BID# 20-018B
MATANUSKA-SUSITNA BOROUGH PURCHASING DIVISION
PALMER, ALASKA

BIDDING AND CONTRACT DOCUMENTS FOR

BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM

OPENING DATE & TIME: August 1, 2019 @ 3:00 PM
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MATANUSKA-SUSITNA BOROUGH
350 East Dahlia
Palmer, Alaska 99645

ADVERTISEMENT

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>ACCOUNT #</th>
<th>DATE FOR ADVERTISEMENT</th>
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</thead>
<tbody>
<tr>
<td>Anchorage Daily News</td>
<td>MATA 0070</td>
<td>July 12, 2019</td>
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The material herein must be printed in its entirety on the dates shown above. Affidavit of publication is required prior to payment.

MATANUSKA-SUSITNA BOROUGH
BID #20-018B
BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM

The Matanuska-Susitna Borough (MSB) is requesting bids from interested contractors to design & construct approximately 7,500 linear feet of multi-use motorized trail and provide project management. The Ridge Trail System has long been used by cross-country skiers, hikers, dog mushers, ski-jorers, mountain bikers, and ATVs. The 4.5-mile trail system is located on Borough and State lands at T26N, R04W, Sections 16 and 17, Seward Meridian (See Attachment A). The project is funded by the Borough through the 2016 voter-approved bond measure.

Bid documents are available to download for free beginning July 12, 2019 from the MSB Purchasing Division’s website, at https://www.matsugov.us/contractopportunities. For more information call (907) 861-8601, Fax (907) 861-8617, or e-mail purchasing@matsugov.us.

Pre-bid: July 16, 2019 at 10:00 AM. The pre-bid will start on the east side of the trail alignment at the end of Comsat Road. This is marked by the green arrow on Attachment A.

Deadline for Questions: Wednesday, July 24, 2019 @ 5:00 PM

Bids open: August 1, 2019 at 3:00 PM in the Purchasing Division

Bids must be received in the Purchasing Division prior to the time fixed for opening of the bids to be considered. Time of receipt will be determined by the time stamp in the Purchasing Division.

Persons needing accommodation in order to participate should contact the borough ADA coordinator at (907) 861-8404.

The Matanuska-Susitna Borough reserves the right to accept or reject any or all bids, waive any and all technicalities or informalities it deems appropriate. Award of this project is subject to the availability of funding.

7/11/19  
Approved by:

DEPARTMENT ACCOUNT NO.: 440.000.000.462.940 ~15043/1000/1003
BID # 20-018B
BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINITIONS

1.1 Bidding Documents include the Advertisement or Invitation to Bid, Instructions to Bidders, bid form, other sample bidding and contract forms, proposed Contract Documents, including any Addenda issued prior to receipt of bids and bond forms. Contract Documents proposed for the work consist of the Borough-Contractor Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract.

1.2 All definitions set forth in the General Conditions of the Construction Agreement or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written or graphic instruments issued by the Borough prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.

1.4 A Bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.

1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the work described in the Bidding Documents as the base, to which work may be added, or from which work may be deleted for sums stated in Alternate Bids.

1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid, if the corresponding change in the work, as described in the Bidding Documents, is accepted.

1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or services, as described in the Bidding Documents or in the proposed Contract Documents.

1.8 A Bidder is a person or entity who submits a Bid.

1.9 A Sub-bidder is a person or entity who submits a Bid to a Bidder for materials or labor for a portion of the work.

1.10 Any interested party submitting a bid/proposal on Matanuska-Susitna Borough (MSB) projects should first review the MSB Debarment/Suspension List. This listing is available on the MSB web page under Economy and Bids. Any submission of a bid/proposal, with participation or involvement of an individual, company, firm or corporation on this list will render the bid/proposal as non-responsible.

ARTICLE 2 - BIDDER’S REPRESENTATIONS

2.1 Each Bidder by making a Bid represents that:

2.1.1 The Bidder has read and understands the Bidding Documents and the Bidder’s Bid is made in accordance therewith.

2.1.2 The bidder has visited the site and has taken other steps as may be necessary to ascertain the nature and local conditions of the work, the general and local conditions which could affect the work or costs thereof. Failure to do so will not relieve Bidders of responsibility for estimating properly or the difficulty or cost of successfully performing the work. The submission of a Bid shall be an admission that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements and accuracy of the Bidding Documents.

2.1.3 The Borough assumes no responsibility for any understanding or representations concerning conditions made by any of its officers, agents, or employees prior to the execution of this Contract, unless such understanding or representations are expressly stated in the Bidding Documents or Addenda.

2.1.4 The Bidder shall include in their Bid sums sufficient to cover all items required by the Contract and the conditions of the site(s), and shall rely entirely upon their own examination in making their Bid. The submission of a Bid shall be taken as a prima facie evidence of compliance with this paragraph.

2.1.5 The Bidder’s Bid is based upon the materials, systems, and equipment required by the Bidding Documents without exception.
ARTICLE 3 - BIDDING DOCUMENTS

3.1 Copies

3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office’s webpage as designated in the Advertisement or Invitation to Bid.

3.1.2 Bidders shall use complete sets of Bidding Documents in preparing Bids; the Borough does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents. If material required for bidding purposes by these documents is absent, the Bidder is required to notify the Purchasing Officer.

3.1.3 The Borough in making electronic copies of the Bidding Documents available on the above terms does so only for the purpose of obtaining Bids on the work, and does not confer a license of grant for any other use.

3.2 Interpretation or Correction of Bidding Documents

3.2.1 Bidders and Sub-bidders shall promptly notify the Purchasing Officer by fax at 861-8617, or by e-mail at Purchasing@matsugov.us of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Purchasing Officer at least five (5) work days prior to the date for receipt of Bids. Questions or requests for clarifications shall be directed to the borough's Purchasing Officer at Purchasing@matsugov.us. Questions or requests for clarification directed to any other member of the borough staff, or consultant may be grounds for rejection of bid as being irregular.

3.2.3 Any interpretation, correction, or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections, and changes.

3.3 Addenda

3.3.1 Addenda will be posted on the Borough's Purchasing webpage, notice will be emailed to all known by the Purchasing Division to have requested to be added to a plan holders list for the solicitation.

3.3.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3.3.3 No Addenda will be issued later than four (4) days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids, or one which includes postponement of the date for receipt of Bids.

3.3.4 Each Bidder shall be responsible for ascertaining prior to submitting their Bid that they have received all Addenda issued, and they shall acknowledge their receipt in their Bid.

ARTICLE 4 - BIDDING PROCEDURE

4.1 Form and Style of Bids

4.1.1 A Bid shall constitute an irrevocable offer to enter into a contract with the Borough on the terms of the Bid and the Bidding Documents. Bids shall be submitted on forms provided in the Bidding Documents.

4.1.2 All blanks on the Bid form shall be filled in, typed or written legibly in ink (preferably in blue ink).

4.1.3 Where required on the Bid, Bidders must quote on all items and they are warned that failure to do so may disqualify the Bid. When quotations on all items are not required, Bidders should insert the words "no bid" in the space provided for any item where no quotation is made.

4.1.4 Bids shall specify a unit or lump sum price, typed or written legibly in ink for each Bid item called for. In case of error in the extension of prices, the unit price will govern. Bids may be rejected if they show any omissions, alteration of the forms, additions not called for, conditional or alternate Bids not called for, qualified bids, or irregularities of any kind.

4.1.5 Any interlineation, alteration or erasure must be initialed by the signer of the Bid.

4.1.6 All requested Alternates shall be Bid. If no change in the Base Bid is required, enter "No Change."

4.1.7 Where two or more Bids for designated portions of the work have been requested, the Bidder may, without forfeiture of their Bid Guarantee, state their refusal to accept award of less than the combination of Bids they so stipulate. The Bidder shall make no additional stipulations on the Bid form nor qualify their Bid in any other manner.
4.1.8 Each copy of the Bid shall include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, a partnership, a corporation, or some other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent’s authority to bind the Bidder. The full name, address, and corporate or partnership title, including status of each person signing shall be typed or printed below the signature.

4.2 Bid Guarantee

4.2.1 Any bid exceeding $50,000 for total of all base items and alternates shall be accompanied by a certified check, money order, cashier’s check, or Bid Bond in the amount of at least five percent (5%) of the total Base Bid amount, made payable to the Matanuska-Susitna Borough, Palmer, Alaska, with good and sufficient surety or sureties acceptable to the Borough. Bid Guarantees will be held until the Agreement is executed or for 60 days whichever is less. Power-of-Attorney for the person signing the Bid Bond for the Surety must be submitted with the Bid Bond.

4.2.2 If a surety bond is submitted, it shall be written on the form included in the Bidding Documents and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of their power of attorney.

4.3 Submission of Bids

4.3.1 All copies of the Bid, the Bid Guarantee, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed envelope. The envelope shall be addressed to: Matanuska Susitna Borough, Purchasing Division, 350 East Dahlia Avenue, Lower Level, Palmer, Alaska, 99645, and shall be identified with the Project name, Bid Number, and Bidder’s name and address. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation “SEALED BID ENCLOSED” on the face thereof.

4.3.2 Bids shall be deposited at the designated location prior to the time and date for opening of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids are late Bids, will not be considered, and will be returned unopened.

4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

4.3.4 Oral, telephonic, or faxed Bids are invalid and will not receive consideration.

4.3.5 Bids will not be considered if the following documents are not completely filled out and submitted with the bid: See documents listing on “Bid Form”.

4.3.6 A checklist is provided on the Submittal Page as a courtesy to prospective bidders. The checklist may not be all inclusive; it is the Bidder’s responsibility to make sure they comply with all requirements within the solicitation documents.

4.3.7 If more than one Bid is offered by any one party, by or in the name of their clerk, partner, or other person, all such Bids will be rejected. A party who has quoted prices to a Bidder is not thereby disqualified from quoting prices to other Bidders, or from submitting a Bid directly for the work.

4.4 Modification or Withdrawal of Bid

4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the opening of Bids, and each Bidder so agrees in submitting their Bid.

4.4.2 Prior to the time and date designated for opening of Bids, any Bid submitted may be modified or withdrawn by notice to the Borough at the place designated for receipt of Bids. Such notice shall be in writing with the signature of the Bidder and delivered in person or by fax. If by fax, the written confirmation over the signature of the Bidder shall be received before the date and time set for opening of Bids, and it shall be so worded as not to reveal the amount of the original Bid. The modified bid may be sent by fax to 907-861-8617. The Borough shall not be responsible for the opening or security of modifications or withdraws submitted by fax. Contractors are advised to call the Purchasing Division at 907-861-8601 to verify the fax transmission has been received.

4.4.3 Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids, provided that they are then fully in conformance with these Instructions to Bidders.

4.4.4 Bid Guarantee, if any is required, shall be in an amount sufficient for the Bid as modified or resubmitted.
ARTICLE 5 - CONSIDERATION OF BIDS

5.1 Opening of Bids

5.1.1 The properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Base Bids and Alternate Bids, if any, will be made available to Bidders upon request after the Purchasing Officer has tabulated or summarized the results.

5.1.2 No responsibility will attach to the Borough or its representatives for the premature opening of, or the failure to open, a Bid not properly addressed and identified.

5.1.3 When vendors and/or contractors propose equal pricing (or tie bids), bids will be reviewed by the Purchasing Officer to determine responsiveness. If all requirements for the bid being responsive are met, then the award or recommendation of the award will be made in favor of the bid which received the earliest time stamp prior to bid opening.

5.2 Rejection of Bids

5.2.1 The Borough shall have the right to reject any or all Bids and to reject a Bid not accompanied by any required Bid Guarantee or by other data required by the Bidding Documents, or to reject a Bid which is in anyway incomplete or irregular.

5.3 Acceptance and Award

5.3.1 This Contract, if awarded, shall be awarded to the lowest qualified, responsive and responsible Bidder. The Borough shall determine whether a Bidder is qualified, responsive and responsible on the basis of the following criteria:

A. The skill and experience demonstrated by the Bidder in performing contracts of a similar nature;

B. The Bidder's record of honesty and integrity;

C. The Bidder's capacity to perform in terms of facilities, personnel, and financing;

D. Whether the Bidder has been debarred or suspended under Section 3.08.235 of the Matanuska Susitna Borough Code.

E. At all times the best interests of the Borough shall be recognized in awarding bids.

5.3.2 The Borough may waive any informality or irregularity or correct any purely arithmetical or clerical error apparent on the face of the Bid in any Bid or Bids received, when such waiver or correction is in the interest of the Borough. The Borough reserves the right to reject any and all Bids.

5.3.3 The Borough further reserves the right to accept or reject any or all items of any Bid, unless the Bidder qualifies such Bid by specific limitation; also to make an award to the Bidder whose aggregate Bid or any combination of Bid items is lowest.

5.3.4 The Borough shall have the right to select and accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates accepted.

5.3.5 The Bidders past performance under Borough Agreements; If the Bidder has failed in any material way to perform its obligations under any Agreement with the Borough, the Bidder may be determined as a non-responsible Bidder.

ARTICLE 6 - POST BID INFORMATION

6.1 Contractor's Qualification Statement

6.1.1 Bidders to whom award of a Contract is under consideration shall submit to the Purchasing Officer upon request, a properly executed Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

6.1.2 Bidders shall attach to the Qualification Statement a sheet listing the following four additional requirements and submit to the Purchasing Officer:

A. Names of surety companies utilized in the last five (5) years.

B. Estimate Progress Schedule for the completion of the work.

C. A resume of the Company and of the job Superintendent for the project.

D. A list of other projects planned to be concurrent with the construction phase of this project.
ARTICLE 7 – PAYMENT AND PERFORMANCE BONDS

7.1 For any bid exceeding $50,000 for total of all base items and alternates, the successful Bidder shall furnish the Purchasing Officer a Performance and Payment Bond in the full amount of the Agreement and shall maintain the Bond in force during the continuance of the Agreement including the one-year warranty period, unless otherwise specified. The Bond shall be for the faithful performance of the Agreement in all respects including, but not limited to, payments for all materials and labor. All alterations, extensions of time, additional work and other changes authorized by the Agreement Documents may be made without securing the consent of the Surety or Sureties. Power-of-Attorney for the person signing the Bond for the Surety must be submitted with the Bond. Local Bond Exemptions under MSB 3.08.530 will NOT be considered for this project.

ARTICLE 8 - FORM OF AGREEMENT BETWEEN BOROUGH AND CONTRACTOR

8.1 The Contract shall be in the form provided with the Bidding Documents.

ARTICLE 9 - SUBSTITUTION OF MATERIALS AND METHODS

9.1 Substitution of Materials

9.1.1 There will be no substitutions prior to award of contract unless otherwise specified.

ARTICLE 10 - TYPE OF SPECIFICATIONS

10.1 Technical Provisions

10.1.1 The technical provisions of these Specifications are the abbreviated or "streamlined" type and include incomplete sentences. Omission of words or phrases such as “the Contractor shall”, "in conformity therewith", "shall be", "as noted on the drawings", “according to the plans”, “a”, and/or “the”, are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a note occurs on the Drawings.

10.1.2 The Contract shall provide all items, articles, materials, operations, or methods listed, mentioned, or scheduled on the Drawings and/or herein, including labor, necessary equipment and parts, for adequate performance and sound construction as intended by these documents.

10.1.3 Wherever the word “approved”, "satisfactory”, "directed", "submitted", "inspected", "notify" or similar words or phrases are used, it shall be assumed that the word “Purchasing Officer” follows the verb as the object to the clause, such as “approved by the Purchasing Officer” or “submitted to the Purchasing Officer”.

10.1.4 Wherever "or equal" or similar phrases are used, it shall be assumed that decisions as to quality and design shall rest with the Purchasing Officer. All equal items shall be approved in writing.

ARTICLE 11 - SUBCONTRACTORS

11.1 The apparent low bidder shall list the names of the proposed subcontractors and suppliers as provided on the form under, “Proposed Subcontractors and Suppliers”. A list of all other subcontractors and suppliers who are to furnish the principal items of labor, equipment, and material proposed for the work shall be submitted within 24 hours of being requested as required by paragraph 5.2.1 of the General Conditions. If none are utilized, state “None”.

ARTICLE 12 - PREPARATION OF BIDS

12.1 Follow instructions in Article 4.3.1 of these Instructions to Bidders.

12.2 To be considered responsive, all of the required documents must be included in the sealed envelope with the Bid Form.

ARTICLE 13 - BIDDERS’ VIOLATIONS OF TAX OBLIGATIONS

13.1 No Contract shall be awarded to any individual, firm, corporation, or business that is found to be delinquent in any area of taxation, lease or rental agreement with the Borough which has not been remedied within ten (10) calendar days of receipt of written notice.

13.2 This Contract can be terminated for cause if it is determined that the individual, firm, corporation or business is in arrears of any taxation, lease or rental agreement that is due to the Borough that is not remedied within ten (10) calendar days of notification by certified mail.

13.3 The Borough reserves any right it may have to offset amounts owed by an individual, firm, corporation, or business for delinquent Borough taxes against any amount owing to the same under a Contract between the Borough and the same.
ARTICLE 14 - EXECUTION OF CONTRACT

14.1 The Bidder whose Bid is accepted shall execute the Contract and furnish the required bonding and insurance within five (5) working days after Notice of Intent to Award of the Contract is issued. The Contract shall be considered executed by the successful Bidder when the Contract is signed by an authorized representative of the Bidder and the bond(s) and insurance certificate(s) are received by the Purchasing Officer. Failure or neglect of the Bidder to execute the Contract within the time specified may result in a forfeiture of the Bid Guarantee and award of the Contract to the next lowest Bidder.

14.2 The Borough will execute the Contract within ten (10) calendar days after execution by the Bidder as set forth above. The date the Contract is executed by the Borough is the Contract Date. The rights and obligations provided for in the Contract shall become effective and binding upon the parties as of the Contract Date.

ARTICLE 15 - INSURANCE REQUIREMENTS

See Insurance Requirements in Sample Agreement.

ARTICLE 16 - STATE OF ALASKA PREVAILING WAGE SCALE/CERTIFIED PAYROLL

The Contractor shall comply with the Provisions of Title 36 of the Alaska Statutes for any construction projects awarded by the State of Alaska or its political subdivisions, such as local governments. To obtain the latest regulations and prevailing rate for wages, http://labor.alaska.gov/lss/pamp600.htm.

It is the Contractor’s responsibility to meet and comply with all mandated submissions and documentation required by the Alaska Department of Labor, Wage and Hour Administration, Labor Standards and Safety Division, 1251 Muldoon Road, Suite 113, Anchorage, AK 99504.

ARTICLE 18 - LOCAL BIDDER PREFERENCE

Not applicable due to funding source.

ARTICLE 19 - MATANUSKA-SUSITNA BOROUGH BUSINESS LICENSE

Matanuska-Susitna Borough Code, Chapter 3.36, requires that all entities conducting business within the Borough boundaries have a current business license issued by the Matanuska-Susitna Borough. MSB §3.36.040.

ARTICLE 20 - ALASKA AND CONTRACTORS LICENSES

All bidders must be in compliance with state of Alaska Statutes 08.18 and 45.70.

ARTICLE 21 - PROTEST OF AWARD OF BID:

Within two days of service of the Purchasing Officer’s determination of the apparent successful proposal, a proposer who wishes to protest the determination shall lodge a protest with the Purchasing Officer. The protest shall be in writing on a form provided by the Purchasing Officer. The protest shall describe with particularity the alleged errors in the award recommendation. The Purchasing Officer shall conduct a review and, within three working days of receipt of the protest, issue a determination. Full text of the protest and appeal procedures, as well as the protest form, can be downloaded from the Borough’s web site at www.matsugov.us, selecting “Services”, then selecting “Forms” under Forms and Documents, then selecting “Purchasing Forms”. A copy can also be obtained by contacting the Purchasing Division at (907) 861-8601.

In order to receive notice of the apparent successful proposal, the proposer must provide the Borough with a fax number. It is the responsibility of the proposer to follow the selection process and stay apprised of the bid or proposal due date, the date notice of apparent successful proposer is issued and the period in which protests can be filed.

ARTICLE 22 - ACCEPTANCE OF CONTRACT/AGREEMENT TERMS AND CONDITIONS

By signing the Bid Form/Proposal Submittal Form, the bidder or proposer certifies that they have examined and accept the terms and conditions of the contract or agreement contained in this solicitation. The acceptance is inclusive of, but not limited to, all CONTRACT REQUIREMENTS, TERMS AND CONDITIONS, GENERAL PROVISIONS, AND SUPPLEMENTAL CONDITIONS along with any and all conditions contained in the INSTRUCTIONS TO BIDDERS/PROPOSERS associated with this solicitation. Submission of a bid or proposal in response to this solicitation, certifies that the bidder is willing to accept these terms and understands that failure to accept these terms will subject the bidder to forfeiture of the contract/agreement and loss of any bid guarantee as liquidated damages as outlined in the bid documents.

Bidders and proposers are encouraged to carefully examine the insurance requirements, any bonding requirements, and any Defense and Indemnification
ARTICLE 23. FLOW DOWN PROVISIONS
This Contract may include flow down provisions. This Contract may be issued in connection with another government agency and may include flow down or contract provisions required by that agency. In the event of a conflict between the terms and conditions of the general agreement and any flow down terms and conditions, the flow down terms and conditions shall govern. The Consultant agrees to comply with any and all flow down or contract provisions required by the Borough or another government agency that are included in the Contract. In the event that flow down or contract provisions required by other agencies or by Law are inadvertently omitted from this Contract, both parties agree to negotiate in good faith for that provisions inclusion into the Contract.

ARTICLE 24. CONTRACTORS WARRANTY
All work under the Agreement shall be under warranty by the Contractor for one year from the Final Acceptance Date except when a different period is identified in the SPECIFICATIONS/SCOPE OF WORK. This warranty shall require the Contractor to remedy promptly, without cost to the Owner, any and all defects in material and workmanship including any consequential damages resulting from defective materials or workmanship. If the defect, in the opinion of the Borough Representative, is of such nature as to demand immediate repair, the Borough shall have the right to take corrective action and the cost thereof shall be borne by the Contractor.

ARTICLE 25. ENVIRONMENTAL SPILLS.
Reporting or clean-up of any spills of oil and/or hazardous substances larger than one gallon must be reported to ADEC by the Contractor. Any quantity of a spilled hazardous substance must be cleaned up, containerized, and disposed of in a proper manner. All spills in the water must be reported immediately to ADEC. Clean-up procedures are specified in ADEC’s Oil and Hazardous Substances Pollution Control Regulations, 18AAC75. All inquiries may be directed to the Wasilla ADEC office at 376-5038.
Project Background and Scope

The Matanuska-Susitna Borough (Borough), in partnership with the Talkeetna Community Council Incorporated (TCCI), intends to make improvements to an existing trail system located south of the Talkeetna River in the Talkeetna area. The Ridge Trail system has long been used by cross-country skiers, hikers, dog mushers, ski-jorers, mountain bikers, and ATVs. The 4.5-mile trail system is located on Borough and State lands at T26N, R04W, Sections 16 and 17, Seward Meridian (See Attachment A). The project is funded by the Borough through the 2016 voter-approved bond measure.

The trail and access improvements will include trail work, modest parking lot expansion, and installing signage at key access points and along the trails. The intent of this project is to implement the Ridge Trail, Trail Development Plan. Attachment B is the Trail Development Plan which includes additional detail about the tasks as well as trail maps.

Layout of the trail improvements was completed in May of 2019 by Trailwerx. The layout is intended to utilize the best available terrain to minimize trail maintenance intensity, enhance the recreational experience of the user, and is not intended to be solely for transportation.

Bids must be submitted for construction of new trail, reclamation of existing trail, and obliteration of existing trail per linear foot. Linear foot estimates for each trail segment are included in Appendix A of the Trail Development Plan. Final payment will be based on a centerline measurement of completed and accepted work made with a Rolotape wheel.

Task A - Construct multi-use motorized trail

The east-west multi-use trail will provide a pass-through route for summer ATV's and winter snowmachine "commuters," as well as for non-motorized trail users wanting to cross between points east and west. The trail will run from Beaver Road to the state easement north of the Talkeetna Bluffs Trail. The intent is to locate and design the eastern trail intersection in order to minimize incidental traffic entering the Ridge Trail system from the Talkeetna Bluffs Trail.

The trail must meet the Alaska State Parks ATV Trail Class 4 and include adequate entry barriers to restrict vehicles greater than five foot six inches in width with a minimum turn radius of 30 feet.

Class 4 ATV Trail Design Parameters

Design tread width: 60”- 72”
Design surface: Native, with imported materials for tread stabilization, Sections of soft tread uncommon, minor roughness; Protrusions less than or equal to 3” uncommon and discontinuous; Obstacles up to 3” uncommon.
Design Grade: - Target Grade 3% - 10%; Short Pitch Maximum 15%; Maximum Pitch Density 10% - 20% of trail.
Design Cross Slope: Target Cross Slope - 3% - 5%; Maximum Cross Slope – 8%.
Design Clearing: Height – 8’ – 10’; Width 72” – 96” (on steep side hills, increasing clearing on uphill side by 6” – 12”).
Design Turn: 8’ – 12’
The Contractor is responsible for reviewing the State Trail Management Handbook to familiarize themselves with the requirements for a class 4 trail. A class 4 trail is a highly developed trail:

**Class 4 Trail Attributes**

**Tread and Traffic Flow:**
- Tread wide and relatively smooth with few irregularities
- Width may consistently accommodate two-lane travel
- Native or imported materials
- May be hardened

**Obstacles**
- Few or no obstacles exist
- Grades typically <12%
- Vegetation cleared outside of trailway

**Constructed Features**
- Structures frequent and substantial
- Substantial trail bridges are appropriate at water crossings
- Trailside amenities may be present

**Signs**
- Wide variety of signs likely present
- Informational signs likely
- Interpretive signs possible

**Trail Management (Typically managed to accommodate):**
- Very heavy use
- Users w/ minimal skills and experience
- Users with minimal to no orienteering skills
- Easy/comfortable travel by managed use types
The borough shall provide a detailed map, along with a corresponding set of GPS data, of the alignment prior to the Contractor commencing fieldwork. The trail must be constructed within 30 feet of the line shown on the following map unless otherwise approved by the borough in writing.

Install signage and prepare other public information (e.g. website map) specifying allowed and prohibited uses in the trail system. Sufficient signs and barriers must be installed to direct motorized traffic to this new route.

**Project Management**
The contractor will be expected to provide project communications including a schedule and a final letter of completion with photographs to the Borough. The MSB Community Development Department will manage the project, and be the Contractor's point of contact.

**Bid Submittal**
Prospective contractors are to submit with their bid, details and references on 3 trail layout and construction projects of similar nature.

**Project Schedule**

Dates shall be as follows:

- August 15, 2019: Request for Proposals
- August 21, 2019: Pre-proposal Meeting
- September 15, 2019: Pre-construction Meeting with Contractor
- May 1, 2020: Finalize construction plans
- May 2020 – September 2020: Construction
Having carefully examined the Project Plans and Specifications and all Bidding and Contract Documents as listed in the “Table of Contents” and in compliance with the “Invitation for Bids”, the undersigned hereby proposes to furnish all materials, labor, equipment, and supervision necessary to complete the work as solicited under 20-018B BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM for the Matanuska-Susitna Borough in full accordance with the Bidding Documents. Contract award will be based on total base bid to the lowest qualified responsive and responsible bidder. All erasures, strike-throughs, white-out and/or corrections made on this form must be initialed.

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Est. Quantity</th>
<th>Unit Bid Price (per lineal foot)</th>
<th>Amount Bid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Task A – Design &amp; Construct Multi-Use Motorized Trail.</td>
<td>7,500 Feet</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2.</td>
<td>Task B – Project Management</td>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL BASE BID (SUM OF ITEM NUMBERS 1 &amp; 2)</strong></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

___________________________________________  _____________________________________
Signature       Date

__________________________________________
Company Name

**BID FORM CONTINUED ON THE FOLLOWING ONE (1) PAGE**
By signing below, the Bidder is hereby certifying to the following:

1. The Bidder has carefully examined the bid documents for the solicitation number and agrees to perform all specified services for the sum(s) provided above.
2. The individual signing below, or the firm association or corporation of which they are a member, has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this solicitation.
3. The individual signing below is authorized by the firm association or corporation to bind such association or corporation to a legal contract.
4. The individual signing below, or the firm association or corporation of which they are a member, is not debarred or suspended from doing business with the Matanuska-Susitna Borough.
5. They are acknowledging receipt of the following Addenda Numbers (if no addenda have been issued, either leave blank or write “N/A”):

Addenda numbers being acknowledged:

________________________________________________________________________

_____________________________________________  _____________________________
Company Name     Date

_____________________________________________  _____________________________
Mailing Address    Signature

_____________________________________________  _____________________________
City, State and Zip Code    Printed (or typed) Name

_____________________________________________  _____________________________
Contact Person (printed or typed)    Title (printed or typed)

_____________________________________________  _____________________________
Phone Number    Email Address

_____________________________________________  _____________________________
Facsimile Number    State and Specialty License Numbers

It shall be the responsibility of the Bidder to see that their bid is received at or before the date and time fixed for opening.

