



STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

**INVITATION TO BID (ITB)
ITB No. 10-015-23**

**DATE OF ISSUE:
February 23, 2023**

**TITLE:
1000 Skies-Sunrise Phase 2 Road Construction**

Important Notice: If you receive this solicitation from the State's Online Public Notice website you must register with the DNR Procurement Section to receive subsequent amendments. Registration must be in writing and may be made via email to christopher.brooks@alaska.gov. Failure to register with the DNR Procurement Section may result in rejection of your offer.

ADA: The State of Alaska complies with Title II of the Americans with Disabilities Act of 1990. Individuals with disabilities who may need auxiliary aids, services, and/or special modifications to submit a bid should contact the DNR Procurement Section via email to christopher.brooks@alaska.gov or telephone at 907-269-8666 not later than 10 calendar days prior to the bid closing date to make necessary arrangements.

Procurement Officer: Chris Brooks
Phone Number: (907)269-8666
Email: christopher.brooks@alaska.gov

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State wage rates can be obtained at <http://www.labor.state.ak.us/lss/pamp600.htm>. Use the State wage rates that are in effect 10 days before Bid Opening.

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES



INVITATION FOR BIDS
for Construction Contract

Date **February 23, 2023**

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

	Project Name and Number
Location of Project:	Near Nelchina, Alaska
Contracting Officer:	Christopher Brooks, DNR Procurement Officer
Issuing Office:	Division of Support Services
	State Funded <input checked="" type="checkbox"/> Federal Aid <input type="checkbox"/>

Description of Work:

See Scope of Work section and Attachments A-F for project details and requirements.

The Engineer's Estimate is:

<input type="checkbox"/> Less than \$100,000	<input type="checkbox"/> Between \$1,000,000 and \$2,500,000
<input type="checkbox"/> Between \$100,000 and \$250,000	<input type="checkbox"/> Between \$2,500,000 and \$5,000,000
<input checked="" type="checkbox"/> Between \$250,000 and \$500,000	<input type="checkbox"/> Greater than \$5,000,000
<input type="checkbox"/> Between \$500,000 and \$1,000,000	

All work shall be completed in NA Calendar Days, or by **September 1, 2023**.
Interim Completion dates, if applicable, will be shown in the Special Provisions.

Bidders are invited to submit sealed bids, in single copy, for furnishing all labor, equipment, and materials and for performing all work for the project described above. Bids will be opened publicly at 2:00 PM local time, at 550 W. 7th Ave., Suite 1330; Anchorage, AK 99501 on the 17th of March 2023.

SUBMISSION OF BIDS

ALL BIDS INCLUDING ANY AMENDMENTS OR WITHDRAWALS MUST BE RECEIVED PRIOR TO BID OPENING. BIDS SHALL BE SUBMITTED ON THE FORMS FURNISHED AND MUST BE MARKED AS FOLLOWS:

Bid for Project:
1000 Skies-Sunrise Phase 2 Road
Construction
ITB No. 10-015-23

ATTN:
Procurement Officer
Dept. Natural Resources
550 W. 7th Ave., Suite 1330
Anchorage AK 99501-3564
Phone: (907) 269-8666 / Email: christopher.brooks@alaska.gov

Bids, amendments or withdrawals transmitted by mail must be received at the above specified address no later than 30 minutes prior to the scheduled time of bid opening. Hand-delivered bids, amendments or withdrawals must be received at the above specified address prior to the scheduled time of bid opening.

A bid guaranty is required with each bid in the amount of 5% of the amount bid. (Alternate bid items as well as supplemental bid items appearing on the bid schedule shall be included as part of the total amount bid when determining the amount of bid guaranty required for the project.)

The Department hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises (DBEs) will be afforded full opportunity to submit bids and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

NOTICE TO BIDDERS

Bidders are hereby notified that data to assist in preparing bids is available as follows:

See Scope of Work section and Attachments A-F for project details and requirements.

Any questions about bidding procedures, site conditions, or contract requirements must be submitted in writing to the Procurement Officer designated on the Invitation to Bid. Questions must be submitted in sufficient time to get a reply before submitting a bid. No oral responses or other oral statements are binding on the department. Any response to a material question shall be issued by addendum sent to all bidders. Questions submitted within two business days of bid opening may or may not be considered at the department's discretion. If a significant question is asked just prior to bid opening, the department will determine whether the issue raised is significant enough to delay the bid opening and issue an addendum or to proceed with the scheduled bid opening. At increments of time determined by the department, all questions and answers on the project received will be published on the On-line Public Notice Site.

