as a whole or (iii) within twenty-four (24) hours of Contractor's demand for removal. The removal shall be undertaken by Contractor at its sole cost and expense, and shall be performed in accordance with all laws.

Damage to the Project or any adjacent property resulting from improper use, or any discharge or release of Hazardous Materials shall be remedied by Contractor at its sole cost and expense, and in compliance with all laws. Contractor shall indemnify Owner for any and all damage, without limitation arising from the use, or misuse of Hazardous Materials. Contractor shall immediately notify Contractor of any release or discharge of Hazardous Materials on the Project.

The term "Hazardous Materials" means any hazardous or toxic substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (19 CFR 172.101) or listed by the Environmental Protection Agency as hazardous substances (40 CFR part 302) and any amendments thereto, and any substances, materials or wastes that are or become regulated under federal, state or local law, including but not limited to petroleum asbestos and PCB's.

23. Warranty. Contractor warrants to Owner that all materials (excepting the materials provided by Owner) and equipment furnished shall be new unless otherwise specified and that all work under this Agreement shall be performed in a good and workmanlike manner, shall be of good quality, free from faults and defects, and shall be in conformance with this Agreement. All work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The warranty provided in this section 23 shall be in addition to and not in limitation of any other warranty or remedy required by law this Agreement or from a third party manufacturer.

Contractor hereby expressly warrants its work for a period of two (2) years from the date of acceptance by Owner of Contractor's work, or from the date of the Final Payment, whichever is later in time. In the event that during the express warranty period, any faulty or defective materials, excepting materials provided by Owner under this Agreement, or faulty or defective workmanship is discovered, Owner may give written notice thereof to Contractor with the request that Contractor immediately repair or remedy such defects and any and all damages caused by such defects at the sole cost and expense of Contractor. Contractor covenants that it shall commence and pursue diligently the repair and remedy of such defects and resultant damage within ten (10) business days after receipt of said notice. In the event that Contractor fails to commence such corrective work within said period, or fails to diligently pursue to completion such corrective work, then, the Owner may correct or repair the work, with reimbursement to be made to Owner within ten (10) days of Contractor's receipt of Owner's invoice of reasonable costs, fees, expenses related to correction of the work.

24. Assignment. Contractor shall not, without the written consent of the Owner, assign or transfer any portion of this Agreement or the work required by this Agreement to a third party.
25. Independent Contractor. Both parties expressly agree and acknowledge that Contractor is an independent contractor and this Agreement shall not be construed in any way to create any type of employee/employer relationship, master/servant relationship, partnership or joint venture.

26. Clean Job Site. At all times during the course of work on the Project, Contractor shall maintain the site in a clean, safe and orderly condition. Upon completion of the work, Contractor shall remove from the site all hazardous materials, temporary structures, debris and waste incident to its operation to the condition existing prior to the start of work, relative to the performance of this Agreement.
27. Costs and Attorney's Fees. In the event of any dispute, including but not limited to litigation, arbitration or mediation, the prevailing party shall be entitled to receive all reasonable costs, including reasonable attorney's fees.
28. Amendment. This Agreement shall only be amended by a writing signed by both parties. Verbal amendments shall not be valid under any circumstances.
29. Binding. This Agreement shall be binding upon and inure to the benefit of both parties successors and assigns.
30. Venue and Choice of Law. This Agreement shall be construed and interpreted according to the laws of the State of Colorado. The parties hereby consent to venue lying exclusively with the courts of San Miguel County, Colorado.

Executed the date first written above:

OWNER:

TOWN OF MOUNTAIN VILLAGE, a home-rule municipality and political subdivision of the state of Colorado.

By: _____

CONTRACTOR:

By: _____

BIDDER'S QUALIFICATION STATEMENT
Town of Mountain Village,
2017 Waterline Improvement Projects

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES: CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS COMPLETION OR MODIFICATION.

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO: Finn Kjome, Public Works Director

**ADDRESS: 411 Mountain Village Blvd., 2ND Floor
Mountain Village, CO 81435**

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

NAME OF PROJECT (if applicable):

TYPE OF WORK (file separate form for each Classification of Work):

- | | |
|---|--|
| <input type="checkbox"/> General Construction | <input type="checkbox"/> Paving |
| <input type="checkbox"/> Earthwork/Mass Grading | <input type="checkbox"/> Concrete (Curb/Gutter, Flatwork) |
| <input type="checkbox"/> Dry Utilities (Power/Gas/Cable/Fiber) | <input type="checkbox"/> Landscaping |
| <input type="checkbox"/> Wet Utilities (Water/Sewer lines & related) | <input type="checkbox"/> Fencing |
| <input type="checkbox"/> Drainage (storm sewer, culverts & related) | <input type="checkbox"/> Other (describe) |

ORGANIZATION

- 1.1** How many years has your organization been in business as a Contractor?
- 1.2** How many years has your organization been in business under its present business name?
 - 1.2.1** Under what other or former names has your organization operated?

1.3 If your organization is a corporation, answer the following:

- 1.3.1** Date of incorporation:
- 1.3.2** State of incorporation:
- 1.3.3** President's name:
- 1.3.4** Vice-president's name(s):
- 1.3.5** Secretary's name:
- 1.3.6** Treasurer's name:

1.4 If your organization is a partnership, answer the following:

- 1.4.1** Date of organization:
- 1.4.2** Type of partnership (if applicable):
- 1.4.3** Name(s) of general partner(s):

1.5 If your organization is individually owned, answer the following:

- 1.5.1** Date of organization:
- 1.5.2** Name of owner:

1.6 If the form of your organization is other than those listed above, describe it and name the principals:

2. LICENSING

2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

2.2 List jurisdictions in which your organization's partnership or trade name is filed.

3. EXPERIENCE

3.1 List the categories of work that your organization normally performs with its own employees and equipment.

3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

3.2.1 Has your organization ever failed to complete any work awarded to it?

3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

3.2.3 Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years?

3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

3.4.1 State total worth of work in progress and under contract:

3.5 On a separate sheet, list the major projects your organization has completed in the past five years; giving the name of project; owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own employees and equipment.

3.5.1 State average annual amount of construction work performed during the past five years:

3.6 On a separate sheet, list the construction experience relating specifically to areas within the scope of this project and present commitments of the key individuals of your organization.

4. REFERENCES

4.1 Trade References:

4.2 Bank References

4.3 Surety:

4.3.1 Name of bonding company:

4.3.2 Name, address and telephone number of agent:

4.3.3 Maximum available bonding capacity as of this date

5. SIGNATURE

5.1 Dated this ____ day of _____

Name of Organization:

By: _____

Title:

5.2

_____ being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this ____ day of _____

Notary Public: _____

My Commission Expires: _____

**NOTICE OF INTENT TO AWARD
Town of Mountain Village,
2017 Waterline Improvement Projects**

Date:

TO:

The Owner, having duly considered the Bid submitted on _____ for the work covered by the Bidding Documents titled **Town of Mountain Village, 2017 Waterline Improvement Projects** in the amount of _____, and it appearing that the Price and other information in your Bid Form is fair, equitable and to the best interest of the Owner, the offer in your Bid Form is hereby accepted.

In accordance with the terms of the Bidding Documents, you are required to execute the Agreement and Performance and Payment Bond in three counterparts within ten (10) calendar days from and including the date of this Notice of Award.

In addition, you are required to furnish at the said time Certificates of Insurance evidencing compliance with the requirements for insurance as stated in the Bidding Documents.

The Bid Security submitted with your Bid will be returned upon execution of the Agreement, furnishing of the required Performance and Payment Bond and Certificates of Insurance within the time limit specified. In the event that you should fail to execute the Agreement and Performance and Payment Bond within the time limit specified, said Security will be retained by the Owner as liquidated damages and not as a penalty for the delay and extra work caused thereby.

Sincerely,
Town of Mountain Village.

ACCEPTANCE OF NOTICE OF INTENT TO AWARD

Receipt of the Notice of Intent to Award is hereby acknowledged on this ____ day
of _____, 2017.

By _____

Title _____

Company _____

Please complete and return this form with the Agreement, Certificates of Insurance, bonds, and completed W-9 in one envelope to offices of the Town of Mountain Village within ten (10) calendar days.

PERFORMANCE AND PAYMENT BOND
Town of Mountain Village, 2017 Waterline Improvement Projects

THE STATE OF _____)
) ss. KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF _____)

That we _____, of the City of _____, County of _____, and State of _____ (hereinafter called "Principal") as Principal, and _____(hereinafter called "Surety") as Surety, authorized under the laws of the State of Colorado to act as surety on bonds for principals, are held and firmly bound unto the Town of Mountain Village, (hereinafter called "Owner") as obligee, in the penal sum of _____ (\$_____) in lawful money of the United States for payment by Principal and Surety, and bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally and firmly by these presents.

WHEREAS, Principal has, on _____, 20____, entered into a written Agreement with Owner for construction of the Project as defined in said Agreement, which Agreement is by reference made a part hereof and is hereinafter referred to as the Agreement.

NOW, THEREFORE, the conditions of this obligation are that if the Principal shall: (1) faithfully perform said Agreement on Principal's part and satisfy all claims and demands incurred for the same; (2) fully indemnify and save harmless the Owner from all costs and damages which said Owner may suffer by reason of Principal's failure so to do; (3) fully reimburse and repay said Owner all outlay and expenses which said Owner may incur in making good any default; (4) pay all persons, firms and corporations all just claims due them for the payment of all laborers and mechanics for labor performed, for all materials and equipment furnished, and for all materials and equipment used or rented in the performance of Principal's Agreement; and (5) keep the Work constructed under this Agreement in good repair for a period of one year from date of final acceptance by said Owner, then this obligation is null and void; otherwise it shall remain in full force and effect

The Principal shall protect, defend, indemnify and save harmless the Owner, the Engineer, and their officers, agents, servants and employees, from and against suits, actions, claims, losses, liability or damage of any character, and from and against costs and expenses including, in part, attorney fees incidental to the defense of such suits, actions, claims, losses, damages or liability on account of injury, disease, sickness, and death to any person or damage to property, including in part the loss of use resulting therefrom, based upon or allegedly based upon any act, omission or occurrence of the Principal, or his employees, servants, agents, subcontractors or suppliers, or anyone else under the Principal's direction and control, and arising out of, occurring in connection with, resulting from, or caused by the performance or failure of performance of any work or services called for by the Agreement, or from conditions created by the performance or non-performance of said work or services.

PERFORMANCE AND PAYMENT BOND

This indemnity shall not extend to liability arising out of the preparation by the Engineer of the design or specifications for the Owner or the giving of written directions or instruction by the Engineer as may be required by the Bidding Documents, provided the giving of such written instructions or directions is the proximate cause of the injury or damage should it occur.

Whenever Principal shall be, and is declared by Owner to be, in default under the Agreement, the Owner having performed Owner's obligations thereunder, the Owner may avail itself of the provisions of the General Conditions which are incorporated by reference in the Agreement and the Surety shall promptly pay the amounts, if any, due Owner by Principal.

Any suit under this Bond must be instituted before the expiration of one year from the date on which final payment under the Agreement falls due. In the event of a dispute as to the terms and conditions of the Bidding Documents, the prevailing party in any such action shall collect all reasonable costs and expenses incurred in such action, including, but not limited to, reasonable attorney's fees.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the successors and assigns of Owner and to all persons, firms and corporations for all just claims due them for the payment of all laborers and mechanics for labor performed, for all materials and equipment furnished, and for all materials and equipment used or rented in the performance of Principal's Agreement.

The Surety hereby waives the right to special notification of any notification of or alterations, omissions or reductions, extra or additional work, extensions of time, Change Orders, Field Orders or any other act or acts of Owner or its authorized agents under the terms of the Agreement; and failure to notify Surety of such shall in no way relieve Surety of its obligations.

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

PRINCIPAL: _____

Witness By: _____

(Address)

SURETY: _____

Witness By: _____

(Address)

NOTICE TO PROCEED

Date:

Re: **Town of Mountain Village, 2017 Waterline Improvement Projects**

Dear:

The date of Notice to Proceed for the above project is:

In accordance with the Agreement dated _____, 2017, you are hereby notified to commence work within seven (7) calendar days after this Notice to Proceed, hence on or before _____, 2017.

You are to complete the work by the date shown in Schedule B: Bid Form of the contract documents.

Cordially,

Town of Mountain Village

ACCEPTANCE OF NOTICE TO PROCEED

Receipt of the Notice to Proceed is hereby acknowledged on this ____ day of _____, 2016.

By _____

Title _____

Company _____

Please complete and return this form within ten days to:

Finn Kjome
Public Works Director
Town of Mountain Village
411 Mountain Village Blvd., 2nd Floor
Mountain Village, CO 81435

APPLICATION FOR PAYMENT NO. _____
Town of Mountain Village, 2017 Waterline Improvement Projects

To: _____ (OWNER)
From: _____ (CONTRACTOR)
Contract: _____
Project: _____
OWNER's Contract No. _____ ENGINEER's Project No. _____
For Work accomplished through the date of: _____.

- | | | |
|-----------|--|-----------------|
| 1. | Original Contract Price: | \$ _____ |
| 2. | Net change by Change Orders and Written Amendments (+ or -): | \$ _____ |
| 3. | Current Contract Price (1 plus 2): | \$ _____ |
| 4. | Total completed and stored to date: | \$ _____ |
| 5. | Retainage (per Agreement): | |
| | _____% of completed Work: | \$ _____ |
| | _____% of stored material: | \$ _____ |
| | Total Retainage: | \$ _____ |
| 6. | Total completed and stored to date less retainage (4 minus 5): | \$ _____ |
| 7. | Less previous Application for Payments: | \$ _____ |
| 8. | DUE THIS APPLICATION (6 MINUS 7): | \$ _____ |

Accompanying Documentation:

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied on account to discharge CONTRACTOR's legitimate obligations incurred in connection with Work covered by prior Applications for Payment numbered 1 through _____ inclusive; (2) title of all Work, materials and equipment incorporated in said 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, security interests and encumbrances (except such as are covered by a Bond acceptable to OWNER indemnifying OWNER against any such Lien, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Bidding Documents and not defective.

Dated _____ CONTRACTOR
By:

State of _____
County of _____
Subscribed and sworn to before me this _____
day of _____, _____

Notary Public
My Commission expires: _____
Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated _____ ENGINEER
By:

INSTRUCTIONS

A. GENERAL INFORMATION

The sample form of Pay Request is intended as a guide only and shown below. Many projects require a more extensive form with space for numerous items, descriptions of Change Orders, identification of variable quantity adjustments, summary of materials and equipment stored at the site and other information. It is expected that a separate form will be developed by Engineer and Contractor at the time Contractor's Pay Request Form is finalized. Note also that the format for retainage must be changed if the Contract permits (or the law provides), and Contractor elects to deposit securities in lieu of retainage. Refer to Article 14 of the General Conditions for provisions concerning payments to Contractor.

Pay Request #1, Town of Mountain Village, 2016 Meadows Base Area Improvements											
Date:											
ITEM#	ITEM DESCRIPTION	CONTRACT				PREVIOUS PAYMENTS		TOTAL TO DATE		DUE THIS PERIOD	
		QUANTITY	UNIT	UNIT COST	TOTAL COST	AMOUNT	TOTAL AMT	AMOUNT	TOTAL AMT	AMOUNT	TOTAL AMT
Change Order #1											
Change Order #2											
Total						Total					

Note: Total Pay Request Form Amount should equal the current Contract Price.

B. COMPLETING THE FORM

The Pay Request Form, submitted and approved as provided in paragraphs 2.05.B.3 and 2.07 of the General Conditions, should be reproduced as appropriate in the space indicated on the Application for Payment form. Note that the cost of materials and equipment is often listed separately from the cost of installation. Also, note that each Unit Price is deemed to include Contractor's overhead and profit.

All Change Orders affecting the Contract Price should be identified and included in the Schedule of Values as required for progress payments.

The form is suitable for use in the Final Application for Payment as well as for Progress Payments; however, the required accompanying documentation is usually more extensive for final payment. All accompanying documentation should be identified in the space provided on the form.

C. LEGAL REVIEW

All accompanying documentation of a legal nature, such as Lien waivers, should be reviewed by an attorney, and Engineer should so advise Owner.

CONTRACTOR'S AFFIDAVIT AND PARTIAL RELEASE OF LIENS
Town of Mountain Village, 2017 Waterline Improvement Projects

OWNER: Town of Mountain Village

CONTRACTOR: _____

1. Affiant is duly authorized to make this affidavit agreement on behalf of Contractor and is fully and personally cognizant of all facts and matters herein stated.

2. Pursuant to that certain Construction Contract between ("Owner") and Contractor dated _____, materials, services and supplies for use in connection with the **Town of Mountain Village, 2017 Waterline Improvement Projects** AT the property ("Property") located in San Miguel County, Colorado.

3. All bills, debts, claims or accounts now due which Contractor has incurred to any person, firm or corporation for work or labor performed for equipment rental, or for materials, specially fabricated materials, services or supplies furnished in connection with work under such Contract thru _____, (which date is the last day covered by the Affidavit and Release and is herein called the "payment date") have been paid, settled or discharged in full or are included in the amount requested in Contractor's current payment application, and no basis exists for affixation of liens against the above-described Property and improvements thereon by virtue of any work performed under such Contract to and including the payment date, except for retainage. Contractor has not received any notice or communication that any subcontractor, material man, laborer or other party has not been fully paid for all labor performed or materials heretofore furnished in connection with work performed under such Contract to and including the payment date, except for retainage.

4. This agreement constitutes a partial release and waiver of all liens to which Contractor may be entitled against the above described Property, all improvements thereon and any fixtures, chattels or other property of Owner, thereon on account of all work performed and all materials furnished under such Contract to and including the payment date.

5. Affiant understands that this affidavit is made for the purpose of inducing Owner to make payments under the Contract and that, in making any such advance. Owner will rely upon the accuracy of the matters stated in this affidavit. Contractor therefore agrees to indemnify and hold Owner and Owner's lender, and their respective successors and assigns, harmless from any loss, cost or expense incurred by virtue of any claims made against them on account of any unpaid bills for labor heretofore performed or for materials, specially fabricated materials, services or other supplies furnished under such Contract to and including the payment date.

EXECUTED THIS _____ day of _____, 201__.