To be considered responsive, Bidders should include the following with their bid:
- Signed Bid Form (acknowledging Addenda if applicable)
- Bid Guarantee (if required)
- Other Items required in Instructions to Bidders & Specifications/Scope of Work
- Details of 3 Similar Trail Projects and References Performed by the Contractor
CONSTRUCTION AGREEMENT
BETWEEN OWNER AND CONTRACTOR
#20-018B
BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM
THIS AGREEMENT is made this ______ day of ______________________, 2019, by and between:

MATANUSKA-SUSITNA BOROUGH (hereinafter the "BOROUGH") and

[Insert contractor's name in all caps and bold, remove redline feature] (hereinafter the "CONTRACTOR")

The parties agree as follows:

SECTION 1. WORK. The Contractor will do all work described in the Agreement documents listed in Section 11. The work is more specifically identified as:

Design and construct a multi-use combination motorized and non-motorized trail system to include Project Management duties. The trail and access improvements will include trail layout, construction of new trail, and installing signage at key access points and along the trails. The intent of this project is to implement the Ridge Trail Development Plan.

SECTION 2. AGREEMENT TERM. This Agreement shall begin upon execution of this Agreement by both parties and shall expire upon completion of all duties by the Contractor to the satisfaction of the Contracting Officer.

SECTION 3. AGREEMENT TIME. The work shall begin no later than ten (10) days after a Notice to Proceed is issued by the Contracting Officer. The planning portion of the work shall begin in August of 2019 with final construction completion by September of 2020.

SECTION 4. AGREEMENT PRICE. The Borough shall pay the Contractor a total sum of ENTER TOTAL DOLLAR AMOUNT IN WORDS (WRITE DOLLAR AMOUNT IN FIGURES IN PARENS) for the work specified in the Agreement documents.

SECTION 5. METHOD OF PAYMENT. A single sum on short-term Agreements (30 days or less) and monthly payments on long-term Agreements (31 days or longer) shall be paid to the Contractor within thirty (30) working days after the Contracting Officer receives and approves a written Request for Payment from the Contractor. A copy of all certified payrolls submitted to the state of Alaska must precede or accompany any payment requests. Final payment will not be made until the Contractor has completed and submitted to the contracting officer a Contractor's Release and Affidavit of Payment of Debts and Claims, and submitted the Department of Labor Notice of Completion with final payment request. Consent of Surety to Final Payment must also be submitted if applicable.

SECTION 6. RELATIONSHIP OF THE PARTIES. The Contractor shall perform all obligations under this Agreement as an independent Contractor of the Borough. The Borough will administer this Agreement and monitor the Contractor's performance within the Agreement but shall not supervise or otherwise direct the Contractor except as provided in this Agreement.

SECTION 7. ASSIGNMENTS AND SUBCONTRACTORS. The Contractor may not assign any interest in the Agreement to another person, nor delegate any duties to a subcontractor or other person without the prior
written approval of the Contracting Officer. Any attempt by the Contractor to assign any interest or delegate duties under this Agreement shall give the Borough the right to immediately terminate this Agreement without any liability for work performed subsequent to termination.

SECTION 8. WARRANTY. The Contractor expressly warrants that all materials used will be of the best quality locally available and that all workmanship will meet the highest standards of the trade. The Contractor guarantees to answer personally for all materials and workmanship supplied to the Borough and shall undertake to correct workmanship or defect in materials found by the Contracting Officer, or his delegate.

SECTION 9. DEFENSE AND INDEMNIFICATION.

A. The Contractor shall indemnify, defend, and hold and save the Borough, its elected and appointed officers, agents and employees, harmless from any and all claims, demands, suits, or liability of any nature, kind or character, including costs, expenses, and attorney fees. The Contractor shall be responsible under this clause for any and all legal actions or claims of any character resulting from injuries, death, economic loss, damages, violation of statutes, ordinances, constitutions or other laws, rules or regulations, contractual claims, or any other kind of loss, tangible or sustained by any person, or property arising from Contractor's or Contractor's Officers, agents, employees, partners, attorneys, suppliers, and subcontractor's performance or failure to perform this Agreement in any way whatsoever. This defense and indemnification responsibility includes claims alleging acts or omissions by the Borough or its agents which are said to have contributed to the losses, failure, violations, or damage. However, Contractor shall not be responsible for any damages or claim arising from the sole negligence or willful misconduct of the Borough, its agents, or employees.

B. If any portion of this clause is voided by law or court of competent jurisdiction, the remainder of the clause should remain enforceable.

SECTION 10. TERMINATION. This Agreement may be terminated by the Borough:

A. if the Contractor fails to perform any obligation under this Agreement; or

B. for any reason upon ten (10) days written notice to the Contractor; or

C. under Section 7 of this Agreement.

Upon termination of this Agreement, the Borough shall pay the Contractor for all work completed to the satisfaction of the Contracting Officer as of the date termination is effective.

SECTION 11. AGREEMENT DOCUMENTS AND INTEGRATION.

A. This Agreement and those documents and appendices incorporated by reference by "B" of this section shall constitute the entire Agreement of the parties. There are no promises, terms, conditions, or obligations other than those stated in this Agreement and its appendices, and this Agreement shall supersede all previous communications, representations, or agreements, either oral or written, between the parties.
B. The following documents are incorporated in full text or by reference into this Agreement:

<table>
<thead>
<tr>
<th>FULL TEXT</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibit A - Bid Form</td>
<td>Matanuska-Susitna Borough License</td>
</tr>
<tr>
<td>Exhibit B - Scope of Work</td>
<td>State of Alaska Business License</td>
</tr>
<tr>
<td>Exhibit C - Addendum(a) Issued</td>
<td>Contractor’s License</td>
</tr>
<tr>
<td>Exhibit D - General Conditions &amp; Supplementary General Conditions</td>
<td>Solicitation Documents &amp; Attachments Issued for Bid #20-018B</td>
</tr>
<tr>
<td>Exhibit E - Certificate of Insurance</td>
<td></td>
</tr>
<tr>
<td>Exhibit F - Payment &amp; Performance Bonds</td>
<td></td>
</tr>
<tr>
<td>Exhibit G - State of Alaska Department of Labor Forms and Publications</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 12. MODIFICATIONS. The Borough may require modifications in the Scope of Work performed or other terms of this Agreement. It is expressly understood that no changes will be authorized without the written and signed consent of the Contractor and the Borough Purchasing Officer or Borough Manager. All such changes shall be in the form of a Change Order and shall be incorporated into this Agreement.

SECTION 13. EQUAL EMPLOYMENT OPPORTUNITY.

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, physical handicap, age, status as a disabled veteran, or veteran of the Vietnam war era. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, national origin, physical handicap, age, status as a disabled veteran, or veteran of the Vietnam war era. Such actions shall include, but not be limited to the following: employment, upgrading, demotions, or transfers; recruitment or recruitment advertising; layoffs or terminations; rates of pay or other forms of compensation; selection for training, including apprenticeship; and participation in recreational and educational activities. The Contractor agrees to post in conspicuous places available for employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, physical handicap, age, or status as a disabled veteran, or veteran of the Vietnam war era. The Contractor will cause the foregoing provisions to be inserted in all subcontracts for any work covered by this Agreement. The Contractor shall keep such records and submit such reports concerning the equal opportunity employment provisions set forth in this section for applicants for employment and employees as the Borough may require.

B. The Contractor shall keep such records and submit such reports concerning the racial and ethnic origin of applicants for employment and employees as the Borough may require.

SECTION 14. INTEREST OF MEMBERS OF BOROUGH AND OTHERS. No officer, member, or employee of the Borough, and no member of its governing body, and no other public official of the governing body, shall participate in any decision relating to this Agreement which affects his personal interest or the interest of any corporation, partnership or association in which he is, directly or indirectly, interested or having any personal or pecuniary interest, direct or indirect, in this Agreement or the proceeds thereof.

SECTION 15. CONFLICT OF INTEREST. The Contractor, all employees of the Contractor, contractors and other personnel employed by the Contractor providing the services under this Agreement shall in no way stand to gain financially from the terms of this Agreement except for wages, salaries or bonuses paid by the Contractor and
shall abide by federal, state, and local laws and regulations associated with conflict of interest and financial disclosure. The Contractor covenants, that he presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this Agreement. The Contractor further covenants that in the performance of this Agreement, no person having any such interest shall be employed.

SECTION 16. AUDITS AND INSPECTIONS. At any time during normal business hours and as often as the Borough or the Comptroller General of the United States may deem necessary, there shall be made available for examination all of the Contractor's records with respect to all matters covered by this Agreement and the Contractor will permit representatives of the Borough or the Comptroller General to audit, examine, and make excerpts or transcripts from such records, and to make audits of all contracts, invoices, materials, payrolls, records, personnel information, conditions of employment, and other data relating to all matters covered by this Agreement.

SECTION 17. JURISDICTION; CHOICE OF LAW. Any civil action arising from this Agreement shall be brought in the Superior Court for the Third Judicial District of the state of Alaska at Palmer. The law of the state of Alaska shall govern the rights and obligations of the parties.

SECTION 18. NON-WAIVER. The failure of the Borough at any time to enforce a provision of this Agreement shall in no way constitute a waiver of the provisions, nor in any way effect the validity of this Agreement or any part thereof, or the right of the Borough thereafter to enforce each and every protection hereof.

SECTION 19. PERMITS, LAWS AND TAXES. The Contractor shall acquire and maintain in good standing all permits, licenses and other entitlements necessary to its performance under this Agreement. All actions taken by the Contractor under this Agreement shall comply with all applicable statutes, ordinances, rules and regulations. The Contractor shall pay all taxes pertaining to its performance under this Agreement.

SECTION 20. SEVERABILITY. If any provision of the Agreement or the application thereof to any person or circumstances is held invalid, the remainder of this Agreement and its application to other persons or circumstances shall not be affected thereby.

SECTION 21. RULE OF INTERPRETATION. This Agreement shall not be interpreted for or against either party, but shall be interpreted according to its fair and reasonable intent.

SECTION 22. NOTICES. Any notice required pertaining to the subject matter of the Agreement shall be personally delivered or mailed by prepaid first-class, registered or certified mail to the following address:

Borough: 350 East Dahlia Avenue, Palmer, Alaska 99645

Contractor: (Insert Contractor's address here, remove bold feature)

SECTION 23. INSURANCE. It is specifically agreed between the parties executing this Agreement that it is not intended by any of the provisions of the Agreement to create in the public or any member thereof a third party benefit hereunder, or to authorize anyone not a party to this Agreement to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Agreement.

It is highly recommended that the Contractor confer with their respective insurance companies or brokers to determine if their insurance program complies with the Borough's Insurance requirements.

The Contractor shall procure and maintain the following insurances:
A. Minimum Scope of Insurance
   Coverage shall be at least as broad as:

   1. Insurance Services office form number CG 0001 (Edition 10/01) covering Commercial General Liability.
   2. Insurance Services office form number CA 0001 (Edition 10/99) covering Automobile Liability, symbol 1 "any auto".
   3. Worker's Compensation insurance as required by the State of Alaska and Employers Liability Insurance.

B. Minimum Limits of Insurance
   Contractor shall maintain limits no less than:

   1. General Liability
      $1,000,000 - combined single limit per occurrence for bodily injury, property damage, personal injury and advertising injury.
      $2,000,000 - Products/Completed Operations
      $2,000,000 - General Aggregate Limit. The general aggregate limits shall apply separately to each project.
      If the general liability insurance is written on a claims made form, the Contractor shall provide insurance for a period of two years after final payment of this agreement. The policy(s) shall evidence a retroactive date, no later than the beginning of this Agreement.

   2. Auto Liability:
      $1,000,000 - combined single limit per accident for bodily injury and property damage.

   3. Worker's Compensation and Employers Liability:
      Worker's Compensation shall be statutory as required by the State of Alaska. Employers liability shall be endorsed to the following minimum limits:

      Bodily Injury - $1,000,000 Per Occurrence
      Bodily Injury - $1,000,000 Per Employee
      Bodily Injury by Disease - $1,000,000 Policy Limit

C. Deductibles and Self-Insured Retention
   Prior to work commencing any deductible or self-insured retention must be declared and approved by the Borough. The Contractor may be requested to demonstrate how the deductible or self-insured retention will be funded in the event of a claim. At the option of the Borough, the Contractor shall reduce or eliminate such deductibles or self-insured retention as respects the Borough, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.
D. Other Insurance Provisions

The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability
   
a. The Borough, its Administrator, officers, officials, employees and volunteers are to be covered as additional insureds as respects: liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor premises owned, occupied or used by the Contractor or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitation on the scope of protection afforded to the Borough, its Administrator, officers, officials, employees and volunteers.

   b. The Contractor's insurance coverage shall be primary insurance as respects the Borough, its Administrator, officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the Borough, its Administrator, officers, officials, employees and volunteers shall be excess of the Contractor insurance and shall not contribute to it.

   c. The Contractor insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

2. Worker's Compensation and Employer's Liability

   The insurer shall agree to waive all rights of subrogation against the Borough, its Administrator, officers, officials, employees and volunteers for losses arising from work performed by the Contractor or any subcontractor for the Borough.

3. All Insurance

   Each insurance policy required by this Agreement shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after 30 days prior written notice for nonpayment of premium or fraud on the part of the Contractor or 60 days prior written notice for any other reason by certified mail, return receipt requested, has been given to the Borough. Such notice shall be mailed by the Contractor to the attention of the Borough's Purchasing Officer.

E. Acceptability of Insurers

   Insurance is to be placed with insurers with a minimum A.M. Best rating of A-VII.

F. Verification of Coverage

   Contractor shall furnish the Borough with certificates of insurance and with certified copies of all endorsements effecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates are to be on forms acceptable to the Borough. All certificates are to be received and approved by the Borough before work commences. The Borough reserves the right to require complete, certified copies of all required insurance policies, at any time.
G. Subcontractors

Contractor shall include all subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all requirements stated herein.

H. Lapse in Coverage

A lapse in insurance coverage is a material breach of this agreement which may result in immediate termination of the agreement, pursuant to the appropriate Section within the contract.

SECTION 24. AGREEMENT ADMINISTRATION.

A. The Borough Manager, or their designee, will be the representative of the Borough administering this Agreement.

B. The services to be furnished by the Contractor shall be administered, supervised, and directed by _________________. In the event that the individual named above or any of the individuals identified in the Bid to perform work under the Agreement is unable to serve for any reason, the Contractor shall appoint a successor in interest subject to a written approval of the Matanuska-Susitna Borough.

SECTION 25. UNDERSTANDING. The Contractor acknowledges that the Contractor has read and understands the terms of this Agreement, has had the opportunity to review the same with counsel of the Contractor's choice, and is executing this Agreement of the Contractor's own free will.

SECTION 26. CONTRACTORS' VIOLATIONS OF TAX OBLIGATIONS.

A. Any Contractor in arrears on a Borough obligation, including, but not limited to tax, assessment, lease, sale, or rental payments, whether as an individual, or as a representative of a business, organization, firm, corporation, or partnership, shall not be awarded the Agreement if the delinquency is not cured within ten calendar days of receipt of written notice sent by the Borough of the delinquency.

B. This Agreement can be terminated for cause, pursuant to Section 10, if it is determined that a Contractor, whether the amounts owed are in the name of the Contractor as an individual or as a representative of a firm, business, corporation, or partnership, is in arrears of any taxation, lease or rental agreement that is due to the Borough that is not remedied within 10 calendar days of notification by regular mail.

C. The Borough reserves any right it may have to offset amounts owed by an individual, firm, corporation or business for delinquent Borough taxes, moneys owed on sales, assessments, leases and rental agreements, against any amount owing to the same under an Agreement between the Borough and the same.

SECTION 27. ENVIRONMENTAL SPILLS. Reporting or clean-up of any spills of oil and/or hazardous substances larger than one gallon must be reported to ADEC by the Contractor. Any quantity of a spilled hazardous substance must be cleaned up, containerized, and disposed of in a proper manner. All spills in the water must be reported immediately to ADEC. Clean-up procedures are specified in ADEC's Oil and Hazardous Substances Pollution Control Regulations, 18AAC75. All inquiries may be directed to the Wasilla ADEC office at 376-5038.

SECTION 28. THIRD PARTY FINANCING AGREEMENTS AND/OR ASSIGNMENTS OF PAYMENT NOT ALLOWED. Because of additional administrative and accounting time required of borough departments/divisions when third party financing agreement and/or assignments of payment are permitted, they will not be allowed under any agreement resulting from this Invitation to Bid.
SECTION 29. FLOWDOWN PROVISIONS. This Contract may include flow down provisions. This Contract may be issued in connection with another government agency and may include flow down or contract provisions required by that agency. In the event of a conflict between the terms and conditions of the general agreement and any flow down terms and conditions, the flow down terms and conditions shall govern. The Consultant agrees to comply with any and all flow down or contract provisions required by the Borough or another government agency that are included in the Contract. In the event that flow down or contract provisions required by other agencies or by Law are inadvertently omitted from this Contract, both parties agree to negotiate in good faith for that provisions inclusion into the Contract.

SECTION 30. CONTRACTS ENFORCEABLE AGAINST THE BOROUGH (MSB CODE 3.08.120)
A contract for supplies, services, professional services or construction, or any amendment to the contract, may not be enforced against the borough unless its terms have been approved in accordance with this chapter, and unless the contract or amendment to the contract has been set forth in writing, executed in accordance with this chapter.

SECTION 31. PUBLICATION, REPRODUCTION AND USE OF MATERIALS
No material produced, in whole or in part, under this Agreement shall be subject to copyright in the United States or in any other country. The Borough shall have unrestricted authority to publish, disclose, distribute and otherwise use, in whole or in part, any reports, data or other materials prepared under this Agreement.

SECTION 32. AUTHORITY OF THE PURCHASING OFFICER (MSB Code 3.08.150)
All borough contracts for supplies, services, professional services and construction, and any amendments to the contracts shall be signed by the manager or the purchasing officer.

MSB Code 3.08.170 CONTRACT AMENDMENTS; ASSEMBLY APPROVAL states

A. Contract amendment shall not be used to avoid procurement by the competitive procedures establish under this title.

B. Except for emergency procurement authorized under MSB 3.08.200, contracts for supplies, services, profession services and construction may be amended by the manager or the purchasing officer with the approval of the assembly, as set forth in MSB 3.08.161, only for the following reasons:

1. to change the quantity order or date of delivery under contract for supplies, where necessary to meet unforeseen borough requirements;

2. to change the quantity of services or professional services to be rendered, or to change the scope of a project under a contract for services or professional services where necessary to meet unforeseen changes in borough requirements;

3. to change the scope of a project or the scope of services or professional services under a construction contract to meet unforeseen borough requirements, or to change the specification under a construction contract because unforeseen conditions render the original specification impracticable;

4. to change the time for completing a project under a contract for services, professional services or construction;

5. to correct an error in contract specifications made by the borough in good faith or to resolve a good faith dispute between the borough and a contractor as to a party’s rights and obligations under the contract; and
6. to change administrative provisions of a contract without materially altering the contract terms governing the quantity or quality of supplies, services, professional services or construction furnished the borough.

For these purposes, the Purchasing Officer is defined as Rustin Krafft during absences of the purchasing officer, the Assistant Purchasing Officer has been delegated the authority to act as the Purchasing Officer.

AUTHORITY OF THE BOROUGH PROJECT MANAGER

The Borough Project Manager has the authority to monitor and administer the Agreement, but cannot make changes to the amount of the contract nor change the completion date of the contract.

I hereby acknowledge that I have read and understand the authority granted to the parties by the Matanuska-Susitna Borough.

SIGN HERE: ___________________________________

SECTION 33. FUND VERIFICATION. Fund source and verification of funds for this project:

Funding Source:  Purchase Order 2020-828
STATE OF ALASKA
Third Judicial District

On ______________________, 2019, __________________________________ personally appeared before me,

1. _____ who is personally known to me

2. _____ whose identity I proved on the basis of _______________________________

3. _____ whose identity I proved on the oath/affirmation of ________________________, a credible witness

to be the signer of the Bid #20-018B, BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM
and he/she acknowledged that he/she signed it.

________________________________________
NOTARY PUBLIC
My commission expires: _______________________

STATE OF ALASKA
Third Judicial District

On ______________________, 2019, RUSTIN M. KRAFFT, Purchasing Officer, personally appeared before me,
who is personally known to me, to be the signer of the above document, and he acknowledged that he signed
it on behalf of the Matanuska-Susitna Borough.

________________________________________
NOTARY PUBLIC
My commission expires: _______________________


SECTION VI

GENERAL CONDITIONS
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1

CONTRACT DOCUMENTS

BOROUGH ADMINISTERED

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Invitation for Bids, Instructions to Bidders, Agreement, the Conditions of the Contract (General Supplementary and other Condition), the Drawings, the Specifications, the Payment and Performance Bond, Certificate of Insurance, additional documents as listed in the Supplementary General Conditions, and all Addenda issued prior to and all Modifications issued after award of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Project Manager pursuant to Subparagraph 1.2.5, or (4) a written order for a minor change in the Work issued by the Project Manager pursuant to Paragraph 12.3. A Modification may be made only after award of the Contract.

1.1.2 THE CONTRACT

The Contract Documents form the Contract. The Certificate of Insurance and required bonds are necessary for the validity of the Contract. The Contract represents the entire integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements. The Contract may be amended or modified only by a Modification as defined in Paragraph 1.1.1. Nothing contained in the Contract Documents shall create any contractual relationship between the Borough or the Project Manager and any Subcontractor or Sub-Subcontractor.

1.1.3 THE WORK

The Work comprises the completed construction required by the Contract Documents, and includes all labor and supervision necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

1.2 EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

1.2.1 The Contract Documents shall be signed in not less than triplicate by the Borough and Contractor. If either the Borough or the Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Agreement shall identify them by reference to specific documents.

1.2.2 By submitting a bid, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Contract is to be performed and correlated his observation with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be binding as if required by all. Work not covered in the Contract will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended result. Words and abbreviations which have well known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings, unless otherwise defined in the contract documents.

1.2.4 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2.5 Written interpretations necessary for the proper execution or progress of the Work, in the form of drawings or otherwise, will be issued within 14 calendar days by the Project Manager and in accordance with any schedule agreed upon. Contractor may make written request to the Project Manager for such interpretations. Such interpretations shall be
consistent with and reasonably inferable from the Contract Documents, and may be effected by Field Memo. The Borough will provide field memo forms. D.V.C.R.'s/D.C.V.R.'s will not be used. A copy of the field memo form is attached.

1.2.6 SPECIFIED ITEMS

1.2.6.1 Where items are specified by use of referenced standard specifications, the date of the referenced standard shall be the latest edition at the time of award of the contract, unless otherwise specified.

1.3 COPIES FURNISHED AND OWNERSHIP

1.3.1 The Contractor will be furnished, free of charge, the number of copies of the Contract Documents as set out in the Supplementary General Conditions. Additional sets will be furnished upon request at actual cost.

ARTICLE 2

PROJECT MANAGER

2.1 ADMINISTRATION OF THE CONTRACT

2.1.1 The Borough will provide general Administration of the Construction Contract, including performance of the functions hereinafter described.

2.1.2 The Project Manager will be the Borough's representative during construction and until final payment. The Project Manager will have authority to act on behalf of the Borough to the extent provided in the Contract Documents, unless otherwise modified by written instrument which will be shown to the Contractor. All of the Borough's instructions to the Contractor shall be issued through the Project Manager.

2.1.3 The Project Manager shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Project Manager may perform his functions under the Contract Documents.

2.1.4 Based on observations and evaluation of Contractor's Applications for Payment, the Project Manager will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.1.5 The Project Manager will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by the Contractor. The Project Manager will, within a reasonable time, render such interpretations as he may deem necessary for the proper execution or progress of the Work.

2.2 (Not used)

2.3.10 CLAIMS AND DISPUTES

2.3.10.1 Except for claims which have been waived by acceptance of final payment as provided in Paragraph 9.7.5 and 9.7.6, and except as otherwise provided in this Contract, any claims, any disputes, or other questions arising out of, or relating to, this Contract shall be presented in writing by the Contractor to the Project Manager. In presenting any claim, the Contractor shall clearly and specifically state in writing:

1. The specific contract provision under which the claim is made.
2. The contract item on which the claim is based.
3. The specific relief including additional time and/or compensation to which the Contractor believes he is entitled.
4. The detailed basis of any additional actual costs that are claimed and all verifiable documentation necessary to support those costs.

The contractor shall provide access to any such record and furnish copies, if requested. In computing damages, or cost claimed for a change order, the contractor must prove actual damages based on internal costs for equipment, labor or
efficiencies. Total cost, modified total cost, or jury verdict forms of presentation of damage claims are not permissible to show damages.

2.3.10.2 Claims must be submitted not later than 20 days after the first observance or awareness or notice of the basis for the claim. If the amount of time and/or compensation cannot be readily ascertained at the time the claim is submitted, such amounts shall be submitted as soon as they are discernible. In any case, the amount of time and/or compensation claimed together with all necessary supporting data, shall be submitted no later than 60 days after completion of the contract item of work on which the claim is based.

2.3.10.3 Failure to comply with Clause 2.3.10.1, 2.3.10.2, 12.2.1. shall constitute a waiver and abandonment of the right to make any claim on the particular contract item in question.

2.3.10.4 A claim as soon as received from the Contractor shall be acknowledged in writing by the Project Manager. If the claim is not disposed of by agreement, the claim shall be reviewed by the Project Manager, who shall, within fourteen (14) days, advise the Contractor of his final decision and communicate his final decision to the Contractor. This final decision of the Project Manager shall, unless otherwise determined on appeal to the Superior Court of Alaska, be final and conclusive. Any appeal from this decision to the Superior Court of Alaska shall be commenced on or before 30 days from the date of completion and acceptance of the entire contracted Work. In the event that no such appeal to the court is made within 30 days, the decision of the Project Manager shall be final and conclusive as to the dispute. Pending final decision of any dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract, and after the Project Manager's final decision is made, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the Project Manager's final decision.

2.3.10.5 The jurisdiction and venue for any court action arising as a result of this Contract shall be the Superior Court of Alaska in Palmer, Alaska.

ARTICLE 3

OWNER

3.1 DEFINITIONS

3.1.1 The Owner is the Matanuska-Susitna Borough, and referred to through the contract as "The Borough" but may be described in some contract documents as "Owner." The term Borough means the Borough or its authorized representative.

3.1.2 Requests for changes in the work will be considered as Borough requests only if issued in writing by the Project Manager. The Contractor shall not respond to request for changes from any other sources.

3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.2.1 The Borough shall furnish copies of surveys describing the limits of the Project site.

3.2.2 The Borough shall secure and pay for easements for permanent structures or permanent changes in existing facilities.

3.2.3 Information or services under the Borough's control shall be furnished by the Borough with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.4 The Borough shall issue all instructions to the Contractor through the Project Manager.

3.3 BOROUGH'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Borough, by a written order signed by the Project Manager or his designee, may order the Contractor to stop the Work, or any portion thereof, until the cause of such order has been eliminated; however, this right of the Borough to stop the Work shall not give rise to any duty on the part of the Borough to exercise this right for the benefit of the Contractor or any other person or entity.
3.4 BOROUGH'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Borough may, after seven days' written notice to the Contractor and without prejudice to any other remedy it may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Borough.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 Before making his proposal or bid to the Borough, and continuously after execution of the Contract, the Contractor shall carefully study and compare the Contract Documents and shall at once report to the Borough, through the Project Manager, any error, inconsistency or omission he may discover, including any requirement which may be contrary to any law, ordinance, rule, regulation or order of any public authority bearing on the performance of the Work. By submitting his proposal or bid for the Contract and Work under it, the Contractor agrees that the Contract Documents appear accurate, consistent and complete insofar as can reasonably be determined. The Contractor shall perform no portion of the Work at any time without Contract Documents and, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, regardless of the trade performing the Work, or the particular portion of the Contract Documents requiring the Work. It is the intent of the Contract Documents to provide a complete and finished Project in all areas, unless specifically stated otherwise. Contractor shall furnish any necessary accessories, even if not specifically specified, that are required to finish the Work, in a first-class finished and/or operating condition for use by the Borough as indicated by the Contract Documents.