Plans and Specifications may be downloaded from: <https://aws.state.ak.us/OnlinePublicNotices/default.aspx>

For additional information contact:

Bids shall be sent to (email is preferred):

Chris Brooks, Procurement Officer
Dept. of Natural Resources
550 W. 7th Avenue, Suite 1330
Anchorage, AK 99501
Phone: (907) 269-8666 / Email: christopher.brooks@alaska.gov

All questions relating to design features, constructability, quantities, or other technical aspects of the project should be directed to the following:

David Ciampa, Land Surveyor 2
3700 Airport Way
Fairbanks, Alaska 99709
Phone: (907) 458-6795 / Email: david.ciampa@alaska.gov

All questions concerning bidding procedures should be directed to:

Chris Brooks, Procurement Officer
Dept. of Natural Resources
550 West 7th Avenue, Suite 1330
Anchorage, AK 99501
Phone: (907) 269-8666 / Email: christopher.brooks@alaska.gov



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

REQUIRED DOCUMENTS

REQUIRED FOR BID. Bids will not be considered if the following documents are not completely filled out and submitted at the time of bidding:

1. **Bid Form (Form 25D-9)**
 2. **Bid Schedule**
 3. **Bid Bond**
 4. Any bid revisions must be submitted by the bidder prior to bid opening on the following form:
Bid Modification (Form 25D-16)
-

REQUIRED AFTER NOTICE OF APPARENT LOW BIDDER. The apparent low bidder is required to complete and submit the following document within 5 working days after receipt of written notification:

1. **Subcontractor List (Form 25D-5)**
-

REQUIRED FOR AWARD. In order to be awarded the contract, the successful bidder must completely fill out and submit the following documents within the time specified in the intent to award letter:

1. **Construction Contract (Form 25D-10A)**
2. **Payment Bond (Form 25D-12)**
3. **Performance Bond (Form 25D-13)**
4. **Contractor's Questionnaire (25D-8)**
5. **Certificate of Insurance**
6. **Work Schedule**



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

SUBCONTRACTOR LIST

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

The apparent low bidder shall complete this form and submit it so as to be received by the Contracting Officer prior to the close of business day on the fifth working day after receipt of written or verbal notice from the Department.

Failure to submit this form with all required information by the due date will result in the bidder being declared nonresponsive and may result in the forfeiture of the Bid Security.

Scope of work must be clearly defined. If an item of work is to be performed by more than one firm, indicate the portion or percent of work to be done by each.

Check as applicable: ☐ All Work on the above-referenced project will be accomplished without subcontracts greater than 1/2 of 1% of the contract amount.

OR

☐ Subcontractor List is as follows:

LIST FIRST TIER SUBCONTRACTORS ONLY

FIRM NAME, ADDRESS, PHONE NUMBER	AK BUSINESS LICENSE NO., CONTRACTOR'S REGISTRATION NO.	SCOPE OF WORK TO BE PERFORMED

CONTINUE SUBCONTRACTOR INFORMATION ON REVERSE SIDE

I hereby certify that the listed licenses and registrations were valid at the time bids were received for this project. For contracts involving Federal-aid funding, Alaska Business License and Contractor Registration will be required prior to award of subcontract.

Signature of Authorized Company Representative

Title

Company Name

Company Address (Street or PO Box, City, State, Zip)

Date

()
Phone Number



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

CONTRACTOR'S QUESTIONNAIRE

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

A. FINANCIAL

1. Have you ever failed to complete a contract due to insufficient resources?

☐ NO

☐ YES

If YES, explain:

2. Describe any arrangements you have made to finance this work: _____

B. EQUIPMENT

1. Describe below the equipment you have available and intend to use for this project:

ITEM	QUAN.	MAKE	MODEL	SIZE / CAPACITY	PRESENT MARKET VALUE

2. What percent of the total value of this contract do you intend to subcontract? _____%

3. Do you propose to purchase any equipment for use on this project?

☐ NO ☐ YES If YES, describe type, quantity, and approximate cost:

4. Do you propose to rent any equipment for this work?

☐ NO ☐ YES If YES, describe type and quantity:

5. Is your bid based on firm offers for all material necessary for this project?

☐ NO ☐ YES If NO, explain:

C. EXPERIENCE

1. Have you had previous construction contracts or subcontracts with the State of Alaska?

☐ NO ☐ YES If YES, explain:

2. List, as an attachment to this questionnaire, other construction projects you have completed, the dates of completion, scope of work, and total contract amount for each project completed in the past 12 months.