By: _____
Name: _____
Title: _____

CHANGE ORDER
Town of Mountain Village, 2017 Waterline Improvement Projects
No. 1

Project: TMV 2017 Waterline Improvements Owner: Town of Mountain Village

Date of issuance: Effective Date:

Contractor is hereby instructed to proceed with the following changes:

Description of changes

Purpose of the Change Order:

Original Contract Price	\$
Net change by previous Change Orders	\$
Contract Sum prior to this Contract Modification	\$
Contract Sum will have decreased (per itemization above)	\$
New Contract Sum including this Contract Modification	\$

Change in contract time: _____

Recommended:

By: _____
(Authorization signature)

Engineer

By: _____
(Authorization signature)

Accepted:

Contractor

By: _____
(Authorization signature)

Accepted:

Owner

SPECIAL PROVISIONS
Town of Mountain Village,
2017 Waterline Improvement Projects

A. Project Description

The scope of work for this Project includes installation of approximately 2,000 total linear feet of domestic waterline in two different locations as shown on the construction drawings and with components as follows:

Lift 7/Coonskin Waterline Improvement

1. Excavating existing waterlines at specified tie-in locations.
2. Install 8-inch and 12-inch welded steel pipe and appurtenances in the same trench.
3. Bed pipe in washed rock to drain to low point/existing swale.
4. Connection of new welded steel lines to existing ductile iron waterlines.
5. Abandon specified waterline sections in place.
6. Seeding and mulching disturbed project area.

Touchdown Drive Waterline Improvement

1. Excavating existing waterlines at specified tie-in locations.
2. 8-inch HDPE pipe and appurtenances (Options A in open trench or Option B in a boring)
3. Connection of new HDPE line to existing ductile iron waterline.
4. Abandon specified waterline sections in place.
5. Bed pipe in washed rock to drain to low point/existing swale.
6. Backfill new waterline trench.
7. Landscaping disturbed project area.

B. General Items

1. **Contact** - Finn Kjome, Public Works Director will be the Project Manager and he or his designee shall be main point of contact for this project. Russell Planning and Engineering, Inc. may also serve as Mountain Village designee, Mountain Village Public Works Department designee, or Town Representative in the contract documents. Designated members of the Mountain Village Public Works Department may also serve as inspectors on the project.
2. **Schedule** – **All bidders shall submit a detailed schedule for project completion with their bid.** Time is of the essence for completion of this project. A separate Notice to Proceed shall be issued for each of the two projects, and the Contractor shall have 60 days from issuance of the Notice to Proceed to establish Substantial Completion of the Project..
3. **Submittals** - Contractor shall provide the following submittals (as well as any other submittals deemed necessary during the course of the project) to Russell Planning and Engineering, Inc.:
 - Welded steel pipe
 - HDPE Pipe
 - Pipe appurtenances (valves, bends, etc.)
 - Casing materials (if proposed by the contractor) associated with bore
 - Bedding material
 - Concrete mix design

SPECIAL PROVISIONS

- Cost for these, and any other required submittals shall be incidental to the proposal items they are associated with.

C. Method of Measurement and Payment

This section describes the bid line items for the project and shall be used in conjunction with the Bid Schedule to determine the measurement of quantities and the method of payment. The various bid line items and the items included with them are described more fully as follows:

101. Mobilization

Description: Includes all labor, materials, and equipment costs to mobilize for the project including such items as moving equipment, trucks, and personnel both to the site and off of the site upon completion of the work. All expenses for which there are no specific pay items such as permits, bonds, project coordination, materials and quality control testing coordination, storage of materials, removal and disposal of construction debris and temporary supplies, including power, telephone, and temporary offices necessary for the execution of the work, shall be included in this proposal item. All work and testing for the work shall conform to the Project's Standard Specifications and these Special Provisions. The staging area and surrounding disturbed areas are to be returned to their original condition. Selection and payment of a firm for materials and quality control testing shall be the responsibility of the Town of Mountain Village. All United States Forest Service Permitting shall be paid for by the Town. An Excavation Permit for work in the Public Right of Way dedicated to the Town of Mountain Village shall be paid for by the Town.

The Town of Mountain Village will perform leak detection testing using a Subsurface LC-2100 between every gate valve installed, and contractor will be responsible for repairing any leaks detected. Contractor will be responsible for disinfecting and flushing the line.

Pay Item: Payment shall be based on the percentage completion of the entire job as determined by the total amount paid to date for all line items excluding items 101 through 106 divided by the total contract amount including change orders.

102. Construction Staking/Surveying

Description: Includes all labor, materials, and equipment costs associated with staking the waterline and any other related construction staking that is required. Contractor shall get TMV proposed waterline and waterline appurtenance locations from the construction drawings. Any monuments that are disturbed during construction shall be replaced at the contractor's expense.

This item shall include any additional surveying necessary to certify elevations for all earthwork measurements and verification of plan quantities if the contractor thinks there are discrepancies between the topographic data shown on the construction drawings and the field conditions (Note: topographic mapping for the Lift 7/Coonskin Waterline project has been field surveyed by **SGM, Inc.**).

Pay Item: Payment shall be based on the percentage completion of the entire job as determined by the total amount paid to date for all line items excluding items 101 through 106 divided by the total contract amount including change orders.

SPECIAL PROVISIONS

103. Traffic Control – Touchdown Drive Waterline Replacement

Specifications: Per CDOT and MUTCD

Description: Includes all labor, materials, and equipment costs associated with all necessary traffic control for construction of the proposed improvements along the proposed waterline design route where existing roads are crossed or impacted. Traffic control shall meet all Colorado Department of Transportation and the Manual of Uniform Traffic Control Devices requirements. A traffic control plan shall be provided to the Town of Mountain Village for approval prior to the start of work.

A minimum of one lane shall be maintained and open at all times, with the exception of up to 20 minute delays if a two day notice is given to the Town so they can notify residents of the delays. With two day notice, under unique circumstances the contractor may request that the road be closed with proper notice for up to 2 hours during paving operations.

Pay Item: Payment shall be based on the percentage completion of the entire job as determined by the total amount paid to date for all line items excluding items 101 through 106 divided by the total contract amount including change orders.

104. Trail detours/relocation

Specifications: Per United States Forest Service (USFS) and the USFS Operating Plan Town of Mountain Village 2017 Waterline Improvements Project.

Description: Includes all labor, materials, and equipment costs associated with all necessary USFS Trail use interruptions for construction of the proposed improvements along the proposed waterline design route. The Town of Mountain Village will provide signage and flaggers, if deemed necessary.

While ground is disturbed along any of the below listed trails, the contractor shall completely close the trail. The contractor will coordinate with the Town of Mountain Village and other agencies to determine acceptable trail re-routing and closure dates. The Town shall provide orange construction fencing or other deterrents/barricades deemed necessary by the Town/contractor to protect the jobsite. The Town of Mountain Village will provide staff to assist in re-directing trail users and signage indicating trail closures and dates. At no time will the public be allowed on a trail that has open trenching or active machinery in close proximity.

1. Prospect Trail
2. Town of Mountain Village Trail
3. Summer Road

Pay Item: Payment shall be based on the percentage completion of the entire job as determined by the total amount paid to date for all line items excluding items 101 through 106 divided by the total contract amount including change orders. The Contractor may request payment in full for this line item at such time as all aspects of the project with expected trail impacts and closures have been accepted and considered complete by the Town.

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105. Erosion Control/Storm Water Management (pre-construction, during construction, and post-construction)

Specifications: Per CDPHE permit requirements, the USFS Operating Plan Town of Mountain Village 2017 Waterline Improvements Project, and Sections 107.25, 208, 209, 212, 213, 214, 215, 216, 217, and 250 of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, 2011 Edition and Section M-208-1 of the Colorado Department of Transportation Standard Plans List M&S Standards, July 2012 Edition.

Description: Includes all labor, materials, and equipment costs associated with standard methods of protection from erosion and stormwater management. Although the project should disturb less than an acre and a State of Colorado Department of Health and Environment (CDPHE) Stormwater Discharge Permit may not be required, the contractor will be expected to protect adjacent areas to the project site from erosion and deposition due to impacts of the project.

Topsoil identified in areas to be excavated will be selectively removed from unsuitable sub-soils, whenever practical. Salvaged topsoil shall be re-spread over the disturbed areas prior to re-vegetation. In areas where topsoil is not available, the top cover material (if present) will be saved and spread over the surface after re-grading and backfilling is complete. Replacing cover material will assist in the natural re-vegetation of the area.

Includes seeding, mulching with a certified weed-free hay or straw (at a minimum rate of 2 tons per acre), crimping the hay or straw, and planting all disturbed areas with seed mix(es) described in the “USFS Operating Plan, Town of Mountain Village, 2017 Waterline Improvement Project”, contained in this project manual.

Straw in such advanced stages of decomposition as to smother or retard the normal growth of grass will not be accepted. Old dry straw, which breaks in the crimping process in lieu of bending will not be accepted. Work shall include the cost of dust control and watering.

For Schedule one (Lift 7/Coonskin Waterline) the seed mix shall be Pawnee Butte Seed, Inc. PB-36047-14 (phone 970-356-7002).

Disturbed areas in Schedule Two (Touchdown Drive Waterline Replacement) must be seeded, mulched with a certified weed-free hay or straw (at a minimum rate of 2 tons per acre). This includes crimping the hay or straw, and planting all disturbed areas with seed mix(es) described in the “USFS Operating Plan, Town of Mountain Village, 2017 Waterline Replacement Project”, contained in this project manual..

Straw in such an advanced stages of decomposition as to smother or retard the normal growth of grass will not be accepted. Old dry straw, which breaks in the crimping process in lieu of bending will not be accepted. Work shall include the cost of dust control, and watering.

Seed mix shall be as follows:

(a) Native Grass Seed Mix (General Revegetation)

Western Yarrow 5%

Tall Fescue 10%

Arizona Fescue 5%

Hard Fescue 5%

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Creeping Red Fescue 10%
Alpine Bluegrass 15%
Canada Bluegrass 10%
Perennial Ryegrass 15%
Slender Wheatgrass 10%
Mountain Brome 15%

(b) Wetlands Buffer Mix

To be planted within twenty feet (20') of wetland areas
Arizona Fescue 14%
Alpine Bluegrass 14%
Slender Wheatgrass 35%
Mountain Brome 36%

Contractor shall at all times have materials for BMP's (erosion logs, silt fencing, etc.) on site and ready to use. Contractor is responsible for maintaining and repairing erosion control BMP's at his expense during construction.

Dewatering shall be done in accordance with all stated requirements in the CDPHE stormwater permit and the "USFS Operating Plan, Town of Mountain Village, 2017 Waterline Extension Project".

Contractor shall be responsible for dust and mud control of his construction activity as per the CDPHE stormwater permit requirements and the stormwater management plan (SWMP). During dry weather conditions, Contractor shall wet down his Work area and roads leading to Work area as needed to keep airborne dust generated by his activities to an absolute minimum. Vehicles leaving site shall take proper measures to clean excess mud from vehicle before entering improved street areas. Contractor shall clean mud and debris tracking off asphalt roads immediately.

In addition to the Contractor's responsibility to perform inspections per the State Permit, Owner's Designated Representative will perform stormwater inspections and direct the contractor to perform necessary maintenance to BMPs during construction.

Pay Item: Payment shall be based on the percentage completion of the entire job as determined by the total amount paid to date for all line items excluding items 101 through 106 divided by the total contract amount including change orders.

106. Record Drawings

Specifications: Per Requirements of these Special Conditions

Description: Record drawings shall include accurate as-constructed drawings of the utilities in both CAD and pdf format, providing northings and eastings and vertical elevation for new waterlines and all appurtenances.

Two weeks prior to consideration of substantial completion, full as-built data will be required including, but not limited to all valve locations, bends, tees, crosses, end caps, pressure reducing valves and vaults, meter pits, crossings with other utilities, and any other water related appurtenances;

As-built data provided by a licensed surveyor in CAD format will be required.

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Pay Item: Measurement shall be on a lump sum basis upon completion, submittal and acceptance of ALL required as-builts to the Town of Mountain Village.

201. Welded steel pipe in trench (12-inch, 8-inch, and 6-inch)

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 200.

Description: For most of the waterline length, the 12-inch and 8-inch welded steel lines will be installed in the same trench. However, as the replaced section of the 12-inch waterline extends further to the north and south than the 8-inch waterline, the 12-inch waterline will be in its own trench for the far north and south ends of the project area.

Includes all labor, materials, and equipment costs associated with the installation of an epoxy coated steel waterline with a working pressure of 400 psi or above per the construction drawings and contract documents. Pipe shall be epoxy coated inside and epoxy or tape coated outside per AWWA C210 or C214. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of select native bedding material, placement of the pipeline to grade, tracer wire, warning tape, backfilling, and compacting the trench backfill up to the level of the surrounding ground. Contractor shall provide 6 inches of shading with fine native material above all pipe. All material used for backfill above the bedding and shading zones shall meet CDOT specifications for Class 2 structure backfill.

All waterlines must have locate wire installed at the depth of the pipe and brought up on all valves. A warning ribbon must also be installed at approximately 1 foot above pipe.

For cathodic protection, UltraMag™ high potential magnesium anode, model 20D2, or approved equal, connected to the pipe per manufacturers recommendations every 200 feet of steel pipe.

PTFE gaskets shall be used on all flanged connections.

Pay Item: Measurement shall be in linear feet. Payment shall be made based on the number of linear feet installed.

202. Welded steel pipe horizontal bend

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 200.

Description: Includes all labor, materials, and equipment costs associated with the installation of a waterline bend per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the bend, relevant thrust blocks (see typical details in construction drawings) tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of the surrounding ground.

PTFE gaskets shall be used on all of the flanged connections.

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Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of bends installed.

203. Welded steel pipe vertical bend

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 200.

Description: Includes all labor, materials, and equipment costs associated with the installation of a waterline bend per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the bend, tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of the surrounding ground.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of bends installed.

204. Welded steel pipe tees

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 200.

Description: Includes all labor, materials, and equipment costs associated with the installation of a steel waterline tee per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the tee, installation of the tee to grade, mega lugs or equivalent, thrust block, tracer wire, warning tape, backfilling, and compacting the embankment up to the level of the surrounding ground.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of tees installed.

205. Welded steel gate valve on steel pipe

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 200.

Description Includes all labor, materials, and equipment costs associated with the installation of a double flanged waterline Kennedy Model 8561A gate valve per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the valve, installation of the valve to grade, installation of flanges on both adjacent pipes, tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of

SPECIAL PROVISIONS

the surrounding ground. Work shall also include valve boxes and stems, raising or lowering valve boxes as required by final grade and installation of a minimum of two 3-inch grade rings leaving the top of the valve box with grade rings a minimum of 2-inches below grade. All main line valves must have a valve box adapter installed between the valve and first section of the standpipe to help keep standpipe straight and contaminate free.

Valve stems shall have extensions installed to bring the top of the valve stem to within one foot of the surface of the valve box so a shorter key may be used.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of gate valves installed.

206. Waterline pipe connections

Specifications: Per Requirements of these Special Conditions.

Description: For connections #1-#4 (tying-in proposed welded steel with existing ductile iron waterline at the north and south ends of the Coonskin project area), either the 12-inch or the 8-inch can be shut down for up to (2) working days. The 12-inch waterline and the 8-inch waterline cannot be shut down at the same time.

Connection #1: Connect 12-inch welded steel pipe to existing 12-inch ductile iron pipe (north). Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. Pipe connections should follow the *Coonskin Waterline Tie-In Detail* and *Coonskin Waterline Concrete Anchor Block Detail* included in the construction drawings. Payment under this line item shall include the necessary ductile iron pipe, ductile iron bends, thrust blocks, concrete anchor block, and ductile iron pipe connections. Welded steel pipe and gate valves shall be paid for under the appropriate line item in sections 200 and 300.

Connection #2: Connect 12-inch welded steel pipe to existing 12-inch ductile iron pipe (south). Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. Pipe connections should follow the *Coonskin Waterline Tie-In Detail* and *Coonskin Waterline Concrete Anchor Block Detail* included in the construction drawings. Payment under this line item shall include the necessary ductile iron pipe, ductile iron bends, thrust blocks, concrete anchor block, and ductile iron pipe connections. Welded steel pipe and gate valves shall be paid for under the appropriate line item in sections 200 and 300.

Connection #3: Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (north). Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. Pipe connections should follow the *Coonskin Waterline Tie-In Detail* and *Coonskin Waterline Concrete Anchor Block Detail* included in the construction drawings. Payment under this line item shall include the necessary ductile iron pipe, ductile iron bends, thrust blocks, concrete anchor block, and ductile iron pipe connections. Welded steel pipe and gate valves shall be paid for under the appropriate line item in sections 200 and 300.

Connection #4: Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (south). Connections should join the existing waterline with the proposed welded steel waterline with a

SPECIAL PROVISIONS

minimum of four feet of cover. Pipe connections should follow the *Coonskin Waterline Tie-In Detail* and *Coonskin Waterline Concrete Anchor Block Detail* included in the construction drawings. Payment under this line item shall include the necessary ductile iron pipe, ductile iron bends, thrust blocks, concrete anchor block, and ductile iron pipe connections. Welded steel pipe and gate valves shall be paid for under the appropriate line item in sections 200 and 300.

Connection #5: Connect 8-inch welded steel pipe to existing 8-inch ductile iron pipe (Coonskin tank connection). The new connection shall be made just to the north of the existing 90 degree bend entering the tank, and just south of where the existing line crosses the Summer Road. Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. The pipe connection between Steel and Ductile Pipe should be a flange to flange connection, with other new connections on the Ductile Iron to included Megalugs®. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #6: Connect 6-inch welded steel pipe to existing 6-inch ductile iron pipe (6x6x6 tee). Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. The pipe connection between Steel and Ductile Pipe should be a flange to flange connection, with other new connections on the Ductile Iron to included Megalugs®. 6 inch welded steel pipe should run between connections 6 and 7. Pipe connections should follow the *Tie-over Detail, Connections #6, #7, # 9* included in the construction drawings. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #7: Connect 6-inch welded steel pipe to 8-inch welded steel pipe (8x8x6 tee). Connections should join the existing waterline with the proposed welded steel waterline with a minimum of four feet of cover. The pipe connection between Steel and Ductile Pipe should be a flange to flange connection, with other new connections on the Ductile Iron to included Megalugs®. 6 inch welded steel pipe should run between connections 6 and 7. Pipe connections should follow the *Tie-over Detail, Connections #6, #7, # 9* included in the construction drawings. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #8: Connect proposed 8-inch welded steel pipe to proposed 8-inch welded steel pipe replacement line to the Coonskin Water Tank. (8x8x8 tee). Connections should join with a minimum of four feet of cover. Pipe connections should follow the *Tie-over Detail, Connection #8* included in the construction drawings. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #9: Connect existing 6-inch ductile iron pipe to new 12-inch welded steel pipe (12x12x6 tee). Connections should be made with a minimum of four feet of cover. Connection should involve installation of the 12X12X6 inch tee turned so the 6 inch outlet from the tee is turned down toward the deeper 6 inch line. The new vertical pipe and connections shall be bedded in ¾ inch washed rock. A 6inch vertical bend shall be installed on the 6 inch line to turn the line west toward connections 6 and 7. Pipe connections should follow the *Tie-over Detail, Connections #6, #7, # 9* included in the

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construction drawings. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #10: Connect new HDPE pipe with existing Ductile Iron just south of the existing residential service. Connection shall be made using the HYMAX® Grip restraining system. For cathodic protection, one UltraMag™ high potential magnesium anode, model 20D2, or approved equal, shall be connected in one spot to the existing DIP pipe per manufacturers recommendations. Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Connection #11: Connect new HDPE pipe with existing Ductile Iron just north of the existing fire hydrant lateral. of the existing residential service. Connection shall be made using the HYMAX® Grip restraining system. For cathodic protection, one UltraMag™ high potential magnesium anode, model 20D2, or approved equal, shall be connected in one spot to the existing DIP pipe per manufacturers recommendations Payment under this line item shall be the cost above and beyond the cost of the appropriate appurtenance and pipe installation. Pipe and appurtenances (bends, valves, tees, etc.) shall be paid for under the appropriate line item in sections 200 and 300.