4.3.2 The Contractor shall not be relieved from his obligations to perform the work in accordance with the contract documents either by the activities or duties of the Project Manager in his administration of the contract, or by inspections, tests or approvals (or the lack thereof) required or performed under Article 7.8 by persons other than the contractor.

4.4 LABOR AND MATERIALS

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

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

4.5 WARRANTY

4.5.1 The Contractor warrants to the Borough that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be good quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective, and may be rejected.
If required by the Borough, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The warranty provided in this paragraph shall be in addition to and not in limitation of any other warranty remedy required by law or by the Contract Documents.

4.5.2 Contractor's Warranty as contained in paragraph 4.5.1 shall continue for a period of one year from the date of substantial completion. Items as determined by substantial completion inspection to be deficient in any respect shall be corrected, and the warranty period for those items shall not begin until the deficiencies have been corrected, reexamined and finally approved.

Within the warranty period, the contractor shall remedy, at the contractor's expense, any failure to conform, or any defect. In addition, the contractor shall remedy, at the contractor's expense any damage to the Borough's owned or controlled property when the damage is the result of the contractor's failure to perform to contract requirements, or any defects of equipment, material, workmanship or design furnished by the contractor. The contractor shall restore any work damaged in fulfilling the terms and conditions of this paragraph. Contractor's warranties apply to all work, goods, materials and items furnished by subcontractors or suppliers.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are in effect or become effective during the term of the Contract.

4.6.2 The Contractor shall have and maintain in effect an Alaska Business License, and be registered as a general contractor and shall be responsible for current licenses and registration for all subcontractors, sub-subcontractors and suppliers as required by Alaska law. The Contractor shall notify the Borough in writing of any canceled, revoked, or expired license or registration of the Contractor or Subcontractors or Sub-subcontractors.

4.7 PERMITS, FEES AND NOTICES

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses, and inspections necessary for the proper execution and completion of the Work which are customarily secured after award of the Contract, and which are in effect at the time the bids are received.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If the Contractor observes that any of the Contract Documents are in variance therewith in any respect, he shall promptly notify the Borough in writing, and any necessary changes shall be adjusted by appropriate modification. If the Contractor performs any Work knowing or which be reasonably should have known to be contrary to such law, ordinances, rules and regulations, and without such notice to the Project Manager, the Contractor shall assume full responsibility therefore and shall bear all costs attributable thereto.

4.8 CASH ALLOWANCES

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract documents. These allowances shall cover the net cost of the materials and equipment delivered and unloaded at the site, and all applicable taxes. The Contractor's handling costs on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance. The Contractor shall cause the Work covered by these allowances to be performed for such amounts and by such persons as the Project Manager may direct, but he will not be required to employ persons against whom he makes a reasonable objection. If the cost, when determined, is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order which will include additional handling costs on the site, labor, installations costs, overhead, profit and other expenses resulting to the Contractor from any increase over the original allowance.

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during the progress of the Work. The superintendent shall be satisfactory to the Project Manager, and shall not be changed except with the consent of the Project Manager, unless the superintendent proves to
be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor.

4.10 RESPONSIBILITY FOR THOSE PERFORMING THE WORK

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

4.11 PROGRESS SCHEDULE

4.11.1 The Contractor, within fifteen days after being awarded the Contract, shall prepare and submit for the Project Manager's review, an estimated progress schedule for the Work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents. The progress schedule shall indicate the dates for starting and completion of the categories of construction outlined on the list of Progress Schedule Items attached at the end of the Supplementary General Conditions. The progress schedule shall indicate the percentage of each phase to be completed at the end of each month during the term of the Contract, and shall be revised as required by the conditions of the Work, and an updated progress schedule shall be submitted with each pay request.

4.12 DRAWINGS AND SPECIFICATIONS AT THE SITE

4.12.1 The Contractor shall maintain at the site for the Project Manager and Project Manager a complete set of the Contract Documents maintained in an up to date condition, including all amendments, modifications or changes, in a neat, legible manner to the satisfaction of the Project Manager. The Contractor shall also maintain a complete set of as-built drawings which shall show all deletions, additions, changes in routing or location, materials or design, piping, equipment, ducts, conduit and other items pertinent to the entire scope of the Project. These record drawings shall reflect all changes made by change orders and/or supplemental drawings. The as-built drawings shall (1) place special emphasis on concealed items and substitutes to items specified or shown including all approved changes to such items; (2) include all work being performed by any subtrade, including mechanical and electrical which shall be up to date and correct; (3) clearly indicate all relocations and routing, dimension adequately to assure location for future maintenance or remodeling. The as-built drawings shall be available to the Project Manager, and, prior to final acceptance and as an essential condition of final acceptance, shall be certified as correct by the general contractor, by the electrical and mechanical subcontractors and other subcontractors by signature on the record drawings, and when complete shall be submitted to the Project Manager. The Project Manager may decline to approve progress payment requests if the up to date contract documents and as-built drawings are not currently maintained, if such failure renders it difficult or impossible for the Project Manager to determine the status, progress, nature or quality of the work.

4.12.2 Whenever manufacturers printed Specifications or Instructions are by reference made part of these Specifications, the Contractor shall furnish copies of such Specifications or Instructions to the Project Manager.

4.12.3 All manufacturers' warranties for any item installed in the Work shall be delivered to the Project Manager upon completion of the Work.

4.12.4 Contractor shall verify dimensions on the job. If errors or omissions of dimensions or other discrepancies are found, he shall immediately notify the Project Manager. If the Contractor continues work in the area affected before clarifications are made by the Project Manager, the Contractor shall bear the cost of any charges required as a result of such errors, omissions or discrepancies.

4.13 SHOP DRAWINGS AND SAMPLES

4.13.1 Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the Work.

4.13.2 Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the Work will be judged.
4.13.3 The Contractor shall review, stamp with his approval and submit to the Project Manager with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents or subsequently by the Project Manager as covered by Modifications. Shop Drawings and Samples shall be properly identified as specified, or as the Project Manager may require. At the time of submission the Contractor shall inform the Project Manager in writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.

4.13.4 By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he had checked and coordinated each Shop Drawing and Sample with the requirements of the Work and of the Contract Documents.

4.13.5 The Project Manager will review and approve Shop Drawings and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Project Manager's approval of a separate item shall not indicate approval of an assembly in which the item functions.

4.13.6 The Contractor shall make any corrections required by the Project Manager and shall resubmit the required number of corrected copies of Shop Drawings or new Samples until approved. The Contractor shall direct specific attention in writing or in resubmitted Shop Drawings to revisions other than the corrections requested by the Project Manager on previous submissions.

4.13.7 The Project Manager's approval of Shop Drawings or Samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Project Manager in writing of such deviation at the time of submission and the Project Manager has given written approval to the specific deviation, nor shall the Project Manager's approval relieve the Contractor from responsibility for errors or omissions in the Shop Drawings and Samples.

4.13.8 No portion of the Work requiring a Shop Drawing or Sample submission shall be commenced until the submission has been approved by the Project Manager. All such portions of the Work shall be in accordance with approved Shop Drawings and Samples.

4.13.9 (Not used.)

4.13.10 Contractor shall instruct maintenance personnel of the Borough in operation and maintenance of all equipment. This will include actual demonstration of operation and written instructions as required. Contractor shall bind all required instructions, including Project managerial, mechanical and electrical guarantees and manufacturers' literature into a three-ring binder with index and identification and provide four copies.

4.14 USE OF SITE

4.14.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.14.2 Before starting Work, the Contractor shall locate all general reference points, and take all steps necessary to prevent their dislocation or destruction and if disturbed or destroyed, replace as directed, at no cost to the Borough. A competent licensed surveyor shall lay out Work and be responsible for its accuracy.

4.14.3 Arrangements shall be made with the public utility before disconnecting or connecting utility services and all temporary service connections shall be removed after their purpose has been served. The cost of installation and any service charges incidental thereto for temporary or permanent services will be the responsibility of the Contractor, except permanent ‘connection charges' made in lieu of assessments or assessment charges.

4.15 CUTTING AND PATCHING OF WORK

4.15.1 The Contractor shall do all cutting, fitting, or patching of his Work that may be required to make its several parts fit together properly, and shall not endanger any Work by cutting, excavating or otherwise altering the Work or any part of it.
4.16 CLEANING UP

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

4.16.2 If the Contractor fails to clean up, the Borough may do so and the cost thereof shall be charged to the Contractor as provided in Paragraph 3.4.

4.17 (Not Used.)

4.18 DEFENSE AND INDEMNIFICATION

4.18.1 A. The Contractor shall indemnify, defend, and hold and save the Borough, its elected and appointed officers, agents and employees, harmless from any and all claims, demands, suits, or liability of any nature, kind or character, including costs, expenses, and attorney fees. The Contractor shall be responsible under this clause for any and all legal actions or claims of any character resulting from injuries, death, economic loss, damages, violation of statutes, ordinances, constitutions or other laws, rules or regulations, contractual claims, or any other kind of loss, tangible or sustained by any person, or property arising from Contractor's or Contractor's Officers, agents, employees, partners, attorneys, suppliers, and subcontractor's performance or failure to perform this Agreement in any way whatsoever. This defense and indemnification responsibility includes claims alleging acts or omissions by the Borough or its agents which are said to have contributed to the losses, failure, violations, or damage. However, Contractor shall not be responsible for any damages or claim arising from the sole negligence or willful misconduct of the Borough, its agents, or employees.

B. If any portion of this clause is voided by law or court of competent jurisdiction, the remainder of the clause should remain enforceable.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

5.1.2 A Sub-Subcontractor is a person or organization who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-Subcontractor or an authorized representative thereof.

5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the Borough or the Project Manager and any Subcontractor or Sub-Subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 By the end of the first work day following notification, the Contractor shall deliver to the Borough the list of subcontractors proposed for the work. Subcontractors shall be listed on the form that occurs at the end of the Supplementary General Conditions. This list is titled, "Proposed Subcontractors and Suppliers." The Borough will promptly reply to the Contractor in writing stating whether or not it has reasonable objections to any such proposed person or entity. Failure of the Borough to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Borough has made reasonable objection under the provisions of Subparagraph 5.2.1.

5.2.3 If the Borough has reasonable objections to any such proposed person or entity, the Contractor shall submit a substitute to whom the Borough has no reasonable objection, and the Contract Sum shall be increased or decreased by the difference in the cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no
increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively to submitting names as required by Subparagraph 5.2.1.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Borough makes reasonable objection to such substitution.

5.2.5 If the Borough requires a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By an appropriate agreement, the Contractor shall require each Subcontractor to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Borough. The Subcontract agreement shall preserve and protect the rights of the Borough under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Borough. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of all of the Contract Documents to which the Subcontractor will be bound by Paragraph 5.3, and identify to the Subcontractor any terms and condition of the proposed Subcontractor shall similarly make copies of such Documents available to his Sub-Subcontractors.

5.4 EXAMINATION OF RECORDS

5.4.1 The Contractor agrees that when any claim is made under this Contract that the Borough or any of his duly authorized representatives shall until the expiration of six years after final payment under this Contract have access to and right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this Contract. The periods of access and examination described above include, but are not limited to, pertinent books, documents, papers, and records which relate to litigation or settlement of claims arising out of the performance of this Contract.

5.4.2 The Contractor agrees to include in his subcontracts hereunder provisions to the following effect:

"Subcontractor agrees that when any claim is made under this Contract, the Borough or any of his duly authorized representative shall until the expiration of six years after final payment under this Contract have access to and the right to examine any directly pertinent books, documents, papers, and records of the Subcontractor involving transactions related to this Contract. The periods of access and examination described above include, but are not limited to, pertinent books, documents, papers, and records which relate to litigation or settlement of claims arising out of the performance of this Contract."

ARTICLE 6

SEPARATE CONTRACTS

6.1 BOROUGH'S RIGHT TO AWARD SEPARATE CONTRACTS

6.1.1 The Borough reserves the right to award other contracts in connection with other portions of the Project under these or similar Conditions of the Contract.

6.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall be the Contractor who signs each separate contract.
6.2 MUTUAL RESPONSIBILITY OF CONTRACTORS

6.2.1 The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his Work with theirs.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect and promptly report to the Project Manager any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work.

6.2.3 The Contractor shall indemnify, defend and hold harmless the Borough and its officers, agents and employees from and against all claims for damages, losses and expenses including, but not limited to, attorneys' fees arising out of or resulting from the Contractor causing damage to the Work or property of any separate Contractor employed by the Borough on the Project, in accordance with paragraph 4.18.1.

6.3 CUTTING AND PATCHING UNDER SEPARATE CONTRACTS

6.3.1 The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete his Work except as otherwise specifically provided in the Contract Documents. The Contractor shall not endanger any work of any other contractors by cutting, excavating or otherwise altering any work and shall not cut or alter the work of any other contractor except with the written consent of the Project Manager.

6.3.2 Any costs caused by defective or ill-timed work shall be borne by the party causing those costs. This provision shall only apply to cutting and patching work pursuant to Article 6.3.

6.4 BOROUGH'S RIGHT TO CLEAN UP

6.4.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by Paragraph 4.16, the Borough may clean up and charge the cost thereof to the several contractors pro rata as determined by the Project Manager.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 The Contract shall be governed by Alaska law.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Borough and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Borough.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice, or if received via confirmed legible fax transmission.

7.4 CLAIMS FOR DAMAGE

7.4.1 Should either party to the contract suffer injury or damage to persons or property because of any act or omission of the Borough or of any of his employees, agents or others for whose acts he is legally liable, claims shall be made in
writing to the Borough within twenty days after the first observance of such injury or damage; otherwise, the contractor shall have waived and abandoned any and all rights he may have against the Borough; and such claim shall clearly and specifically state in writing elements 1-4 as listed in paragraph 2.3.10.1, and shall be governed by 2.3.10.2, 2.3.10.3, 2.3.10.4 and 2.3.10.5.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Contractor shall furnish a performance bond in an amount equal to 100% of the contract price as security for the faithful performance of this Contract and also a payment bond in an amount equal to 100% of the contract price on the forms provided in the Project Manual, with sureties in compliance with applicable law and qualified by law to act as surety in furnishing such bonds, and as may be acceptable to the Borough. The premium shall be paid by the Contractor. The Contractor shall deliver the required bonds to the Borough not later than ten days after notice of award.

7.5.2 If the surety on any Bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated or it ceases to meet the requirements of paragraph 7.5.1, the Contractor shall immediately notify the Borough within five days thereafter substitute another Bond and Surety, both of which must be acceptable to the Borough.

7.6 RIGHTS AND REMEDIES

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.7 ROYALTIES AND PATENTS

7.7.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall defend and save the Borough harmless from loss on account thereof, except that the Borough shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Project Manager.

7.8 TESTS

7.8.1 Contractor's Obligation

1. The Contractor shall obtain and pay for all testing that may be necessary to qualify materials for use in the work. This shall include material quality tests, mix designs, equipment and plant calibration, optimum moisture, and maximum density curves, and other similar tests required to qualify materials for compliance with the specified standards for field control tests. The Contractor shall submit test results to the Project Manager sufficiently in advance of the work so that approval to proceed is received by the Contractor prior to the using material in the work.

2. Samples of material required for testing shall be furnished by the Contractor.

3. The Contractor is responsible for coordinating with the Borough's Representative and requesting all testing, including field testing paid for by the Borough.

4. All standby time for on-site testing which is caused by the delay in Contractor's work because the progress of the work is not ready for field testing will be paid by the General Contractor.

7.8.2 Borough's Obligation

The Borough shall pay for all field testing performed to monitor construction control of materials used in the work. This includes slump, air and cylinders on concrete work, density tests, and other similar control tests. Failing tests shall be retested and the costs of additional testing shall be borne by the Contractor.
The Contractor must notify the Borough of his representative about work which will require testing a minimum of 24 hours before the work begins.

7.8.3 If after the commencement of the Work the Project Manager determines that any Work requires special inspection, testing, or approval which Subparagraph 7.8.1 does not include, he will, upon written authorization from the Borough, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as in Subparagraph 7.8.1. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including the Project Manager's additional services made necessary by such failure; otherwise the Borough shall bear such costs, and an appropriate Change Order shall be issued.

7.8.4 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Project Manager.

7.8.5 If the Project Manager or his designee wishes to observe the inspections, tests or approvals required by this Paragraph 7.8, he will do so promptly and, where practicable, at the source of supply.

7.8.6 Neither the observations of the Project Manager in his administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

7.9 INTEREST

7.9.1 Any monies not paid when due to either party under this Contract shall bear interest at the legal rate in force in the State of Alaska at the time of award of the contract.

7.10 WAGE RATES ON PUBLIC CONSTRUCTION

7.10.1 Contractor shall file with the Alaska State Department of Labor, and copy the Borough, showing conformance with AS 36.05.010, Wage Rates on Public Construction, certified payrolls from Contractor and Subcontractors as stipulated by AS 36.05.040, Filing Schedule of Employees, Wages Paid and Other Information.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 The Contract Time is the period of time allowed in the Contract Documents for completion of the Work.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Project Manager when construction is sufficiently complete, in accordance with the Contract Documents, so the Borough may occupy the Work or designated portion thereof for the use for which it is intended.

8.1.4 The term day as used in the Contract Documents shall mean calendar day.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the Work forwarded expeditiously with adequate forces and shall complete it within the Contract Time.

8.2.3 The date for Substantial Completion as defined in Sub-Paragraph 8.1.3 shall be as stated in Division 1, General Requirements, as modified by applicable Change Orders. The Borough reserves the right to use or occupy the space, or
any part thereof, or use equipment installed under the Contract prior to final acceptance if the Contractor has not reached completion by the Contract Completion Date. Borough shall not occupy any portion of space before stipulated date for completion, except with the approval of the Contractor. Date of Final Completion of the space as required by Division 1, General Requirements, is date when the Work is complete in all respects as required by the Contract Documents. At the time Substantial Completion has been established, a “Certificate of Substantial Completion” will be issued. Date of Substantial Completed stated on “Certificate of Substantial Completion” shall be used for assessing liquidated damages as applicable. Date of substantial completion shall be first day of warranty periods for all items approved at substantial completion inspection. Deficiency items shall not have their warranty periods begin until the date of final completion or until they have been corrected to the satisfaction of the Project Manager.

8.3 TIME EXTENSIONS FOR DELAY

8.3.1 If the Contractor is delayed by acts including an intentional or negligent act of the Borough, or by intentional or negligent act of any employee of the Borough, or by an intentional or negligent act of a separate contractor employed by the Borough, or by the process of a Change Order or by additional work required by a change in the Work, in any way including but not limited to delay resulting in loss of productivity, the Contractor’s sole remedy shall be a time extension for the completion of the Work. This paragraph does not exclude the Borough recovering from the Contractor, money damages that result from the Contractor causing delay.

8.3.2 However, the Contractor’s right to proceed shall not be terminated nor the Contractor charged with resulting damage if (1) the Contractor is delayed in the completion of the Work arising from causes beyond the control and without the fault or negligence of the Contractor, limited to the following: intentional or negligent act of the Borough, or by any employee of either; by a separate contractor employed by the Borough, by Change Orders in the Work (pursuant to Article 12), earthquakes, fires, floods, epidemics, acts of a public enemy, then the time for completion of the contract shall be extended by a change order for such reasonable time as the Project Manager may determine; and (2) the Contractor, whenever possible at least ten days before the beginning of the delay occurs, notifies the Project Manager in writing, or, if the delay was not reasonably foreseeable then the Contractor notifies the Project Manager in writing within ten days from the beginning of such delay; and (3) the Contractor provides a written estimate of the number of days the Project will be delayed.

8.3.3 Unforeseeable weather conditions, and other causes of delay not set forth in Subparagraph 8.3.2 above shall not constitute a basis for a time extension, nor for money damages for delay.

8.4 DAMAGES FOR DELAY IN COMPLETION: LIQUIDATED OR ACTUAL

8.4.1 The Borough has made a reasonable estimate of the harm caused to the Borough by delay in completion of the contract, based upon information available to the Borough at the time of the contract. The Borough’s best and reasonable estimate, based upon economic loss to the Borough is in the amount set forth in the agreement. For each calendar day that any work remains uncompleted after time for completion as set forth in this contract, liquidated damages in that amount shall be deducted per day from any money due the contractor under this contract. This amount is not a penalty, but is based on the reasonable estimate of the harm caused to the Borough which is difficult or impossible to accurately ascertain.

8.4.2 Because circumstances may occur which were not known to, nor foreseen by, or foreseeable by the Borough at the time of entering into the contract, actual damages for delay in performance of the contract may be greater than the liquidated damages amount set forth above. In the event actual damages for delay in the Project prove to be greater than the amount of liquidated damages set forth above, the Borough, at its sole option, may elect to prove actual damages for delay and the Contractor shall be liable for actual damages which are greater than the liquidated damages, and in lieu of the liquidated damages, based on such proof.

8.4.3 Permitting the Contractor to continue and finish work or any part it after the time fixed for its completion by the contract or any written amendment therefore shall not constitute a waiver by the Borough’s rights to liquidated or actual damages.
ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and is the total amount payable by the Borough to the Contractor for the performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Project Manager a schedule of values of the various portions of the Work, including quantities if required by the Project Manager, aggregating the total Contract Sum, divided so as to facilitate payments to Subcontractors in accordance with Paragraph 9.4.3.1, prepared in such form as specified or as the Project Manager and the Contractor may agree upon, and supported by such data to substantiate its correctness as the Project Manager may require. Each item in the schedule of values shall include its proper share of overhead and profit. This schedule, when approved by the Project Manager, shall be used only as a basis for the Contractor's Applications for Payment.

9.2.2 Schedule of Values must be submitted as soon as practical after the award of the Contract. In all cases Schedule of Values must be submitted at least 15 days prior to the first Application For Payment. Schedule of Values must show a complete breakdown of all phases of the Work required by the Contract Documents. In preparing Schedule of Values, Contractor shall establish a value for each item of work, including all applicable profit and overhead and supported by such additional data as the Project Manager may require. This schedule, unless objected to by the Project Manager, shall be used as a basis for the Contractor's application for payment.

9.2.3 Contractor shall establish his cash flow requirements throughout the anticipated life of the Project. This information shall be submitted along with the schedule of values. The cash flow information shall address itself to a monthly cash flow requirement based on the Progress Schedule and Schedule of Values.

9.3 PROGRESS PAYMENTS

9.3.1 On or about the first day of each month the Contractor shall submit to the Project Manager an itemized Application for Payment, based on Schedule of Values, for a period from the first day of the month through the last day of the month. Application for Payment shall be executed and submitted in three copies on AIA forms G702 and G702A furnished by the Project Manager. Application to be supported by such data substantiating the Contractor's right to payment, as the Borough and Project Manager may require. In all cases where the application includes a request for payment of stored material, an itemized listing of such material, substantiated by invoices for the material, shall be attached to the Application for Payment and the total listed on the Application for Payment under the line provided for "Stored Materials."

If any stored materials are claimed which are not stored on the construction site, itemized location must be available for inspection of the materials. Approval must be granted by the Project Manager of any location for stored materials other than the construction site prior to submittal of Application for Payment. After payment request has been submitted, correctly certified and approved, payment will be made for 90% of the work completed and materials suitably stored. Upon Substantial Completion of the entire Work, payment will be made in an amount sufficient to increase the total payment to 95% of the Contract Sum, less such retainages as the Project Manager shall determine for all incomplete work and unsettled claims. At the time of Final Payment Request, not less than 2% of the total Contract amount shall be retained to assure satisfactory completion of all Contractual obligations and will not be paid until all work has been completed. and all submittals made, properly certified and approved.

If any stored materials are claimed which are not stored on the construction site, itemized location must be available for inspection of the materials. Approval must be granted by the Project Manager of any location for stored materials other than the construction site prior to submittal of Application for Payment. After payment request has been submitted, correctly certified and approved, payment will be made for 90% of the work completed and materials suitably stored. Upon Substantial Completion of the entire Work, payment will be made in an amount sufficient to increase the total payment to 95% of the Contract Sum, less such retainages as the Project Manager shall determine for all incomplete work and unsettled claims. At the time of Final Payment Request, not less than 2% of the total Contract amount shall be retained to assure satisfactory completion of all Contractual obligations and will not be paid until all work has been completed. and all submittals made, properly certified and approved.

After 50% of the work has been completed, the Project Manager, if he finds that satisfactory progress is being made, may limit the retainage withheld to an amount equivalent to 5% of the bid amount so long as progress and quality of work produced remain satisfactory. If at any time following such reduction in retainage the Project Manager finds that the rate of progress or quality of work produced, or both has become unsatisfactory, an amount equivalent to 10% of all work in place shall be deducted from the next progress estimate, and from all future progress estimates until the deficiencies in progress, or work or both, have been satisfactorily corrected.

9.3.2 If payments are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon
submission by the Contractor of bills of sale or such other procedures satisfactory to the Borough to establish the Borough's title to such materials or equipment or otherwise protect the Borough's interest including applicable insurance and transportation to the site.

9.3.3 The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to the Borough upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interest or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor; or by any other person performing the Work at the site of furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 If the Contractor has made Application for Payment as above, the Project Manager will, with reasonable promptness but not more than fourteen days after the receipt of the Application, issue a Certificate for Payment to the Borough, with a copy to the Contractor, for such amount as he determines to be properly due, or state in writing his reasons for withholding a Certificate as provided in Subparagraph 9.5.1.

9.4.2 (Not used)

9.4.3 After the Project Manager has issued a Certificate for Payment, the Borough shall make payment within 30 days.

9.4.3.1 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Borough out of the amount paid to the Contractor on account of such Subcontractor's work, the amount to which said Subcontractor is entitled reflecting the percentage actually retained, if any, from the payments to the Contractor on account of each Subcontractor's work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to his Sub-Subcontractors in similar manner.

9.4.3.2 The Project Manager may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of the completion or the amounts applied for by the Contractor and the action taken thereon by the Project Manager on account of the Work done by such Subcontractor.

9.4.3.3 Neither the Borough nor the Project Manager shall have any obligation to pay or to see to the payment of any monies to any Subcontractor.

9.4.4 No certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Borough, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.5 PAYMENTS WITHHELD

9.5.1 The Project Manager may decline to approve an Application for Payment; and may withhold his Certificate in whole or in part, to the extent reasonably necessary to protect the Borough, if in his opinion he is unable to make representations to the Borough as provided in Subparagraph 9.4.2. The Project Manager may also decline to approve any Applications for Payment or, because of subsequently discovered evidence or subsequent inspections, he may nullify the whole or any part of any Certificates for Payment previously issued, to such extent as may be necessary in his opinion to protect the Borough from loss because of:

1. defective work not remedied,
2. third party claims filed or reasonable evidence indicating probable filing of such claims,
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment,
4. reasonable doubt that the Work can be completed for the unpaid balance of the Contract Sum,
5. damage to another Contractor,
6. reasonable indication that the Work will not be completed within the Contract Time, or
7. unsatisfactory prosecution of the Work by the Contractor,
8. work performed by subcontractor, which subcontractor has not been approved by the Borough, and
9. failure of Contractor to submit updated Monthly Progress Schedule with Application for Payment.

9.5.2 The Contractor agrees that he will indemnify, defend and save the Borough harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract, in accordance with paragraph 4.18.1. The Contractor shall, at the Borough's request, furnish satisfactory evidence that all obligations of the nature herein above designated have to be paid, discharged, or waived. If the Contractor fails to do so, then the Borough may, after have served written notice on the said Contractor, either pay unpaid bills, of which the Borough has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Borough to either Contractor or his Surety.

In paying any unpaid bills of the Contractor, the Borough shall not be liable to the Contractor for any such payment made in good faith.

9.6 FAILURE OF PAYMENT

9.6.1 If the Project Manager should fail to issue any Certificate for Payment, through no fault of the Contractor, within fourteen days after receipt of the Contractor's Application for Payment, or if the Borough should fail to pay the Contractor within seven days after the date of payment established in the Agreement any amount certified by the Project Manager, then the Contractor may, upon seven additional days' written notice to the Borough and the Project Manager, stop the Work until payment of the amount owing has been received.