I hereby certify that the above statements are true and complete.

Name of Contractor

Name & Title of Person Signing

Signature

Date



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

BID FORM

for

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

by

Company Name

Company Address (Street or PO Box, City, State, Zip)

**TO THE CONTRACTING OFFICER,
DEPARTMENT OF NATURAL RESOURCES:**

In compliance with your Invitation for Bids dated **February 23, 2023**, the Undersigned proposes to furnish and deliver all the materials and do all the work and labor required in the construction of the above-referenced Project, according to the plans and specifications and for the amount and prices named herein as indicated on the Bid Schedule consisting of **one** sheet, which is made a part of this Bid.

The Undersigned declares that he has carefully examined the contract requirements and that he has made a personal examination of the site of the work; that he understands that the quantities, where such are specified in the Bid Schedule or on the plans for this project, are approximate only and subject to increase or decrease, and that he is willing to perform increased or decreased quantities of work at unit prices bid under the conditions set forth in the Contract Documents.

The Undersigned hereby agrees to execute the said contract and bonds within fifteen calendar days, or such further time as may be allowed in writing by the Contracting Officer, after receiving notification of the acceptance of this bid, and it is hereby mutually understood and agreed that in case the Undersigned does not, the accompanying bid guarantee shall be forfeited to the State of Alaska, Department of Natural Resources as liquidated damages, and the said Contracting officer may proceed to award the contract to others.

The Undersigned agrees to commence the work within 10 calendar days, and to complete the work within **N/A** calendar days, after the effective date of the Notice to Proceed, or by **September 1, 2023**, unless extended in writing by the Contracting Officer.

The Undersigned proposes to furnish Payment Bond in the amount of **100%** (of the contract) and Performance Bond in the amount of **100%** (of the contract), as surety conditioned for the full, complete and faithful performance of this contract.

The Undersigned acknowledges receipt of the following addenda to the drawings and/or specifications (give number and date of each).

Addenda Number	Date Issued	Addenda Number	Date Issued	Addenda Number	Date Issued

NON-COLLUSION DECLARATION

The Undersigned declares, under penalty of perjury under the laws of the United States, that neither he nor the firm, association, or corporation of which he is a member, has, 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 bid.

The Undersigned has read the foregoing and hereby agrees to the conditions stated therein by affixing his signature below:

Signature of Authorized Company Representative

Typed Name and Title

()

Phone Number

()

Fax Number

Email Address

(See Reverse Side for Instructions)

Bid Phase: _____ Bidder: _____

1. This worksheet accurately reports the type and quantity of product(s) that: (a) qualify for application of the Alaska Product Preference under AS 36.30.321 *et seq.* and (b) this bidder will use in performing the advertised project, if awarded the contract; and
2. All listed product(s) are specified for use on the project and will be permanently incorporated; and
3. I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning its proposal.

Date _____

TOTAL

INSTRUCTIONS FOR ALASKA PRODUCTS PREFERENCE WORKSHEET

Special Notice: All procurements, except those funded from Federal sources, shall contain Contract provisions for the preference of Alaska products. To be considered for the Alaska Product Preference, each product listed by the Bidder on this worksheet must have current certification from the Alaska Products Preference Program at the time of Bid Opening or the proposal due date. A product with expired certification at the bid opening or proposal due date will not be considered eligible. Products that are not specified for use on the project will not be considered eligible.

The Alaska Product Preference Program List of certified products is available online at:

<https://www.commerce.alaska.gov/web/dkra/AlaskaProductPreferenceProgram.aspx> or may be obtained by contacting Dept. of Commerce & Economic Development Alaska Division of Community and Regional Affairs, Alaska Products Preference Program, 550 W. 7th Ave., Suite 1650, Anchorage AK 99501-3510; Phone: (907) 269-4501 Fax: (907) 269-4563, E-mail: madeinalaska@alaska.gov

BIDDERS INSTRUCTIONS:

A. General. The contracting Agency may request documentation to support entries made on this form. False presentations may be subject to AS 36.30.687. All Bidder's entries must conform to the requirements covering bid preparations in general. Discrepancies in price extensions shall be resolved by multiplying the declared total value times the preference percentage and adjusting any resulting computation(s) accordingly.