Pay Item: Measurement shall be on an each basis as described further under each connection.

301. Welded HDPE in trench (6-inch and 8-inch)

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: Includes all labor, materials, and equipment costs associated with the installation of HDPE waterline per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, placement of the pipeline to grade, tracer wire, warning tape, backfilling, and compacting the trench backfill up to the level of the surrounding ground. Contractor shall provide 6 inches of shading with fine native material above all pipe. Bedding shall be compacted to at least 90% of the maximum dry density as determined by AASHTO T-180. All material used for backfill above the bedding and shading zones shall meet CDOT specifications for Class 2 structure backfill which shall be compacted to at least 90% of the maximum dry density as determined by AASHTO T-180.

All waterlines must have locate wire installed at the depth of the pipe and brought up on all valves and fire plugs. A warning ribbon must also be installed at approximately 1 foot above pipe.

For saturated areas use bid Item for unstable trench bottom below and fill for unsuitable material below.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be in linear feet. Payment shall be made based on the number of linear feet installed.

302. Welded HDPE in boring (8-inch)

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Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: Includes all labor, materials, and equipment costs associated with the installation of HDPE waterline per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation of boring pits, legal disposal of the excavated material, placement of the pipeline to grade, tracer wire, boring pit backfilling, and compacting up to the level of the surrounding ground. Boring to be flagged by TMV.

All waterlines must have locate wire installed at the depth of the pipe and brought up on all valves. A warning ribbon must also be installed at approximately 1 foot above pipe.

Pay Item: Measurement shall be in linear feet. Payment shall be made based on the number of linear feet installed.

303. 8-inch x 8-inch x 6-inch HDPE pipe tee (include flanges on all sides)

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: Includes all labor, materials, and equipment costs associated with the installation of a triple flanged waterline tee per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the tee, installation of the tee to grade, tracer wire, warning tape, backfilling, and compacting the embankment up to the level of the surrounding ground. Thrust blocks are required, but will be paid for under a separate line item.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of tees installed.

304. 8-inch HDPE gate valve

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description Includes all labor, materials, and equipment costs associated with the installation of a double flanged waterline Kennedy Model 8561A gate valve per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the valve, installation of the valve to grade, installation of flanges on both adjacent pipes, tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of the surrounding ground. Work shall also include valve boxes and stems, raising or lowering valve boxes as required by final grade and installation of a minimum of two 3-inch grade rings leaving the top of the valve box with grade rings a minimum of 2-inches below grade. All main line valves must have a valve

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box adapter installed between the valve and first section of the standpipe to help keep standpipe straight and contaminate free.

Valve stems shall have extensions installed to bring the top of the valve stem to within one foot of the surface of the valve box so a shorter key may be used.

PTFE gaskets shall be used on all of the flanged connections.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of gate valves installed.

305. Remove old fire hydrant

Specifications: Per Requirements of these Special Conditions.

Description: The existing hydrant is to be removed and returned to the town of Mountain Village for re-use if feasible.

Pay Item: Measurement shall be on a lump sum basis upon completion of hydrant removal.

306. Fire hydrant (new)

Specifications: Per Requirements of these Special Conditions.

Description: A new Kennedy Model K821 fire hydrant conforming to AWWA and town specifications is to be installed in the same location of the existing hydrant. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of tees and bends, tracer wire, warning tape, backfilling, and compacting the embankment up to the level of the surrounding ground. Thrust blocks are required, but will be paid for under a separate line item.

Pay Item: **Pay Item:** Measurement shall be on an each basis. Payment shall be made based on the number of fire hydrants installed.

307. 8-inch HDPE pipe angle

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: Includes all labor, materials, and equipment costs associated with the installation of a waterline bend per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the bend, tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of the surrounding ground.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of bends installed.

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308. Thrust blocks (if deemed necessary)

Specifications: Per Requirements of these Special Conditions.

Description: Standard thrust blocks shall be installed if directed at hydrants and tees.

Pay Item: Measurement shall be on a lump sum basis upon completion, submittal and acceptance of ALL required as-builts to the Town of Mountain Village.

309. 8-inch Hymax Grip Coupler

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: Includes all labor, materials, and equipment costs associated with the installation of a Hymax grip coupler per the construction drawings. Work shall include the cost of materials, loading, hauling, excavation, legal disposal of the excavated material, placement of bedding material, assembly of the grip coupler, tracer wire, warning tape, backfilling, and compacting trench backfill up to the level of the surrounding ground.

Pay Item: Measurement shall be on an each basis. Payment shall be made based on the number of couplers installed.

310. Pipe Bedding

Specifications: Per AWWA, CDOT Standard Specifications for Road and Bridge Construction, Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR), and attached specification Section 300.

Description: All welded steel and welded HDPE pipe in trench shall be installed with ¾ inch washed or screened rock bedding within the bedding zone and capped with geotextile fabric to prevent migration of fines into the bedding. Washed rock bedding is included in the pipe installation appurtenances and is not a not a pay item.

Pay Item: Non-pay item. Item is included in cost of piping and appurtenances.

401. Potholing

Specifications: Per Requirements of these Special Conditions

Description: Potholes are to be dug by contractor to verify the depths and waterline sizes at all proposed waterline connections.

Pay Item: Measurement shall be on an each basis.

402. Cut and remove existing asphalt

Specifications: Per Requirements of these Special Conditions.

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Description: The existing asphalt on Touchdown Drive is to be sawcut and removed in order to dig the proposed waterline trench.

Pay Item: Measurement shall be on a square yard basis as measured in the field.

403. Asphalt patching of trench

Specifications: Per Requirements of these Special Conditions.

Description: Upon completion of the waterline replacement, the surface of Touchdown Drive is to be patched and with asphalt meeting CDOT specifications.

Pay Item: Measurement and payment shall be on a tonnage basis.

404. Unsuitable Material Excavation

Specifications: Per Requirements of these Special Conditions.

Description: In areas of unstable or saturated conditions, the Owner's Representative may require removal of unsuitable materials from the bottom of the trench. This includes all labor, materials, and equipment costs necessary for the removal of unsuitable material from the trench bottom and legal disposal at a nearby location designated by the owner's representative. Material caused to be unsuitable due to precipitation and/or runoff is **NOT** payable under this item and is the contractor's responsibility. The amount of material to be removed shall be determined by the Owner's Representative and will not be paid for if not approved in writing prior to the work being completed.

Pay Item: Pay Item: Measurement shall be in cubic yards of unsuitable material excavated measured in place in the field by the Owner's Representative. Estimated bid quantity may or may not be accurate or necessary.

405. Fill for unsuitable material

Specifications: Per Colorado Department of Transportation Standard Specifications for Road and Bridge Construction

Description: Includes all labor, materials, and equipment costs associated with the placement of washed rock or other approved material to be used to stabilize trench with an unstable trench bottom. The necessity for the use of stabilization material and the amount of material necessary shall be determined by the Owner's Representative. Work shall include the cost of material, loading, hauling, placing, compacting, and grading of the required material. This item IS NOT INDICATED ON THE CONSTRUCTION DRAWINGS, but rather is provided as a provision for unforeseen conditions in the field.

Pay Item: Measurement shall be in cubic yards of stabilization material placed measured in place in the field by the Owner's Representative. Estimated bid quantity may or may not be accurate or necessary.

406. Stabilization Geotextile Fabric (nonwoven)

SPECIAL PROVISIONS

Specifications: Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, and Manufacturers Recommendations

Description: Includes all labor, materials, and equipment costs associated with the installation of woven geotextile fabric, for trench bottom stabilization as determined in the field by ENGINEER. Material shall be non-woven geotextile fabric (Tytar 3401 or approved equal) and shall be placed as directed to separate fill used for stabilization from unsuitable base materials below. Installation shall be per “Colorado Department of Transportation Standard Specifications for Road and Bridge Construction” and manufacturers recommendations.

Pay Item: Measurement and payment shall be on a square yard basis measured in the field by the Owner’s Representative. Square yard quantity for pay shall include necessary overlap.

407. Flowfill

Specifications: None

Description: Includes all labor, materials, equipment, and testing costs associated with the installation of flowfill trench backfill **in the top 2 feet of the trench only** for areas where new pipe is installed on Touchdown Drive where asphalt pavement will be the final surface. Work shall include the **ADDITIONAL** cost of materials, loading, hauling, and placement associated with using flowfill for 2 feet of trench backfill instead of standard backfill materials, and placement of plant mixed flowable fill.

Pay Item: Measurement and payment shall be in linear feet, based on plan quantities.

408. Trench drain – daylight line

Specifications: Per Requirements of Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, and these Special Conditions.

Description: Install a perforated pipe wrapped in a 1 foot by 1 foot washed rock bed and fabric to facilitate the drainage and infiltration of water that will gather in the low spot of the utility trench around the waterline. Holes in perforated pipe are to be in the top of the pipe and not the bottom.

For Touchdown Drive, additional costs for placement of flowfill, and asphalt patching will be included under the appropriate line items.

Pay Item: Measurement shall be on a linear foot basis as measured in the field.

409. Trench Dewatering

Specifications: Per these Special Provisions, the USFS Operating Plan, Town of Mountain Village 2017 Waterline Improvements Project, and standard practices.

Description: Includes all labor, materials, and equipment costs associated with dewatering the trench where deemed necessary by the Owner’s Representative. All dewatering must meet the requirements of the SWMP and the USFS Operating Plan, Town of Mountain Village Waterline Extension Project which is attached to this Project Manual.

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Pay Item: Measurement shall be in linear feet. Payment shall be made based on the number of linear feet dewatering is deemed necessary by the Town's Representative.

Section 200

TECHNICAL SPECIFICATIONS FOR STEEL WATER PIPE

PART 1: GENERAL

1.1 Scope of Work

Provide and install steel pipe of the sizes and in the locations shown on the plans and as specified herein.

PART 2: QUALITY ASSURANCE

2.1 Reference Standards

Unless otherwise stated, the latest edition for any commercial standards and all manufacturing tolerances referenced therein shall apply.

ANSI/AWS D1.1	Structural Welding Code- Steel
ANSI/AWS B2.1	Specification for Welding Procedure and Performance Qualification
ANSI/AWWA C200	Steel Water Pipe—6 In. (150 mm) and Larger
ANSI/AWWA C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4 In. (100 mm) and Larger- Shop Applied
ANSI/AWWA C206	Field Welding of Steel Water Pipe
ANSI/AWWA C207	Steel Pipe Flanges for Waterworks Service—Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
ANSI/AWWA C208	Dimensions for Fabricated Steel Water Pipe Fittings
ANSI/AWWA C209	Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipe
ANSI/AWWA C210	Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
ANSI/AWWA C214	Tape Coating Systems for the Exterior of Steel Water Pipelines

ANSI/AWWA C215	Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines
ANSI/AWWA C216	Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fitting
ANSI/AWWA C222	Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings
ASME Section IX	International Boiler & Pressure Vessel Code: Welding and Brazing Qualifications
AWWA M11	Steel Water Pipe: A Guide for Design and Installation
SSPC-PA 2	Systems and Specifications SSPC Painting Manual, Volume 2 Chapter 7: Measurement of Dry Coating Thickness with Magnetic Gages

2.2 Qualifications

- Manufacturers who are fully experienced, reputable, and qualified in the manufacture of the products to be furnished shall furnish all steel pipe and fittings. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.
- Pipe cylinders, lining, coating and fabrication of specials shall be the product of one manufacturer that has at least five (5) years of successful experience manufacturing pipe of the particular type and size indicated. The Pipe Manufacturer must have a certified quality assurance program. This certified program shall be ISO 9001:2000 or other equivalent nationally recognized program as approved by the Owner.

2.3 Warranty

- A one-year warranty for the pipe shall be included from the Contractor, and shall cover the cost of replacement pipe and freight to project site, should the pipe have any defects in material or workmanship.
- In addition to the standard pipe warranty, the welding contractor shall provide in writing a warranty for a period of one year for all the welded joints, including formation, installation, and pressure testing.
- Unless otherwise specified, the warranty periods shall begin Certificate of Acceptance is issued for the contract.

2.4 Submittals

2.4.1 Shop Drawings

Drawings shall be submitted to the Owner for approval and shall include the following:

- Pipeline layout showing stations and elevations.
- Thickness of steel pipe wall, lining and coating
- Details of standard pipe, joints, specials and fittings.
- Type of joint and joint restraint, if any

2.4.2 Design

- Calculations for pipe and fittings including, but not limited to
 - Wall thickness based on external earth and live loading
 - Pressure class based on internal pressure
- Details of joint bonding and field welded joint restraint calculations.

2.4.3 Certifications

- The Contractor shall furnish a certified affidavit of compliance that meets or exceeds the requirements of these specifications for all pipe and fittings furnished.
- Linings for potable piping shall be NSF certified.

2.5 Verification

2.5.1 Inspections

- All pipes shall be subject to inspection at the place of manufacture in accordance with the provisions of AWWA C200 and AWWA coating and lining standard as supplemented by the requirements herein.

2.5.2 Tests

- Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of AWWA C200 and AWWA coating and lining standards.
- The Contractor shall perform required tests at no additional cost to the Owner. The Owner shall have the right to witness all testing conducted by the Contractor,

provided that the Contractor's schedule is not delayed for the convenience of the Engineer.

2.5.3 Welding Requirements

- All welding procedures used to fabricate pipe shall be qualified under the provision of AWS B2.1 or ASME Section IX.

2.5.4 Welder Qualifications

- Skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used shall do all welding. Welders shall maintain current qualifications under the provisions of AWS B2.1 or ASME Section IX. Machines and electrodes similar to those in the work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

2.6 Handling, Storage and Shipping

- Pipe shall be stulled as required to maintain roundness of +/- 1% during shipping and handling.
- Coated pipe shall be shipped on bunks with nylon belt tie-down straps or padded banding located approximately over stulling.
- Coated pipe shall be stored on skids, sand or dirt berms, sand bags, old tires or other suitable means so that coating will not be damaged.
- Coated pipe shall be handled with wide belt slings. Chains, cables or other equipment likely to cause damage to the pipe or coating shall not be used.

2.6.1 *For Tape coated pipe*

Prior to shipment, tape coated pipe shall be visually inspected for damage to the coating by the following procedure:

- When visual inspection shows a dielectric coating system has sustained physical damage, the area in question shall be subjected to an electrical holiday test. Voltage shall be per AWWA C214.
- When the area is tested and there are no holidays or no tearing of the material, (wrinkling or bruising of tape may be permitted) then the area shall be noted "OK" and shipped with no patching required.

2.6.2 *For Polyurethane Coated Pipe*

Prior to shipment, polyurethane coated pipe shall be visually inspected for damage to the coating by the following procedure:

- When visual inspection shows a dielectric coating system has sustained physical damage, the area in question shall be subjected to an electrical holiday test. Voltage shall be per AWWA C222.
- When the area is tested and there are no holidays, the area shall be noted “OK” and shipped with no patching required.

2.6.3 *For Tape or Polyurethane Coated Pipe*

When the damaged area does show damage going clear to the steel from either a visual inspection or a jeep from a holiday detector, the area shall be repaired as per manufacturer’s recommendations.

2.7 **Markings**

The Contractor shall legibly mark all pipes and specials in accordance with the laying schedule and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation. All special pipe sections and fittings shall be marked at each end with top field centerline. The word “top” or other suitable markings shall be painted or marked on the outside top spigot end of each pipe section.

PART 3: PRODUCT

3.1 Material

3.1.1 Pipe

- Steel pipe shall conform to AWWA C200. Steel plate used in the manufacture and fabrication of steel pipe shall meet the requirements of AWWA C200. All longitudinal and girth seams, whether straight or spiral, shall be butt-welded using an approved electric-fusion-weld process.
- Pipe design shall be in accordance with AWWA M11 considering the followings:
 - Internal pressure
 - External pressure
 - Special physical Loading
 - Practical requirements

- Practical design Considerations for steel stresses with various lining and coating
 - Minimum wall thickness of 0.25-inch
- Pipe shall be bedded and backfilled per the Plan details or manufacturer's recommendations utilizing an E' value for design check per AWWA M11 Chapter 6.
 - Pipe is to be furnished principally in 50-foot net laying lengths with shorter lengths, field trim pieces and closure pieces as required by Plan and profile for location of elbows, tees, reducers and other in-line fittings or as required for construction. The pipe fabricator shall prepare a pipe laying schedule showing the location of each piece by mark number with station and invert elevation at each bell end.

3.1.2 Fittings

- Unless otherwise shown on the Plans, all specials and fittings shall conform to the dimensions of AWWA C208. Pipe material used in fittings shall be of the same material and pressure class as the adjoining pipe. The minimum radius of elbows shall be 2 ½ times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11 ¼-degrees (one cut elbow up to 22 ½-degrees). If elbow radius is less than 2 ½ times the pipe diameter, stresses shall be checked per AWWA M11 and the pressure class increased if necessary.
- Fittings shall be equal in pressure class design as the adjoining pipe. Specials and fittings, unless otherwise shown on the Plans, shall be made of segmental welded sections from hydrostatically tested pipe, with ends compatible with the type of joint or coupling specified for the pipe. All welds made after hydrostatic testing of the straight sections of pipe shall be tested per the requirements of AWWA C200 Section 5.2.2.1.