9.7 SUBSTANTIAL COMPLETION AND FINAL PAYMENT

9.7.1 When the Contractor determines that the Work or a designated portion thereof acceptable to the Borough is substantially complete, the Contractor shall prepare for submission to the Project Manager a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Project Manager on the basis of an inspection determines that the Work is substantially complete, he will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Borough and the Contractor for maintenance, heat, utilities, and insurance, and shall fix the time within which the Contractor shall complete the items listed herein. The Certificate of Substantial Completion shall be submitted to the Borough and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.7.2 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Project Manager will promptly make such inspection and, when he finds the work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable.

9.7.3 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Project Manager (1) an Affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Borough or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of Surety, if any, to final payment, and (3) if required by the Borough, other data establishing payment in satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Borough. If any Subcontractor refuses to furnish a release or waiver required by the Borough, the Contractor may furnish a bond satisfactory to the Borough to indemnify and defend him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Borough all monies that the Borough may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees. Contractor shall submit in duplicate "Contractor's Affidavit of Payment of Debts and Claims," and/or "Contractor's Affidavit of Release of Liens," and/or "Consent of Surety Company to Final Payment" as may be required by the Borough.

9.7.4 If after Substantial Completion of the Work final completion thereof is materially delayed through no fault of the Contractor, and the Project Manager so confirms, the Borough shall, upon certification by the Project Manager, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If
the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Subparagraph 7.5.1, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Project Manager prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.7.5 The making of final payment shall constitute a waiver of all claims by the Borough except those arising from:

1. unsettled liens,
2. faulty or defective work appearing after Substantial Completion,
3. failure of the Work to comply with the requirements of the Contract Documents, or
4. terms of any guarantees required by the Contract Documents.

9.7.6 Acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

9.8 USE OF PROJECT

9.8.1 The Borough shall have the right to take possession of and to use any completed or partially completed portions of the building even though the time of completing the entire work or such portion thereof may not have expired and such use shall not constitute acceptance thereof. The occupancy shall not unreasonably interfere with the operations of the Contractor.

9.9 INSPECTION FOR SUBSTANTIAL COMPLETION AND INSPECTION FOR FINAL COMPLETION

9.9.1 At the time that the Contractor determines that the Project has reached a point to be considered Substantially Complete, he shall request in writing to the Project Manager, an inspection of Substantial Completion. Request for inspection must be made at least fourteen (14) days prior to the date on which the Work will be ready for inspection.

9.9.2 At such time as the Contractor has determined that the Project has reached the state of Final Completion of all portions, in accordance with the Contract Documents, he shall request an inspection for Final Completion.

9.9.3 Any delay in making inspections under 9.9.1 and 9.9.2 shall not relieve the Contractor of responsibility for the Work, or entitle him to compensation due to continuing overhead, maintenance, and other costs caused by the delay.

9.9.4 If the Project Manager or his representative making the inspection finds the Work so far from complete as to make a later visit necessary to establish a date of Substantial Completion or Final Completion, the Contractor shall be liable to the Project Manager for the expense to the Representative incurred for reinspection. If, at the time of inspection, the Project is found to be Substantially Complete or if Final Completion has been reached, a Certificate of Substantial Completion shall establish the date for commencement of the one-year warranty of all Work included in the Contract.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonably protection to prevent damage, injury or loss to:

1. all employees working on the Project and all other persons who may be affected thereby,
2. all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors,

3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction, and

4. the Contractor shall physically barricade any excavation that is over three feet deep.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Borough and users of adjacent utilities.

10.2.3 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.4 The Contractor shall promptly remedy all damage or loss to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Borough or anyone directly or indirectly employed by him, or by anyone for whose acts he may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.

10.2.5 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Borough and the Project Manager.

10.2.6 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE. The Contractor shall not commence Work under this Contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the Borough, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until the insurance required of the Subcontractor has been so obtained and approved.

11.1.1 WORKER'S COMPENSATION INSURANCE. The Contractor shall procure and shall maintain during the life of this Contract Worker's Compensation Insurance as required by applicable State law for all of his employees to be engaged in work at the site of the Project under this Contract and, in case of any such work sublet, the Contractor shall require the Subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case any class of employee engaged in hazardous work on the Project under this Contract is not protected under the worker's compensation statute, the contractor shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance for the protection of such of his employees as are not otherwise protected.

11.1.2 CONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE. The Contractor shall procure and shall maintain during the life of this Contract Contractor's Public Liability
Insurance, Contractor's property Damage Insurance and Vehicle Liability Insurance in the amounts specified in the Supplemental General Conditions.

11.1.3 SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE. The Contractor shall either (1) require each of his Subcontractors to procure and to maintain during the life of his subcontract, Subcontractor’s Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in the Supplemental General Conditions specified in Clause 11.1.3 hereof, or, (2) insure the activities of his Subcontractors and sub-subcontractors in his policy as specified in Clause 11.1.2 hereof.

11.1.4 SCOPE OF INSURANCE AND SPECIAL HAZARDS. The insurance required under Clauses 11.1.2 and 11.1.3 hereof shall provide adequate protection for the Contractor, his Subcontractors, and Sub-subcontractors respectively, against damage claims which may arise from operations under this Contract, whether such operations be by the insured or any anyone directly or indirectly employed by him and, also against any of the special hazards which may be encountered in the performance of this Contract as enumerated in the Supplemental General Conditions.

11.1.5 BUILDER’S RISK INSURANCE (FIRE AND EXTENDED COVERAGE). The Contractor shall procure and shall maintain during the life of this Contract Builder’s Risk Insurance (Fire and Extended Coverage) on a 100% completed value basis on the insurable portion of the Project. The Borough, the Contractor, and Subcontractors (as their interests may appear) shall be named as the Insured.

11.1.6 PROOF OF CARRIAGE OF INSURANCE. The Contractor shall furnish the Borough with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such certificates shall also contain substantially the following statements: “The insurance covered by this certificate will not be canceled or materially altered, except after sixty (60) days' written notice has been received by the Borough.” The Borough may require submitted for review and approved all insurance policies required in the contract.

ARTICLE 12

CHANGES IN THE WORK

12.1 CHANGE ORDERS

12.1.1 A Change Order is a written order to the Contractor executed by the Borough, issued after execution of the Contract, authorizing a change in the Work or adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order executed in accordance with MSB Code 3.08.150. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment to the Contract Sum or the Contract Time.

12.1.2 The Borough, without invalidating the Contract and without notice to the sureties, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by the Change Order, and shall be performed under the applicable conditions of the Contract Documents.

12.1.3 The cost or credit to the Borough resulting from a change in the Work shall be determined in one or more of the following ways:

1. by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiation data to permit evaluation,
2. by unit prices stated in the Contract Documents, or subsequently agreed upon, or
3. by cost and a mutually acceptable fixed or percentage fee.

12.1.4 If none of the methods set forth in Subparagraph 12.1.3 is agreed upon, the Contractor, provided he receives an executed Change Order, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Project Manager on the basis of the Contractor’s direct costs, including, in the case of an increase in the Contract sum, a reasonable allowance for overhead and profit. In such case, and also under Clause 12.1.3.3 above, the Contractor shall keep and present, in such form as the Project Manager may prescribe, an itemized accounting together with appropriate supporting data. Pending final determination of cost to the Borough, payments on account shall be made on
the Project Manager’s Certificate of Payment. The amount of credit to be allowed by the Contractor to the Borough for any deletion or change which results in a net decrease in cost will be the amount of the actual net decrease as confirmed by the Project Manager. When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increases, if any.

"Cost" of the Contractor's work shall be as follows:

A. Cost defined:

a. Direct costs are defined as the net cost to the Contractor resulting from the accomplishment of a given change. These include cost of materials including sales tax and tax for delivery; cost of direct labor including FICA and Employment Security Contribution and Worker's Compensation Insurance payment; cost of rental of tools and power equipment. Bond costs are considered part of direct costs. Direct costs do not include such items as superintendent time, foreman time, project manager time, project engineer time, secretarial time, owned tools, equipment, and other field office expenses, home office expenses, or overhead and related expenses. The above noted costs are considered to be indirect costs as noted below. This list is not intended to be all inclusive but representative of the types of items that are not to be considered direct expense.

b. Indirect costs are defined as general operational charges which the Borough cannot readily determine to be from the accomplishment of a given change. The Borough will treat those costs as part of combined overhead and profit. Indirect costs include such items as superintendent time, foreman time, project manager time, project engineer time, secretarial time, owned tools, equipment, and other field office expenses, home office expenses, overhead and related expenses. This list is not intended to be all inclusive but representative of the type of items that are to be considered indirect costs.

B. Overhead and Profit:

"Reasonable allowance for overhead and profit" shall be defined as: 15% of the contractor's direct costs on a change order; 10% of the Contractor's cost for direct costs due to a subcontractor for a change order; and 15% of the subcontractor's direct costs on a change order for work he performed.

A Subcontractor's overhead and profit is not considered part of the direct costs of the work.

C. When changes are deductive, overhead and profit shall be 5% of the direct costs of the Contractor's deleted own work and 5% of the direct costs of the subcontractor's deleted own work.

12.2 NOTICE OF CLAIMS

12.2.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he must immediately begin keeping complete, accurate and specific daily records concerning every detail of the potential claim including actual costs incurred. He shall give the Project Manager written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 10.3.1. No such claim shall be valid unless so made and the claim must comply with and is governed by paragraphs 2.3.10.1, 2.3.10.2, 2.3.10.3, 2.3.10.4 and 2.3.10.5. Any change in the Contract Sum resulting from such claim shall be authorized only by a written Change Order.

12.3 MINOR CHANGES IN THE WORK

12.3.1 The Project Manager shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on the Borough and the Contractor.

12.4 FIELD MEMOS

12.4.1 The Project Manager may issue written Field Memos which interpret the Contract Documents in accordance with Subparagraph 1.2.5 or which order minor changes in the Work in accordance with Paragraph 12.3 without change in
ARTICLE 13

UNCOVERING AND CORRECTING OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any Work should be covered contrary to the request of the Project Manager it must, if required by him, be uncovered for his observation and replaced, at the Contractor's expense.

13.1.2 If any other Work has been covered which the Project Manager has not specifically requested to observe prior to being covered, the Project Manager may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Borough. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by a separate contractor employed as provided in Article 6, and in that event the Borough shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all Work rejected by the Project Manager as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of services thereby made necessary.

13.2.2 If, within one year after the Date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Borough to do so unless the Borough has previously given the Contractor a written acceptance of such condition. The Borough shall give such notice promptly after discovery of the condition. "Such condition" is to be interpreted as one specific item of work. Acceptance by the Borough or final payment shall not relieve the Contractor from responsibility for guarantees and correction of work.

13.2.3 All such defective or non-conforming Work under Clauses 13.2.1 and 13.2.2 shall be removed from the site if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Borough.

13.2.4 The Contractor shall bear the cost of satisfactorily replacing or repairing all work of separate contractors destroyed or damaged by such removal or correction.

13.2.5 If the Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from the Project Manager, the Borough may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Borough may upon ten additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds hereof, including compensation for additional Project Managerial services. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Borough.

13.2.6 If the Contractor fails to correct such defective or non-conforming Work, the Borough may correct it in accordance with Paragraph 3.4.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Borough prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.
ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor for the Project Manager's failure to issue a Certificate for Payment as provided in Paragraph 9.6 or the Borough's failure to make payment thereon as provided in Paragraph 9.6, then the Contractor may, upon seven days' written notice to the Owner and the Project Manager, terminate the Contract and recover from the Borough payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonably profit and damages, in accordance with the provisions and limitations of paragraphs 12.1.3 and 12.1.4.

14.2 TERMINATION BY THE BOROUGH

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the contract documents, then the Borough may, without prejudice to any right or remedy and after giving the Contractor and his Surety, if any, seven days' written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Project Manager's additional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Borough. The costs incurred by the Borough as herein provided shall be certified by the Project Manager.

End of General Conditions
SUPPLEMENTARY GENERAL CONDITIONS

CONFLICT WITH GENERAL

This Section supplements the General Conditions of the Contract for Construction and, if in conflict, supersedes the conflicting item. Where any article, paragraph, subparagraph, or clause is modified or deleted by these supplements, the unaltered provision of the article, paragraph, subparagraph, or clause shall remain in effect.

SGC 1. CONTRACT DOCUMENTS (REFERENCE GENERAL CONDITIONS, ARTICLE 1)

A. Change 1.2.5: “14 calendar days” in this section to read: 7 calendar days”.

B. Change 1.3.1 to read as follows: “The Contractor will be supplied with one CD with all documents included, free of charge. Additional CD’s will be furnished upon request at actual cost.”

SGC 2. PROJECT MANAGER (REFERENCE GENERAL CONDITIONS, ARTICLE 2)

(Not Used)

SGC 3. OWNER (REFERENCE GENERAL CONDITIONS, ARTICLE 3)

(Not Used)

SGC 4. CONTRACTOR (REFERENCE GENERAL CONDITIONS, ARTICLE 4)

A. Add 4.6.3: “All Contractors submitting a bid for this Contract shall have in effect Alaska Business License, Contractor’s License as required by Laws of Alaska, and a Matanuska-Susitna Borough Business License prior to contract execution. Contractor shall notify Project Manager, in writing, of any license, which is cancelled, or not renewed at time of expiration during the term of the Contract. Contractor shall be responsible for any additional licenses and/or permits required in the locality of the Work. General Contractor shall further be responsible for current licenses for all subcontractors and suppliers, as required by law, during the term of the Contract and provide proof thereof.”

SGC 5. SUBCONTRACTORS (REFERENCE GENERAL CONDITIONS, ARTICLE 5)

SGC 6. SEPARATE CONTRACTS (REFERENCE GENERAL CONDITIONS, ARTICLE 6)

(Not Used)

SGC 7. MISCELLANEOUS PROVISIONS (REFERENCE GENERAL CONDITIONS, ARTICLE 7)

(Not Used)

SGC 8. TIME (REFERENCE GENERAL CONDITIONS, ARTICLE 8)

A. Substantial Completion of construction plans is set at May 1, 2020 with Final Completion of September 30, 2020.

B. Add to 8.4.1 Before last sentence of paragraph: For each calendar day that any work remains uncompleted after time for completion set forth in this Contract, liquidated damages in the amount of $250.00 shall be deducted from any money due the Contractor under this Contract.

SGC 9. PAYMENTS AND COMPLETION (REFERENCE GENERAL CONDITIONS, ARTICLE 9)

A. Add to 9.7.3: “Contractor shall submit in duplicate ‘Contractor’s Affidavit of Payment of Debts and Claims’, ‘Contractor’s Affidavit of Release of Liens’, and ‘Consent of Surety Company to Final Payment’ before final
SGC 10.  PROTECTION OF PERSONS AND PROPERTY (REFERENCE GENERAL CONDITIONS, ARTICLE 10)

(Not Used)

SGC 11.  INSURANCE (REFERENCE GENERAL CONDITIONS, ARTICLE 11)

(Not Used)

SGC 12.  CHANGES IN THE WORK (REFERENCE GENERAL CONDITIONS, ARTICLE 12)

(Not Used)

SGC 13.  UNCOVERING AND CORRECTING OF WORK (REFERENCE GENERAL CONDITIONS, ARTICLE 13)

A.  13.2.2:  Insert after 'Date of Substantial Completion' "or Date of Final Completion."

SGC 14.  TERMINATION OF THE CONTRACT (REFERENCE GENERAL CONDITIONS, ARTICLE 14)

(Not Used)

End of Supplementary General Conditions
BID BOND

KNOW ALL MEN BY THESE PRESENT, that we, the undersigned, ___________________________ as Principal, and ___________________________ as Surety, are hereby held and firmly bound unto Matanuska-Susitna Borough, Palmer, Alaska as OWNER in the penal sum of ___________________________ for the payment of which, will and truly to be made, will hereby jointly and severally bind ourselves, successors and assigns.

Signed, this ____________ day of ___________________________, 2019.

The condition of the above obligation is such that whereas the Principal has submitted to Matanuska-Susitna Borough a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for BID ___________________________.

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto properly completed in accordance with said BID, and shall furnish a BOND for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith,

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

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

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and the Surety has caused their seal to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Bond must be acceptable to Matanuska-Susitna Borough.

__________________________________________ (L.) ________________
Principal                                Surety

By: ____________________________________________  By: ____________________________________________

IMPORTANT: Surety Companies executing bonds must be authorized to transact business in the state of Alaska where this project is located. INDIVIDUAL SURETY BONDS ARE NOT ACCEPTABLE.
**BID #20-018B**  
**BYPASS TRAIL CONSTRUCTION FOR THE RIDGE TRAIL SYSTEM**

**PROPOSED SUBCONTRACTORS AND SUPPLIERS**

NOTE: If your company is the apparent low bidder, this list is to be delivered to the borough within 24 hours of request from the Purchasing Division. Put an ‘X’ or ‘√’ in the right columns indicating if the company is a sub-contractor or a supplier.

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SIGNATURE ___________________________ COMPANY NAME ___________________________ DATE ________________
LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That ____________________________ as Contractor, and __________________________, as Surety, are held and firmly bound unto Matanuska-Susitna Borough, Palmer, Alaska, hereinafter called OWNER in the sum of ___________________________ dollars, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said OWNER to perform all work required under the Bidding Schedule(s) __________.

NOW THEREFORE, if said Contractor, or subcontractors, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, said Surety will pay for the same in an amount not exceeding the sum specified above and, in the event suit is brought upon this bond, a reasonable attorney's fee to fixed by the court. This bond shall insure to the benefit of any persons, companies or corporation entitled to file claims under applicable State law.

Provided, that any alterations in the work to be done or the materials to be furnished, which may be made pursuant to the terms of said Contract, shall not in any way release either said Contractor or said Surety thereunder, nor shall any extensions of time granted under the provisions of said Contract release either said Contractor or said Surety, and notice of such alterations or extensions of the Contract is hereby waived by said Surety.

Signed, this ______________day of ______________________________, 2019.

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

(C Contractor)____________________

by: __________________________

(Signature)

__________________________

(Agent)____________________

by: __________________________

(Signature)

__________________________

(Surety)

by: __________________________

(Signature)

Address: __________________________

Address: __________________________

Telephone No. __________________________

Telephone No. __________________________

IMPORTANT: Surety Companies executing bonds must be authorized to transact business in the state of Alaska where this project is located. INDI V IDUAL SURETY BONDS ARE NOT ACCEPTABLE.
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

That ___________________________________________ as Contractor, and ___________________________________________ as Surety, are held and firmly bound unto Matanuska-Susitna Borough, Palmer, Alaska, hereinafter called OWNER in the sum of

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

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said OWNER to perform all work required under the Bidding Schedule(s) __________ of the Owner's specifications, entitled ________________________________.

NOW THEREFORE, if said Contractor shall perform all the requirements of said contract required to be performed on his part, at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

THE Surety hereby waives notice of any alteration or extension of time made by the Owner.

WHENEVER Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or
2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount previously paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

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 heirs, executors, administrators or successors of the Owner.

Signed, this ____________ day of ________________________________, 2019.

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

__________________________________________

(Contractor)

by: _______________________________________

(Signature)
(Agent)  
by: ___________________________  
(Signature)  

(Surety)  
by: ___________________________  
(Signature)

Address: ___________________________  

Address: ___________________________

Telephone No. ___________________________  
Telephone No. ___________________________

**IMPORTANT:** Surety Companies executing bonds must be authorized to transact business in the state of Alaska where this project is located. **INDIVIDUAL SURETY BONDS ARE NOT ACCEPTABLE.**
CONSENT OF
SURETY COMPANY
TO FINAL PAYMENT

PROJECT:
(name, address)

TO (Owner)

ARCHITECT'S
PROJECT NO:
CONTRACT FOR:

CONTRACTOR:

In accordance with the provisions of the Contract between the owner and the Contractor as indicated above, the

(here insert name and address of Surety Company)

, SURETY COMPANY,

on bond of (here insert name and address of Contractor)

, CONTRACTOR,

hereby approves the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to (here insert name and address of Owner)

, OWNER,

as set forth in the said Surety Company's bond.

IN WITNESS WHEREOF,
the Surety Company has hereunto set its hand this __________ day of __________________ 2019

________________________________________
Surety Company

Attest: ____________________________
(Seal)                                Signature of Authorized Representative

________________________________________
Title
CONTRACTOR'S RELEASE AND AFFIDAVIT OF PAYMENTS OF DEBTS AND CLAIMS

The undersigned, being first duly sworn deposes and says:

1. That pursuant to this contract for project __________________________ between the undersigned and the Matanuska-Susitna Borough dated ______________ the undersigned hereby certifies that, except as listed below, he has paid in full or has otherwise satisfied all obligations for materials and equipment furnished for all work, labor, and services performed and for all known indebtedness and claims for which the Contractor or the Matanuska-Susitna Borough is or may become liable in connection with performance under this contract. The Contractor warrants that he has made diligent search and inquiry to determine the existence of any such claim, debt or liability and that all such obligations, whether liquidated, unliquidated or disputed, have been satisfied.

2. The Contractor further certifies he did not extend any loan, gratuity, or gift of money of any form whatsoever to any employee or agent of the Borough, that he did not rent or purchase any equipment or materials from any employee of the Borough, nor to the best of his knowledge, from any agent of any employee of the Borough, and that he has not made any promise to an employee or agent of the Borough to do or undertake any such action after completion of the subject contract.

3. Pursuant to the above-described contract and in consideration of the final payment in the amount of $__________________________, the undersigned Contractor hereby remise, release and discharge the Matanuska-Susitna Borough, its officers, agents and employees of and from any and all further claim, debt, charge, demand, liability or other obligation whatsoever under or arising from said contract, whether known or unknown and whether or not ascertainable at the time of the execution of this instrument except specified claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the Contractor, as follows:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

The Contractor, in connection with the claims which are not released as set forth above, certifies that he has or agrees that he will comply with all the provisions of the said contract, including without limitation those provisions relating to notification of the contracting officer and relating to the prosecution of claims.

4. The Contractor shall indemnify, defend, and hold and save the Borough, its elected and appointed officers, agents and employees, harmless from any and all claims, demands, suits, or liability of any nature, kind or character, including costs, expenses, and attorney fees. The Contractor shall be responsible under this clause for any and all legal actions or claims of any character resulting from injuries, death, economic loss, damages, violation of statutes, ordinances, constitutions or other laws, rules or regulations, contractual claims, or any other kind of loss, tangible or sustained by any
person, or property arising from Contractor's or Contractor's Officers, agents, employees, partners, attorneys, suppliers, and subcontractor's performance or failure to perform this Agreement in any way whatsoever. This defense and indemnification responsibility includes claims alleging acts or omissions by the Borough or its agents which are said to have contributed to the losses, failure, violations, or damage. However, Contractor shall not be responsible for any damages or claim arising from the sole negligence or willful misconduct of the Borough, its agents, or employees.

If any portion of this clause is voided by law or court of competent jurisdiction, the remainder of the clause should remain enforceable.

IN WITNESS WHEREOF, this release and affidavit has been executed this ______ day of ______________________, 2019.

__________________________________________
(Contractor's signature)

Title________________________________________

SUBSCRIBED AND SWORN to before me this _____ day of ________________, 2019.

__________________________________________
Notary Public
My commission expires:_____________________

(Note: In case of a corporation, the attached Certificate of Authority must be completed by a corporate officer other than the one who signs above.)
CERTIFICATE OF AUTHORITY

I, _______________________________, certify that I am the
________________________________ (official title) of the corporation named as
Contractor in the foregoing release and affidavit; that ________________________________
who signed said release and affidavit on behalf of the Contractor was then
_________________________ (official title) of said corporation; that said release and
affidavit was duly signed for and in behalf of said corporation by authority of its governing
body and is within the scope of its corporate powers.

________________________________________
(Signature)

____________________________________
Notary Public for
My commission expires: ______________________
# (Number)

(Project)       (Date)

REFERENCE: (Drawing or Specification) __________________________________________________________

DESCRIPTION:

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(Source)

(Date)

RESPONSE:

___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

RESPONSE NEEDED BY: ______________________________

ACTION REQUIRED BY: ______________________________

RESOLUTION:

Notification must be given in accordance with the contract documents, if any architect/engineer response/description causes any change to contract documents.
NOTICE TO CONTRACTORS

Please visit the state of Alaska Department of Labor web site for the current and applicable published state documents at:

http://www.labor.state.ak.us/lss/lssforms.htm
## SECTION X
### ATTACHMENTS

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Introduction

Project Goals & Overview of Findings

Project Goals and Purpose

The Talkeetna Community Council, Inc. (TCCI) and its standing committee the Talkeetna Parks Advisory Committee (TPAC), with technical support from the Matanuska-Susitna Borough (“the Mat-Su Borough”), initiated a process for the Ridge Trail - Trail Development Plan in summer 2016. The project’s overall goal was to prepare a development plan for trails on Mat-Su Borough owned parcels in the Talkeetna Ridge Trail area. Goals that guided the planning process are below:

- The overarching goal: prepare a trail plan that provides a safe, high quality trail user experience.
- Work with the full community and a broad range of trail users to set objectives for trail improvements that reflect public sentiments and priorities.
- Document historical and current trail system use, easements, land ownership and plans, including user trends and impacts.
- Identify potential upgrades and enhancements to the trail system, including new loops or routes, upgrades to existing trails, and supporting infrastructure such as trail kiosks and parking.
- Secure a multi-use trail link through the project area to connect the trail system east of the project with downtown Talkeetna.
- Establish clear guidelines for ongoing trail management and maintenance, including allowable uses of trails and prescriptions so trails are sustainable.
- Establish a phased, prioritized implementation plan to carry out plan-identified trail improvements.
- Identify issues needing resolution related to but outside this Ridge Trail – Trail Development Plan, such as parking, access trails and the status of easements.
- Reclassify the Mat-Su Borough lands in the area of the trail system to support ongoing recreation use.
- Educate residents and visitors about the Talkeetna trail system and its use.

Summary of Plan Policies

In order to accomplish the project goals above, this plan does the following:

- Establishes a plan for the location, use and management of an improved, sustainable recreational trail system, including upgraded and rerouted existing trails and new loop trails. This improved Ridge Trail System is designed to accommodate various user groups, including:
  - A designated multi-use “pass-through” trail for winter snowmachines and summer all-terrain vehicle, dog sleds, and other non-motorized uses, along the south side of the project area (see Maps 7 and 8 for details).
  - An improved system of trails reserved for walking, skiing, biking, dog mushing and other forms of non-motorized recreation (see Maps 7 and 8 for details).
- Reclassification of portions of Mat-Su Borough land within the project area from “Resource Management + Reserve” to “Public Recreation.” The result reserves a portion of the project area for gravel extraction, with the majority of the area classified Public Recreation (see Map 3 for details).
- Identifies needed trail-related infrastructure improvements including wayfinding and signage and parking lot improvements.
- Sets out management and maintenance strategies to support appropriate trail use and a sustainable trail system.
- Recommends actions outside the project area, including, for example, a trail connecting the project area and downtown Talkeetna.
- Sets out a schedule of steps to implement this plan (Table 1: Classification Process and Table 5: Summary of Implementation Actions).
Map 1: Introduction to the Project Area

The Talkeetna Ridge Trail - Trail System (referred to as the “Ridge Trail System” throughout this plan) stretches out along the south side of the Talkeetna River. The majority of the existing 4.5 mile trail system is on Mat-Su Borough land.

Most of these trails were originally constructed in the early 1980s by local volunteers for cross-country skiing. Over the years, the trail system has been increasingly used by a more mixed user group, including dog mushers, hikers, ATVs, snow machines, ski-jorers and bikes. The area currently gets relatively limited cross-country skiing use. This shift is likely due in part to the creation of non-motorized, groomed Nordic ski trails in the Talkeetna Lakes Park area, and also to increases in motorized use that made the trails less inviting to non-motorized trail users.

The Ridge Trail System is located approximately one and a half miles northeast of downtown Talkeetna. One of the primary entry points to the area is on the west side, at the junction of the Old Lake Road and Beaver Road. Other entry points include:

- From the southeast, starting from the large cul-de-sac/informal parking area at the end of Comsat road.
- From the Talkeetna Bluffs trail, entering on the east.
- From the end of the Christiansen Lake Road via Old Lake Road – often starting from a parking area view spot, known locally as Rubber Neck Point.