B. Form Completion – BASIC BIDS.

- (1) Enter project number and name, the words "Basic Bid" and the CONTRACTOR'S name in the heading of each page as provided.
- (2) The Bidder shall compare those candidate products appearing on the preference listing (see Special Notice comments above) against the requirements of the technical specifications appearing in the contract documents. If the Bidder determines that a candidate product can suitably meet the contract requirements, then that product may be included in the worksheet as follows.
- (3) For each suitable product submitted under the "Basic Bid" enter:
 - The product name, generic description and its corresponding technical specification section number under the heading "PRODUCT",
 - The company name of the Alaska producer under the heading "Manufacturer", and
 - The product class (I, II, or III) and preference percentage (3, 5, or 7% respectively) under the "CLASS/% heading.
- (4) For each product appearing on the list and to be utilized by the CONTRACTOR enter:
 - Under the heading "TOTAL DECLARED VALUE" the manufacturer's quoted price of the product, (caution: this value is to be the manufacturer's quoted price at the place of origin and shall not include costs for freight, handling or miscellaneous charges of incorporating the product into the Work,) and
 - The resulting preference – i.e. the preference percentage times the total declared value amount – under the heading "REDUCTION AMOUNT".
- (5) Continue for all "suitable" basic bid products. If the listing exceeds one page enter the words "Page # ___ SUB" in front of the word "TOTAL" and on the first line of the following pages enter "SUBTOTAL OF REDUCTION AMOUNT FROM PREVIOUS PAGE".
- (6) On the final page of the listing enter "BASIC BID PREFERENCE GRAND" immediately before the word "TOTAL".
- (7) Total the entries in the "REDUCTION AMOUNT" column for each page by commencing at the first entry for that page. If a continuation page exists, ensure that the subtotal from the previous page is computed into the running total. Number pages as appropriate.
- (8) Compute a Grand Total for the Basic Bid Preference. Enter the amount on the final page of the worksheet. (Note: When solicitations require written bids this amount should also be entered on line "C" of the Basic Bid Schedule.) Submit worksheet(s) with the Bid Schedule.

C. Form Completion – ALTERNATE BIDS.

- (1) Enter project number and name, the words "ALTERNATE BID # ___", and CONTRACTOR'S name in the heading of each page as provided.
- (2) On the first entry line enter "ADDITIONAL ALASKA PRODUCTS FOR ALTERNATE BID # ___", and repeat procedures 2 through 5 under part B these Bidder's instructions except that references to "Basic Bid" shall be replaced with the words "Alternate Bid # ___".
- (3) Following the listing of all additional Alaska products enter the words "ADDITIONAL PRODUCTS PREFERENCE FOR ALTERNATE BID # ___ - SUBTOTAL" and enter a subtotal amount for all additional products as listed. Subtotal amount to be determined by adding all additional product entries in the "REDUCTION AMOUNT" column.
- (4) Skip three lines and enter "LESS THE FOLLOWING NON-APPLICABLE ALASKA PRODUCTS:
- (5) Beginning on the next line, enter the product name and manufacturer of each Alaska Product appearing on the "Basic Bid" listing which would be deleted or reduced from the Project should the "Alternate Bid" be selected. Details of entry need only be sufficient to clearly reference the subject product. (i.e. "Pre-hung doors by Alaska Door Co., Anchorage.") Products being reduced shall specify the amount of the reduction. Should no products require deletion enter "None". When a product is listed as a "NON-APPLICABLE ALASKA PRODUCT" for this alternate bid and if under the basic bid the Bidder received a preference on his basic bid as a result of that product, then the applicable entries under the headings "TOTAL DECLARED VALUE" and "REDUCTION AMOUNT" (for each product and from the basic bid listing) shall also be entered into the corresponding headings of this form. Where only a portion of the products has been deleted, the entry (which will differ from those on the basic bid listing) may be "pro-rated" or as otherwise substantiated.
- (6) Following the listing of all non-applicable Alaska products enter the words "NON-APPLICABLE PRODUCTS PREFERENCE FROM BASIC BID ___ SUBTOTAL" and enter a subtotal amount for all non-applicable products listed. Subtotal amount to be determined by adding all non-applicable entries in the "REDUCTION AMOUNT" column.
- (7) At the bottom of the final page enter the words "ALTERNATE BID # ___ PREFERENCE GRAND" immediately before the word "TOTAL".
- (8) Compute a Grand Total for the Alternate Bid Preference (for Alternate # ___) by subtracting the non-applicable product preference subtotal from the additional product preference subtotal. Enter on the final page. (Note: When solicitations require written bids this amount should also be entered on line "C" of the Alternate Bid Schedule.) Submit separate worksheet(s) with each Alternate Bid

**STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES**

ALASKA BIDDER PREFERENCE CERTIFICATION

In response to the advertised procurement for:

Project Name and Number: _____

Bidder/Proposer (company name): _____

Operation of Alaska Bidder Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.990(2), if a bidder is an eligible "Alaska Bidder", the Department will apply a five percent preference to the price of the bidder's proposal.