3.1.3 Joints

3.1.3.1 *Rolled Groove Rubber Gasket Joint*

- The standard joint shall be a rolled groove rubber gasket joint unless otherwise noted on the Plans. Rolled groove rubber gasket joints shall conform to AWWA C200 and as shown in Chapter 8 of AWWA M11.
- The O-ring gasket shall have sufficient volume to approximately fill the area of the groove and shall conform to AWWA C200.

- The joint shall be suitable for a working pressure equal to the class of pipe furnished and shall operate satisfactorily with a deflection angle, the tangent of which is not to exceed $1.00/D$ where D is the outside diameter of the pipe in inches with a pull-out of 1-inch.
- Rolled groove rubber gasket joints may be furnished only by a manufacturer who has furnished pipe with joints of similar design for comparable working pressure and pipe diameters that has been in successful service for a period of at least 5 years.

3.1.3.2 *Lap Weld*

- Lap weld joints shall conform to AWWA C200 and as shown in Chapter 8 of AWWA M11.
- Lap field welded joints shall be used where restrained joints are required or indicated on the Plans. The standard bell shall provide for a 2 ½-inch lap. The minimum lap shall be 1-inch. The maximum joint deflection or offset shall be a 1-inch joint pull.
- Lap welded joints shall be welded either externally or internally. Holdbacks for coating and linings shall be provided as shown on the approved shop drawings. “Weld-after-backfill” of interior welds may be performed any time after joint completion and backfilling has been completed.
- Unless otherwise shown on the Plans, all field joints shall be lap welded for diameters 78-inches and greater.

3.1.3.3 *Mechanical Couplings*

- Mechanical couplings where indicated on the Plans shall be Smith Blair Style 411, Baker Style 200, Victaulic Depend-O-Loc or equal.
- Insulating mechanical couplings where indicated on the Plans shall be double insulated Smith Blair Style 416, Baker Style 216, or equal for working pressures up to 150 psi only.
- (*For Cement-mortar OR Tape coated pipe*) Couplings for buried service shall have all metal parts painted with epoxy paint and conform to AWWA C210.
- (*For Polyurethane coated pipe*) Couplings for buried service shall have all metal parts painted with polyurethane paint and conform to AWWA C222.

- Pipe ends for mechanical couplings shall conform to AWWA C200 and M11. The shop applied outside coating shall be held back as required for field assembly of the mechanical coupling or to the harness lugs or rings.
- (*For Cement-mortar OR Tape coated pipe*) Harness lugs or rings and pipe ends shall be painted with one shop coat of epoxy conforming to AWWA C210.
- (*For Polyurethane coated pipe*) Harness lugs or rings and pipe ends shall be painted with one shop coat of polyurethane conforming to AWWA C222.
- Pipe for use with sleeve-type couplings shall have plain ends at right angles to the axis.

3.1.3.4 *Flanges*

- Flanges shall be in accordance with AWWA C207 Class D for operating pressures to 175 psi on 4-inch through 12-inch diameter, and operating pressures to 150 psi on diameters over 12-inches.
- Flanges shall be AWWA C207 Class E for operating pressures over 150 psi to 275 psi or shall be AWWA C207 Class F for pressures to 300 psi (drilling matches ANSI B 16.5 Class 250).
- Shop lining and coating shall be continuous to the end of the pipe or back of the flange. Flange faces shall be shop coated with a soluble rust preventive compound.
- Gaskets shall be full face, 1/8-inch thick, cloth-inserted rubber, Garlock 3000, John Crane Co. Style 777 or equal.

3.1.3.5 *Bolts and Nuts for Flanges*

Bolts for flanges shall be carbon steel, ASTM A 307, Grade B for Class B and D flanges and nuts shall be ASTM A 563, Grade A heavy hex. Bolts for Class E and F flanges shall be ASTM A 193, Grade B7 and nuts shall be ASTM A 194, Grade 2H heavy hex.

3.1.3.6 *Unwelded Pipe*

All unwelded pipe joints shall be bonded for electrical continuity in accordance with the Pipe Manufacturer's recommendations unless otherwise specified in the Plans.

3.2 Linings and Coatings

3.2.1 Cement-mortar Lining

- Interior surface of all steel pipe, fittings, and specials shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with AWWA C205.
- (*For Cement-mortar coated pipe*) The pipe ends shall be left bare where field welded joints occur as shown on the Plans. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.
- (*For Tape OR Polyurethane coated pipe*) Holdbacks shall be left bare and be provided as shown on the approved shop drawings. Holdbacks shall be filled with cement mortar after joint completion per AWWA C205.
- Defective linings as identified in AWWA C205 shall be removed from the pipe wall and shall be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder in order to avoid feather edged joints.
- Fittings shall be cement-mortar lined per AWWA C205. Pipe and fittings too small to cement-mortar line may be lined with AWWA C210 epoxy or AWWA C222 polyurethane.
- Cement-mortar lining shall be kept moist during storage and shipping. The Contractor shall provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

3.2.2 Cement-Mortar Coating

- All pipes shown on the Plans to be cement-mortar coated shall be coated with ¾-inch minimum thickness of reinforced cement-mortar coating in accordance with AWWA C205.
- Coating of Fittings, Specials and Joints

Fittings shall be lined and coated per AWWA C205. Fittings too small to cement mortar line may be lined with AWWA C210 epoxy or AWWA C222 polyurethane.

3.2.3 Polyethylene Tape Coating

- 3.2.3.1 The prefabricated multi-layer cold applied tape coating system for straight-line pipe shall be in accordance with AWWA C214. The system shall consist of a three-layer system totaling 80 mils.

- An acceptable alternate is a two-layer extruded polyolefin coating system in accordance with AWWA C215.

3.2.3.2 Coating of Fittings, Specials and Joints

- Fittings, specials and joints that cannot be machine coated, shall be coated in accordance with AWWA C209. Prefabricated tape shall be Type II and shall be compatible with the tape system used for straight-line pipe. The system shall consist of 2 layers totaling 70 mils.
- Alternate coating methods for fittings, specials and field joints are shrink sleeves per AWWA C216, liquid epoxy per AWWA C210, or polyurethane per AWWA C222.
- Joint bonds shall be completely encapsulated by the coating system as per manufacturer's recommendations.
- Coating repair for fittings and specials shall be in accordance with the procedure described below for straight-line pipe.

3.2.3.3 Coating repair shall be made using tape and primer conforming to AWWA C209 Type II and manufacturer's recommendations. The tape and primer shall be compatible with the tape system used for straight-line pipe.

- An alternative repair method shall be to install heat shrink sleeves in accordance with AWWA C216 and manufacturer's recommendations.

3.2.4. Polyurethane Coating

- Polyurethane coating shall be per AWWA C222 to a minimum thickness of 25 mils, measured in accordance with SSPC-PA 2. Coating shall be continuous to the ends of the pipe except where field welding is indicated. Exterior field joints shall be completed utilizing heat-shrink sleeves per AWWA C216.
- Coating repairs shall be per AWWA C222 and paint manufacturer's recommendations.

PART 4: EXECUTION

4.1 Installation

The Contractor shall provide and install all required piping and accessories in accordance with the contract documents and manufacturer's recommendations. Pipe installation as specified in this section supplements AWWA M11.

4.2 Installing Buried Piping

- Handle pipe in a manner to avoid any damage to the pipe. Do not drop or roll pipe into trenches under any circumstances.
- Inspect each pipe and fitting before lowering into the trench. Inspect the interior and exterior protective coatings. Repair damaged areas in the field in accordance with Section 2.02. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
- Grade the bottom of the trench and place a 4-inch minimum layer of select or scarified material under the pipe. Before laying each section of the pipe, check the grade and correct any irregularities found. The trench bottom shall form a uniform bearing and support for the pipe.
- At the location of each joint, dig bell (joint) holes in the bottom of the trench and at the sides to permit completion and visual inspection of the entire joint.
- Keep the trench in a dewatered condition during pipe laying.
- When the pipe laying is not in progress, including the noon hours, close the open ends of the pipe. Do not permit trench water, animals, or foreign objects to enter the pipe.

4.3 Joints Assembly

4.3.1 Rolled Groove Rubber Gasket Joint

- Clean exposed ends of joint surfaces.
- Thoroughly lubricate the gasket with material approved by the Pipe Manufacturer.
- Place gasket in grooved spigot and relieve tension by inserting a dull instrument under the gasket and completing at least two revolutions around the joint circumference.
- Upon completion of insertion of spigot (including any angular deflection as shown on the approved shop drawing) and prior to releasing from slings the entire placement of the gasket should be checked with a feeler gauge per manufacturer's recommendations. If gasket has disengaged or rolled, immediately pull the joint apart and reinstall the joint with a new gasket if required. Again verify proper placement of gasket with feeler gauge.

- It is recommended that bonding wires or clips be installed as supplied by the Pipe Manufacturer unless otherwise required in the Plans.
- *(For Cement-mortar coated pipe)* Grout the interior and exterior of the joints with cement mortar per AWWA C205.
- *(For Tape OR Polyurethane coated pipe)* Grout the interior of the joints with cement mortar per AWWA C205. Complete the exterior of the joints with heat-shrink sleeves per AWWA C216 and manufacturer's recommendations.

4.3.2 Field Welded Lap Joints

- Clean exposed end of joint surfaces.
- Provide a minimum overlap of 1-inch at any location around the joint circumference.
- Field welders and field weld procedures shall be certified in accordance with AWS D1.1.
- At the Contractor's option, provide a full fillet weld per AWWA C206 either on the inside or outside of the pipe. Inside welding may be performed after backfilling in accordance with manufacturer's recommendations.
- Testing of field welds shall be in accordance with AWWA C206.
- *(For Cement-mortar coated pipe)* Grout the interior and exterior joints with cement mortar per AWWA C205.
- *(For Tape OR Polyurethane coated pipe)* Grout the interior of the joints with cement mortar per AWWA C205. Complete the exterior of the joints with heat-shrink sleeves per AWWA C216 and manufacturer's recommendations.

4.3.3 Flanged Joints

- Bolt holes of flanges shall straddle the horizontal and vertical centerlines of the pipe. Clean flanges by wire brushing before installing flanged fittings. Clean flange bolts and nuts by wire brushing; lubricate bolts with graphite or oil.

- Insert the nuts and bolts (or studs), finger tighten, and progressively tighten diametrically opposite bolts uniformly around the flange to the proper tension.
- Execute care when tightening joints to prevent undue strain upon valves, pumps and other equipment.
- If flanges leak under pressure testing, loosen or remove the nuts and bolts, reset or replace the gasket, reinstall or re-tighten the bolts and nuts, and retest the joints.

4.4 Field Testing

- Perform hydrostatic pressure test in the presence of the Engineer in accordance with the DWU requirements as specified in Sec 506.COD of City of Dallas Addendum to North Central Texas Council of Governments (NCTCOG) Public Works Construction Standards, Latest Edition.
- Provide all necessary piping between the reach being tested and the water supply, together with all required materials and equipment.
- Provide dished heads, blind flange or bulkheads as necessary to isolate and test pipeline.
- Methods and scheduling of tests to be approved by the Engineer.
- Protect pipes and provide thrust restraint as required to complete test.
- Provide for proper legal disposal of test water.

PART 5 METHOD OF MEASUREMENT AND PAYMENT

Method of Measurement and Payment for the work included in this section will be in accordance with the payment schedule in the Bid Proposal and the Special Provisions.

****END OF SECTION****

SECTION 300
HDPE (High Density Polyethylene) Pipe and Fittings
Specification for Buried Potable Water

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 – GENERAL

1.1 DESCRIPTION:

- A. Scope – This section specifies high density polyethylene pipe (HDPE) and fittings for water utility use as indicated on the Drawings, and as specified herein.
- Furnish, Install, and Test HDPE pipe as indicated and specified in this section, and as referred to in related sections, and the Drawings.
 - The primary installation method is burial. The means and methods, including the testing for acceptance shall conform to all applicable standards as noted herein with the intention of providing a leak-free system to the owner.
- B. Special Instructions: None

1.2 RELATED WORK

- A. The following sections are incorporated by reference, *[Reference the other sections of the contract that influence the HDPE- such as soil and site excavation, control of material at site – payment schedule etc]*
- a. CDOT Standard Specifications for Road and Bridge Construction
 - b. Town of Mountain Village Water and Sewer Operations Rules and Regulations (WSORR)

1.3 REFERENCES

- A. To the extent referenced in this specification section, the standards and documents listed below are included, and made a part of this specification.
- B. In the event of a conflict, the requirements of this specification section prevail.

- C. Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the project.

ANSI/AWWA www.awwa.org

- ANSI/AWWA C901-08 Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm) for Water Service
- ANSI/AWWA C906-07 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1,600 mm), for Water Distribution and Transmission
- ANSI/AWWA C651 Standard for Disinfecting Water Mains
- AWWA M55 Manual of Water Supply Practices, PE Pipe—Design and Installation

Plastics Pipe Institute, PPI www.plasticpipe.org

- PPI Handbook of Polyethylene Pipe – 2009 (2nd Edition)
- PPI TR-33 Generic Butt Fusion Joining Procedure for Polyethylene Gas Pipe
- PPI TR-34 Disinfection of Newly Constructed Polyethylene Water Mains
- PPI TR-41 Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping
- PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators for Municipal and Industrial Projects (2009)

NSF www.nsf.org

- NSF / ANSI 61 Drinking Water System Components—Health Effects

ASTM www.astm.org

- ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
- ASTM F905 Standard Practice for Qualification of Polyethylene Saddle-Fused Joints
- ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing
- ASTM F 1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
- ASTM F 1412 Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems
- ASTM F1417 Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air

- ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
- ASTM F2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE) Plastic Pipe, Fittings, Sheet Stock, Plate Stock, or Block Stock
- ASTM D 2239 Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
- ASTM D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
- ASTM D 2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing
- ASTM D 2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping
- ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- ASTM D 3350-08 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

1.4 SYSTEM DESIGN PARAMETERS

- A. The *polyethylene* system working pressure rating *accommodates* the normal operating pressure and the repetitive surges. The pressure rating applies at $80^{\circ}F$ or less.
- B. Per AWWA 901 and C906, the repetitive surge pressure allowance is one half the pressure class of the pipe, and the occasional surge over pressure allowance is equal to the pressure class of the pipe. Allowable Total Pressure during Recurring Surge conditions equals 1.5 times the pipe's pressure class. Allowable Total Pressure during Occasional Surge conditions equals 2.0 times the pipe's pressure class.

Table 1 gives the Pressure Class per AWWA C901, Pressure Rating and Allowable Total Pressure During Recurring and Occasional Surge for **PE4710** pipe at $80^{\circ}F$ or less. For PE 3608, refer to Table 2.

Table 1. Pressure Class per AWWA C901 for **PE 4710** at 80°F or less

Pipe Dimension Ratio (DR)	Pressure Class	Pressure Rating	Allowable Total Pressure During Recurring Surge	Allowable Total Pressure During Occasional Surge
<i>DR 9</i>	<i>250 psi</i>	<i>250 psi</i>	<i>375 psi</i>	<i>500 psi</i>
<i>DR 11</i>	<i>200 psi</i>	<i>200 psi</i>	<i>300 psi</i>	<i>400 psi</i>
<i>DR 14.3</i>	<i>150 psi</i>	<i>150 psi</i>	<i>225 psi</i>	<i>300 psi</i>
<i>DR 17</i>	<i>125 psi</i>	<i>125 psi</i>	<i>185 psi</i>	<i>250 psi</i>
<i>DR 21</i>	<i>100 psi</i>	<i>100 psi</i>	<i>150 psi</i>	<i>200 psi</i>

Table 2 gives the Pressure Class per AWWA C901 and C906 , Pressure Rating and Allowable Total Pressure During Recurring and Occasional Surge for **PE3608** pipe at 80°F or less.

Table 2. Pressure Class per AWWA C901 and C906 for **PE 3608** at 80°F or less

Pipe Dimension Ratio (DR)	Pressure Class	Pressure Rating	Allowable Total Pressure During Recurring Surge	Allowable Total Pressure During Occasional Surge
<i>DR 9</i>	<i>200 psi</i>	<i>200 psi</i>	<i>300 psi</i>	<i>400 psi</i>
<i>DR 11</i>	<i>160 psi</i>	<i>160 psi</i>	<i>240 psi</i>	<i>320 psi</i>
<i>DR 14.3</i>	<i>120 psi</i>	<i>120 psi</i>	<i>180 psi</i>	<i>240 psi</i>
<i>DR 17</i>	<i>100 psi</i>	<i>100 psi</i>	<i>150 psi</i>	<i>200 psi</i>
<i>DR 21</i>	<i>80 psi</i>	<i>80 psi</i>	<i>120 psi</i>	<i>160 psi</i>

1.5 SUBMITTALS

A. Quality Assurance / Control Submittals

1. Affirmation that product shipped meets or exceeds the standards set forth in this specification. This shall be in the form of a written document from the manufacturer attesting to the manufacturing process meeting the standards. *[The specifier can also ask for various test results to be supplied that are done according to the standards]*
2. Manufacturers recommended fusion procedures for the products.

1.6 DELIVERY – STORAGE – HANDLING

- A. Handle the pipe in accordance with the *PPI Handbook of Polyethylene Pipe (2nd Edition)*, Chapter 2 using approved strapping and equipment rated for the loads encountered. Do not use chains, wire rope, forklifts or other methods or equipment

that may gouge or damage the pipe or endanger persons or property. Field storage is to be in compliance with AWWA Manual of Practice M55 Chapter 7.

- B. If any gouges, scrapes, or other damage to the pipe results in loss of 10% of the pipe wall thickness, cut out that section or do not use.

PART 2 A– PRODUCTS FOR 3 INCH AND SMALLER PIPE PER AWWA C901

2A.01 PIPE

- A. Polyethylene pipe shall be made from a HDPE material having a minimum material designation code of PE 4710 or PE 3608. The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE445474C for PE 4710 and PE345464C for PE 3608. In addition, the pipe shall be listed as meeting NSF-61.
- B. The pipe shall meet the requirements of AWWA C901
- C. HDPE pipe shall be rated for use at a pressure class of _____ *[User specified]* psi. *[The specifier chooses the pressure class from Table 1 or Table 2 in Section 1.04 above].* The outside diameter of the pipe shall be based upon the IPS, CTS, or SDR sizing system. *[User to specify the appropriate sizing system on the plans.]*
- D. Approved manufacturers are: *[The specifier is referred to the list of manufacturers as shown on the PPI website*
http://plasticpipe.org/municipal_pipe/mi_members.html *]*

2A.02 FITTINGS

- A. Butt Fusion Fittings - Fittings shall be made of either PE4710 or PE 3608, with a minimum Cell Classification as noted in 2A.01A. Butt Fusion Fittings shall meet the requirements of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans.