Source: Google base map with annotations by Agnew::Beck
Most of the Ridge Trail System is located on Mat-Su Borough land

At this location the trail may cross onto private property and/or the public easement associated with the section line

Trail crosses onto State of Alaska land see Note 1

This trail section is located within a State of Alaska right-of-way, reserved for a possible future bridge crossing the Talkeetna River

Source: Mat-Su Borough base map with annotations by Agnew:Beck

Note 1: The Ridge Trail System crosses beyond the boundaries of Borough-owned land in the northeastern portion of the trail. The Alaska Department of Natural Resources 2011 Susitna-Matanuska Area Plan page 3-33 and Map 3-10 clarifies this land is intended for protection of water resources and dispersed recreation like trails.

Note 2: Specific boundary description: Township 26 North, Range 4 West, Seward Meridian.

Sections: (1) Section 16, Lot C1 and state lands north of C1 and south of the Talkeetna River. (2) Section 17, Lot D1. (3) Section 20, Lot A5. (4) Section 21, established public easements on private Lots B1 (end of Comsat Road, Alascom Land); B5 and unit 2.

Map 2: Project Area Land Ownership
Map 3: Project Area: Current Mat-Su Borough Classifications

The map below shows the current Mat-Su Borough land classifications across the two Borough parcels. The trail system overlaps lands classified in three categories: Public Recreation and the combined classification Resource Management + Reserve.

The three land classifications are defined as follows in the Mat-Su Borough code 23.05.100 Land Classifications:

(12) “Public Recreation Lands” are those lands which, because of location, physical features, or adjacent development, are presently or potentially valuable to the public as natural or developed recreational or historic areas.

(13) “Reserve Use Lands” are those lands which have been transferred, assigned, or designated for present or future public use, or for use by a government or quasi-government agency, or for future development of new town sites, or for future expansion of existing public uses.

(16) “Resource Management Lands” are lands which, because of surface or subsurface resources contained within the land or in connection with adjacent lands, are presently or potentially valuable for multiple-use management.

Source: Mat-Su Borough base map with annotations by Agnew::Beck
With the exception of a few wetland sections, the area has good soil and topographical conditions for building strong, durable trails.

The project area offers attractive terrain for trail construction and trail-based recreation use. The eastern two thirds of the site show its glacial history, with steep sided hills and ridges, kettles and small wetlands. Several of the higher ridgelines offer attractive views. Further west the land is relatively flat, showing this area has been part of the Talkeetna River floodplain.

Specific site characteristics, and the implications of these characteristics for trail construction are outlined on the following page.

This plan focuses on an identified set of “Ridge Trail System trails,” those shown in red on the map. Trails shown in black are part of the context for this project, but are not affected or directly addressed through this plan. There are some trails in the area not depicted on this map, including the undeveloped Talkeetna-Iron Creek Trail.
### Site Characteristics: Illustrative Photos

**Vegetation** in the area is typical South Central forest, with mature birch and spruce, and on the west side, cottonwood. Understory species include ferns, devil's club and berry species. The relatively limited understory allows for decent sight lines, which helps users see and avoid unexpected contact with wildlife or other users.

**Topography - West Side Flat area**: The entire western end of the project area is flat river floodplain, which poses a drainage problem for natural surface trails. It is generally underlain by well-drained, gravelly soil and has some micro-terrain that can be used to create a sustainable trail, but much of any trail constructed here will require gravel fill to be sustainable in heavier non-motorized traffic (>10 users/day).

**Topography - East Side Ridge Area**: The eastern two thirds of the project area is composed mostly of glacial features including till ridges. This area is very suitable for construction of sustainable, natural surface trails, with well-drained side slopes and durable tread material. Sloping terrain offers advantages for trail building, because the slopes allow for relatively convenient, low cost drainage solutions. In contrast, draining water from flat terrain often requires importing fill material.

**Accessibility**: Access to the project area typically comes from one of two locations: from the west, where there is an informal, 4-car dirt pulloff at the intersection of Old Lake and Beaver Roads (near the photo on left) or on the east side via the Comsat Road or Talkeetna Bluffs trail (near the photo at right). Neither area is a formally designated parking area, however the Comsat area is a large well used parking site.
Map 5: Existing Trails and Trail Conditions

The existing Ridge Trail System trails, shown at in red at right, include routes that generally follow ridgelines and avoid low-lying kettle areas. Ridgeline trails offer the benefit of generally good drainage, an appealing open feeling and some attractive views, but also mean portions of the trails are quite steep. In one area, multiple trails run in parallel.

Also shown on the map, in black, are trails that are not part of the formal Ridge Trail System. This includes the Slough Trail and the Talkeetna Bluffs trail, which, like the Comsat trail, is severely rutted. There are some trails in the area not depicted on this map, including the undeveloped Talkeetna-Iron Creek Trail (generally shown on state plats as RST-331). This historic trail is mostly south of the planning area and then heads northeast along the state ROW and continues northeast of the project area.
Summary of Trail Conditions and Problems with Current System

The current condition of the Ridge Trail System reflects the history of system’s design, construction and use. The original trails were formally surveyed and built locally using grant funding. While constructed with good intentions, they were not built to modern sustainable standards, and with no real strategy for maintenance and management. The trails were relatively narrow, intended for cross country skiing and other non-motorized uses, not built for ATV and dogsled traffic, and served the community well at low use levels. As motorized use has grown, and in the absence of any regular maintenance, some areas of the trail have been damaged and need remediation, re-routing or other improvements.

The condition of the existing trails – the original cross-country ski trails now widened & rutted by ATV use – is probably best characterized as fair to mixed, ranging from sections that are in good shape, to areas with notable problems. As the photos below and on the following pages show, ATV use has dug the trails into the ground, leaving multiple stretches that are rocky and eroded, or that fill with water. The trails that follow ridges generally do not show the extreme rutting and erosion often seen in unmanaged mixed use trails around the Mat-Su Borough, nor are there the large “go arounds” or trail braiding that develops where trails cross through wetlands. The exception to this general characterization is the severely rutted State right-of-way (ROW) trail that runs north out of the Comsat parking area, and links to the Talkeetna Bluffs trail.

Specific trail issues, including those referenced on the map on the preceding page, include:
- Rutting and muddy areas, and water filled holes in many locations in the system.
- Steep sections that are not well suited for mixed trail use, and where ATV traffic has resulted in rutting and erosion. Solving this problem requires re-routing to reduce the grade to 10% or less, with integrated drainage control. These types of improvements could provide greater safety, due to lower speeds and better traction, reduce erosion to a minimal amount, and offer a design allowing more users to safely enjoy the trail.
• Some areas are unsuitable or at minimum very challenging for dog teams due to steepness of terrain or sharp turns.
• Both the southern part of the State ROW trail just north of the Comsat site, and the Talkeetna Bluffs trail branching east are severely eroded, rutted and worn from the passage of ATVs and highway-sized 4x4 vehicles. No natural-surface trail can withstand this use over time without large scale repair and reconstruction, requiring gravel fill, culverts, etc.
• A few areas of the Ridge Trail System cross over small streams and wetland areas. One example is along the east west section of Old Lake Road; another is where the State ROW trail runs north of Comsat Road (see photo below). Bringing this route to a sustainable condition will likely require either a reroute or fill and one or more culverts.
• There is a possible need for a re-route or other solution for a segment of the existing Ridge Trail in the southern, central portion of the project area, where one short section may cross onto private property and the public easement associated with the section line.

In addition to these physical trail condition issues, it is important to note that the trails were not originally designed for ATV and dogsled traffic, and there are use conflicts between motorized and non-motorized users.
Other Uses in the Project Area (gravel extraction area)

Other than roads on existing easements and trails, the only developed use in the project area is an active gravel pit. Gravel is currently being extracted by a private contractor under a contract with the Matanuska-Susitna Borough, for use expanding the nearby Talkeetna airport. While the area is also available for gravel extraction by other commercial and non-commercial users, gravel extraction activity over the years has been relatively low. As the map and photo shows, this pit is a quite visible element of portions of project area.

The rectilinear lines show the boundaries of the area formally reserved by the Borough as available for gravel extraction. Current extraction is concentrated on the northeastern portion of this designated area, with gravel trucks using the Beaver Road for access.

Extraction within this area is subject to Borough requirements, for maximum slopes as well as other standards. As part of the revised classification boundaries established by this plan, this area will remain classified as Resource Management + Reserve (surrounding areas will be classified Public Recreation.)

Extraction of gravel from the active pit is expected to continue for many years into the future. Terms of the gravel extraction contract require leaving stable slopes, and other requirements as specified in Borough code. Once all the gravel is extracted, this area must be reclaimed per Borough requirements, and over time the area could go back to a more natural appearance.
Map 6: Talkeetna Ridge Trail - Trail System Context

This plan and the process leading to its completion focused on the Ridge Trail System; furthermore, this is a trail plan, not a land use plan or park plan. While not directly within the authority of this plan, it is important to consider external factors, use and access in the greater area in order to realize the plan’s objectives and realistically plan for the trail system’s future design, use and management.

This map shows some of these external considerations and recommendations that will affect use of the Ridge Trail System. The implementation section of this document lists specific recommendations related to the issues outlined here.

**Recommendation:** Improve the trail connection from downtown to the Ridge Trail System.

**Recommendation:** Beaver Road/Old Lake Road junction trailhead. This access point/trailhead – part of the Ridge Trail System – should be improved to provide for a few (approximately 6-10) cars.

**Recommendation:** Rubber Neck Point: The state and University should work together to better manage this current access point/trailhead to regulate unauthorized use including prohibiting illegal overnight parking.

**Recommendation:** Comsat parking area: this is used by private property owners in the Talkeetna Bluffs area and beyond, and is used informally by a wide range of users. The community needs to explore trailhead management options.

**Recommendation:** This route includes the Old Lake Road on the west, a section known as the RCA trail on the south, and the State Road ROW trail on the east. This route is reserved under State ADL 33023, and is a 60-foot public easement for most of its length (with a short stretch near Sphagnum Pond that is 100’ wide). This route is reserved for public use as a road or, as it is now, a rough road often used as a trail. While much of this route including the RCA trail is commonly used for recreational ATVs, dog mushers and other trail users, the route is not reserved for trail use; in the future it could be developed as a road and lost as a trail. One of the motivations for creating a multi-use/motorized trail as part of the Ridge Trail System is securing an east west route for the future.
## Trail User Group Descriptions and Trends

The table below and on the following page gives an overview of the use of the Ridge Trail System, sorted by summer and winter uses. Overall, use of the area is relatively light, primarily because of the degradation of trails caused by ATV use, and also because it is not large enough or sufficiently well known to attract out of town summer or winter use, and finally because nearby designated parks and open space areas offer well developed, attractive non-motorized trails.

<table>
<thead>
<tr>
<th>Use Type</th>
<th>Description, Location of Use</th>
<th>Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summer</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| ATVs                          | **Pass through “Commuters”**  
  - Backcountry cabin/property owners, especially in the Talkeetna Bluffs subdivision, but also people with property along the Talkeetna River, who use the trails as a pass-through route to get from east-to-west or vice versa. Most of this use follows the northern branch of the existing Ridge Trail System.  
  - Out-of-town recreational ATV users have a reputation with local residents for being “rowdy” including late night drinking and gunfire.  
  - Occasional use by commercial ATV users, although most of the commercial groups go farther north.  
  - Occasional, but quite limited, use by local residents for recreational riding.  
  - ATVs have been using the area for over thirty years. Use by ATVs and snowmachines has grown in recent years, primarily by out of town recreation users.  | Local residents, including residents of the Talkeetna Bluffs subdivision, say the trail route running west of the Comsat road – the “RCA trail” – is generally preferred as a commuter route, as it offers easier terrain. |
| Biking                        | **Some summer bike use, although many bikers opt to use other trails because a) there are more quality non-motorized trails in other locations such as Talkeetna Lakes Park, and b) users avoid areas open to motorized use due to trail damage (wet and muddy).**  
  - A fat tire bike race goes through the area in winter.  | Bike use has gone down.                                                                                                               |
| Dry Land Dog Mushing (often attached to ATVs) | **Dog teams pulling carts and ATVs in neutral (motorized power helps with hills).**  
  - Mushers use the Ridge Trail as part of a larger loop. The Ridge Trail System by itself is not a large enough area to be a significant mushing destination, but is a key connector to other local trails or to trails in the outlying areas.  | Dry land dog mushing use has remained stable.                                                                                      |
| Hiking/Walking                | **This category includes dog walkers and birders.**  
  - Some casual hunting in the fall, which includes spruce grouse, occasionally moose.  | Use has gone down for the same reasons referred to above for bikes.                                                                   |
<p>| Equestrian/Horseback Riding   | <strong>Some use in the summer.</strong>  | Horseback riding use in the area has remained stable.                                                                                 |</p>
<table>
<thead>
<tr>
<th>Use Type</th>
<th>Description, Location of Use</th>
<th>Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Winter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-Country Skiing</td>
<td>● Some skiers use the trail, although it is not groomed. At times snow machine use produces a better surface more appealing to skiers. The trail has sharp turns and steep hills that are difficult for novice skiers.</td>
<td></td>
</tr>
<tr>
<td>Dog Mushing</td>
<td>● Mushers use the Ridge Trail System as part of a larger trail system, including the RCA Trail.</td>
<td>Dog mushing use has remained stable.</td>
</tr>
<tr>
<td>Dog Walking and Ski-Joring</td>
<td>● Occasional use by local residents.</td>
<td>Dog walking and ski-joring use has increased.</td>
</tr>
<tr>
<td>Fat Tire Bikes</td>
<td>● Occasional use by local residents.</td>
<td>Fat tire biking has increased.</td>
</tr>
<tr>
<td>Snowmachines</td>
<td>● Minimal use as a destination for winter recreational use.</td>
<td>Snowmachining has remained stable.</td>
</tr>
<tr>
<td>Walking &amp; Snowshoeing</td>
<td>● Occasional use by local residents.</td>
<td>Walking and snowshoeing has remained stable.</td>
</tr>
</tbody>
</table>
Overview of Planning Process Leading to this Plan

The Talkeetna Community Council, Inc. (TCCI), the Talkeetna Parks Advisory Committee (TPAC), and the Talkeetna Ridge Trail – Trail Development Plan subcommittee oversaw development of this project, with input from the Talkeetna community and the Mat-Su Borough. The plan was developed with assistance from Agnew::Beck Consulting and Jon Underwood of Happy Trails. Project funding was provided by the Matanuska-Susitna Borough and the Mat-Su Trails and Parks Foundation.Outlined below is a summary of the steps followed in preparing this Trail Development Plan:

**September 2016**

- “Kick Off” meeting with TPAC Talkeetna Ridge Trail – Trail Development Plan sub-committee and Mat-Su Borough staff.
- Created a project flyer, conducted outreach and prepared for the October public workshop.
- Reviewed relevant community and regional planning documents, including the *Talkeetna Comprehensive Plan* (1999); the *Talkeetna Community/Tourism Plan* and *Talkeetna Special Use District (SPUD)* code (2002); State of Alaska’s *Susitna Matanuska Area Plan* (August 2011); *North to the Future: Alaska’s Statewide Comprehensive Outdoor Recreation Plan (SCORP)*; Mat-Su Trails and Parks Foundation *Trails and Parks Master Plan for the Mat-Su Area* (July 2013), and the following plans prepared by the Mat-Su Borough: the *Christiansen Lake – Lake Management Plan* (September 1999); *Talkeetna Lakes Management Plan*, (October 2003); *Talkeetna Riverfront Park Plan* (April 2004); and the *Mat-Su Borough Recreational trails plan* (2008).

**October 2016**

- Conducted a community-wide public scoping workshop.
- Met with TPAC members and motorized/non-motorized users to select an alternate “pass-through” multi-use route.

**November-December 2016**

- Met with the Mat-Su Borough staff to share emerging plan direction, discuss easements and land classifications.
- Developed the draft plan.

**January – February 2017**

- Released the public review draft plan on January 11th; invited community review, in person or by mail/email, through February 10, 2017.
- Scheduled and held a second community-wide public workshop on January 24th to share, review, discuss and confirm the draft Trail Development Plan and revised as needed.
- Collected and reviewed public comments. Overall, over 50 sets of comments were received; comments are available on the TCCI website.
- TPAC subcommittee members met to discuss final changes to the plan; Agnew::Beck incorporated final changes, reflecting public and MSB staff input.

**After February 2017**

- See Table 5 for additional phases, implementation information and next steps.
Plan Policy

Summary of Public Priorities and Vision

The bullet points below summarize the overall trail system goals and vision for the Talkeetna Ridge Trail - Trail Development Plan. This list comes from community input, previous planning documents, conversations with the Talkeetna Parks Advisory Committee and the Mat-Su Borough.

- Overarching goal – improve the Ridge Trail System to provide a high quality, sustainable, trail-focused recreational asset, offering safe, enjoyable and healthy outdoor recreation experiences for Talkeetna residents and visitors.
- Provide a multi-use “pass-through” east-west access route including winter snowmachine and summer ATV users.
- Create an improved non-motorized recreation trail system, serving a range of users.
- Protect environmental resources, wildlife habitat, and the natural character of the land.
- Contribute to a sustainable local economy.
- Design a sustainable trail system, where maintenance and management requirements take into account available resources, including volunteers and funding generated locally, from permitted commercial activities and events, and from the Mat-Su Borough.

Major Plan Policies and Actions

The remainder of the plan outlines the specific policies and actions needed to reach the goals outlined above. These include:

1. Establish a plan for the location, use and management of an improved, sustainable recreational trail system, including upgraded and rerouted existing trails and new trails. This improved Ridge Trail System must be designed to accommodate various user groups, including:
   a. A designated multi-use “pass-through” trail for winter snowmachines and summer all-terrain vehicles, dog mushing, and other non-motorized uses, along the south side of the project area.
   b. An improved system of trails reserved for walking, skiing, biking, dog mushing and other forms of non-motorized recreation. Motorized activity is allowed for grooming and maintenance.
2. Change the classification of Mat-Su Borough land within the project area from “Resource Management + Reserve” to “Public Recreation.” With the exception of the Borough’s reservation of the Gravel Pit area, the majority of the area should be classified Public Recreation.
3. Establish specific management and maintenance strategies needed to support appropriate trail use, and to ensure a sustainable trail system.
4. Specify trail-related infrastructure improvements including wayfinding guidance and signage, parking lot improvements.
5. Identify actions outside the project area, including, for example, a trail connecting the project area to downtown.
6. Establish a specific set of priorities for trail construction and phased implementation steps.
Adoption and Reclassification of Mat-Su Borough Lands

As shown in the Current Classifications map on Map 3, the parcels of Borough owned land that underlie the Ridge Trail System are classified either as “Resource Management + Reserve” (a dual classification) or “Public Recreation.” Trails within parcels that are currently classified as “Resource Management + Reserve” are not protected from disruption by new development, roads, resource extraction and other potentially conflicting uses or activities.

The management priority for lands within the Planning Area is public recreational trail use. Accordingly, all MSB lands within the planning area, with the exception of the Beaver Gravel Pit, will be classified as “Public Recreation.” The Beaver Gravel Pit is currently classified as “Resource Management + Reserve,” and will remain as such, defined by aliquot part boundaries, as shown on Map 5. It is anticipated the gravel pit will remain in that use for the foreseeable future, providing gravel for the airport, the local Road Service Area and community needs. Otherwise, the MSB lands within the planning area, subject to existing easements, will be classified as “Public Recreation.”

The reclassification order will be included in the same Assembly ordinance that provides for the adoption of the Plan itself. In addition, the Reclassification of Borough Land must follow Part 20 of Title 23, the Borough’s Land and Resource Management Division’s Policy and Procedure Manual.

Table 1 Adoption and Reclassification Process – Earliest Possible Dates

(see Table 5 for a full project approval & implementation schedule)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Who?</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talkeetna Parks Advisory Committee (TPAC) considers and votes to recommend approval of the Talkeetna Ridge Trail - Trail Development Plan to the Talkeetna Community Council Inc. (TCCI).</td>
<td>Lead: TPAC</td>
<td>Early Spring 2017</td>
</tr>
<tr>
<td>TCCI approves the Ridge Trail – Trail Development Plan.</td>
<td>Lead: TCCI</td>
<td>Early Spring 2017</td>
</tr>
<tr>
<td>The Ridge Trail – Trail Development Plan is approved by the Mat-Su Borough Parks, Recreation and Trails Advisory Board.</td>
<td>Lead: TCCI + Borough Staff</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>The Plan is introduced to the Mat-Su Borough Planning Commission at a regularly-scheduled meeting.</td>
<td>Lead: TCCI + Borough Staff</td>
<td>Spring 2017</td>
</tr>
<tr>
<td>Mat-Su Borough Planning Commission Hearing (held the 1st and 3rd Mondays).</td>
<td>Lead: Borough Staff, assisted by TPAC</td>
<td>Early Summer 2017</td>
</tr>
<tr>
<td>Mat-Su Borough Assembly Public Hearing (held the 1st and 3rd Tuesdays).</td>
<td>Lead: Borough Staff, assisted by TPAC</td>
<td>Early Summer 2017</td>
</tr>
</tbody>
</table>
Map 7 shows needed improvements to address deficiencies in the existing trails. Also approved by this plan – using a combination of existing, rerouted and loop trails – is a multi-use trail for summer ATV and winter snow machine use, as well as non-motorized uses connecting the Old Lake Road/Beaver Road to the current Talkeetna Bluffs trail.

This set of improvements will lead to a more durable, quality trail system, with improved drainage, appropriate grades, and separation of multi-use and non-motorized trail use.
Specific trail improvements called for in this plan include:

- Throughout the existing Ridge Trail System, muddy trail sections will require drainage and tread construction. Many places will require excavating and creating a raised grade for the tread, particularly in the lower-lying western portion of the project area.

- In the sections where re-routes are required, the trail will be laid out at the proper grade, with integrated water control, and the old trail reclaimed in locations shown.

- Reroute the existing trail near where it would otherwise cross the new multi-use trail (in the southern central portion of the project area). Re-routed trails may be reclaimed by using an excavator or similar machine to pull dead trees, stumps, and rocks into the trail, and roughen the trail tread by digging into it or by depositing soil on it. Leaves or other loose organic material, if available, can be blown into the reclaimed area with a leaf blower to cover and obscure the disturbance, allowing the affected area to return to a natural state.

- Link the eastern end of the recommended new multi-use trail to the multi-use State right-of-way (ROW) trail and the Talkeetna Bluffs motorized trail. The eastern end of Ridge Trail System multi-use/motorized trail would enter the State ROW a short distance north of the start of the Talkeetna Bluffs trail, and provide access to that State ROW trail. In addition, branching east off the new multi-use/motorized trail will be a new non-motorized trail, looping up the hill and then back around to the other portions of the Ridge Trail System (see Map 8). This set of improvements can all occur on well drained wooded terrain south of the creek/wetland area. This connection does not require a creek crossing (fill, culvert, etc.).

- The continuation of the State ROW trail north of the trail junctions mentioned immediately above (with the Ridge Trail System multi-use trail/Talkeetna Bluffs trail) would require a creek crossing and associated culverts and fill. This project is a very low priority relative to the other improvements called for in this plan, in large part because resources are limited, and there is no guarantee that improvements for a trail would not prove to be money poorly spent if/when this ROW ever builds out to become a road.

- See Table 2 on page 23 for details of allowed trail uses & trail management policies and Table 4 on page 28 for relative priorities of planned trail improvements.

**NOTE:** The re-routes and proposed new multi-use trail on map 7 have been ground-checked. However, at the time these routes are laid out and flagged for construction, more detailed on-site work will be used to precisely locate trails in response to specific on-the-ground conditions. As a result, the routes may shift from these initial alignments.
Map 8: Summary of Ridge Trail System Improvements

The Talkeetna Ridge area offers ample opportunity for construction of new trails. The terrain is interesting and the soil is mostly suitable. This plan offers a variety of potential new trails, mapped at right and described below.

A. The east-west multi-use trail will provide a pass-through route for summer ATV’s and winter snowmachine “commuters,” as well as for non-motorized trail users wanting to cross between points east and west. The trail will be wide enough for ATVs (including side-by-sides/double wides), and have wide turn radii so it is suitable for large dog teams. This trail may require gravel fill to traverse some low spots on the eastern end. Trail design and dimensions mean this route would provide a trail experience more utilitarian transportation than recreation.
The other existing, re-routed, and new trails will be designed, constructed and reserved for non-motorized use. Separating motorized and non-motorized use will increase safety, reduce user conflict and reduce erosion. New non-motorized trails will increase recreational options both for new users and many of the current users of the trail system. The new trails should be designed according to modern trail standards (Alaska State Park trail standards are included in the appendix), which ensure the trail will succeed physically, aesthetically, and socially. The non-motorized trails fall into four categories.

B. The existing trails will generally remain as they are, but with important drainage improvements, tread repair, and re-routing of certain segments. This will result in a coherent set of trails that are available for all kinds of non-motorized use, including dog mushing. However, they will still likely be challenging to dog mushers and may not be suitable for large teams.

C. (lower priority) The new trails in the hilly part of the project area will be designed to biking specifications, with narrower tread and tighter turns. These trails will provide an experience that is physically challenging but more intimate with the environment.

D. (lower priority) The potential new trails in the flat areas to the west will be wider, generally level, and designed with a more leisurely pace in mind. If built, these trails will require gravel fill to make a sustainable tread in many places, thus are more expensive to construct. These trails should be easy to walk, snowshoe, push a jogger stroller, or take a relaxing stroll with the family. Their location in the mature forest on the river bottomlands provides a good venue for bird watching, berry picking, and similar quiet activities.

Not shown on the map, but possibly important for the future: the multi-use State right-of-way (ROW) trail on the east side of the project area – as the name makes clear – follows the route of a ROW reserved for a possible future road and bridge over the Talkeetna River. Odds are good this costly project will not happen for many years. If and when that does occur, the intent of this plan is to accommodate a relocated route for this important existing trail.

While these trails are intended for non-motorized users, motorized activity will be allowed for grooming and maintenance; in addition, dog teams may use motorized equipment when needed during training. In general, local discretion and oversight is encouraged to define specific motorized allowances.

**NOTE:** The re-routes and proposed new multi-use trail on Map 8 have been ground-checked. However, at the time these routes are laid out and flagged for construction, more detailed on-site work will be used to precisely locate trails in response to specific on-the-ground conditions. As a result, the routes may shift from these initial alignments.
Overview of Trail Design, Use, Management

While a range of motorized and non-motorized users can share the same trail, experience shows the benefits of separating trails for motorized use from trails that are designed and managed for an array of non-motorized uses. A central goal of this plan is to accommodate a mix of trail users, and do so within a relatively small area. This strategy reflects respect for the traditional uses of the area, including motorized uses, and also the availability of other opportunities in the Talkeetna area and the upper Susitna Valley, for both motorized and non-motorized trail uses. The table below summarizes trail improvements; Appendix B provides a link to more detailed specs.