Markings for molded fittings shall comply with the requirements of ASTM D 3261. Fabricated fittings shall be marked in accordance with ASTM F 2206. Socket fittings shall meet ASTM D 2683.

- B. Electrofusion Fittings - Fittings shall be PE4710 or PE 3608, with a minimum Cell Classification as noted in 2A.01A. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.
- C. Flanges and Mechanical Joint Adapters (MJ Adapters) – Flanges and Mechanical Joint Adapters shall be PE4710 or PE 3608, with a minimum Cell Classification as noted in 2A.01A. Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined

flange adapters or MJ Adapters shall be per ASTM D 3261. Fabricated (including machined) flange adapters shall be per ASTM F 2206.

Van-Stone style, metallic (including stainless steel), convoluted or flat-plate, back-up rings and bolt materials shall follow the guidelines of Plastic Pipe Institute Technical Note # 38, and shall have the bolt-holes and bolt-circles conforming to one of these standards: ASME B-16.5 Class 150, ASME B-16.47 Series A Class 150, ASME B-16.1 Class 125, or AWWA C207 Class 150 Series B, D, or E. The back-up ring shall provide a long-term pressure rating equal to or greater than the pressure-class of the pipe with which the flange adapter assembly will be used, and such pressure rating shall be marked on the back-up ring. The back-up ring, bolts, and nuts shall be protected from corrosion by a system such as paint, coal-tar epoxy, galvanization, polyether or polyester fusion bonded epoxy coatings, anodes, or cathodic protection, as specified by the project engineer.

- D. Service connections shall be electrofusion saddles with a brass or stainless steel threaded outlet, electrofusion saddles, sidewall fusion branch saddles, tapping tees, or mechanical saddles.

For electrofusion saddles with threaded outlet the size of the outlet shall be one inch IPS unless a larger size is shown on the plans. Electrofusion saddles shall be made from materials required in part 2A.02 B. Electrofusion Fittings.

For sidewall fusion saddles, the size of the saddle shall be as indicated on the plans. The saddle can be made in accordance to ASTM D 3261 or ASTM F 2206. After installation, approximately ¼" of the PE pipe shall be visible beyond the saddle to confirm that proper surface preparation occurred. Saddle faces that do not provided ¼ inch of area beyond the saddle are not acceptable.

Tapping tees shall be made to ASTM D3261 or D2683.

Mechanical strap-on saddles can only be used where there use on PE pipe is approved by the mechanical saddle manufacturer. The body of the saddle shall be stainless steel, epoxy coated cast iron or brass. The gasket material and design must be acceptable for PE pipe. The outlet shall be threaded for one inch IPS unless a larger size is shown on the plans. Mechanical strap-on saddles will be installed per the manufacturer's instructions.

2A.03 PIPE AND FITTING IDENTIFICATION

- A. The pipe shall be marked in accordance with the standards to which it is manufactured.
[or alternative as above]
- B. Color identification by the use of stripes on pipe to identify pipe service shall be optional. If used, stripes or colored exterior pipe product shall be blue for potable water. *[Optional]*

- C. Tracing wire shall be placed parallel and above, but separate from the pipe and shall be 10 AWG or engineer approved equal. *[The specifier can change this to the preferred material or method, all pipes should have a methodology to be locatable]*
- D. Marking tape shall be approved by the engineer and placed between 6 and 12 inches above the crown of pipe. *[Optional]*

PART 2 B– PRODUCTS FOR 4 INCH AND LARGER PIPE PER AWWA C906

2B.01 – PIPE

- A. Polyethylene pipe shall be made from HDPE material having a material designation code of PE3608 or higher. The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE345464C. In addition, the material shall be listed as meeting NSF-61.
- B. The pipe and fittings shall meet the requirements of AWWA C906.
- C. HDPE pipe shall be rated for use at a pressure class of _____ *[User specified]* psi. *[The specifier chooses the pressure class from Table 2 in Section 1.04 above].* The outside diameter of the pipe shall be based upon the IPS or DIPS sizing system. *[User to specify the appropriate sizing system on the plans.]*
- D. Approved manufacturers are: *[The specifier is referred to the list of manufacturers as shown on the PPI website http://plasticpipe.org/municipal_pipe/mi_members.html]*

2B.02 FITTINGS

- A. Butt Fusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE3608 and with a minimum Cell Classification as noted in 2B.01A. Butt Fusion Fittings shall meet the requirements of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All fittings shall meet the requirements of AWWA C906.

Markings for molded fittings shall comply with the requirements of ASTM D 3261. Fabricated fittings shall be marked in accordance with ASTM F 2206. Socket fittings shall meet ASTM D 2683.

- B. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 3608 and with a minimum Cell Classification as noted in 2B.01A. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and have nominal burst values of four times the Working Pressure Rating (WPR) of the fitting. Markings shall be according to ASTM F 1055.
- C. Flanges and Mechanical Joint Adapters (MJ Adapters) – Flanges and Mechanical Joint Adapters shall have a material designation code of PE3608 or higher and a

minimum Cell Classification as noted in 2B.01A. Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ Adapters shall be per ASTM D 3261. Fabricated (including machined) flange adapters shall be per ASTM F 2206.

Van-Stone style, metallic (including stainless steel), convoluted or flat-plate, back-up rings and bolt materials shall follow the guidelines of Plastic Pipe Institute Technical Note # 38, and shall have the bolt-holes and bolt-circles conforming to one of these standards: ASME B-16.5 Class 150, ASME B-16.47 Series A Class 150, ASME B-16.1 Class 125, or AWWA C207 Class 150 Series B, D, or E. The back-up ring shall provide a long-term pressure rating equal to or greater than the pressure-class of the pipe with which the flange adapter assembly will be used, and such pressure rating shall be marked on the back-up ring. The back-up ring, bolts, and nuts shall be protected from corrosion by a system such as paint, coal-tar epoxy, galvanization, polyether or polyester fusion bonded epoxy coatings, anodes, or cathodic protection, as specified by the project engineer.

- D. Service connections shall be electrofusion saddles with a brass or stainless steel threaded outlet, electrofusion saddles, sidewall fusion branch saddles, tapping tees, or mechanical saddles.

For electrofusion saddles with threaded outlet the size of the outlet shall be one inch IPS unless a larger size is shown on the plans. Electrofusion saddles shall be made from materials required in part B. Electrofusion Fittings.

For sidewall fusion saddles the size of the saddle shall be as indicated on the plans. The saddle can be made in accordance to ASTM D 3261 or ASTM F 2206. After installation, approximately ¼" of the PE pipe shall be visible beyond the saddle to confirm that proper surface preparation occurred. Saddle faces that do not provided ¼ inch of area beyond the saddle are not acceptable.

Tapping tees shall be made to ASTM D3261 or D2683.

Mechanical strap-on saddles can only be used where there use on PE pipe is approved by the mechanical saddle manufacturer. The body of the saddle shall be stainless steel, epoxy coated cast iron or brass. The gasket material and design must be acceptable for PE pipe. The outlet shall be threaded for one inch IPS unless a larger size is shown on the plans. Mechanical strap-on saddles will be installed per the manufacturer's instructions.

2B.03 PIPE AND FITTING IDENTIFICATION

- A. The pipe shall be marked in accordance with the standards to which it is manufactured.
[or alternative as above]

- E. Color identification by the use of stripes on pipe to identify pipe service shall be optional. If used, stripes or colored exterior pipe product shall be blue for potable water, or green for wastewater/sewage, or purple (lavender) for reclaimed water. *[Optional]*
- F. Tracing wire shall be placed parallel and above, but separate from the pipe and shall be 10 AWG or engineer approved equal. *[The specifier can change this to the preferred material or method, all pipes should have a methodology to be locatable]*
- G. Marking tape shall be approved by the engineer and placed between 6 and 12 inches above the crown of pipe. *[Optional]*

PART 3 – EXECUTION

3.1 JOINING METHODS

- A. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620 or PPI TR-33. All fusion joints shall be made in compliance with the pipe or fitting manufacturer’s recommendations. Fusion joints shall be made by qualified fusion technicians per PPI TN-42.
- B. Saddle fusion: Saddle fusion shall be done in accordance with ASTM F 2620 or TR-41 or the fitting manufacturer’s recommendations and PPI TR-41. Saddle fusion joints shall be made by qualified fusion technicians. Qualification of the fusion technician shall be demonstrated by evidence of fusion training within the past year on the equipment to be utilized on this project. *[Saddle fusion is used to fuse branch saddles, tapping tees, and other HDPE constructs onto the wall of the main pipe]* (ASTM F905).
- C. Socket Fusion: Molded socket fusion fittings are only to be used for joining of HDPE pipe from 1/2 inch to 2” in size. Socket fusion shall be done in accordance with ASTM F 2620 or the fitting manufacturer’s recommendations. Socket fusion is the process of fusing pipe to pipe, or pipe to fitting by the use of a male and female end that are heated simultaneously, and pressed together so the outside wall of the male end is fused to the inside wall of the female end. Qualification of the fusion technician shall be demonstrated by evidence of socket fusion training within the past year on the equipment to be utilized on this project. *[Socket fusion is not widely used, and the specifier may decide to prohibit its use]*
- D. Electrofusion: Electrofusion joining shall be done in accordance with the manufacturers recommended procedure. Other sources of electrofusion joining information are ASTM F 1290 and PPI TN 34. The process of electrofusion requires an electric source , a transformer, commonly called an electrofusion box that has wire leads, a method to read electronically (by laser)or otherwise input the barcode of the fitting, and a fitting that is compatible with the type of electrofusion box used. The electrofusion box must be capable of reading and storing the input parameters and the fusion results for later download to a record file. Qualification of the fusion technician shall be demonstrated by evidence of

electrofusion training within the past year on the equipment to be utilized for this project.

E. Mechanical:

1. Mechanical connection of HDPE to auxiliary equipment such as valves, pumps, and fittings shall use mechanical joint adapters and other devices in conformance with the PPI Handbook of Polyethylene Pipe, Chapter 9 and AWWA Manual of Practice M55, Chapter 6.
2. Mechanical connections on small pipe under 3" are available to connect HDPE pipe to other HDPE pipe, or a fittings, or to a transition to another material. The use of stab-fit style couplings is allowed, along with the use of metallic couplings of brass and other materials. All mechanical and compression fittings shall be recommended by the manufacturer for potable water use. When a compression type or mechanical type of coupling is used, the use of a rigid tubular insert stiffener inside the end of the pipe is recommended.
3. Mechanical couplings that wrap around the pipe and act as saddles are made by several manufacturers specifically for HDPE pipe. All such saddles, tapping saddles, couplings, clamps etc. shall be recommended by the manufacturer as being designed for use with HDPE pipe at the pressure class listed in this section.
4. Unless specified by the fitting manufacturer, a restraint harness or concrete anchor is recommended with mechanical couplings to prevent pullout.
5. Mechanical coupling shall be made by qualified technicians. Qualification of the field technician shall be demonstrated by evidence of mechanical coupling training within the past year. This training shall be on the equipment and pipe components to be utilized for this project.

F. Joint Recording - The critical parameters of each fusion joint, as required by the manufacturer and these specifications, shall be recorded either manually or by an electronic data logging device. All fusion joint data shall be included in the Fusion Technician's joint report.

G. The specifier is referred to the list of manufactures as shown on the PPI website http://plasticpipe.org/municipal_pipe/mi_members.html.

3.2 INSTALLATION

- A. Buried HDPE pipe and fittings shall be installed in accordance with ASTM D2321 or ASTM D2774 for pressure systems and AWWA Manual of Practice M55 Chapter 7.
- B. Pipe embedment - Embedment material should be Class I, Class II, or Class III , materials as defined by ASTM D-2321 Section 6. The use of Class IV and Class V materials is not recommended, however it may be used only with the approval of the engineer and appropriate compaction.
- C. Bedding: Pipe bedding shall be in conformance with ASTM D2321 Section 8. Compaction rates should be as specified in ASTM D2321. Deviations shall be approved by the engineer.

- D. Haunching and backfill shall be as specified in ASTM D 2321 Section 9 with Class I, II, or III materials. Compaction shall be in excess of 85% Proctor [*Specifier to put in the percent compaction and other site specific information as needed*]

3.3 TESTING

- A. Hydrostatic leakage testing is recommended and shall comply with ASTM F 2164, ASTM F 1412, AWWA Manual of Practice M55 Chapter 9, and PPI Handbook of Polyethylene Pipe Chapter 2 (2nd Edition). If the test section fails this test, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner.
- B. Pneumatic (compressed air) leakage testing of HDPE pressure piping is prohibited for safety reasons.

3.4 CLEANING AND DISINFECTING

- A. Cleaning and disinfecting of potable water systems shall be in accordance with AWWA C651 and AWWA Manual of Practice M55 Chapter 10, and PPI Handbook of Polyethylene Pipe Chapter 2 (2nd Edition).
- B. After installation and pressure testing, new water mains should be disinfected according to AWWA C651.
- C. The disinfection chemicals should be limited to less than 12% active chlorine. The duration of the disinfection should not exceed 24 hours.
- D. Upon completion, the system should be thoroughly flushed with fresh water, and retested to verify the disinfectant chlorine level has been reduced to potable drinking water concentrations in all service water tubing and branch lateral pipes.

End



USFS Operating Plan **Town of Mountain Village** **2017 Waterline Improvements Project**

Invasive and Noxious Weed Standards and Best Management Practices:

Introduction:

Invasive weeds are plants that have been introduced to a habitat outside of their typical native range, and have few or no natural limiting factors that inhibit and prevent further spread. As a consequence, weedy species alternative plant habitats, negatively affect forage values for wildlife and livestock, and if unchecked, can severely impact the functioning of native eco-systems.

The spread of invasive and noxious weeds is a major issue in construction projects, which involve soil disturbance. Earth moving activities spread weed seeds and create favorable habitat for many weedy species. Most noxious weeds are early-successional species that prefer highly disturbed sites. The presence of weedy plant species is highly correlated to sun-lit soils, and frequent severe disturbances, such as roadsides and construction zones. In addition, many weed species are prolific seed producers. It is well established that prevention is the most effective and least expensive way to slow or stop the spread of noxious weeds. Once a species has been introduced, early discovery and eradication is the next best step. When a population has become well established, the strategy becomes one of contain and control.

Preventing the further spread of invasive weeds typically relies on several key strategies:

1. Educating workers on the basics of noxious weed concerns on an ongoing basis, including training workers in the identification and reporting methods.
2. Treatment of existing populations in an effort to slow or stop the continued spread.
3. Integrating proactive measures into the design and implementation of construction projects to prevent weeds and weed seeds from spreading into new areas.

This document serves to provide guidelines and useful measures that should be integrated into earth disturbing projects. The weed management process must include education, identification, avoidance, treatment, and aggressive reclamation of disturbed areas using certified weed-free materials. The first step is to develop a weed strategy that incorporates best management practices into each construction project.

This document will serve as the Town of Mountain Village (TMV) Operating Plan. Elements from the Weed Plan shall be incorporated into specific construction plans submitted to the Forest Service (USFS).

Authorities:

Invasive species have been identified by the Chief of the Forest Service as one of the four significant threats to the National Forest System. The Forest Service developed a National Strategy, consisting of 4 key components:

1. ***Prevention***--stop invasive species before they arrive.
2. ***Early detection and rapid response***--find new infestations and eliminate them before they become established.
3. ***Control and Management***--contain and reduce existing infestations.
4. ***Rehabilitation and restoration***--reclaim native habitats and eco-systems.

On February 3, 1999 the President signed the Executive Order on Invasive Species. Federal Agencies are expected to follow the direction in the Executive Order. The Executive Order requires agencies to utilize programs and authorities to prevent the introduction of invasive species and to not authorize or carry out actions that are likely to cause the introduction or spread of invasive species unless the agency has determined, and made public, documentation that shows that the benefits of such actions clearly outweigh the potential harm, and all feasible and prudent measures to minimize the risk of harm will be taken in conjunction with the actions.

Forest Service policy identifies prevention of the introduction and establishment of noxious weed infestations as an agency objective. The policy directs the Forest Service to:

1. Determine the factors that favor establishment and spread of noxious weeds.
2. Analyze weed risks in resource management projects.
3. Design management practices to reduce these risks.

Specifically, the objectives of noxious weed management are to:

1. Prevent the introduction or establishment of new noxious weed species.
2. Contain and suppress the existing noxious weed infestations.
3. Cooperate with State agencies, local landowners, weed control boards, and other Federal agencies in the management and control of noxious weeds.
4. Increase the knowledge of landowners, employees; NFS land users, and State agencies about noxious weed threats.

Other authorities relating to noxious weeds management include the Federal Noxious Weeds Act (7 USC 2801), Forest Service Manual section 2080, Forest Service Handbook 2209.23, Section 330, The Colorado Weed Management Act, USDA Departmental Regulation 9500-10, and the GMUG Land and Management Plan.

General Guidelines:

1. Provide training to both management and field workers in the identification of noxious weeds in all stages of growth, the importance of noxious weed control, and the measures available to minimize their spread. Consider developing an incentive program that encourage weed awareness, reporting, and for locating new infestations.
2. Monitor the permit area, both private and National Forest lands on a regular, ongoing basis. Develop standard procedures for reporting, mapping and treatment of new infestations, as well as regular post-control monitoring of known infestations.
3. Avoid working in known weed infested areas whenever possible. Utilize project planning to identify project areas with known weed infestations. Delay work until weeds have been controlled at the prospective work site.
4. Design and implement projects in areas free of weed infestations before commencing work in non-infested areas. Equipment must be cleaned prior to working in non-infested areas following work in infested areas.
5. During project planning and implementation, identify and use weed-free staging areas for equipment.

6. Minimize soil disturbances in weed infested areas whenever possible.
7. Aggressively treat small or new infestations before they become widespread and deeply established populations.

Construction and General Maintenance:

1. Integrate the weed strategy into the layout, design and construction of ground disturbing projects.
2. Identify existing infestations of noxious weeds along access roads, in the vicinity of the project area, and within the area of proposed ground disturbance prior to the commencement of a project.
3. Remove and/or treat existing weed sources that could be spread by construction and traffic (including foot traffic) within the project area prior to new or additional ground disturbance.
4. Avoid moving weed-infested earth, gravel, or other fill materials into weed-free areas. If used, imported fill must come from weed-free sources. Inspect borrow areas and gravel pits on a regular basis, and keep them weed-free.
5. Identify existing infestations along roads used to access the project area and control them prior to heavy equipment moving into weed-free areas.
6. Minimize contact with roadside sources of weeds that could be transported to other areas while moving construction equipment around the mountain.
7. *Cleaning vehicles and equipment on a regular basis is the most effective and least expensive method of noxious weed control.* Power-wash (high pressure cleaning) equipment, trucks, and off-road vehicles of mud, dirt and vegetation, including undercarriage and tires, prior to moving into weed-free areas.
 - Clean equipment prior to entering NFS lands.
 - If equipment is operating in, or has been stored in areas with known weed infestations, equipment should be cleaned on site, prior to leaving the area.
8. Employ excavation techniques that conserve native topsoil, stockpile topsoil, and replace topsoil to its original position when infilling disturbed areas.

Seeding and Restoration of disturbed areas:

1. Only certified weed-free seed from Colorado will be used for revegetation.
2. Use only certified weed-free mulches and matting for restoration and erosion control.
3. Re-establish vegetation on all disturbed ground immediately to minimize weed-seed germination and spread.
4. "Rough up" soils and cleat in exposed soil surfaces and mulches so that broadcast seed/mulch is held on the slopes. Do not back blade disturbed areas smooth. Compacted areas should be loosened prior to revegetation.
5. Monitor areas of previous disturbance on a regular basis for success of past revegetation

efforts. If revegetation has not been effectively established within one season, aggressively re-seed and re-mulch the area. If necessary to achieve sufficient growth, consider organic soil amendments (manure, compost, urea, etc.) to accelerate the process.

6. Monitor all revegetated sites for new weed infestations. Aggressively treat weeds within newly re-vegetated areas. Treat populations adjacent to newly disturbed areas prior to reseeded.
7. Avoid re-entry or additional ground disturbance whenever possible in disturbed areas until vegetation (native or revegetation seed-mix) has been re-established.
8. Monitor effectiveness of re-vegetation seed mixes, and alter seed mix (coordinate with USFS) as necessary to achieve aggressive re-vegetation of disturbed sites.

Road and Slope Maintenance:

Controlling weeds along roads is an important component of a weed program. Roads are a high-risk area for the introduction and spread of weeds. Transporting seeds and plant parts as well as soil disturbance associated with road maintenance provide an ideal setting for the spread of weeds. Roads are the primary travel corridor along the mountain and a main route for the spread of weed seeds.

In the case of ski slopes, equipment used for brushing and mowing often carry weed seeds in the mower head, which may be transported to weed-free areas. Early (winter) season use of tillers and snow cats that have been resting in weed-infested areas during the summer are a common way that weeds are spread at ski areas.

Equipment should be cleaned before resuming winter activities upon commencement of a new ski season:

1. Minimize disturbance of roadside vegetation whenever possible. Retaining native vegetation along roadsides is a primary factor proven to limit the spread of weeds.
2. Do not blade roadsides and ditches that are infested with weeds, unless doing so is required for public safety or protection of the roadway. If the ditch must be cleaned, ensure that weeds remain on-site. Blade from least infested to most infested locations. Schedule road maintenance of infested areas during times when weed seeds are least likely to be spread.
3. Pressure wash slope grooming equipment prior to resuming use at the beginning of a new winter season.
4. Early in the spring and mid-season prior to native grasses developing seed heads.
5. The use of road stabilizers can reduce the need for grading and road maintenance, which spreads weeds. Avoid stabilizers that can kill native grasses and forbs, allowing weedy species to colonize roadsides.
6. Re-seed and re-mulch road shoulders and berms following major grading or water bar installation and maintenance.

References:

Ferguson, L, Duncan, C, Snodgrass, K. Backcountry Road Maintenance and Weed Management. USDA Forest Service. Missoula Technology and Development Program. Missoula, Montana. July 2003.

Guidelines for Re-vegetation for the Arapaho-Roosevelt, Grand Mesa, Uncompahgre, and Gunnison, Medicine Bow-Routt, and Pawnee and Thunder Basin National Grasslands. USDA Forest Service. Guide to Noxious Weed Prevention Practices. USDA Forest Service. July 5, 2001

National Strategy and Implementation Plan for Invasive Species Management. USDA Forest Service.

2004.

Noxious Weed Strategy. Grand Mesa, Uncompahgre, and Gunnison National Forests, 1994

Siegel, S. and Donaldson, S. Measures to Prevent the Spread of Noxious and Invasive Weeds During Construction Activities. Fact Sheet FS-03-59 University of Nevada Cooperative Extension, Reno, Nevada.

WATER CONTROL:

Erosion control measures will be planned prior to commencement of other construction activity at the site. Natural established patterns of runoff will be retained as much as possible in conjunction with the prudent design and use of culverts, sub-surface drains, water-bars, etc. Erosion potential will be reduced through prompt revegetation of disturbed soils. Drainage mitigation will take place in areas where trail construction or maintenance presents a threat to the stabilization of the soil.

SURFACE DRAINS:

Water-Bars: A series of small ditches perpendicular to the fall line of the slope will be installed to catch and direct water. An 8-12% grade will be used to minimize erosion and also prevent the silting in of the bars. Water-bars will be installed by hand when not feasible by dozer.

Erosion Matting: Will be used in instances where it is necessary to run water straight down a run. This is intended to keep erosion to a minimum.

SUB-SURFACE DRAINS:

Solid Pipe: Will be used to channel water from one point to another so as to keep the piped area dry. Depending on the volume of water, this will vary from large corrugated metal pipe (CMP) to small diameter plastic pipe (PVC). The pipe is placed in a ditch; water diverted through it, and then over burden is placed on the pipe to protect it.

SUB-SURFACE SEEP DRAINS:

Sub-surface seep drains are used where underground water has surfaced due to contouring. Upon receipt of the appropriate approval/permit the area will be excavated. The ditch will be lined with a water permeable fabric. Washed rock or timbers are placed around perforated pipe which is laid in the fabric. This creates voids for the water to run to the pipe. The perforated pipe daylight at a surface drain or hooks to a solid pipe that carries the water to a surface drain. The fabric is wrapped around the pipe and rock and overlapped to form a closure. This allows water in but keeps dirt out. If necessary to pick water up at different elevations within the ditch, 4' x 8' perforated panels will be set against the wall of the ditch, allowing the water to enter and fall down to the main line of the drain. Finally, the ditch is filled with dirt to ground level.

SAFETY:

All ditch workers will wear a hard hat and boots (rubber or leather work shoes).

CHECK DAMS: Will be placed on long stream runs to settle out sediment from being transported to major drainages. Provisions will be made to excavate materials trapped by check dams once filled, so a pooling effect may take place resulting in settling of sediments.

Areas of less water volume may be check dammed with chip bags. Ends of water bars falling off run banks, areas where water channels through the woods between ski runs, etc.

BLASTING:

When rock becomes an obstacle that a dozer or excavator cannot deal with, blasting will take place.

Holes will be drilled and loaded with stick powder when access for a compressor is available. If this is not feasible, a surface charge will be used. A blasting cap attached to fuse is inserted inside the charge. Pull wire ignitors are used to light the fuse. If necessary, Prima cord will be used to tie multiple charges together. Cap and fuse will be tied to the main trunk line and ignited as referred to above.

Prior to blasting, the San Miguel Sheriff will be notified.

Protective equipment will include wearing hard hats, ear protection and body fully clothed.

Caps and fuse will be stored in a lockable metal box. Powder will be stored in a location away from cap box and safe from fly-rock while in the field.

Prior to any shoot, the area will be cordoned off by ski area personnel. Signs stating "Danger Blasting Keep Out" will be posted on any roads accessing the area at a distance safe from fly-rock.

After blasting, all materials will be returned to our bomb cache.

Blasters will announce "fire in the hole" over 2-way radio when fuses are lit.

The use, storage and transportation of explosives will adhere to all safety rules and regulations.

Blasting Safety Apparel:

- Hard hats
- Safety or sun glasses
- Long pants
- Leather boots with safety toe
- Ear protection while drilling and blasting

REVEGETATION:

Revegetation of areas disturbed by earth-moving will take place as soon as feasible after final contouring (within 14 days). Final contouring is defined as "the ground has been altered to its desired level or slope and no further earth-moving is anticipated within the next year". Revegetation will take place through a combination of seeding, fertilizing and mulching of the disturbed area. Mulch will be held in place by crimping, hydromulch with tackifier or matting. Areas greater than 40% slope will be hand strawed or have 750 lbs./acre of Biosol (or comparable product) or straw matted with pins to enhance growth.

Generally, an acre receives 50 lbs. of seed, 200 lbs. of fertilizer and 50 bales of straw. Areas too steep for the straw blower will be hand spread. Where feasible, crimping will be done by a snowcat or dozer to help bury the seed and hold the mulch in place.

The Standard Dryland Trail mix consists of the following:

Thurber's Fescue or Arizona Fescue	(30%)	Slender Wheatgrass	(40%)
Alpine Timothy	(15%)	Sanberg Bluegrass	(15%)

The Wetland & Meadow mix consists of the Following:

Alpine Bluegrass	(12%)	Alpine Timothy	(12%)
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Tufted Hairgrass	(14%)	Water Sedge	(31%)
Beaked Sedge	(31%)		

Two different fertilizers may be used. A nitrogen, phosphorus and potassium mix in areas that have top soil. Biosol or comparable organic product will be used in areas with less dirt.

Any contouring after September 20th that does not get revegetated will be water-barred for erosion control with seeding and mulching to take place as soon as possible the following spring.

Over seeding of 20 lbs./acre will occur the year following an initial seeding of an area.

Revegetation Methods:

Grades of <40% or less:

1. Seed/blow straw/machine crimp
2. Seed/fertilizer/blow straw/machine crimp

Grades over >40%:

1. Seed/hand straw
2. Seed/straw matting
3. Seed/blow straw/hydrotack (banks)
4. Seed/fertilizer
5. Seed impregnated blanket
6. Seed/hydro mulch

Straw Mulcher Operation Safety:

Protective equipment will be worn while operating or working around the mulching machine. Eye protection, ear protection and hand/arm protection are required. Employees will not put their hands in the mulching machine while chain flails are turning or machine is running.

Safety Apparel:

Safety or sun glasses
 Long sleeved shirt
 Long pants
 Leather boots with safety toe
 Ear protection
 Gloves

EARTHWORK:

Spot or strip dozing for stump removal or smoothing out break-overs and transitions may be necessary.

Top soil will be stockpiled and respread over the dozed areas where conditions warrant and is feasible.

Cuts and Fills: Will take place in areas that need contour modification to produce a desirable ski slope. These cuts and fills will be identified and estimated volume calculated prior to commencement of the contour modification. However, 10 foot contour maps may not be accurate enough to eliminate the need for field decisions regarding the earth-moving.

Engineered Cuts and Fills: The specifics of the engineering report will be followed.

Non-Engineered Cuts and Fills: Fill areas will be put in lifts or stages and compacted by the dozer walking

on the fill. Any subsurface water problems will be addressed prior to final contouring. After final contouring, water bars will be installed to catch any surface water, and then directed to an area where the water is anticipated not to create a problem.

No cut bank roads will be dozed out unless they are in an area that is scheduled to be contoured. They will be taken out prior to completion of project.

Contouring: Is the method of removing minor obstacles in the run (stumps, rocks, minor irregularities, etc.), but is not a major cut and fill. Stumps will be pushed to a burn pile, burned as much as possible and then buried. As this method of dozing disturbs the top soil, revegetation and surface drainage will follow.

Equipment Operating Safety Apparel:

Long pants
Leather boots with safety toe
Ear protection

CONSERVATION MANAGEMENT PRACTICES FOR EROSION & SEDIMENTATION CONTROL:

INTRODUCTION:

The measures provided in this plan shall serve as guidelines for control of runoff, erosion, and sedimentation at disturbed areas associated with the implementation of construction activities at the Telluride Ski Area. The objective of this plan is to provide procedures to minimize disturbances, and to return disturbed areas to a condition that is stable from a soil erosion standpoint, productive as vegetative communities, useful to wildlife, and aesthetically pleasing. **This document is intended to serve as general guidance by which more detailed site-specific plans will be developed.** The site-specific plans will be prepared by the TMV for review and approval by the USFS, acting as the lead agency, prior to commencement of construction activities on Federal Lands.

Each site-specific plan will describe pertinent pre-existing conditions, the extent and type of disturbance, and mitigation and monitoring measures. Each site-specific plan shall include the following components.

- Characteristics of the affected area.**
- Project time frame.**
- Performance objectives.**
- Vegetation management.**
- Earthwork.**
- Temporary erosion and sedimentation control.**
- Permanent erosion and sedimentation control.**
- Monitoring and maintenance.**

1.0. CHARACTERISTICS OF THE AFFECTED AREA:

Each site-specific plan shall generally summarize the existing vegetation, soils, topography, and natural

features of the site. Information provided, depending on site-specific conditions, may include the following:

- 1.1. Soils tests.
- 1.2. Site specific topography.
- 1.3. Wetland delineations.
- 1.4. Location of streams, lakes, tributaries, and drainage.
- 1.5. Unique or important wildlife habitat.
- 1.6. Habitat features that require special attention.

2.0. PROJECT TIME FRAME:

Each site-specific plan will indicate the projected time frame of construction, temporary erosion and sediment control measures, permanent erosion and sediment control measures, and monitoring.

3.0. PERFORMANCE OBJECTIVES:

The site-specific plans will be designed to meet achievable performance criteria. Generally reclamation success will be evaluated on site-specific potential; therefore, erosion control and revegetation objectives and success criteria will be tailored to the site potential based on practical principles, control measures, and monitoring guidelines. The following are recommended performance objectives for construction, erosion control, and revegetation:

- 3.1. Minimize disturbance of soil and vegetation through planning, design, and site protection.
- 3.2. Protect existing vegetation through effective construction site management procedures.
- 3.3. Restore revegetation potential, to an extent practical, through a topsoil management program.
- 3.4. Stabilize and protect disturbed areas as soon as practicable through mulching, erosion control, and propagation of new vegetation.
- 3.5. Establish a vigorous stand of desirable plant species that will preclude invasion of noxious or undesirable plants, slow velocity of runoff, and limit erosion potential.
- 3.6. Establish vegetation that will allow natural plant community succession on all disturbed areas.
- 3.7. Revegetate the disturbed areas with plant species useful to wildlife.
- 3.8. Proper handling and storage of fuel etc. at construction sites.

4.0. MANAGEMENT OF EXISTING VEGETATION:

The site-specific plans will describe procedures for protection of vegetation and natural features (wetlands, streams, etc.), and vegetation clearing. Such procedures include felling and removal of merchantable trees, disposal of slash and non-merchantable trees, shrub cropping, and vegetation clearing. Of particular importance will be procedures to avoid areas such as wetlands, streams and stream banks, lakes, riparian zones, or important wildlife habitat and habitat features, and to minimize impact to these areas. The following measures shall be considered in preparation of the site-specific plans:

- 4.1 Careful planning and coordination of the project and construction site management to keep disturbed areas as small as possible.

- 4.2. Assess potential hydrologic impacts to adjacent wetlands, riparian zones, and other sensitive aquatic environments.
- 4.3. Directionally fell trees away from wetlands, riparian zones, and other sensitive areas.
- 4.4. Preclude heavy equipment and vehicles from entering wetlands, riparian zones, and other sensitive areas.
- 4.5. Clearly identify clearing limits, trees to be protected, and centerline of proposed trail clearing.
- 4.6. Clearly identify access roads and specify signage that will restrict all construction vehicles to the access roads.
- 4.7. Branches and other slash suitable for chipping shall be processed on-site and used for erosion control or removed from the site.
- 4.8. Burning shall only be considered as a method of tree, stump, or slash disposal when all other methods of removal are not practical. Approval from USFS and other agencies having jurisdiction shall be required.
- 4.9. If burning is not appropriate, then other on-site disposal shall be implemented. Stumps shall be buried on mostly level, previously disturbed sites at least 100 feet from streams and wetlands.
- 4.10. Evaluate the possibility of wind throw where clearing occurs in dense forest stands.
- 4.11. Feather cut unit edges to reduce the strong contrast between the ski trails and undisturbed surrounding areas.
- 4.12. Use wind firm trees as windbreaks and visual screens for lifts, trails and facilities.
- 4.13. Gladed areas shall have selective cutting with all trees that are felled being bucked such that all remnants are flush with the ground.
- 4.14. Through planning and construction site management minimize direct and indirect impacts to wetlands, streams, lakes environments, riparian zones, and other vegetative wildlife habitat.

5.0 EARTHWORK:

Topsoil management, regrading and contouring shall be incorporated into site-specific plans with measures to minimize disturbance and provide revegetation potential.

5.1. Topsoil Management:

The following measures will be considered in preparation of the site-specific plan in regard to topsoil management:

5.1.a. On portions of the ski area that will require grading and re-contouring, a topsoil survey will be conducted prior to initiating construction. Topsoil will be considered as any soil material that is suitable as a plant growth medium. Topsoil suitability is dependent on depth, texture, organic matter content, fertility, and coarse fragment characteristics. Such a survey may involve topsoil sampling to determine depths, textures, and fertility.

5.1.b. A site-specific soils stability investigation may be necessary, and shall be

considered where roads, lift terminals and towers, and graded trails cross or are sited on areas with potential stability problems (i.e., moderate to high stability hazard).

- 5.1.c.** Topsoil identified in areas to be graded or recontoured will be selectively removed from unsuitable subsoils, whenever practical.
- 5.1.d.** Salvaged topsoil shall be re-spread after grading activities are completed. If feasible, topsoil shall be imported from adjacent topsoil surplus areas to ensure adequate topsoil depths for revegetation.
- 5.1.e.** In areas where topsoil is not available, the top cover material (if present) will be saved and spread over the surface after contouring is complete. Replacing cover material will assist in the natural revegetation of the area.

5.2 Re-grading and Re-contouring:

The following measures will be considered in the preparation of each site-specific plan in regard to regrading and recontouring.