**Table 2 Trail Design and Use Objectives, Specifications at a Glance** (see Appendix B: Trail Management Objectives, for more detailed trail specs)

<table>
<thead>
<tr>
<th>Trail Type</th>
<th>Designed Use</th>
<th>Allowed Use (see two notes below)</th>
<th>Prohibited Use</th>
<th>Design Standard (see Appendix B)</th>
<th>Width</th>
<th>Entry Barrier Width</th>
<th>Minimum Turn Radius</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Multi-Use</td>
<td>ATV’s, snowmachines, dogsleds and other non-motorized uses</td>
<td>Motorized (including side-by-sides) and non-motorized use</td>
<td>Hwy size 4x4’s or other hwy vehicles, any motorized vehicle &gt; 5’6” wide</td>
<td>Alaska State Parks (ASP) ATV Trail Class 4</td>
<td>6-7 foot (ATV spec)</td>
<td>5 foot, 6 inch</td>
<td>30 ft (digsled spec)</td>
<td>Gravel &amp; Natural</td>
</tr>
<tr>
<td>B. Non-motorized, existing &amp; rerouted trails</td>
<td>Multi-use, non-motorized</td>
<td>All non-motorized including dogsleds, ski-jorers</td>
<td>All motorized; (see note 2)</td>
<td>ASP/Bike Trail Class 3-4</td>
<td>4 ft</td>
<td>4’ (48”) wide</td>
<td>15 ft</td>
<td>Natural</td>
</tr>
<tr>
<td>C. Non-motorized, new trails in hilly areas</td>
<td>Multi-use, non-motorized</td>
<td>All non-motorized including dogsleds, ski-jorers (see note 2)</td>
<td>All motorized (see note 2); equestrian use allowed, but with seasonal restrictions</td>
<td>ASP Bike Trail Class 3-4</td>
<td>4 ft</td>
<td>4’ (48”) wide</td>
<td>10 ft</td>
<td>Natural</td>
</tr>
<tr>
<td>D. Non-motorized, new trails in west side flat area</td>
<td>Non-motorized, easy strolling</td>
<td>Hiking, classic skiing, snowshoeing</td>
<td>All motorized; (see note 2) bikes, ski-joring dogsleds equestrian</td>
<td>ASP Hike Trail Class 4</td>
<td>4-6 ft (as desired)</td>
<td>4’ (48”) wide</td>
<td>10 ft</td>
<td>Gravel &amp; Natural</td>
</tr>
<tr>
<td>Not shown on map, Motorized, new trail, along State ROW</td>
<td>Option to replace existing trail if this builds out as a road</td>
<td>Motorized and non-motorized use</td>
<td>Hwy size 4x4’s, motorized vehicles &gt; 5’6” wide</td>
<td>ASP ATV Trail Class 4</td>
<td>6-7 ft (ATV spec)</td>
<td>5’6” wide</td>
<td>30 ft (digsled spec)</td>
<td>Gravel &amp; Natural</td>
</tr>
</tbody>
</table>

- **Note 1:** Type C trails - Dog mushing will not be a designed use, but is an allowed use on these existing/refurbished trails, including ski-joring. The design changes will accommodate a skilled musher with a well-trained team, because the redesigned trails will have increased turn radii and reduced grades, making them considerably more navigable for a musher than the current trails. However, these trails will not be modified to a full dog mushing specification, which would require a minimum 30-foot radius turn and minimum 4 to 5 foot tread width, which would increase costs and make the trails less attractive for other types of non-motorized use.
- **Note 2:** Types B, C, D trails - allow motorized groomers on non-motorized trails, timed to minimize potential conflicts with trail users.
**Trail-Related Infrastructure Needs**

Successful implementation of this plan will require a combination of the appropriate physical trail design, clear signage and other public information, and ongoing active management. Collectively, these actions can help meet the recreation, economic and environmental interests of local residents and businesses, as well as trail users from outside the area. The previous pages present the specifics of trail improvements; the remainder of this plan outlines other actions needed to sustain a successful trail system.

**Trailheads and Parking Needs**

New parking areas are expensive and offer both the benefit and potential problems that come with encouraging concentrated use at certain locations. As shown by end-of-road parking lots in the area, if not actively managed, parking areas can introduce unwanted uses such as illegal camping, fires and unlawful behavior.

There are two options for modest expansion of parking on the west side of the Ridge Trail System:

1) Small expansion of the existing informal pullout near the intersection of Old Lake Road and Beaver Road. The current pullout is located within the utility easement; ideally any expansion will occur outside of this easement, to provide space for approximately 6-10 cars. Any parking on the west side should include “No Overnight” and “No Trailer” signs.

2) Seasonal use of the gravel pit for winter parking, and/or reclaiming portions of the gravel pit extraction area for parking once Phase 1 of extraction is completed. This option would require developing funding strategies for management and maintenance for activities such as plowing and parking enforcement.

Instead of providing a larger area for parking on the west side, we recommend TCCI and TPAC work to improve an attractive trail from downtown to the Ridge Trail System, and continue to work on improved parking options and parking management in the downtown area. This strategy would have the benefit of providing the long-sought answer to the question often heard from downtown visitors, “Where can I go for a hike from downtown?” Avoiding construction of a larger new west side parking lot would also save on both capital and operations costs, and reduce the risk of creating an unregulated, attractive nuisance.

Two other informal parking areas currently serve the Ridge Trail System, serving a mix of motorized and non-motorized users – the area at the end of Comsat Road and the “Rubber Neck Point” area at the end of Christiansen Lake Road. The Comsat area has long been a well-used trailhead for motorized users heading north and east, including property owners in the Talkeetna Bluffs area and beyond, and has been improved by the Talkeetna Bluffs Homeowners Association. Both of the areas have evolved into illegal camping areas, with alleged periods of drinking, shooting and other rowdy behavior. Both feed motorized users into the Ridge Trail System. During this planning process residents initially recommended creating a new parking lot at the end of Comsat Road where the trail/right-of-way crosses onto Borough land, but the soil and topography in the area (silty soil, lots of water, steep slopes) are not conducive to a parking lot and the location would require a road extension; due to these barriers, we do not recommend a new parking lot on the east end of the Borough parcel at this time.

Discouraging misuse and illegal activity at these parking lots is outside the scope of this plan. Recommendations for these locations need to reflect the reality that neither the local community, nor the Borough, nor the State of Alaska can easily provide the oversight and law enforcement needed to address these types of issues. At the same time, experience in places like Sutton and the Jim Creek area show how unregulated shooting, camping and other “recreational” uses can grow into serious problems. Our recommendation:

- TCCI and TPAC should document use in these parking areas, e.g., with photos and journals.
• If the use of these parking areas continues to be a problem, we recommend the community, working with the Borough, call a meeting of affected landowners, including State DOT&PF, the University (for Rubber Neck Point) and other private land owners, and the State Troopers, to address and resolve the situation.

• Possible actions might include signage and patrols by the State Troopers to enforce closures to illegal camping and enforcement of firearm rules. Another option would be to establish a public camping area in the vicinity, where camping would be legal and managed, for example by the State working with a concessionaire.

**Signage and Other Trail Information**

Simple, strategically-placed signage at trailheads and trail intersections, backed up by website and or hardcopy maps, help increase enjoyment of trails, reduce the number of people who get lost, and can also promote safe and appropriate trail use. Specific requirements for signs and associated information are below.

• **Trailhead Signage:** Each trailhead needs a kiosk with a full trail system map. This kiosk should include the following:
  − Map with locations and names of trails (trails need names!) and of significant natural features that can function as landmarks.
  − A north arrow and map scale, with a note regarding approximate time to walk a named trail loop.
  − Clear indication of uses allowed and prohibited on the trail system. Experience with the original kiosks at the Talkeetna Lakes Park shows how not to communicate this information – those signs tended to be overlooked. Clear, direct messaging is best (more on this below). For the Ridge Trail System, the trail map signage should be color coded (like the maps in this plan) to distinguish trails open to different uses.
  − General notes regarding trail etiquette, for example: “Bikers, walkers, give way to dog teams and horses;” and “Go Slow! – this is a multi-use trail system, travel slowly so everyone has a safe, enjoyable trail experience.”
  − Clear indication regarding operation and ownership of the system: for example: “The Ridge Trail System is managed through a partnership between the Mat-Su Borough and the Talkeetna Community Council.”

• **You are Here:** Each of the two major Ridge Trail System trailheads should be named so that users can know where they are started and how to get back. So, for example, there needs to be a “You are at the Beaver Road Trailhead” sign at the west side entry to the Ridge Trail System. Visitors should be encouraged to take a phone photo of the map to have with them for reference.

• **Orientation Signage Inside the Trail System:** Experience in Talkeetna Lakes Park demonstrates that a good percentage of trail users need in-system trail signage. Efforts to improve signage used at the Talkeetna Lakes Park make clear the need to provide a system of simple reference signs within the Ridge Trail System, including trail names, a simple map with an arrow “to the XXX trailhead.” These can be simple signposts (vs. full kiosks) located at key trail intersections – the map on the following page shows conceptual locations.

• **Standardized Sign Appearance:** Use the same typefonts, colors and other design components used in other trails signs on Borough land around the Mat-Su; continuity trains the eye and mind, and can help create a sense of legal authority.

• **Motorized/Non-motorized Use:** Controlling the location of motorized use will likely be the primary management challenge for the Ridge Trail System, particularly as enforcement will be limited. The design of the trail system itself is
intended to separate these uses, but it will be critical to provide signs that make clear what uses are permitted and not permitted. Most people – not all – will follow rules that are presented clearly. Specific strategies include:

- Locate signs clearly communicating motorized use is not allowed wherever a non-motorized trail touches a motorized trail – *see conceptual locations on map.*
- Signs must clearly state uses allowed and prohibited. Adding a “human face” to the signs can help encourage people to follow the rules. For example, the signs on the bike trails in the Bend area refer to the trail user groups that developed and maintains the trails. One example is in the bottom right of the previous page, with a reference to “COTA” – the Central Oregon Trails Association. Other signs in the area (not pictured) included messages saying, in effect “thanks for staying on the designated motorized trails, this trail was built locally for non-motorized use.”

The hard reality is that while signs are necessary, and trail design is helpful, the most important strategies for managing motorized use will come from the ability to, even though difficult, enforce compliance with the rules (e.g., through fines) and by regular use by non-motorized users, who through their conspicuous presence help enforce the rules.

**Concepts for Potential Sign Locations**

- Potential locations for signposts with “You are here” map; prohibited uses, trail names, closest trailhead
- Potential locations for signposts with “You are here” map; trail names, closest trailhead (could also include prohibited uses)
- Potential locations for “Desire Line” barriers (see note below)

**Design Features to Discourage Motorized Use on Non-Motorized Trails**

Enforcement capabilities are limited, so it will be essential to find ways to keep trail users to stay on designated trails in other, more creative ways. Suggested techniques include:

- Discourage crossover to non-motorized trails by motorized users by trail placement that minimizes the overlap/intersection of motorized and non-motorized trails to. In addition, avoid placing new trailheads for non-motorized trails within easy sightlines from high traffic multi-use corridors.
- Add physical barriers such as boulders and bollards at trailheads that prevent users of a certain size from entering onto a trail; specifically
  - Place 5’6” wide barriers at the locations where highway-size 4x4’s might try to get on the multi-use trail; place 4’ wide barriers where the non-motorized trails branch off the multi-use trail (48” wide provides a reasonable easy line for snowmachines with loads, large dog teams, side-by-side ATVs, bikers, etc.).
  - Ensure screening vegetation remains robust, and if necessary add other natural barriers (e.g., downed trees, brush) at potential “desire points” where there is a narrow gap between a motorized route and an adjacent trail. The more western circle on the map above shows a location where the multi-use trail comes close to the non-motorized red trail; the more easterly circle shows where the multi-use trail comes close to where larger 4x4’s travel.
Implementation: Construction and Management of the Trail System

This final section of this plan presents policies regarding implementation and ongoing management of the trail system, including:

- Table 3: Estimated construction costs
- Table 4: Recommended sequencing of trail improvements
- Strategies for Ongoing Trail maintenance and Management
- Future Considerations - Recommendations Outside the Direct Scope of this Plan
- Table 5 Summary of Implementation Actions

Table 3 Trail and Trail Related Construction Costs

<table>
<thead>
<tr>
<th>Trail Type</th>
<th>Typical Cost Per Linear Foot</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Multi-Use/Motorized pass-through</td>
<td>$5-7/ft</td>
<td>$35,600-$50,000</td>
</tr>
<tr>
<td>B. Non-motorized, hilly areas – reroutes and improvements of existing</td>
<td>$5-7/ft</td>
<td>See Appendix A</td>
</tr>
<tr>
<td>trails</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. (no trail costs associated with action C – see table on following</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>page)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Non-motorized, hilly areas – new trails</td>
<td>$4-6/ft</td>
<td>See Appendix A</td>
</tr>
<tr>
<td>E. Non-motorized, west side flat areas</td>
<td>$7-15/ft (or less)</td>
<td>See Appendix A</td>
</tr>
<tr>
<td>Trail Crossings w/culverts</td>
<td>$7,000-$12,000 ea.</td>
<td></td>
</tr>
<tr>
<td>Signage Costs – general estimate</td>
<td>$10,000</td>
<td></td>
</tr>
<tr>
<td>Parking improvements – west side</td>
<td>$10,000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL COSTS</strong></td>
<td><strong>$250,000-$350,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

The table above shows considerations in estimating trail construction, and trail related costs. Team member Jon Underwood of Happy trails did an initial segment-by-segment cost estimate for developing the trail system described in this plan. Based on that initial analysis, the cost for the full system, excluding the fill and culverts for a stream/wetland crossing for the State right-of-way multi-use trail, ranges from $250,000-$350,000. The approximate breakdown of costs by trail segment can be found in Appendix A. Key variables affecting price include the as-built location and length of the trail system, the final in-field trail design process which takes into account highly specific site conditions, and the cost of materials and labor. An additional consideration affectng trail construction costs is the final level of work completed by the contractor vs. the role of trail user group and other volunteers. For example, the last step to pack down and smooth the single track bike trail system at Kincaid Park in Anchorage was done by groups of volunteers. Likewise, the presumption made for the west side parking area presumes limited costs for material, with some work done by community volunteers. In 2016, Mat-Su residents approved a Parks and Recreation Bond, which included $340,000 for trail improvements on the Talkeetna Ridge Trail System; this money will be useful as implementation moves forward.
<table>
<thead>
<tr>
<th>Label</th>
<th>Action</th>
<th>Notes on Implementation and Improvements: Trails and Related Infrastructure, Trail Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Clarify collaborative management, maintenance, “enforcement plans</strong>**</td>
</tr>
</tbody>
</table>
| A    | Multi-use: motorized and non-motorized |  – Construct ATV/ snowmachine/ dogsled pass-through multi-use route – a combination of existing trails, re-routes and new trail segments.  
  – Install signage and prepare other public information (e.g. website map) clarifying allowed and not allowed uses in the trail system.  
  – Install barriers at key locations to help manage trail use. |
| B    | Non-motorized, existing and rerouted trails | Construct upgrades and re-routes of current trails, close and reclaim old trail segments. Provide additional signage and community outreach to be clear these trails are designated for non-motorized use. |
|      | West side/town trail and improved parking* |  – As the initial trail system is improved, and word spreads about trail use options, demand for the trail system will increase. To respond, begin working soon on better information, routing and the trail surface for the “Town to Ridge System trail” (Note: this is a recommendation for a project that is outside the parameters of this current project).  
  – Expand or relocate the existing, small, informal west side parking area. |
| C    | Community meeting | Host a future community meeting, after the initial phase of trail design and construction is complete, to address the following items:  
  – Review and confirm designated trail uses and whether any modifications are necessary.  
  – Reconsider Trail Care agreement party; currently this is TCCI.  
  – Discuss the proposed green trails, including community need/interest in additional trails, location of new trails, designated uses, design widths and timing for implementation.  
  – Discuss parking lot/trail head needs, including how to manage parking areas such as Comsat and Rubber Neck Point, and if/how to accommodate demands for additional parking, and trail connections from downtown. |
| D    | Non-motorized, new trails in hilly areas | Pending outcomes of the ongoing monitoring of trail issues and trail use, including views from trail users at the community meeting mentioned above, consider constructing new non-motorized trails in the central/eastern hilly sections of the Ridge Trail System; provide internal signage at key intersections as the trail develops. Phase trails as follows:  
  1. The trail between the south arm of the existing (“red”) trail system and the State ROW trail.  
  2. The loop trail on the east/mountain side of the State ROW trail.  
  3. The small “connector trail” inside the north and south branches of the existing “red” trail. |
Pending outcomes of the ongoing monitoring of trail issues and trail use, including views from trail users at the community meeting mentioned above, construct new non-motorized trails in the western, flat area. Install related signage, including interpretive signs regarding trailside flora, fauna and natural history.

This is an optional future improvement, subject to funding constraints. In general, higher priority shall be placed on trail improvements outside of the State ROW, as any improvements inside the ROW could be lost in the future if this route ultimately is developed as a road.

* The necessity of these two tasks will need to respond to the level of use and use-related issues resulting from expansion of the trail system and public knowledge.

**Strategies for Ongoing Trail Management and Maintenance**

Active trail management will be needed to assure community and Borough plans for the trails will be realized, and so local and out of town users have a safe and enjoyable trail experience. Management strategies are outlined below:

- **Clarify Responsibility for Managing Trail Use and Improvement**
  - The Mat-Su Borough as the land owner has ultimate responsibility for this land; however, the Borough has minimal capacity for active, regular land management. Consequently, management will be limited, and to a degree the area is managed, will depend on a partnership between the Borough, the Talkeetna Community Council, Inc. and the associated Talkeetna Parks Advisory Committee, and local trail organizations. Together this team will aim to do the following:
    - Track progress and work together on plan implementation and trail construction.
    - Discuss issues and strategies regarding trail management, and clarify arrangements for ongoing trail maintenance. Options for trail maintenance include a combination of local volunteers, possible future trail user/parking fees, and partnerships with groups like the Upper Susitna Soil and Water Conservation District and the affiliated Youth Conservation Corp, as has worked for the Talkeetna Lakes Park.
    - On a continuing basis, strive to provide good information about trail use rules established by this plan, including trail signage and other information.
    - Cooperate in decisions on issuance of any commercial use permits or approvals for activities (see more below).
    - Update this plan in the future plan as needed.

- **Community/User-Based Fundraising**
  - As has happened in the past for other Borough trail systems and parks, local volunteer efforts and local fundraising will continue to be one important source of funds for projects to maintain and improve the trail system. Examples include bike or ski races that generate funds for trail improvements, or local trail maintenance work groups.

- **Commercial and Event Permitting Guidelines**
  - Commercial trail use permits may be authorized for use of the trail system. In general, it is anticipated that relatively limited commercial activities will happen on this trail system; the overall goal for this system is to provide opportunities for non-commercial recreation activities. The Borough has ultimate decision-making authority over commercial permits, although they typically consult with TCCI prior to approving new permits.
    - Broad objectives for approving commercial trail use permitting should include:
      - Maintaining the physical quality of the trail system, and not unduly degrade the physical condition of the trails or the quality of the experience of other trail users.
- Clear evidence that the applicant will comply with the permit guidelines.
  - Firm commitment by the permittee to make in kind donations of labor, materials, etc.
  - Limitations on the duration of the approved permit such that performance can be evaluated as a consideration in continued use.

- In addition, this plan recommends the Borough considers the following factors related to the review and approval process for commercial permits on the Ridge Trail System:
  - Commercial use should be allowed by commercial trail use permit only.
  - Set a cap on permits (competitive permits): two motorized and two non-motorized permits.
  - Include type of use, frequency of use, seasonality of use and group size in the permit application.
  - There should be a public notice and comment process for reviewing and approving commercial use permits.
  - The Talkeetna Community Council Inc. should be notified when a new permit application is received.

- The trail system should be available for one time use or special events such as the Oosik ski race. The Borough and TCCI should collaborate to review and authorize these types of events, to potentially include developing a special event permitting process.

- Enforcing Rules on Allowed/Not Allowed Trail Use
  - The plan outlines a suite of policies to effectively separate motorized and non-motorized trail use. The Borough, TCCI/TPAC and local user groups need to work together, with limited resources, to see these rules are followed (see more on this topic under signage, pages 25-26).
  - Retain the option to close trails during to certain uses for certain time periods, e.g. closures during breakup to specific or all user groups.
Recommendations Outside the Direct Scope of this Plan - Future Considerations

This section includes a list of recommendations related to plan implementation, but outside of the direct purview of this planning process. Map 6 provides additional information on this topic.

- A trail route should be secured and improved linking the Ridge Trail System to downtown Talkeetna. This can provide one response to the long needed interest in a walking trail connected directly to downtown, and reduce the need for parking on the west side of the Ridge Trail area.

- The northeastern corner of the Ridge Trail System leaves Borough land and loops onto land held by the State of Alaska. The DNR Susitna Matanuska Area Plan calls for this specific area to be used for watershed protection and dispersed recreation to be managed in a manner consistent with the Talkeetna River State Recreation Area. We encourage the State of Alaska Department of Natural Resources to explicitly reserve/protect the Ridge Trail segment passing through this area with a trail easement.

- The community and Mat-Su Borough should work together to determine the precise land status of the well-used route running from the Comsat parking lot up to Borough land on the south boundary of the planning area. The State should provide an adjoining new trail or a bridge/tunnel to access the existing trails if a road is ever constructed along the right-of-way.

- Investigate options for a re-route of the Talkeetna Bluffs Trail (also known as the Larson Creek Trail). This trail is not well designed or well located, and continues to erode and deteriorate.

- Improve the management of the growing illegal summer tent camping at both the Comsat and “Rubber Neck Point” parking areas (see notes on this topic on page 24). In responding to this issue, consider trends in expected future/long term parking and access demands and needs, especially for landowners along the Talkeetna River, Larsen Lake, Bald Mountain, Talkeetna Bluffs and other residential developments around the project area.
Table 5 Summary of Implementation Actions

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Who?</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local &amp; Borough Plan Approval – Including reclassification</strong></td>
<td>Complete this trails plan, including clear policies on all major trail issues, including motorized/non-motorized trails; permitted commercial and special uses, trail management and maintenance responsibilities: Complete the formal Mat-Su Borough land reclassification process concurrently with plan approval.</td>
<td>Lead: MSB with TCCI</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Formalize details of range plan-identified trail management agreements and strategies, including enforcement, maintenance, permitting, repairs, etc.</td>
<td>Lead: TPAC/TCC &amp; MSB</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>Borough prepares request for bids/proposals from contractors to improve trail system, using the Talkeetna Ridge Trail - Trail Development Plan as a reference, and selects a contractor, approves a contract and schedule; and commences construction process.</td>
<td>Lead: MSB</td>
</tr>
<tr>
<td><strong>Trail Information</strong></td>
<td>As multi-use trail moves towards completion, identify and install signage for wayfinding and to support new use guidelines; carry out info program &amp; share revised user map with residents, local trail user groups and commercial guiding operations (if relevant)</td>
<td>Lead: MSB/TCC</td>
</tr>
<tr>
<td><strong>Other Priorities</strong> – Work with the University, Troopers, MSB to better manage Rubber Neck Point and Comsat parking areas and/or process for upgrading/improving parking at the Comsat Road informal trailhead.</td>
<td>Lead: TCC</td>
<td>Ongoing</td>
</tr>
<tr>
<td><strong>Other Priorities</strong> – Prioritize new trail upgrades and improvements linking to the Ridge Trail System, in particular the trail connecting from downtown</td>
<td>Lead: TPAC/TCC</td>
<td>Ongoing</td>
</tr>
<tr>
<td><strong>Fundraising</strong> – Continue to raise funds, locally and at the borough level, to support ongoing trail maintenance and management, and expansion and completion of the trails identified in this plan.</td>
<td>Lead: TPAC/TCC</td>
<td>Ongoing</td>
</tr>
<tr>
<td><strong>Update Plan</strong> – Track progress on plan implementation and update the plan as-needed.</td>
<td>Lead: MSB</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
Appendices

A. Trail Cost Estimates by Segment

B. Trail Management Objectives and Guidelines
Appendix A: Estimated Trail Costs by Segment

All trail lines are conceptual only, so cost estimates are approximate. Estimates are based on previous trail construction contracts performed by Happy Trails, Inc., with similar layout, clearing, excavation and finishing requirements. It is assumed that trail construction will be performed with mini-mechanized equipment.

<table>
<thead>
<tr>
<th>Trail Segment</th>
<th>Location on map</th>
<th>Feet</th>
<th>Price/ft, low</th>
<th>Price/ft, hi</th>
<th>Total, low</th>
<th>Total, hi</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRT7</td>
<td>West</td>
<td>1498</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$5,992</td>
<td>$8,988</td>
</tr>
<tr>
<td>RRT10</td>
<td>West</td>
<td>97</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$388</td>
<td>$582</td>
</tr>
<tr>
<td>RRT11</td>
<td>West</td>
<td>188</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$752</td>
<td>$1,128</td>
</tr>
<tr>
<td>East Flat*</td>
<td>West</td>
<td>4699</td>
<td>$7.00</td>
<td>$15.00</td>
<td>$32,893</td>
<td>$70,485</td>
</tr>
<tr>
<td>West Flat*</td>
<td>West</td>
<td>4488</td>
<td>$7.00</td>
<td>$15.00</td>
<td>$31,416</td>
<td>$67,320</td>
</tr>
<tr>
<td>11 ATV So.</td>
<td>Center</td>
<td>7128</td>
<td>$5.00</td>
<td>$7.00</td>
<td>$35,640</td>
<td>$49,896</td>
</tr>
<tr>
<td>RRT3</td>
<td>Center</td>
<td>1089</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$4,356</td>
<td>$6,534</td>
</tr>
<tr>
<td>RRT4</td>
<td>Center</td>
<td>1093</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$4,372</td>
<td>$6,558</td>
</tr>
<tr>
<td>RRT5</td>
<td>Center</td>
<td>1835</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$7,340</td>
<td>$11,010</td>
</tr>
<tr>
<td>RRT5.5</td>
<td>Center</td>
<td>465</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$1,860</td>
<td>$2,790</td>
</tr>
<tr>
<td>RRT6</td>
<td>Center</td>
<td>696</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$2,784</td>
<td>$4,176</td>
</tr>
<tr>
<td>RRT9</td>
<td>Center</td>
<td>586</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$2,344</td>
<td>$3,516</td>
</tr>
<tr>
<td>RRT12</td>
<td>Center</td>
<td>2018</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$8,072</td>
<td>$12,108</td>
</tr>
<tr>
<td>16 NM</td>
<td>Center</td>
<td>1570</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$6,280</td>
<td>$9,420</td>
</tr>
<tr>
<td>13 NM</td>
<td>East</td>
<td>7709</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$30,836</td>
<td>$46,254</td>
</tr>
<tr>
<td>14 NM</td>
<td>East</td>
<td>6547</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$26,188</td>
<td>$39,282</td>
</tr>
<tr>
<td>15 NM</td>
<td>East</td>
<td>306</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$1,224</td>
<td>$1,836</td>
</tr>
</tbody>
</table>

**TOTAL:** $202,737 $341,883
**Trail Segment Cost Estimates - West**

NOTE: All trail lines are conceptual only, so estimated costs are approximate.

<table>
<thead>
<tr>
<th>Trail</th>
<th>Feet</th>
<th>Price/ft, low</th>
<th>Price/ft, hi</th>
<th>Total, low</th>
<th>Total, hi</th>
</tr>
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<td>$7.00</td>
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<td>$31,416</td>
<td>$67,320</td>
</tr>
</tbody>
</table>

*price extremely dependent upon gravel source proximity*
**Trail Segment Cost Estimates - Center**

NOTE: All trail lines are conceptual only, so estimated costs are approximate.

<table>
<thead>
<tr>
<th>Trail</th>
<th>Feet</th>
<th>Price/ft, low</th>
<th>Price/ft, hi</th>
<th>Total, low</th>
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</tr>
</thead>
<tbody>
<tr>
<td>11 ATV So.</td>
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<tr>
<td>RRT12</td>
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<tr>
<td>16 NM</td>
<td>1570</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$6,280</td>
<td>$9,420</td>
</tr>
</tbody>
</table>
**Trail Segment Cost Estimates – East**

NOTE: All trail lines are conceptual only, so estimated costs are approximate.