- 5.2.a.** Actual reshaping of areas will be designated in each site-specific plan and approved by the USFS prior to construction.
- 5.2.b.** All grading activities will be carried out during periods with the lowest probability for precipitation events that would result in surface runoff (i.e., late spring to late fall, to avoid the spring runoff).
- 5.2.c.** Regrading and recontouring activities will minimize disruption of natural swales and runoff channels. Where grading cannot avoid these areas, hydrologic continuity across the ski trail or road will be maintained.
- 5.2.d.** Specified requirements for engineered cuts and fills will ensure slope stability.
 - 5.2.e.** Non-engineered cut and fill areas shall be graded in lifts and compacted by dozers walking on the fill. Any subsurface water problems encountered will be addressed prior to final contouring. After final contouring, water bars will be installed to catch any surface water, then directed into undisturbed vegetation or natural drainage ways.
- 5.2.f.** On soils with moderate or high stability hazard, deep cuts and fills or complete vegetation removal on extensive areas will be avoided when possible.
- 5.2.g.** Special engineering shall be considered in the event unstable slope conditions may exist.
- 5.2.h.** Cut and fill slopes to be revegetated will be laid back to slope gradients of 1½:1 or flatter whenever possible.
- 5.2.i.** Grading activities of shallow soils over bedrock will include precautions to ensure that some subsoil is spread over impermeable bedrock prior to respreading of topsoil, whenever practical.
- 5.2.j.** An assessment will be made to determine if the regraded areas are overly compacted or too loose to provide an optimum plant growth condition. If determined to be too loose, compaction will be accomplished. If determined to be excessively compacted, a spike tooth harrow or similar implement will be used to loosen the soil.

5.2.k. Spot or strip dozing for stump removal or smoothing out break overs and transitions may be necessary.

5.2.l. Cuts and fills will take place in areas that need contour modification to produce a desirable ski slope. These cuts and fills will be identified and estimated volume calculated prior to communication of the contour modification.

6.0 TEMPORARY EROSION AND SEDIMENTATION CONTROL:

Site-specific plans shall address surface runoff, erosion, and sediment control. The following measures shall be considered in preparation of site-specific plans:

- 6.1.** Minimize the area of exposed soils at any one time to only the area necessary for timely and efficient project construction.
- 6.2.** Minimize the length and gradient of disturbed areas.
- 6.3.** Use interceptor ditches to prevent runoff from undisturbed areas from entering the disturbed area.
- 6.4.** All water collected within the road environment will be discharged onto an energy dissipator (i.e., rip-rap) and subsequently into undisturbed vegetation or natural drainage ways.
- 6.5.** A supply of surface runoff and erosion control materials (silt fence materials, straw bales, sand bags, and tools) will be on site at all times for emergencies.
- 6.6.** Implement surface runoff and temporary erosion control measures on all disturbed areas prior to or immediately following initial disturbance.
- 6.7.** Topsoil shall be spread over the site to be revegetated by spreading across the slope, then tracking the topsoil to leave grouser imprints perpendicular to the slope.
- 6.8.** Construct water bars across all disturbed areas at the following recommended spacing:

Slope Gradient (percent)	Water-Bar Interval (feet)
10	200
15	150
20	100
30	75
40	50
50	40
>50	30

6.9. In disturbed areas, water bars will be constructed perpendicularly to the hillslope topography. Water-bars will be constructed by digging or dozing a small trench and casting the soil material to the downhill side, to form a row or bank. Each water-bar will initiate in undisturbed vegetation up slope, traverse the disturbed area at a gradient between 1 and 10 percent (depending on slope), and discharge water into undisturbed vegetation on the

lower side of the disturbed area.

- 6.10.** Trenches and/or silt fences will be extensively utilized along the lower portion of all disturbed areas. Proper construction of silt fences will be implemented by following manufacturer's specifications.
- 6.11.** Sensitive areas or areas of high erosion potential will be marked to prevent disturbance.
- 6.12.** Sediment ponds or traps will be utilized (if necessary, depending on soil type) to allow sediment particles to settle out before the runoff continues to natural drainage.
- 6.13.** Flexible pipes or sluice boxes may be used to transfer water down embankments or fill slopes. The transferred water will be intercepted with a culvert inlet.
- 6.14.** Culverts may be temporarily buried or placed on the ground surface to convey water through, around, or under the disturbed area.

7.0 PERMANENT EROSION AND SEDIMENTATION CONTROL:

Site - specific plans shall address permanent erosion and sedimentation control measures. Methods shall include slope stabilization techniques, grade control, and revegetation. The objective is to stabilize the soil as soon as practical to minimize erosion potential and sediment discharge into existing water courses. The following measures shall be considered when preparing permanent erosion and sediment control plans:

- 7.1.** All disturbed areas that have been regraded and re-top soiled shall undergo revegetation treatments as soon as possible, usually within fourteen (14) days after soil preparation.
- 7.2.** Permanent drainage diversions shall be installed and stabilized. Stabilization shall include revegetation, rip rap, grade control devices, etc.
- 7.3.** Sediment basins shall be installed where appropriate.
- 7.4.** Seed mix(es) for revegetation will be designed based on site-specific conditions of a specific area to meet general criteria of revegetation. Seed mixes shall take into consideration usefulness and effectiveness for site stabilization, usefulness to foraging animals, and climax community with native species, availability, and cost.
- 7.5.** Seed mix(es) shall be subject to review and approval by the USFS. Only weed-free sources shall be utilized.
- 7.6.** Seed mix(es) shall be applied at optimum rates as specified by the seed distributor.
- 7.7.** Prior to reseeding, disturbed areas will be prepared by loosening and roughening the surface.
- 7.8.** Addition of organic or inorganic fertilizers may be required to assure successful revegetation and maintenance of soil productivity. Application of fertilizer will be based upon an inventory of soil quality and type.
- 7.9.** All regraded, re-top soiled, and reseeded areas will be protected from erosion by effective revegetation methods and through application of mulch, using stapled netting or tacifier when necessary. Only weed-free mulch sources will be utilized. Mulch will be applied at a rate of at least 1.5 tons/acre. The mulch will be crimped into the soil with a snowcat, bulldozer, or other effective mechanical device. If mechanical crimping is impractical, stapled netting and/or chemical tacifiers would be used to bind the loose mulch to the soil surface to minimize removal by wind or surface runoff.

- 7.10. On slopes too steep to use heavy equipment, hydro mulch will be used in place of straw or hay mulch. Slopes inaccessible by hydro mulching equipment shall have some other type of mulch. On areas with excess rock and little or no topsoil, Biosol (an organic pellet fertilizer) will be applied at a rate no less than 750 lbs./acre after seeding.
- 7.11. Wetlands will not be disturbed by construction except where authorized through the COE 404 permit process. Revegetation efforts adjacent to wetlands will be designed to maximize the establishment of vegetation species which will filter runoff or otherwise buffer wetlands from the effects of disturbance.
- 7.12. In areas that will be subject to further disturbance, permanent revegetation may not be appropriate. In such cases, temporary erosion control and/or revegetation measures may be implemented by either mulching in the absence of seeding or fertilization, or seeding with a quick germinating and fast growing grass (i.e., annual wheat or rye). Both techniques may be required in highly erosive sites to obtain the desired degree of erosion control.
- 7.13. In dense forest stands with a depauperate ground cover where forest overstory clearing is specified, a revegetation effort may be required to assure an adequate ground cover.

8.0 MONITORING AND MAINTENANCE:

The TMV will be responsible for all aspects of implementation of each site specific plan. Monitoring of Conservation Management Practices shall occur throughout the entire construction period. Monitoring shall continue after the construction activity is complete and until an acceptable level of permanent erosion and sediment control has been achieved. Effective monitoring at optimum intervals will ensure that environmental degradation will be minimal by allowing problems to be corrected early. The success and effectiveness of the monitoring efforts will determine the success of precluding undue environmental degradation.

The TMV will assume primary responsibility for monitoring activities. The USFS will determine if the monitoring has been effectively implemented and if the monitoring has detected any failures (i.e., ineffective erosion control, substandard revegetation, etc.) that require immediate remediation. Checklists I, II, III, and IV are provided as guidelines for the evaluation and monitoring process.

A report that documents the compliance with the BMP'S will be submitted to the USFS office in Norwood, CO. Possible items to include in the report are:

- A written summary describing the condition and status of the reclamation work.
- Photographs taken of the site(s) that illustrate either success or problems.
- A prognosis of the reclamation efforts.
- A discussion and results of any remedial measures required during the year by USFS.

Should monitoring of site conditions identify areas of concern, TMV will incorporate in the report what measures were taken to mitigate the problem(s). The revegetated areas will be monitored until the areas are released by the USFS, acting as the lead agency, upon attainment of the performance objectives.

Checklist I

Conservation Management Practices Planning and Design Checklist

PLANNER:

PROJECT:

DATE:

Not Required Required

Characteristics of affected site:

- Soils Test
- Soil Inventory
- Site-Specific Topography
- Unique or important wildlife habitat
- Locations of streams, lakes, tributaries and drainages
- Wetland delineations

Projected Time Frame:

- Site layout
- Clearing
- Earthwork
- Temporary erosion and sediment control
- Permanent erosion sediment control
- Revegetation
- Monitoring

Performance Objectives:

Management of Existing Vegetation:

- Assess potential hydrologic impacts to adjacent wetlands and riparian zones
- Identify clearing limits
- Identify access roads
- Identify sensitive areas to be protected

Earthwork:

- Topsoil Management plan
- Re-grading and contouring

Temporary erosion and sedimentation control:

- Temporary erosion control plan, details, and specs.

Permanent erosion and sediment control:

- Permanent erosion control plans, details, and specs.

Monitoring program and project manager assigned:

- Site-specific performance standards established.

Comments:

Checklist II

MONITORING CHECKLIST
Monitoring Conservation Management Practices
During Construction Activity

INSPECTED BY:

PROJECT:

DATE:

- | | | | |
|--------------------------|--------------------------|--|----------|
| <input type="checkbox"/> | Not Required | <input type="checkbox"/> | Required |
| <input type="checkbox"/> | <input type="checkbox"/> | Temporary erosion and sediment control plan has been approved and is available on site during construction activity. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Clearing limits have been established | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fencing and signage has been installed to protect existing vegetation, stream water courses, etc. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Temporary crossings have been installed at streams, tributaries, and drainage channels. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Dust control has been implemented on access roads. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Temporary erosion and sediment control measures have been installed per approved plans and details: | |
| | <input type="checkbox"/> | silt fence | |
| | <input type="checkbox"/> | straw bale check damns | |
| | <input type="checkbox"/> | mulch | |
| | <input type="checkbox"/> | erosion control netting | |
| | <input type="checkbox"/> | intercept dikes | |
| | <input type="checkbox"/> | temporary drainage swales | |
| | <input type="checkbox"/> | water bars | |
| | <input type="checkbox"/> | temporary sediment basins | |
| | <input type="checkbox"/> | grade control structures | |
| | <input type="checkbox"/> | temporary seeding | |
| <input type="checkbox"/> | <input type="checkbox"/> | Trees and slash have been properly disposed of: | |
| | <input type="checkbox"/> | hauled off site | |
| | <input type="checkbox"/> | chipped and used for mulch | |
| | <input type="checkbox"/> | buried | |
| | <input type="checkbox"/> | burned (if approved) | |
| <input type="checkbox"/> | <input type="checkbox"/> | Edges of timber cuts have been "feathered" to reduce strong contrast between the ski trails and undisturbed surrounding areas. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Topsoil assessment completed and stripping avoided wherever practical. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Topsoil storage areas have been established. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Temporary erosion control has been installed at stockpile locations. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Petroleum products and other pollutants are not being stored within 100 feet from wetlands, streams, and other water courses. | |

- Pollutant containment measures have been installed.
 - Temporary erosion and sediment control measures are regularly maintained:
 - silt fence
 - straw bale check damns
 - mulch
 - erosion control netting
 - intercept dikes
 - temporary seeding
 - temporary drainage swales
 - water bars
 - temporary sediment basins
 - grade control structures
 - Erosion and sediment discharges are effective during a rain event.
 Adjustments required and have been implemented.
 - Comments:
-

Checklist III

MONITORING CHECKLIST
Conservation Management Practices
Permanent erosion and sediment control measures

INSPECTED BY:

PROJECT:

DATE:

- | | | | |
|--------------------------|--------------------------|--|----------|
| <input type="checkbox"/> | Not required | <input type="checkbox"/> | Required |
| <input type="checkbox"/> | <input type="checkbox"/> | A site specific erosion and sediment control plan has been approved and is available at the Mountain Operations Offices. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Topsoil has been spread at the proper depth over the sites to be revegetated: | |
| | <input type="checkbox"/> | Soil amendment applied | |
| <input type="checkbox"/> | <input type="checkbox"/> | Topsoil has been "tracked " or "tilled" to create good seed bed. | |
| <input type="checkbox"/> | <input type="checkbox"/> | Seeding has occurred within 14 days with the spreading of topsoil: | |
| | <input type="checkbox"/> | Seed is tilled into soil | |
| | <input type="checkbox"/> | Seed is drilled into soil | |
| <input type="checkbox"/> | <input type="checkbox"/> | Mulch / Erosion control netting has been applied / installed over seeded area: | |
| | <input type="checkbox"/> | Hydro mulch | |
| | <input type="checkbox"/> | Straw blanket | |
| | <input type="checkbox"/> | Straw mulch w/ tacifier | |
| | <input type="checkbox"/> | Straw mulch crimped | |
| | <input type="checkbox"/> | Other erosion control blankets | |
| | <input type="checkbox"/> | Decomposed wood chips | |
| <input type="checkbox"/> | <input type="checkbox"/> | Grade control structures installed: | |
| | <input type="checkbox"/> | Boulder check damns | |
| | <input type="checkbox"/> | Gabion baskets | |
| | <input type="checkbox"/> | Cobble rip rap | |
| | <input type="checkbox"/> | Log and boulder drop structure | |
| <input type="checkbox"/> | <input type="checkbox"/> | Drainage Diversions installed: | |
| | <input type="checkbox"/> | Water bars | |
| | <input type="checkbox"/> | Drainage swales | |
| | <input type="checkbox"/> | Intercept dikes | |
| <input type="checkbox"/> | <input type="checkbox"/> | Drainage channels have been stabilized: | |
| | <input type="checkbox"/> | Properly Graded | |
| | <input type="checkbox"/> | Seeded / Mulched | |
| | <input type="checkbox"/> | Erosion control netting | |
| | <input type="checkbox"/> | Rock rip rap | |
| | <input type="checkbox"/> | Live staking | |
| | <input type="checkbox"/> | Brush layering | |
| | <input type="checkbox"/> | Brush mattresses | |
| | <input type="checkbox"/> | Bio-gabion | |
| <input type="checkbox"/> | <input type="checkbox"/> | Sediment basin(s) have been installed: | |
| | <input type="checkbox"/> | Sidewalls have been stabilized (revegetation or rock) | |
| | <input type="checkbox"/> | Outlets constructed | |

- Temporary road crossings at drainage ditches, streams, tributaries, etc. have been removed and flow has been restored:
 - Adjustments required
 - Comments:
-
-

Checklist IV

MONITORING CHECKLIST
Post Construction Monitoring

INSPECTED BY:

PROJECT:

DATE:

- Not Required Required
- Mulch is maintaining good coverage and is stabilized:
- Additional mulch required
- Additional stabilization / tacifier required

Comments:

- Grade control structures are effective and are being maintained:
- Adjustments required

Comments:

- All signage in revegetated areas has been posted to restrict vehicle access.

Comments:

- Drainage swales / water bars are effective:
- Adjustments required

Comments:

- Seeded areas have germinated. NOTE: 70% vegetative ground cover on revegetated areas will represent acceptable performance standards:

Date: _____

- > 70% coverage
- 60%-70% coverage

- 50%-60% coverage**
- <50% coverage**
- Reseeding required**

Comments:

- Sediment control basins are effective and are being maintained:
 - Adjustments required

Comments:

- Temporary road crossings at drainage ditches, streams, tributaries, etc. have been removed and original flow has been restored:
 - Adjustments required
- Erosion and sediment discharge are adequately controlled during a rain event:
 - Adjustments required

Comments:

Best Management Practices for Ski Areas and other Special Uses on National Forest System lands:

Purpose:

The purpose of these Best Management Practices (BMP's) is to provide general guidelines for erosion control and revegetation for special use projects approved on National Forest System lands. These guidelines are an integration of resource BMP's from a number of sources. (See reference list) These practices are consistent with existing laws and regulations for Special Use permit holders operating on National Forest System lands.

These guidelines should be reviewed and revised as needed as reference policies and conditions dictate and used in conjunction with mitigation measures found in the National Environmental Policy Act (NEPA) documents for specific projects. The most restrictive requirement shall be adhered to unless methods herein prove infeasible or undesirable; variance from these guidelines will be reviewed on a case-by-case basis by the Forest Service authorized officer.

Table of Contents:

- I. Trails/Lift Line Clearing**
- II. Water Diversions/Crossings**
- III. Construction Access**
- IV. Erosion Control**
- V. Revegetation**
- VI. Monitoring**

I. Trail/Lift Line Clearing:

- 1.** All trails or lift lines will be clearly marked at the edges, as well as any leave trees. Trees and shrubs outside the trail limits, and desirable trees within the clearing area, will be protected from damage during the grooming/clearing operations.
- 2.** Mark trees to achieve a "soft edge", keeping smaller trees near the edge and progressing toward larger trees toward the middle. Feather out unit edges to reduce the strong contrast between ski trails/lift lines and undisturbed areas.
- 3.** Maintain the integrity of naturally occurring tree clumps when marking and cutting edges.
- 4.** Removal of more than 25% of the basal area of a forested watershed will be approved on a case by case basis.
- 5.** Bumper trees will be designated before skidding (over snow or summer) is initiated and removed after logging operations are complete.
- 6.** A temporary fence outside the drip line of the trees may be required to protect vegetation from injury and compaction.
- 7.** Directional felling will be specified to minimize disturbance of logging operations.
- 8.** Evaluate the possibility of wind throw when tree removal occurs.
- 9.** Avoid or minimize the amount of cutting in sensitive areas such as wetlands, stream environments,

and important wildlife habitats. Any cutting will be authorized on a case by case basis.

10. Ground winching, butt lifting, and directional felling will be required when tree removal is permitted in sensitive areas.
11. Cut stumps flush with the ground instead of grubbing whenever possible.
12. Preclude slash from falling in streams, drainage channels or wetlands, remove all slash or timber that accidentally falls in these areas immediately.

Slash Disposal:

1. Stumps and slash must be disposed of in a manner approved by the FS. Stumps should be flush cut; however, in some cases stumps may be buried, burned, or hauled off the NF. Slash may be chipped, burned, or lopped and scattered based on the type and volume of slash, site specific conditions, and other resource objectives.
2. Any burning will be in accordance with the Colorado Department of Health, Air Pollution Control Division, and City and County requirements, and an approved Burning Plan.
3. Burying of wood products will be considered on a case by case basis, and only after all other alternatives have been considered.
4. Burying will not be permitted in roads, or on steep slopes where the proper density of compaction is unobtainable or there is a danger of eventual soil movement.
5. Felled trees, slash, and any other clearing debris will not be allowed to accumulate outside of the trail limits unless specifically authorized by the FS. Boulders should be blasted, buried or removed off the forest. They should not be stockpiled.
6. Use of approved herbicides for controlling noxious weeds will conform to current FS specifications. All herbicides will be approved in writing by the FS.
7. The cutting of brush for trail maintenance will be limited to open trails only. Cutting within gladed trails will be in accordance with the Vegetation Management Plan. Wetland vegetation will be trimmed in accordance with site specific project plan.

II. Water Diversions/Crossings:

1. Diverting a stream channel, drainage, or water course will be avoided. Approval will be on a case by case basis.
2. All diversions will be in compliance with the Colorado State Highway Department Erosion Control Manual and the 2509.25 Watershed Conservation Practices Handbook 12/26/96.
3. Design and construct all stream crossings and other instream structures to pass normal flows, withstand expected flood flows, and allow for free movement of resident aquatic life.
4. Design all structures associated with stream courses so that stream health pattern, geometry, and habitats are maintained or improved.

III. Construction Access:

1. An Access Plan will be made a part of the summer construction plan, and may be included within other plans such as Timber Removal Plan.

2. The normal access to project sites will be on existing roads, old roads, and trails when possible.
3. Project access will be assessed on a case by case basis determined by moisture content of soils, compaction nature of soils, and vegetation cover.
4. Excavation equipment shall be track vehicles unless project site allows for rubber tired equipment.
5. Summer access to tundra environments at or above timberline will be limited to foot and helicopter travel only. Any other necessary access will be considered on a case by case basis.
6. Vehicle access to routine projects is restricted to existing roads, old roads (if not obliterated or otherwise revegetated)) and trails.
7. Motorized vehicles should not travel cross country. Cross country travel needs approval prior to activity.

IV. Erosion Control:

Grading and Re-Contouring:

1. The extent of grading and recontouring for each project will be determined on a case by case basis. Levels of disturbance ranging from light modifications to heavy include:

Light:

Trees are flush cut and stumps are left in place. To minimize soil disturbance, trees are directionally felled. The duff layer and understory vegetation are primarily intact on +/- 50% of the area. Soil profile is intact.

Light/Moderate:

Stumps are removed with a brush rake and buried or hauled. The soil profile is retained and duff layer is intact on +/- 50% of the area. Some duff and understory vegetation is visible.

Moderate/Heavy:

Spot dozing is permitted with limited areas of contour grading to smooth terrain irregularities, and stumps are buried or removed. Cuts and fills are less than 2 feet, and topsoil is stockpiled, covered, and replaced.

Heavy:

Contour grading occurs with cuts and fills approved on Contour Grading Plan. Topsoil is stockpiled and covered for replacement, and stumps are buried or removed. A site specific drainage plan must be consistent with the overall Ski Area drainage plan.

2. Any grading and recontouring will integrate with the area wide Hydrologic Assessment and Drainage Plan.
3. Dozing will be permitted only when actual limits of the reshaping is designated on the ground and approved by the FS. Contour Grading Plans will be required on larger projects and will show a balance of cuts and fills.

(A Contour Grading Plan may be needed for any project in the Summer Construction Plan associated with a particular project record which requires cuts and fills or makes changes in the drainage of the area disturbed.)

4. Minimize the area of exposed soils at any one time to that absolutely necessary for project construction. The amount of area exposed in one drainage basin needs to be considered. As a general guideline, limit the extent of severe soil impacts, i.e. compaction, puddling, and displacement, to less than 15% of the sub watershed.
5. Cuts and fills and complete vegetation removal on extensive areas should be avoided to the maximum extent when possible.
6. Dozing will not be permitted on areas that cannot be adequately protected from erosion, i.e., areas where revegetation is questionable.
7. Regrade and re-topsoil disturbed areas by moving equipment across the slope rather than up and down the slope.
8. Dozed surfaces should be left rough or stepped instead of back-bladed smooth. A rough surface will aid in holding moisture and reducing erosion.
9. All erodible cut and fill areas must be back sloped to a degree which will allow proper revegetation, as a general rule, 1.5:1 or flatter.
10. The recontoured surface of the graded areas should blend and match grade with the surrounding undisturbed terrain. Clearing width for trees should generally be 6 feet beyond the top of cut, or wide enough to prevent exposure of tree roots, and the formation of turf cap.
11. Disruption of swales, ephemeral and runoff channels will be minimized. Any proposed modification should be designed into the overall drainage plan, and will be authorized on a case by case basis.
12. In order to reduce the compaction, any ground disturbing activities will not begin until soils have adequately dried out. Use heavy equipment only when the water table is more than 3ft below the surface and soil moisture is below the plastic limit (or when soil is deeply frozen or covered with more than a foot of snow).
13. Grading & other ground disturbing activities should not be carried out during periods of heavy rain.

Surface Runoff and Erosion Control:

1. Detailed BMP's for erosion control can be found in FSH 2509.25 Watershed Conservation Practices Handbook also additional BMP's can be found in the Colorado Department of Highway's Erosion Control Manual, Oct. 1978.
2. Intercept and capture runoff from undisturbed areas and prevent it from entering the disturbed areas.
3. Silt fences shall be installed and maintained along the lower portion of the disturbed areas to intercept and detain sediment carried across the disturbed area by onsite runoff.
4. Silt fences shall be toed into natural sod and not back filled with fill material. The silt fence shall be cleaned out when 50% of the capacity has been reached, and removed when no longer needed
5. Snow fences, trenches, hay bales, and or logs should be placed uphill to protect the integrity of the filter fence from fill and rolling rock. Maintain a 6 foot or greater natural vegetation buffer between filter fence and fence protection. All hay bales used in conjunction with a project shall be certified weed free
6. Have an adequate supply of surface and erosion control materials (silt fence, weed-free hay/straw bales, and tools) onsite at all times for emergencies.
7. A 100 foot wide upland vegetation buffer strip should be left between all areas of disturbance and streams, drainage channels, and wetlands. Width of the buffer strip may be altered depending on

site specific characteristics.

- 8.** Water-bars should be constructed on all disturbed soil immediately after disturbed and before revegetation work is completed.

- 9.** Water-bars should meet the following specifications:

- a).** The overall grade shall traverse the disturbed area at a constant gradient of between five and ten percent with an increasing grade towards the end for self-cleaning.

- b).** They should be constructed by excavating a trench one foot deep and side-casting the material to the lower side, creating a water bar approximately 18 inches deep.

- c).** They must carry the water completely off the disturbed area and spread it as widely as possible on an undisturbed area. The water bars must not merely move the water off the trails and concentrate it near the edge of the trail.

- d).** Energy dissipaters should be constructed at the point of water bar discharge, if necessary

- e).** Each water bar must have a separate discharge point. Several water bars shall not empty into one water bar which could cause overloading and failure.

- f).** Waterbars should incorporate natural terrain features.

- g).** Construct water bars across all disturbed areas at the following recommended spacing:

Slope Gradient (%)	Interval (feet)
10	150
15	100
20	50
30	40
40	35
50+	30

- h).** Once bars are constructed, all vehicle traffic, including tracked vehicles, (other than winter traffic), must avoid the water barred area to avoid breaking down the berm. Damaged berms will be repaired at the end of the work shift.

- 10.** Improvements and maintenance of erosion control measures such as SED fence, water-bars, culverts, and road ditches, should be completed in the fall to handle spring runoff.

Temporary Construction Ditches:

- 1.** Ditches for power lines, snowmaking, etc. should not be open any greater than 300 feet, or have blowout protection every 300 feet. Examples include sandbags or relief ditches.

- 2.** Strip vegetation and topsoil, stockpile and cover for replacement after construction is complete. This soil must be kept moist.

- 3.** Place subsoil uphill from ditch to hydrologically isolate soils from stream, channels.

- 4.** Smooth subsoil for construction travel route instead of creating an additional travel way.

Skier-Arch Pipe:

1. No machine earthwork other than by hand in stream channel.
2. Arch pipe should span the thalweg (normal low water channel). One inch or greater spacing will be maintained between sections.
3. Arch pipe that is placed over stream courses should be removed during summer. This is hand work only unless done over the snow with grooming equipment and no bank damage will occur.
4. Arch pipe may not be permitted on specific channels due to environmental issues.
5. Snow bridges will be authorized on a case by case basis.
6. Daily ground checking of water bars, arch pipe, and culverts will occur during period of spring runoff and high rainfall intensity. The crew doing this checking must be equipped to repair and maintain control structures.

Topsoil Management:

1. On areas that require grading, a topsoil inventory should be accomplished prior to initiating construction. All areas to be disturbed should be mapped in regard to topsoil deficits and surpluses and marked clearly on the ground, and the Contour Grading Plan.
2. Topsoil should be considered as any soil material that is suitable as a plant growth medium which will ultimately produce a vegetative ground cover capable of preventing surface erosion. Topsoil suitability is dependent on depth, texture, organic matter, fertility, and coarse fragment characteristics.
3. A site specific soils stability validation should be accomplished where roads, lift terminals and towers, and graded trails cross or are sited on areas with potential stability problems (i.e., moderate to high stability hazard) or high erodibility potential.
4. The salvaged topsoil should be securely stored away from all construction activities, covered, and hydrologically isolated from watercourses.
5. All topsoil identified in areas to be graded should be selectively removed from unsuitable sub-soils with the minimum amount of soil mixing.
6. Regrading materials should consist of suitable subsoil material upon which topsoil will be respread. Subsoil material should not be comprised of rock, boulders, cobbles, gravel, or sand; but should have a relatively high composition of fine sands and silts to provide adequate site drainage yet provide adequate soil moisture storage and rooting depth.
7. In areas of shallow soils over bedrock, it will be determined on a case by case basis, whether the placement of subsoil will be spread over impermeable bedrock prior to respreading topsoil.
8. Selective boulder removal may be required to facilitate adequate topsoil re-spreading and revegetation.
9. Topsoil should be respread to a depth normal for the site. All available topsoil should be salvaged, stored, covered and respread.
10. Topsoil import from adjacent on-mountain topsoil surplus areas may be required to ensure adequate topsoil depths.

V. Revegetation:

1. Revegetation on any area may be required where ground cover is disturbed. As a general guideline, ground cover should recover to its normal range of variability for the land type and geoclimatic area by the end of the third growing season. Native plant species should ultimately dominate the site, although introducing annual species may be used to ensure vegetation cover initially.
2. Seeding should occur in the fall and immediately after a rain or the first snowfall. On high elevation slopes or areas of special erosion concerns, revegetation should be completed immediately after the disturbance.
3. When no seeding is needed or seeding will be accomplished in the fall, then erosion control measures and mulching need to be applied immediately after recontouring is completed on all areas with erodibility potential.
4. Specific revegetation and restoration efforts will be required where wetlands are authorized to be disturbed by grading activities.

Seed Bed Preparation:

1. Leave an irregular or roughened surface as in a disked field. Do not back-blade smooth.
2. Soil should be moist and fluffy, consisting of sufficient topsoil when available.
3. Compacted areas shall be scarified and loosened by disk, harrow or hand rake.

Seeding:

1. Seed mixtures should be designed based on site-specific conditions of a particular area (i.e. elevation, aspect, vegetation community type, site moisture, soil type etc.) to meet the specific objectives of revegetation. Species name and variety, germination percent, and pure live seed should be specified on the bag.
2. Only certified weed-free seed sources will be utilized. All seed purchased will be required to be tested for "all States noxious weeds" according to the Association of Official Seed Analysts (AOSA) standards and will be certified in writing by a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act and the appropriate State Seed Law regarding testing, labeling, sale and transport of Prohibited and Restricted noxious weeds.
3. Seed should be primarily of native species and varieties. If non-native species are demonstrated to not be overly aggressive and allow for establishment of native species, then seed mix containing non-natives may be allowed, such as sterile wheat or winter rye.
4. Broadcast seeding should be at a rate of 40 to 80 lbs. per acre.
5. In hydromulch is used, application of the seed should be separate from the mulch to prevent the seed from being "caught-up" in the mulch, germinating, and not coming in contact with the mineral soil.
6. Seed should be lightly raked or harrowed into the soil.
7. Seed drilling should be done on the contour and at a rate of 15 lbs. to 20 lbs. per acre.
8. When drill seeding, seed shall be planted using a drill equipped with a depth regulator to ensure proper depth of planting.

9. The seed mixture shall be evenly and uniformly planted over the disturbed area. If using a spreader or drill and seeds are similar in size, they can be seeded together; otherwise, they need to be seeded separately.
10. The District Ranger or his/her representative will approve seed mixtures and rate of application.

Fertilization:

1. Fertilizer may be used on problem areas where lack of adequate topsoil and other site conditions would prevent the establishment of an adequate ground cover.
2. Utilize chemical fertilizers or other chemicals where such use will not reach surface or ground water sources.

Mulch:

1. Mulching will be required in most situations where there is soil disturbance.
2. Mulching materials to be used can be straw, hydromulch (1,500 lbs. per acre), wood fiber, and mulch tackifiers. They should be applied at a rate of 1 ½ to 2 tons per acres.
3. Only certified weed-free straw/hay mulch will be used.
4. Care shall be taken to avoid thick (greater than three inches of depth) spots.
5. Crimping, tackifying, and netting may be required to bind the loose mulch to the soil surface to minimize removal by wind or surface runoff. The method selected should be determined by the condition of the area.
6. A tackifier may be used after replacement of topsoil to reduce the potential for soil loss. The rate should be 90 to 100 lbs./acre.
7. Evaluate each revegetated site regularly in order to determine success.
8. High traffic areas need to be fenced off or identified in some way until revegetation is established.

Irrigation:

1. When possible or dictated by abnormally dry weather, the snowmaking system, or any watering system, may be utilized to facilitate seed germination and establishment of young plants. Water depletion issues and water rights need to be considered.

VI. BMP Monitoring:

1. Monitoring should be implemented to determine BMP successes:
 - Revegetation successes.
 - Sheet and rill erosion, gullies, slumping, and subsidence.
 - Effectiveness of erosion control measures.
 - Noxious and undesirable weed invasion.
 - Evidence of excessive livestock and wildlife grazing.
2. The following performance standards should be used to determine whether the objectives of the

erosion control and revegetation plan have been met at a given time. A reference transect should be established for baseline conditions:

- Percent Cover -75% of the total vegetation cover measured for the reference transect.
 - Dominant Species -90% of the revegetation consists of species contained in the applied seed mix and that occur in the reference transect.
 - Seedling Density-The density and abundance of seedlings is at least 3 to 4 seedlings per square foot.
 - Erosion Condition/Soil Factor-Erosion condition of the reclaimed area is equal to or in better condition than that measured for the reference transect.
3. Photographs should be taken each year at established points to document the reclamation effort and maintain a consistent photographic record.
 4. The revegetated areas should be monitored until the areas are released by the FS representative upon attainment of the performance standards. If performance standards have not been met, the Permit Holder will submit a proposal to meet these standards for the FS acceptance.
 5. More detailed information on reference transects, photographic documentation, and monitoring forms can be found in the Lake Catamount EIS, Volume I, and Appendix. B.

References:

Winter Sports Guidebook, USDA, Forest Service, Rocky Mt Region, June 1992.

Routt National Forest and Resource Management Plan.

2509.25 Watershed Conservation Practices Handbook USDA, December 1996.

Erosion Control Manual, Colorado Dept. of Highways, October 1978.

16.0 SPILL CONTROL PROCEDURES:

16.1 SPILL CONTROL:

In the event of a spill, the TMV must abide by all applicable rules and regulations with respect to reporting requirements and cleaning up the spill. The TMV must also follow any additional procedures required by federal, state, or local agencies. All costs due to spills and spill clean-up must be assumed by the Contractor. All clean-up and other spill related activities must be completed by the Contractor.

These activities include but are not limited to:

- a). The spill site must be evacuated as necessary to safeguard human health. Evacuation parameters shall include consideration for the potential of fire, explosion, and hazardous gases.
- b). The cause of the spill must be stopped immediately.
- c). If the spill is flowing, it must be contained and/or absorbed before reaching surface waters or wetlands.
- d). Absorbent material(s) shall be placed over the substance to minimize spreading and to reduce the spill's penetration into the soil.

- e). For spills which occur into or near surface waters and/or wetlands, the Contractor will immediately notify the National Response Center (1-800-424-8802). This notification is required in accordance with the Federal Clean Water Act (Title 40 CFR, Par 110.10). AN emergency response contractor must be secured to contain and clean up the spill.
- f). For large spills on land, pooled material must be pumped immediately into tank trucks. The Contractor shall excavate all contaminated soil. The spilled material and the contaminated soil must be treated and/or disposed of in accordance with the various federal, state, and local agency requirements.
- g). Smaller spills on land shall be cleaned up with absorbent materials. The Contractor must collect, treat and/or dispose of these materials in accordance with the various federal, state, and local agency requirements.

16.2 WATER WELL PROTECTION:

No refueling or storage of hazardous materials is planned or will be allowed within a 100 foot radius of municipal or community water supply wells.

16.3 SPILL NOTIFICATION:

The Contractor must report spills in excess of 25 gallons (diesel fuel and gasoline) to appropriate federal, state, and local agencies as soon as possible. The primary contacts include:

National Emergency Response Center.....1-800-424-8802
 Colorado Department of Health.....1-303-320-8333
 San Miguel County Sheriff's Dispatch.....1-970-728-3081

The Sheriff's Dispatch Center will contact appropriate local agencies and will arrange for appropriate emergency response actions.

Notification of the spill shall also be made to the USFS, Norwood District Ranger at (970) 327-4261 or

Spill notification should include the following information:

- Exact and specific direction from common landmarks; poor directions cost valuable time.
- The time and date of the spill, and the time and date that the spill was discovered.
- The type and volume of spilled material, and the name of the material's manufacturer.
- The media in which the spill exists (i.e., soil, water, within the containment structure, etc.).
- The topography and surface conditions of the spill site.
- Proximity of the spill to any sensitive resources, including surface waters, wetlands, and riparian zones.
- Weather conditions at the location of the spill.
- Name, company, address, and telephone number of the Contractor or responsible party.
- The cause of the spill.

- **Immediate containment and/or short term mitigative actions implemented.**
- **Name, company, address, and telephone number of person who reports the spill.**