<table>
<thead>
<tr>
<th>Trail</th>
<th>Feet</th>
<th>Price/ft, low</th>
<th>Price/ft, hi</th>
<th>Total, low</th>
<th>Total, hi</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 NM</td>
<td>7709</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$30,836</td>
<td>$46,254</td>
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<tr>
<td>14 NM</td>
<td>6547</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$26,188</td>
<td>$39,282</td>
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<td>15 NM</td>
<td>306</td>
<td>$4.00</td>
<td>$6.00</td>
<td>$1,224</td>
<td>$1,836</td>
</tr>
</tbody>
</table>

Right-of-way (ROW) re-route costs (North ROW RRT and South ROW RRT) are not defined at this time; costs will depend on specific routing, and the cost of establishing culverts to manage stream crossings, which can cost between $7,000 and $12,000.
### Appendix B: Trail Management Objectives and Guidelines

#### General Trail Management Classes from the Alaska State Parks Trail Management Handbook
(adapted from USFS TRACS Trail Classes)

<table>
<thead>
<tr>
<th>Trail Attributes</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimal / Undeveloped Trail</td>
<td>Simple / Minor Development Trail</td>
<td>Developed / Improved Trail</td>
<td>Highly Developed Trail</td>
<td>Fully Developed Trail</td>
</tr>
<tr>
<td><strong>General Criteria</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Characteristics to be Applied to all State Park Trails</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tread and Traffic Flow</strong></td>
<td>Tread intermittent and often indistinct</td>
<td>Tread discernible and continuous, but narrow and rough</td>
<td>Tread obvious and continuous</td>
<td>Treadwise and relatively smooth with few lugs, ripples</td>
<td>Width generally accommodates two-lane and two-directional travel, or provides frequent passing turnouts</td>
</tr>
<tr>
<td></td>
<td>May require route finding</td>
<td>Few or no allowances constructed for passing</td>
<td>Width accommodates unhindered one-lane travel, occasional allowances constructed for passing</td>
<td>Width may consistently accommodate two-lane travel</td>
<td>Commonly hardened with asphalt or other imported material</td>
</tr>
<tr>
<td></td>
<td>Native materials only</td>
<td>Native materials</td>
<td>Typically native materials</td>
<td>Native or imported materials</td>
<td>May be hardened</td>
</tr>
<tr>
<td><strong>Obstacles</strong></td>
<td>Obstacles common</td>
<td>Obstacles occasionally present</td>
<td>Obstacles infrequent</td>
<td>Few or no obstacles exist</td>
<td>No obstacles</td>
</tr>
<tr>
<td></td>
<td>Narrow passages, brush, steep grades, rocks and logs present</td>
<td>Blockages cleared to define route and protect resources</td>
<td>Vegetation cleared outside of trailway</td>
<td>Grades typically &lt;1%</td>
<td>Grades typically &lt;0%</td>
</tr>
<tr>
<td><strong>Constructed Features and Trail Elements</strong></td>
<td>Minimal to non-existent</td>
<td>Structures are of limited size, scale, and number</td>
<td>Trail structures (walls, steps, drainage, raised trail) may be common and substantial</td>
<td>Structures frequent and substantial</td>
<td>Structures frequent or continuous, may include curbs, guardrails, trailside amenities, and boardwalks</td>
</tr>
<tr>
<td></td>
<td>Drainage is functional</td>
<td>Drainage functional</td>
<td>Trail bridges as needed for resource protection and appropriate access</td>
<td>Substantial trail bridges are appropriate at water crossings</td>
<td>Drainage structures frequent; may include culverts and road-like designs</td>
</tr>
<tr>
<td></td>
<td>No constructed bridges or foot crossings</td>
<td>Structures adequate to protect trail infrastructure and resources</td>
<td>Generally native materials used</td>
<td>Trailside amenities may be present</td>
<td></td>
</tr>
<tr>
<td><strong>Signs</strong></td>
<td>Minimum required</td>
<td>Minimum required for basic direction</td>
<td>Regulation, resource protection, user reassurance</td>
<td>Wide variety of signs likely present</td>
<td>Wide variety of signage is present</td>
</tr>
<tr>
<td></td>
<td>Generally limited to regulation and resource protection</td>
<td>Generally limited to regulation and resource protection</td>
<td>Directional signs at junctions, or when confusion is likely</td>
<td>Informational signs likely</td>
<td>Information and interpretive signs likely</td>
</tr>
<tr>
<td></td>
<td>No destination signs present</td>
<td>Typically very few or no destination signs present</td>
<td>Informational and interpretive signs may be present</td>
<td>Interpretive signs possible</td>
<td></td>
</tr>
<tr>
<td>Trail Attributes</td>
<td>Trail Class 1</td>
<td>Trail Class 2</td>
<td>Trail Class 3</td>
<td>Trail Class 4</td>
<td>Trail Class 5</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Minimal / Undeveloped Trail</td>
<td>Simple / Minor Development Trail</td>
<td>Developed / Improved Trail</td>
<td>Highly Developed Trail</td>
<td>Fully Developed Trail</td>
</tr>
<tr>
<td><strong>Typical Recreation Environ and Experience</strong></td>
<td>• Natural, unmodified</td>
<td>• Natural, essentially unmodified</td>
<td>• Natural, primarily unmodified</td>
<td>• May be modified</td>
<td>• Can be highly modified</td>
</tr>
<tr>
<td></td>
<td>• Primitive setting</td>
<td>• Primitive to Semi-Primitive</td>
<td>• Semi-primitive to roaded natural setting</td>
<td>• Typically roaded natural setting</td>
<td>• Typically rural to urban setting</td>
</tr>
<tr>
<td></td>
<td>• Some travel modes may be impractical/impossible</td>
<td>• Transition</td>
<td>• Transition</td>
<td>• Commonly associated with Visitor Centers or high-use recreation sites</td>
<td></td>
</tr>
<tr>
<td><strong>Trail Management</strong></td>
<td>• Low level use</td>
<td>• Low to moderate use levels</td>
<td>• Moderate to heavy use</td>
<td>• Very heavy use</td>
<td>• Intensive use</td>
</tr>
<tr>
<td>Typically managed to accommodate</td>
<td>• Highly skilled users comfortable off trail</td>
<td>• Mid-to-highly skilled users, capable of traveling over awkward conditions/obstacles</td>
<td>• Users w/ intermediate skill level and experience</td>
<td>• Users w/ minimal skills and experience</td>
<td>• Users w/ limited trail skills and experience</td>
</tr>
<tr>
<td></td>
<td>• Users w/ high level orienteering skills</td>
<td>• Users w/ moderate orienteering skill</td>
<td>• Users w/ minimal orienteering skills</td>
<td>• Users w/ minimal to no orienteering skills</td>
<td>• Trail typically meets agency requirements for accessibility</td>
</tr>
<tr>
<td></td>
<td>• Some travel modes and ability levels may be impractical/impossible</td>
<td>• Trails suitable for many user types but challenging and involves advanced skills</td>
<td>• Moderately easy travel by managed use types</td>
<td>• Easy/comfortable travel by managed use types</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Water trail users require high level of navigation/orientation and paddling skills</td>
<td>• Water trails: moderate to high level of navigation/orientation and paddling/piloting skills required</td>
<td>• Water trails: basic to moderate navigation and paddling/piloting skills required</td>
<td>• Water trails: basic to moderate navigation and paddling/piloting skills required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Water trails: moderate to high level of navigation/orientation and paddling/piloting skills required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Criteria**

Physical Characteristics to be Applied to all State Park Trails

- Natural, unmodified
- Natural, essentially unmodified
- Natural, primarily unmodified
- Semi-primitive to roaded natural setting
- May be modified
- Typically roaded natural setting
- Transition
- Transition
- Can be highly modified
- Typically rural to urban setting
- Commonly associated with Visitor Centers or high-use recreation sites
<table>
<thead>
<tr>
<th><strong>Trail Attributes</strong></th>
<th><strong>Trail Class 1</strong></th>
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</tr>
</tbody>
</table>

**General Criteria**

Physical Characteristics to be Applied to all State Park Trails

**Maintenance Indicators and Intensity**

- Resource protection or safety commensurate with targeted recreational experience
- Infrequent or no scheduled maintenance, usually in response to reports of unusual resource problems requiring repair
- Typically not managed for Pack and Saddle and Motorized Trails

**Additional Criteria**

- Typically not managed for Pack and Saddle and Motorized trails.

- User convenience
- Resource protection or safety commensurate with targeted recreational experience
- Trail cleared to make available for use early in use season and to preserve trail integrity
- Maintenance typically performed at least annually

- User comfort and ease
- Resource protection or safety commensurate with targeted recreational experience
- Trail cleared to make available for use at earliest opportunity in use season
- Maintenance typically performed at least annually

- User comfort and ease
- Targeted high level of accessibility to key recreational opportunities
- Safety commensurate with targeted recreational experience
- Maintenance performed at least annually or as needed to meet posted conditions, major damage or safety concerns typically corrected or posted within 24 hours of notice
- Not managed for Pack and Saddle stock, or motorized use

- Not managed for Pack and Saddle stock, watercraft, or motorized use.
Specific USDA Forest Service Design Parameters: Hiker/Pedestrian

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

<table>
<thead>
<tr>
<th>Designed Use HIKER/PEDESTRIAN</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Tread Width</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilderness (Single Lane)</td>
<td>0” – 12”</td>
<td>6” – 18”</td>
<td>12” – 24”</td>
<td>18” – 24”</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Non-Wilderness (Single Lane)</td>
<td>0” – 12”</td>
<td>6” – 18”</td>
<td>18” – 36”</td>
<td>24” – 60”</td>
<td>36” – 72”</td>
</tr>
<tr>
<td>Non-Wilderness (Double Lane)</td>
<td>36”</td>
<td>36”</td>
<td>36” – 60”</td>
<td>48” – 72”</td>
<td>72” – 120”</td>
</tr>
<tr>
<td>Structures (Minimum Width)</td>
<td>18”</td>
<td>18”</td>
<td>18”</td>
<td>36”</td>
<td>36”</td>
</tr>
<tr>
<td><strong>Design Surface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Native, ungraded</td>
<td>Native, limited grading</td>
<td>Native with some onsite borrow or imported material where needed for stabilization, occasional grading Intermittently rough</td>
<td>Native with improved sections of borrow or imported material, routine grading Minor roughness</td>
<td>Likely imported material, routine grading Uniform, firm, and stable</td>
</tr>
<tr>
<td>Protrusions</td>
<td>≤ 24”</td>
<td>≤ 6”</td>
<td>≤ 3”</td>
<td>≤ 3”</td>
<td>No protrusions</td>
</tr>
<tr>
<td>Obstacles (Maximum Height)</td>
<td>24”</td>
<td>14”</td>
<td>10”</td>
<td>8”</td>
<td>No obstacles</td>
</tr>
</tbody>
</table>
### Designed Use

**HIKER/PEDESTRIAN**

<table>
<thead>
<tr>
<th>Design Grade</th>
<th>Target Grade</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Pitch Maximum</td>
<td>40%</td>
<td>5% – 18%</td>
<td>35%</td>
<td>25%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Maximum Pitch Density</td>
<td>20% – 40% of trail</td>
<td>20% – 30% of trail</td>
<td>10% – 20% of trail</td>
<td>5% – 20% of trail</td>
<td>0% – 5% of trail</td>
<td></td>
</tr>
</tbody>
</table>

**Design Cross Slope**

<table>
<thead>
<tr>
<th>Target Cross Slope</th>
<th>Natural side slope</th>
<th>5% – 20%</th>
<th>5% – 10%</th>
<th>3% – 7%</th>
<th>2% – 3% (or crowned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Cross Slope</td>
<td>Natural side slope</td>
<td>25%</td>
<td>15%</td>
<td>10%</td>
<td>3%</td>
</tr>
</tbody>
</table>

**Design Clearing**

<table>
<thead>
<tr>
<th>Height</th>
<th>6’</th>
<th>6’ – 7’</th>
<th>7’ – 8’</th>
<th>8’ – 10’</th>
<th>8’ – 10’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>≥ 24” Some vegetation may encroach into clearing area</td>
<td>24” – 48” Some light vegetation may encroach into clearing area</td>
<td>36” – 60”</td>
<td>48” – 72”</td>
<td>60” – 72”</td>
</tr>
<tr>
<td>Shoulder Clearance</td>
<td>3’ – 6’</td>
<td>6’ – 12’</td>
<td>12’ – 18’</td>
<td>12’ – 18’</td>
<td>12’ – 24’</td>
</tr>
</tbody>
</table>

**Design Turn**

| Radius | No minimum | 2’ – 3’ | 3’ – 6’ | 4’ – 8’ | 6’ – 8’ |

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1. For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

2. Trail Classes 3, 4, and 5, in particular, have the potential to provide accessible passage. If assessing or designing trails for accessibility, refer to the Forest Service Trail Accessibility Guidelines (FSTAG) for more specific technical provisions and tolerances (FSM 2350).

3. The determination of trail-specific design grades, design surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Updated October 16, 2008
Specific USDA Forest Service Design Parameters: Bicycle

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

<table>
<thead>
<tr>
<th>Designed Use</th>
<th>BICYCLE</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Tread Width</strong></td>
<td>Single Lane</td>
<td>6” – 12”</td>
<td>12” – 24”</td>
<td>18” – 36”</td>
<td>24” – 48”</td>
<td>36” – 60”</td>
</tr>
<tr>
<td></td>
<td>Double Lane</td>
<td>36” – 48”</td>
<td>36” – 48”</td>
<td>36” – 48”</td>
<td>48” – 84”</td>
<td>72” – 120”</td>
</tr>
<tr>
<td><strong>Structures</strong></td>
<td>18”</td>
<td>18”</td>
<td>36”</td>
<td>48”</td>
<td>60”</td>
<td></td>
</tr>
</tbody>
</table>

| **Design Surface** | Type | Native, un-graded | Native, limited grading | Native with some onsite borrow or imported material where needed for stabilization, occasional grading | Native, routine grading with improved sections of borrow or imported materials | Likely imported material, routine grading |
| | Native, un-graded | Native, limited grading | Native with some onsite borrow or imported material where needed for stabilization, occasional grading | Native, routine grading with improved sections of borrow or imported materials | Likely imported material, routine grading |
| | May be continuously rough | May be continuously rough | Intermittently rough | Stabilized, minor roughness | Uniform, firm, and stable |
| | Sections of soft or unstable tread on grades < 5% may be common and continuous | Sections of soft or unstable tread on grades < 5% may be common | Sections of soft or unstable tread on grades < 5% may be common, but not common | Sections of soft or unstable tread on grades < 5% may be present, but not common | Stable with minor roughness |
| | | | | | |
| **Protrusions** | ≤ 24” | ≤ 6” | ≤ 3” | ≤ 3” | No protrusions |
| | Likely common and continuous | May be common and continuous | May be common, not continuous | Uncommon, not continuous | |
| **Obstacles** | 24” | 12” | 10” | 8” | No obstacles |
| | (Maximum Height) | | | | |
| **Design Grade** | 5% – 20% | 5% – 12% | 3% – 10% | 2% – 8% | 2% – 5% |
| | 2
<table>
<thead>
<tr>
<th>Designed Use</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>BICYCLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Pitch Maximum</td>
<td>30%</td>
<td>25%</td>
<td>15%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>50% on downhill-only segments</td>
<td>35% on downhill-only segments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Pitch Density</td>
<td>20% – 30% of trail</td>
<td>10% – 30% of trail</td>
<td>10% – 20% of trail</td>
<td>5% – 10% of trail</td>
<td>0% – 5% of trail</td>
</tr>
<tr>
<td>Design Cross Slope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Cross Slope</td>
<td>5% – 10%</td>
<td>5% – 8%</td>
<td>3% – 8%</td>
<td>3% – 5%</td>
<td>2% – 3%</td>
</tr>
<tr>
<td>Maximum Cross Slope</td>
<td>10%</td>
<td>10%</td>
<td>8%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Design Clearing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>6’</td>
<td>6’ – 8’</td>
<td>8’</td>
<td>8’ – 9’</td>
<td>8’ – 9’</td>
</tr>
<tr>
<td>Width</td>
<td>24” – 36”</td>
<td>36” – 48”</td>
<td>60” – 72”</td>
<td>72” – 96”</td>
<td>72” – 96”</td>
</tr>
<tr>
<td></td>
<td>Some vegetation may encroach into clearing area</td>
<td>Some light vegetation may encroach into clearing area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder Clearance</td>
<td>0’ – 12”</td>
<td>6” – 12”</td>
<td>6” – 12”</td>
<td>6” – 18”</td>
<td>12” – 18”</td>
</tr>
<tr>
<td>Design Turn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radius</td>
<td>2’ – 3’</td>
<td>3’ – 6’</td>
<td>4’ – 8’</td>
<td>8’ – 10’</td>
<td>8’ – 12’</td>
</tr>
</tbody>
</table>

1 For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

2 The determination of trail-specific design grades, design surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Updated October 16, 2008
Specific USDA Forest Service Design Parameters: All-Terrain Vehicle

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

### Designed Use

**ALL-TERRAIN VEHICLE**

<table>
<thead>
<tr>
<th>Design Tread Width</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Lane</td>
<td>Typically not designed or actively managed for ATVs, although use may be accepted</td>
<td>48” – 60”</td>
<td>60”</td>
<td>60” – 72”</td>
<td>Typically not designed or actively managed for ATVs, although use may be accepted</td>
</tr>
<tr>
<td>Double Lane</td>
<td>96”</td>
<td>96” – 108”</td>
<td>96” – 120”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structures (Minimum Width)</td>
<td>60”</td>
<td>60”</td>
<td>60”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Design Surface

<table>
<thead>
<tr>
<th>Type</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native, limited grading</td>
<td>Native with some onsite borrow or imported material where needed for stabilization, occasional grading</td>
<td>Native with imported materials for tread stabilization common, routine grading</td>
<td>Minor roughness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May be continuously rough</td>
<td>Intermittently rough</td>
<td>Sections of soft or unstable tread on grades &lt; 5% may be present</td>
<td>Sections of soft tread not common</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sections of soft or unstable tread on grades &lt; 5% may be common and continuous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Protrusions

<table>
<thead>
<tr>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 6”</td>
<td>≤ 3”</td>
<td>≤ 3”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May be common and continuous</td>
<td>May be common, not continuous</td>
<td>Uncommon, not continuous</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Obstacles

<table>
<thead>
<tr>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>12”</td>
<td>6”</td>
<td>3”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May be common or placed for increased challenge</td>
<td>May be common, left for increased challenge</td>
<td>Uncommon</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Design Target Grade

<table>
<thead>
<tr>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% – 25%</td>
<td>5% – 15%</td>
<td>3% – 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designed Use</td>
<td>Trail Class 1</td>
<td>Trail Class 2</td>
<td>Trail Class 3</td>
<td>Trail Class 4</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>Grade</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Short Pitch Maximum</td>
<td>35%</td>
<td>25%</td>
<td>15%</td>
</tr>
<tr>
<td>Maximum Pitch Density</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Cross Slope</strong></td>
<td>Target Cross Slope</td>
<td>5% – 10%</td>
<td>3% – 8%</td>
<td>3% – 5%</td>
</tr>
<tr>
<td>Maximum Cross Slope</td>
<td>15%</td>
<td>10%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td><strong>Design Clearing</strong></td>
<td>Height</td>
<td>6’ – 7’</td>
<td>6’ – 8’</td>
<td>8’ – 10’</td>
</tr>
<tr>
<td>Width</td>
<td>6’ – 8’</td>
<td>8’ – 10’</td>
<td>8’ – 12’</td>
<td>Some light vegetation may encroach into clearing area</td>
</tr>
<tr>
<td>Shoulder Clearance</td>
<td>0” – 6”</td>
<td>6” – 12”</td>
<td>12” – 18”</td>
<td></td>
</tr>
<tr>
<td><strong>Design Turn</strong></td>
<td>Radius</td>
<td>6’ – 8’</td>
<td>8’ – 10’</td>
<td>8’ – 12’</td>
</tr>
</tbody>
</table>

1. For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

2. The determination of trail-specific grades, surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Updated October 16, 2008
Specific USDA Forest Service Design Parameters: Cross-Country Ski

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

<table>
<thead>
<tr>
<th>Designed Use</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROSS-COUNTRY SKI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Groomed Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Lane</td>
<td>Typically not designed or actively managed for cross-country skiing</td>
<td>2’ – 4’</td>
<td>6’ – 8’ (or width of grooming equipment)</td>
<td>8’ – 10’ (or width of grooming equipment)</td>
<td>Typically not designed or actively managed for cross-country skiing</td>
</tr>
<tr>
<td>Double Lane</td>
<td>6’ – 8’</td>
<td>8’ – 12’</td>
<td>12’ – 16’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structures (Minimum Width)</td>
<td>36’</td>
<td>36’</td>
<td>36’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Grooming and Surface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Generally no machine grooming</td>
<td>May receive occasional machine grooming for snow compaction and track setting</td>
<td>Regular machine grooming for snow compaction and track setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protrusions</td>
<td>No protrusions</td>
<td>No protrusions</td>
<td>No protrusions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstacles (Maximum Height)</td>
<td>12’ Uncommon</td>
<td>8’ Uncommon (no obstacles if machine groomed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Grade</td>
<td>5% – 15%</td>
<td>2% – 10%</td>
<td>0% – 8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Pitch Maximum</td>
<td>25%</td>
<td>20%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Pitch Density</td>
<td>10% – 20% of trail</td>
<td>5% – 15% of trail</td>
<td>0% – 10% of trail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designed Use</td>
<td>Trail Class 1</td>
<td>Trail Class 2</td>
<td>Trail Class 3</td>
<td>Trail Class 4</td>
<td>Trail Class 5</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>Designed Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CROSS-COUNTRY SKI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Cross Slope</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target Cross Slope</td>
<td>0% – 10%</td>
<td>0% – 5%</td>
<td>0% – 5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Cross Slope</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(For up to 50’)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Clearing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>6’ – 8’</td>
<td>8’</td>
<td>8’ – 10’</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(Above normal maximum snow level)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>24” – 60”</td>
<td>72” – 20”</td>
<td>96” – 168”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light vegetation may encroach into clearing area</td>
<td></td>
<td>Light vegetation may encroach into clearing area</td>
<td>Widen clearing at turns or if increased sight distance needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder Clearance</td>
<td>0” – 6”</td>
<td>0” – 12”</td>
<td>0” – 24”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Turn</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radius</td>
<td>8’ – 10’</td>
<td>15’ – 20’</td>
<td>≥ 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(or to accommodate grooming equipment)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

2 The determination of trail-specific grades, surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential and other factors contributing to surface stability and overall sustainability of the trail.

**Updated October 16, 2008**
Specific USDA Forest Service Design Parameters: Snowshoe

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent1. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

<table>
<thead>
<tr>
<th>Designed Use</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNOWSHOE</td>
<td>Single Lane</td>
<td>36”</td>
<td>36” – 48”</td>
<td>36” – 60”</td>
<td>Typically not designed or actively managed for snowmobiles.</td>
</tr>
<tr>
<td></td>
<td>Double Lane</td>
<td>60”</td>
<td>72”</td>
<td>72” – 96”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Structures</td>
<td>36”</td>
<td>48”</td>
<td>48”</td>
<td></td>
</tr>
<tr>
<td>Design Tread Width</td>
<td>Type</td>
<td>Design Surface</td>
<td>Protrusions</td>
<td>Obstacles (Minimum Width)</td>
<td>Design Grade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Target Grade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Pitch Maximum</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maximum Pitch Density</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. USDA Forest Service Trail Design Parameters
2. USDA Forest Service Trail Design Parameters
<table>
<thead>
<tr>
<th>Designed Use</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNOWSHOE</td>
<td>Maximum Cross Slope</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Clearing</td>
<td>Height</td>
<td>(Above normal maximum snow level)</td>
<td>6’ – 8’</td>
<td>8’</td>
<td>8’ – 10’</td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>48”</td>
<td>72”</td>
<td>72” – 96”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder Clearance</td>
<td>0”</td>
<td>12”</td>
<td>12” – 24”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Turn</td>
<td>Radius</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3’ – 4’</td>
<td>3’ – 6’</td>
<td>4’ – 8’</td>
<td>(provide sufficient radius for grooming equipment)</td>
<td></td>
</tr>
</tbody>
</table>

1 For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

2 The determination of trail-specific design grades, design surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Updated October 16, 2008
Specific USDA Forest Service Design Parameters: Snowmobile

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

<table>
<thead>
<tr>
<th>Designed Use SNOWMOBILE</th>
<th>Trail Class 1</th>
<th>Trail Class 2</th>
<th>Trail Class 3</th>
<th>Trail Class 4</th>
<th>Trail Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Tread Width</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Lane</td>
<td>Typically not designed or actively managed for snowmobiles.</td>
<td>4’ – 6’ Typically not groomed (or width of grooming equipment) On tight-radius turns, increase groomed width to ≥ 10’</td>
<td>6’ – 8’ Frequently rough and bumpy</td>
<td>8’ – 10’ Regular machine grooming for snow compaction and conditioning</td>
<td>Typically not designed or actively managed for snowmobiles.</td>
</tr>
<tr>
<td>Double Lane</td>
<td></td>
<td>10’ Typically not groomed</td>
<td>10’ – 12’</td>
<td>12’ – 20’</td>
<td></td>
</tr>
<tr>
<td><strong>Structures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Minimum Width)</td>
<td></td>
<td>6’</td>
<td>12’</td>
<td>18’</td>
<td></td>
</tr>
<tr>
<td><strong>Design Surface</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Minimum Width)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td>Generally no machine grooming Commonly rough and bumpy</td>
<td>May receive occasional machine grooming for snow compaction and conditioning Frequently rough and bumpy</td>
<td>Regular machine grooming for snow compaction and conditioning Commonly smooth</td>
<td></td>
</tr>
<tr>
<td><strong>Protrusions</strong></td>
<td>No protrusions</td>
<td>No protrusions</td>
<td>No protrusions</td>
<td>No protrusions</td>
<td></td>
</tr>
<tr>
<td><strong>Obstacles</strong></td>
<td>12” Uncommon</td>
<td>6” Uncommon (no obstacles if machine groomed)</td>
<td>No obstacles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Maximum Height)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Target Grade</strong></td>
<td>0% – 12%</td>
<td>0% – 10%</td>
<td>0% – 8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designed Use</td>
<td>Trail Class 1</td>
<td>Trail Class 2</td>
<td>Trail Class 3</td>
<td>Trail Class 4</td>
<td>Trail Class 5</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>SNOWMOBILE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade (^2)</td>
<td>Short Pitch Maximum</td>
<td>35%</td>
<td>25%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum Pitch Density</td>
<td>15% – 30% of trail</td>
<td>10% – 20% of trail</td>
<td>5% – 10% of trail</td>
<td></td>
</tr>
<tr>
<td>Design Cross Slope</td>
<td>Target Cross Slope</td>
<td>0% – 10%</td>
<td>0% – 5%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum Cross Slope</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Design Clearing</td>
<td>Height</td>
<td>6’</td>
<td>6’ – 8’ (provide sufficient clearance for grooming equipment)</td>
<td>8’ – 12’ (provide sufficient clearance for grooming equipment)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Above normal maximum snow level)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Width</td>
<td>6’ – 12’ (some light vegetation may encroach into clearing area)</td>
<td>8’ – 14’ (light vegetation may encroach into clearing area)</td>
<td>10’ – 22’ (widened clearing at turns or if increased sight distance needed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoulder Clearance</td>
<td>6” – 12”</td>
<td>12” – 18”</td>
<td>12” – 24”</td>
<td></td>
</tr>
<tr>
<td>Design Turn</td>
<td>Radius</td>
<td>8’ – 10’ (or sufficient radius for grooming equipment)</td>
<td>15’ – 20’</td>
<td>25’ – 50’</td>
<td></td>
</tr>
</tbody>
</table>

1 For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18.

2 The determination of trail-specific design grades, design surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Updated October 16, 2008
# Trail Management Objectives (TMO)

**Area:** Talkeetna  
**Unit:** Talkeetna Ridge Trails  
**District:** Mat-Su Borough

<table>
<thead>
<tr>
<th>Trail Name:</th>
<th>Talkeetna Ridge ATV/Dogsled Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail ID:</td>
<td></td>
</tr>
<tr>
<td>Trail Beginning Terminal:</td>
<td></td>
</tr>
<tr>
<td>Trail Ending Terminal:</td>
<td></td>
</tr>
<tr>
<td>Trail Inventory Length:</td>
<td>1.000 miles</td>
</tr>
<tr>
<td>Trail Mileage Source:</td>
<td>Wheel</td>
</tr>
</tbody>
</table>

## TMO Trail Section (if applicable)

| Section Beg. Terminal: |                                   |
| Section End. Terminal: |                                   |
| Beg. Milepost:         |                                   |
| End. Milepost:         |                                   |

### Designed Use Objectives

- **(Check one)**
  - Terra Trail
  - Snow Trail
  - Water Trail

- **(Check one)** Trail Class
  - 1 (Primitive/Undeveloped)
  - 2 (Simple/Minor Development)
  - 3 (Developed/Improved)
  - 4 (Highly Developed)
  - 5 (Fully Developed)

### Difficulty Rating

- **(Check one)**
  - Easiest
  - Moderate
  - Difficult
  - More Difficult
  - Double-Diamond

### Elevation Chg

- + or - Feet

### Level of Use

- Low (0-10 per day)
- Moderate (10-100 per day)
- High (100+ per day)

### Designed Use

- **(Check one)**
  - Hiker / Pedestrian
  - Pack & Saddle
  - Bicycle
  - Wheelchair (ADA stds)
  - Motorcycle
  - All Terrain Vehicle (ATV)
  - Cross-Country Ski
  - Snowmachine
  - Snowshoe
  - Dog Sledding
  - Skiing
  - Watercraft - Non Motorized
  - Watercraft - Motorized

### Design Parameters

- **(Fill in all that apply)**
  - Basic Tread Width, Inches: 72-84
  - Clearing Width, feet: 11
  - Clearing Height, feet: 8
  - Switchback Radius, feet: n/a
  - Target Grade, %: <10
  - Max. Sustainable Grade, % for distance (75ft): 15%
  - Turn Radius Min., ft: 30

### Target Frequency Maintenance per Year

- **(Fill in all that apply)**
  - Trail Opening: 1
  - Tread Repair: 0.5
  - Drainage Cleanout: 0.5
  - Logging Out: 0
  - Brushing: 0
  - Snow Trail Grooming: 1
  - Condition Survey: 0

---

TMO Form ASP - Side 1  
Page 1 of 2
### Trail Management Objectives

#### Trail Use Strategies

<table>
<thead>
<tr>
<th>Managed Use</th>
<th>From Date</th>
<th>To Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiker / Pedestrian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelchair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td>5/1</td>
<td>10/31</td>
</tr>
<tr>
<td>Cross-Country Ski</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowmobile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog Sled</td>
<td>11/1</td>
<td>4/30</td>
</tr>
<tr>
<td>Skijoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowshoe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prohibited Use</th>
<th>From Date</th>
<th>To Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Motorized Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td>1/Jan</td>
<td>31-Dec</td>
</tr>
<tr>
<td>Hiker / Pedestrian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelchair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Other Use

<table>
<thead>
<tr>
<th>Other Use</th>
<th>Accept</th>
<th>Discourage</th>
<th>Eliminate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiker / Pedestrian</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelchair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-Country Ski</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowmobile</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog Sled</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skijoring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowshoe</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Special Considerations

- Accessible per Current Agency Guidelines
- Mechanized Tools or Equipment Prohibited
- Threat, Endangered Species Present (Plant / Wildlife)
- Cultural Resource Present
- Easement across Non-Park Land (Existing / needed)
- Existing Permit or Agreement (Trail-Specific / Area)

#### Remarks / Reference Information

- Completed: Jon Underwood
- Title: Trail Consultant
- Date: October 2016

- Approved by: [Signature]
- Date: [Date]

---

TMO Form - Side 2
### Trail Management Objectives (TMO)

**Area:** Talkeetna  
**Unit:** Talkeetna Ridge Trails  
**District:** Mat-Su Borough

**Trail Name:** Talkeetna Ridge Non-motorized Trails  
**Trail ID:**

**Trail Beginning Terminus:**  
**Beg. Milepost:**

**Trail Ending Terminus:**  
**End. Milepost:**

**Trail Inventory Length:** 4.500 miles  
**Trail Mileage Source:**  
- [ ] Wheel  
- [x] GPS  
- [ ] Map  
- [ ] Unknown

#### TMO Trail Section (if applicable)

<table>
<thead>
<tr>
<th>Section Beg. Terminus</th>
<th>Beg. Milepost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section End. Terminus</td>
<td>End. Milepost</td>
</tr>
</tbody>
</table>

#### Designed Use Objectives

- (Check one)
  - [x] Terran Trail
  - [x] Snow Trail
  - [ ] Water Trail

- (Check one)
  - [x] Primitive/Undeveloped
  - [ ] Simple/Minor Development
  - [ ] Developed/Improved
  - [ ] Highly Developed
  - [ ] Fully Developed

#### Difficulty Rating

- (Check one)
  - [x] Easiest
  - [ ] Moderate
  - [ ] Difficult
  - [ ] More Difficult
  - [ ] Double-Diamond

#### Elevation Chg

- [ ] + or - Feet

#### Level of Use

- [x] Moderate (10-100 / day)
- [ ] High (100+ / day)
- [ ] Low (0-10 per day)

### Design Parameters

**Fill in all that apply**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Tread Width, inches</td>
<td>48</td>
</tr>
<tr>
<td>Clearing Width, feet</td>
<td>8</td>
</tr>
<tr>
<td>Clearing Height, feet</td>
<td>8</td>
</tr>
<tr>
<td>Switchback Radius, feet</td>
<td>6</td>
</tr>
<tr>
<td>Target Grade, %</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Max. Sustainable Grade, % for distance (75ft)</td>
<td>15%</td>
</tr>
<tr>
<td>Turn Radius Min. ft</td>
<td>15</td>
</tr>
</tbody>
</table>

### Target Frequency

**Maintenance per Year**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail Opening</td>
<td>1</td>
</tr>
<tr>
<td>Tread Repair</td>
<td>0.5</td>
</tr>
<tr>
<td>Drainage Cleanout</td>
<td>0.5</td>
</tr>
<tr>
<td>Logging Out</td>
<td>0</td>
</tr>
<tr>
<td>Brushing</td>
<td>0</td>
</tr>
<tr>
<td>Snow Trail Grooming</td>
<td>0</td>
</tr>
<tr>
<td>Condition Survey</td>
<td>1</td>
</tr>
</tbody>
</table>
## Trail Management Objectives

### Trail Use Strategies

#### Managed Use

<table>
<thead>
<tr>
<th>Activity</th>
<th>From Date (mm/dd)</th>
<th>To Date (mm/dd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiker / Pedestrian</td>
<td>5/1</td>
<td>10/31</td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td>5/1</td>
<td>10/31</td>
</tr>
<tr>
<td>Wheelchair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-Country Ski</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowmobile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog Sled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skijoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowshoe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Prohibited Use

<table>
<thead>
<tr>
<th>Activity</th>
<th>From Date (mm/dd)</th>
<th>To Date (mm/dd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Motorized Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hiker / Pedestrian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelchair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-Country Ski</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowmobile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog Sled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skijoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Other Use

<table>
<thead>
<tr>
<th>Activity</th>
<th>Accept</th>
<th>Discourage</th>
<th>Eliminate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiker / Pedestrian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pack &amp; Saddle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheelchair</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Terrain Vehicle (ATV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-Country Ski</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowmobile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog Sled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skijoring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowshoe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - NonMotorized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watercraft - Motorized</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Special Considerations

- Accessible per Current Agency Guidelines
- Mechanized Tools or Equipment Prohibited
- Threat, Endangered or Sensitive Species Present (Plant / Wildlife)
- Cultural Resource Present
- Easement across Non-Park Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

### Remarks / Reference Information

- Completed by: Jon Underwood
- Title: Trail Consultant
- Date: October 2016

Approved by: [Signature]  
Title: [Title]

Page 2 of 2
ATTACHMENT C

Talkeetna Ridge East/West Bypass Trail
Proposed Routing May 27, 2018
Data from field survey by Mark Gronewald and Michael Shields May 14 to May 22, 2018

Legend
- East/West Multiuse Bypass Trail (proposed routing) ~9497 LF
- Existing Multiuse Trails
- Concept Routing from Trails Plan (from Jon Underwood) ~6,900 LF
- Note (see narrative)
Report on the Proposed Routing

Talkeetna Ridge East/West Multiuse Connector

Background:
As I understand the history of this project, local skiers had constructed the interior loop trails intended as XC ski trails sometime around 1981 (per conversation with Mark Wildermuth, adjacent landowner, on May 20, 2018). In general, the trails they built are well-routed with respect to the terrain, although there are a few segments which are pretty steep (>15 %), and one segment crossed the southern boundary onto adjacent property. But, for 1981, I was impressed how those folks had a pretty good grasp of sustainable trail design. Of course in 1981 there were very few ATVs but as they gained popularity, ATVs began to use the trails, along with snowmachiners and dog mushers. Now the trail is showing degradation due to ATV use in the form of general (in some places deep) rutting, and berms caused by displaced tread material which are blocking drainage in many of the dips and low spots. When faced with a new assignment on unfamiliar soils, I like to look at how nearby existing trails are holding up to existing traffic levels-- which gives me a good idea of what the grade specs should be for a new trail (it should be mentioned that user counts almost always go up dramatically after a new trail is constructed). I noticed that at anything above around 9% grades, there is evidence of tread displacement which becomes pretty drastic at grades above 10 to 12%.

A trails plan, conducted by consultants Agnew::Beck and Jon Underwood of Happy Trails, LLC. and with input from local stakeholders and trail users, was finalized in April 2017. As part of this plan, the need for an east/west connector along the southern boundary of the parcel was identified as a way to discourage motorized usage of the established trails and as a bypass corridor for foot, ski, bicycle and dog sled users. A concept line was included showing suggested routing. As far as we can determine, this concept line was not ground-truthed (we found only one small area with relatively recent flagging and nobody could produce a track and waypoints reflecting data from a field visit) and is simply a general line showing the desired routing for the trail. Other community wishes were that the alignment should be as straight as possible with minimal curves and turns and should avoid following the existing trails as much as possible. They also expressed a wish that the trail should require no maintenance (I’ve never seen such a trail; they all require maintenance). A trails plan is just that: a general plan which expresses desired outcomes, but is not often ground-proofed so it’s almost always subject to adjustment once boots hit the ground. I’m just happy this one is being acted on instead of languishing on a shelf somewhere.

An RFP for the design and construction of this trail was issued by the Mat Su Borough in February 2018 which further stipulated that the trails be designed and laid out by contractors who are members of the Professional Trail Builders Association and that the trail be built to an Alaska State
Parks Class 4 ATV standard with controlled grades predominately in the 6 – 8 % range and a 30-foot minimum turn radius along with the other sustainable design standards for integrated drainage, durable tread materials, contour alignment and full bench construction. The contract was awarded to Pioneer Contracting, LLC. of Palmer who in turn hired Trailwerx as the design and layout subcontractor. I was joined in this project by Mike Shields of Michael D. Shields Consulting who is a nationally-recognized trail professional with around 60 years of trail experience.

Field Survey and Trail Layout – With Notes From Map

Please see the above trail routing map for the proposed Talkeetna Ridge East/West Connector trail based on field surveys by Mike Shields and Mark Gronewald. We scouted the site extensively between May 14 and May 22, 2018 and looked at many options to follow the desired routing proposed by the trails plan and MSB Project Manager Emerson Kreuger (and were indeed able to follow it in many areas) but the steepness and layout of the terrain -- when weighed against the very limiting gradient and turn radius specifications for a Class 4 ATV trail, along with the adjacent property boundary -- precluded following it closely in some segments. Please see the map notes below for clarification by segment.

The terrain in the project is complex. Terrain is what largely dictates the placement of a sustainable trail alignment, not a concept line on a map. Complex terrain invariably leads to lots of curvature in a trail alignment. As trail designers we work with the terrain as it’s much easier and far cheaper to make a trail fit terrain than to make terrain fit the trail. Adding required grade reversals to drain water off a trail adds even more curvature and distance. Curvature in the alignment is generally a good thing; it makes the trail seem more natural, helps control speeds, sheds water, and avoids that “superhighway” look. There was some concern about ATVs not being able to negotiate the turns, especially if laden with trail building materials. I would emphasize that our minimum turn radius is 30 feet which is plenty for even modern side by side ATV’s. Mushers using large teams will find it tight, though, but specifying larger turn radii would probably make our routing unfeasible. I understand curvature may be undesirable by some but the only alternative would be large road-style “cut-throughs” of the ridge tops which most would find even less desirable.

The eastern third is fairly flat and wet due to its toe-of-slope location below the hills to the east, but does have areas of micro terrain we were able to capitalize on. The western two thirds (minus the Lake Road segment, which is flat and wet) is predominately well-drained with many glacial-deposited eskas (ridges) separated by ravines, kettle lakes and occasional saddles. It’s very similar to the Crevasse Moraine area near Palmer. Soils throughout the project are predominately course gravels and cobble overlain by a fairly thick stratum of silt, which does not make a very durable tread surface and puts severe limits on grades for heavily-used ATV trails, as evidenced by the other trails in the area. Even without the Class 4 specs, we would still have to keep our grades predominately in the 6 – 8 % range with only a few very short segments in the 10 - 12 % range. Grade limitations like this have an unfortunate side effect of adding extra distance to a proposed trail, though, and that’s what happened in this case.
We started from the eastern side (off the Talkeetna Bluffs Trail) and laid out a 30 foot radius turn to turn southward, roughly paralleling below the existing trail.

Map Note 1: We chose this starting point for the trail intersection because it had good sight distance in four directions and, most importantly, because it offered a 60 foot wide flattish bench on which to place a 30 foot radius turn in order to route the trail through the fall line to a southerly direction. It was my understanding from Emerson this is about where he wanted the intersection but I could be mistaken. It may be possible to move it further north if terrain allows (again, we need a 60+ foot diameter piece of fairly flat terrain to locate a turn on, though). I would be happy to explore this some more.

Map Note 2: Once around the turn here were numerous runoff streams laden with sediment from the trail above us, so we decided to move further downslope to avoid those. We were able to largely route the corridor on either a west facing slope or on the sides of small "microridges" (it’s important to utilize whatever terrain relief is available. Routing the trail along the edge of even a two or three foot high ridge is much preferred to crossing flat ground. Trails on flat ground – unless elevated by structural solutions such as causeways, turnpikes or board walks – invariably become low spots in the terrain and thus catchment zones for all the runoff around them).

Where we came to the point where the route turns to the west, there is a ~200 + LF segment of flat, wet crossing affected by the stream across the trail above us (the one with the pallets). Please see our survey notes for a structural prescription for crossing this.

Map Note 3: Once across the wet crossing, we followed westerly along the edge of a small ridge system, crossed another ~150LF flat wet segment, then turned southwesterly along another small ridge before starting the 8% descent to the northwest to get around a fairly-sized pond, following well-drained side slopes in this area.

Map Note 4: From the point where the trail turns to the northwest and begins the descent around the pond, the terrain from here onward to near Lake Road is predominantly well-drained uplands. The concept line suggested an abrupt fall-line 20 -30% descent to just north of the pond with another abrupt ascent climbing out of the pond to the west. This was not feasible given the Class 4 ATV specs so we had to pass further north of the pond to maintain our 6 to 8 % target grade. (The Class 4 ATV specs are not just a suggestion; they are a contract requirement, by the way). I feel that our alignment around the pond is better in that it crosses higher on the bowl where the ground is dryer and better drained. Also moving the trail away from the pond minimizes any negative effects to wildlife while still allowing views of the pond from the trail.
Map Note 5: Once around the pond, we followed small ridge systems and crossed a saddle before starting a long southeasterly aspect climb to tie in with the existing multiuse trail system. This is all well-drained ground but the terrain entails some curvature in the alignment.

Map Note 6: We then followed the existing trail, which was well-located with respect to the terrain in that area. At the southernmost end of the large curve, the existing trail crosses the section line easement and is actually located on adjoining private property. The existing trail would need to be rerouted at least 85 feet further north and the old trail would need to be closed off and revegetated. There is a reroute option there—and is suggested by the concept line—but the reroute would have to drop downhill considerably onto wet terrain and then climb back up again. Mike Shields estimates it would take about 765 LF of new trail and possibly two turns to accomplish this. We understand Emerson is looking into obtaining a trail easement there so we did not flag out a reroute. Once past the section line, we continued along a curve to the north along a steep east-facing ridge on the multiuse trail until we exited the multiuse trail at a good spot for a 30 foot radius turn. The proposed route shares the existing trail for about 1000 LF here (less than a 2/10 of a mile). This is a point of some controversy.

I suggest keeping the alignment as proposed since the specs for a Class 4 ATV trail are much more restricting than say, a Class 3 hiking/mountain biking trail which can have tighter turns and steeper grades, so I suggest modifying the alignment of the other proposed trails to accommodate the East/West Connector. I’m not playing favorites with the moto crowd here; I’m pretty much a non-moto guy. It’s just simple physics.

Map Note 7: The concept line here suggested the trail climb straight up an east-facing 30-40% slope to a ridgeline and then descend again to cross a saddle toward the west. We scouted extensively there but those pesky Class 4 specs again: we couldn’t go much further south because of the section line, we couldn’t go straight up the hill because it’s way too steep and would be a fall-line alignment, so we had to follow the existing trail around a ways to the north until we found a spot for another 30 foot radius turn which put us well north of the concept line. We looked at options for ascending the ridge closer to the section line but a climb here would entail locating a ~60 foot wide place for a turn somewhere on the hillside. There is indeed such a spot but it is also across the section line so we had to reject this routing in favor of our current one. It simply couldn’t be helped, unless we tunnel through the ridge.

After departing the existing trail, our alignment turns and traverses to the southwest and crosses the same saddle as the concept line, then departs again to the northwest (concept line too steep again here), places another 30 foot radius turn at an intermediate ridge then follows southward again to another saddle shared with the concept line and follows pretty much right on it until we arrive at the existing multiuse trail again, which is usable with some improvement to the bottom of the trail near Denali Zip Line Adventures.
The entire route (with the exception of the existing trail alongside Lake Road) is now centerline-flagged with orange survey tape, grade reversals for drainage are marked with double blue flags, and turn radius points are marked with triple white flagging. Also station markings are placed at a max interval of 300 LF in white tape with black lettering. GPS waypoints are also marked with white flagging. We measured the entire flagged route with a 300 foot tape measure and got a distance of 9,497 LF (distance measured with a GPS track was 9,398 LF) from the eastern end to the western end where it turns to follow the Lake Road. Since this was well above the estimate of 7,500 LF in the contract, we stopped here and did not survey the remaining ~2000 LF to the junction with Beaver Road as planned. All told, we are actually looking at around 11,500 LF of trail in this project, even more if we can move the eastern entry point further north.

I regret I will be away for most of the first half of June and will not be able to attend the field trip but would be happy to return for the Lake Road segment prescription and evaluate options for moving the eastern intersection further north if funding allows. Thank you for the opportunity to work on your project. Please call or email with any questions.

Mark Gronewald
Owner, Trailwerx

May 27, 2018
OBSERVATIONS & COMMENTS  
Talkeetna Ridge E-W ATV Trail Routing and Layout 5/13-21/2018  
by Mike Shields, Trails Consultant

(1) The given minimum turn radius of 30’ was adhered to, though a 50’ radius is the normal minimum for long dog teams. However, if a 50’ radius were to be adopted, several portions of this route would need to be rather drastically modified, involving a total trail length increase of at least 5% to possibly 10%.

(2) If the route’s penetration south of the section line cannot be covered by a Public Use Easement and it must be moved north at least 80’, that will place it on wet soft ground in a swale crossing from which the trail must rise, chasing rising ridgelines on both sides, and include at least 2 (potentially 4) 30’-radius turns on very questionable terrain. As opposed to the roughly 200+’ of existing trail, this new alignment would require at least 570’ (and potentially 758’) of new trail at 12% grades; grades lower than that are probably not possible as the swale grade steepens downslope.

(3) Soils throughout this area are predominantly silt or, in low points and flats, organic silt, with random and sporadic large gravel and cobble at depths of 8 to 30+ inches. The gravel/cobble strata often appear as lenses of variable thickness interlaid by pure silt. The lack of sand and pea-gravel in significant quantity means that the gravels and cobble act much more like independent units in these soils when near saturation; there is no small-particle spectrum to allow the silt to actually bond to and stabilize the larger soil constituents. Except near the crests of topographic ridges (both minor and major) these soils are highly prone to persistent near-saturation moisture levels, making their bearing and shear strength very low throughout much or most of the summer season; the extensive Devil’s-club vegetation is a primary indicator of this condition. Such soils are also highly subject to frost-swell/thaw-subidence. Where white spruce grows these soils “dry” in summer; where birch/poplar predominates the “drying” is noticeable but considerable soil moisture persists through the summer, and if associated with cottonwood and/or Devil’s-club that moisture level remains high.

(4) There are extensive flat-ground areas in the eastern and far western segments of this route, which means water collection (both surface and subsurface) and very slow subsurface drainage. Any trail which is simply cut across such ground invariably becomes lower than the ground alongside it, and thus a water collection point. To establish and retain any measure of “sustainability”, flat-ground trail needs to be elevated above adjacent ground level and have a crowned surface to shed water. At the same time, the elevated trail must not become a dam to the movement of surface water, so the best approach is to lay down a porous base of cobble and gravel, topped by a 4-to-6-inch-thick surface of 3”-minus gravel, sand, and silt.

(5) The Talkeetna Trail Plan speaks of “sustainable trail design and construction” with the implication that no tread or drainage maintenance will be necessary in future – that is a myth. The best designed and routed trail, if it receives any noticeable use, requires enough annual maintenance effort to retain its design parameters; the alternative is periodic, repetitive, and quite costly reconstruction.

Mike Shields  
May 23, 2018
Emerson, 

Mike Shields and I worked on the Talkeetna Ridge E/W Motorized Bypass Trail on May 24, 2019. 

On the eastern entrance point, we were successful in locating a 30 foot radius turn and tying it into our route from last year. Please note that most of the flagging from last year is apparently missing (it looks like it was pulled by someone, there wasn’t even knots left) and we had to go an extra 300 LF along last year’s routing until we found a flagged waypoint remaining from last year. We laid out and flagged a total of 585 LF but we calculate our new routing adds 285 LF to the total. 

On the central ridge we were not so successful. We were able to locate an excellent turn location (previously identified in the walkthrough) and flagged our way southeast downhill along the ridge at a 9% gradient hoping to tie into last year’s 7% layout at the next saddle. Unfortunately, there was just not enough horizontal distance to pull this off at a sustainable grade. When we arrived near the saddle, we were still a long way above it. We looked at the terrain to the southwest of the saddle hoping to find a turn location to make up the extra distance needed but there were no suitable spots. We also briefly considered laying out a steeper traverse directly between the saddle and the ridgetop turn but it would have to be in excess of 15% grade with no grade reversals for 285 LF (well above the allowable specs). Given the shaded location and evidence of wet silt/clay soil, neither of us felt comfortable hanging our hats on that alignment. In the end, we decided it would be best to stick to the original alignment and turn location. I really wanted to make this work and I realize this provides about 150 feet less separation
between the ATV and future hiking trails, but it is much easier to relocate hiking trails than a Class 4 ATV trail.

Attached please see our GPS track and waypoints for the eastern entrance along with Mike Shields’ survey notes. I’ve also attached an invoice if you could forward it to purchasing. Thank you for hiring us and best wishes for your project.

Sincerely,

Mark Gronewald
Ridge Trail
T 26N R 04W Sec. 21

Waypoints_24-MAY-19.gpx
Track_TKA_EEntry_RR2018.gpx
Comsat Rd Right-of-Way

Map intended for discussion only
FIELD SURVEY NOTES  
Talkeetna Ridge Trail Relocations Layout per Community Request  
by Mike Shields May 24, 2019  

EAST END RELOCATION

<table>
<thead>
<tr>
<th>STA</th>
<th>Dist.</th>
<th>Grade</th>
<th>SS</th>
<th>GPS WPt.</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>0+00</td>
<td>--</td>
<td>--</td>
<td>15°+%</td>
<td>384</td>
<td>Start at ATV trail/”road” jct., align 30° +/- NNW</td>
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<tr>
<td>0+56</td>
<td>56</td>
<td>-8%</td>
<td>10-15%</td>
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<td>Drain Pt.; start Sweep Turn to SSW on “platform” crest</td>
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<tr>
<td>1+18</td>
<td>62</td>
<td>0 to -6%</td>
<td>0-10%</td>
<td></td>
<td>arc across Turn “platform”</td>
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<tr>
<td>1+66</td>
<td>48</td>
<td>-5%</td>
<td>0-10%</td>
<td></td>
<td>continue Turn beyond 180° to end Drain Pt.</td>
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<tr>
<td>2+01</td>
<td>35</td>
<td>+10/+8%</td>
<td>15-20%</td>
<td></td>
<td>arc out of drainage swale; lots of Devils-club in bottom</td>
</tr>
<tr>
<td>2+72</td>
<td>71</td>
<td>+5%</td>
<td>10-15%</td>
<td></td>
<td>traverse SW across slope; Devils-club in pockets</td>
</tr>
<tr>
<td>3+00</td>
<td>28</td>
<td>+3%</td>
<td>10-15%</td>
<td></td>
<td>continuing traverse</td>
</tr>
<tr>
<td>3+62</td>
<td>62</td>
<td>3°+%/</td>
<td>10-15%</td>
<td></td>
<td>Drain Pt.</td>
</tr>
<tr>
<td>5+40</td>
<td>178</td>
<td>+4/+8%</td>
<td>10-20%</td>
<td></td>
<td>Drain Pt.</td>
</tr>
<tr>
<td>5+58</td>
<td>18</td>
<td>-2%</td>
<td>10°+%/</td>
<td>385</td>
<td>Jct. with 2018 route at original STA 3+00; adds 258 ft to original layout.</td>
</tr>
</tbody>
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WEST MID-ROUTE RELOCATION

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<thead>
<tr>
<th>STA</th>
<th>Dist.</th>
<th>Grade</th>
<th>SS</th>
<th>GPS WPt.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0+00</td>
<td>--</td>
<td>--</td>
<td>0-5%</td>
<td>387</td>
<td>Start at faint ATV trail, 2018 STA 69+00</td>
</tr>
<tr>
<td>1+44</td>
<td>144</td>
<td>-10 to 0%</td>
<td>0-5%</td>
<td>387*</td>
<td>Start Sweep Turn to S; distance paced</td>
</tr>
<tr>
<td>2+43</td>
<td>99</td>
<td>0 to -6%</td>
<td>0-15%</td>
<td>386*</td>
<td>End Turn; *GPS 386 at Radius Pt.</td>
</tr>
<tr>
<td>4+44</td>
<td>201</td>
<td>-8 to -10%</td>
<td>30-50+%</td>
<td></td>
<td>descending traverse toward saddle; End Survey due to terrain limitations, 18 vertical ft above 2018 STA 78+80.</td>
</tr>
</tbody>
</table>
OBSERVATIONS & COMMENTS

(1) **New East-end Start Point**

This is a better route than the 2018 original in that the terrain allowed the 30-ft-radius turn to start 56 ft *beyond* its road-departure point versus immediately at it. Extending the turn beyond 180° before curving into traverse alignment makes the best use of the uneven terrain which is cut by drainage swales fed from the upslope road. As noted last year this silt-rich ground is persistently moist, so trail tread gravelling will be necessary (and I’d include a 30% by volume sand with the gravel), perhaps including a base-drain structural section across all the swale bottoms.

(2) **West Mid-Route Relocation**

This relocation was proposed to us in order to gain additional linear separation from a planned hiking trail, and involved shifting a 30-ft-radius Sweep Turn 175 ft east (thus increasing *actual* linear separation some 140 ft), then descending to the ravine-spanning saddle in what turned out to be 36% of the 2018 Survey distance. The topography declared this to be impossible if “sustainability”, or even *survivability*, is also a primary goal.

The only good result of our efforts here was finding that the ridgecrest section desired for the relocated Turn was wide enough to avoid entrenching the Turn. The ravine side-slopes range from 30% near the crest to 50-% approaching the saddle, and are persistently “moist” to “wet” silts with random and very sparse gravel/cobble content; at slope angles above 40% I would consider them at least potentially unstable when wet. The ravine bottom south of the saddle drops steeply; to the north it forms a water-collecting “basin” covered by a mixture of grasses, Devils-club, and thick alder jungles.

The 2018 route drops from its ridgecrest Turn to the saddle in 560 ft at an average grade of 7%, including one mid-route grade reversal. This 2019 route dropped from ridgecrest Turn to saddle in 201 ft at an average grade of 9% with *no reversal drainage*, and ended up some 18 vertical ft *above* the saddle. That means that if the average *no reversal drainage* grade was raised to 10% we needed at least another 180 ft of trail to make this work. (Running a steeper no-drainage line to the saddle would require grades in the 20% range on soils where even 10% is quite risky).

Options considered and at least briefly explored included: (1) Run on out another 100+ ft to a second Turn point on the ravine side, then traverse back to a turn onto the saddle – no Turn point was seen for a radius greater than 5 ft, ie. a Switchback; (2) re-run our line, incorporating grade-reversal drainage and not restricting distance, to a Turn point on or near the descending-slope ridgecrest, than traverse back to the saddle – I saw no Turn point in the next 300+ ft capable of holding a radius greater than 10 ft without major entrenchment excavation; (3) forget the saddle and run on down the ravine side to a hopefully-present crossing point, then climb back to the 2018 route -- the ravine bottom drops much steeper than trail grade can follow, with or without incorporated drainage, so we could easily add 800 to 1000 ft to the route length and probably have to cross south of the Section Line; and (4) traverse the west side of the ravine, which would need to start at or very near the 2018 Turn point – this *might* increase the trails-separation distance by 30 to 40 ft, which seems insignificant to me.

Finally, I’d note that on complex ground like this it’s easier to shift a Hiker trail than an ATV trail.

(3) **General Comment**

It might be worthwhile to remind all parties involved that the terrain dictates what is possible, and our own desires are secondary to that fact. If folks want a trail that can survive over time with *minimized* annual maintenance, we can usually provide that in good trail design and layout. If they want anything less they should themselves be willing and able to provide the more intense annual maintenance and periodic reconstruction that will require.

Mike Shields, Trails Technical Consultant 5/26/19