Instructions regarding Alaska Bidder Preference

A bidder that claims the Alaska Bidder Preference must review and then certify that each statement appearing under the heading "Alaska Bidder Certification" is true. The individual that signs the certification shall include his/her printed name and position within bidder's organization, *e.g.*, sole proprietor, partner, etc. If a bidder fails to submit a signed certification, the Department will not apply the claimed preference.

Alaska Bidder Certification

The bidding entity for which I am the duly authorized representative:

- (A) Holds a current Alaska business license;
- (B) Is submitting a bid or proposal for goods, services, or construction under the name appearing on the bidder's current Alaska business license;
- (C) Has maintained a place of business in the State staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the proposal;
- (D) Is incorporated or qualified to do business under the laws of the State, is a sole proprietorship and the proprietor is a resident of the State, is a limited liability company organized under AS 10.50 and all members are residents of the State, or is a partnership under former AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of the State; and
- (E) If a joint venture, is composed entirely of ventures that qualify under the four preceding paragraphs of this Alaska Bidder Certification.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning its proposal, and that the foregoing statements are true and correct.

By (signature)

Date

Printed name

Alaska Business License Number

Title:

**STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES**

ALASKA VETERAN PREFERENCE CERTIFICATION

In response to the advertised procurement for:

Project Name and Number _____,

Bidder (Contractor) _____

Operation of Alaska Veteran Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.321, an eligible entity receives a five percent preference to the price of in the bidder's proposal if the bidder meets three requirements.

The bidder must be:

1. an "Alaska Veteran";
2. a "Qualifying Entity"; and
3. an "Alaska Bidder".

Unless a bidder satisfies all three requirements and furnishes corresponding certifications, it is not eligible for the Alaska Veteran Preference. This preference may not exceed \$5,000.

Instructions regarding Alaska Veteran Preference

A bidder that claims the Alaska Veteran Preference must review and complete the "Alaska Veteran Certification", the "Qualifying Entity Certification", and the "Alaska Bidder Certification". The individual that signs a certification shall include his/her printed name and position within bidder's organization, *e.g.*, sole proprietor, partner, etc. If a bidder fails to submit properly completed certifications, the Department will not apply the claimed preference.

Alaska Veteran Certification

(To be completed by individual(s) upon whom the bidder relies in claiming the Alaska Veteran status. If bidder is a partnership, limited liability company, or corporation, then a majority of partners, members, or shareholders who are Alaska Veterans must sign this Alaska Veteran Certification for the Bidder to be eligible for this preference.)

I hereby represent to the Department that:

I served in the armed forces of the United States, a reserve unit of the United States armed forces, the Alaska Territorial Guard, the Alaska Army National Guard, the Alaska Air National Guard, or the Alaska Naval Militia; and

I was separated from service under a condition that was not dishonorable; and

I am Alaska resident in that I am physically present in the State of Alaska with the intent to remain in the State indefinitely and to make a home in the State.

I certify under penalty of perjury that the foregoing statements are true and correct as they apply to me.

By (signature)

Date

Printed name

Title

Qualifying Entity Veteran Certification

The bidding entity for which I am the duly authorized representative is a:

(Check the appropriate box)

- ☐ sole proprietorship owned by an Alaska Veteran;
- ☐ partnership under AS 32.06 or AS 32.11 and a majority of the partners are Alaska Veterans;
- ☐ limited liability company organized under AS 10.50 and a majority of the members are Alaska Veterans;
or
- ☐ corporation that is wholly owned by individuals and a majority of the individuals are Alaska Veterans.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning the proposal and that the statement I have acknowledged above by checking the appropriate box is true and correct.

By (signature)

Date

Printed name

Title

Alaska Bidder Certification

(To complete your claim for the Alaska Veteran Preference, you must also submit an Alaska Bidder Certification, which the bidder can view, download, and print from the AKDOT&PF's Bid Express Proposal page.)

SCOPE OF WORK

1000 Skies-Sunrise Phase 2 Road Construction

Project # 10-015-23

PROJECT OVERVIEW

The Department of Natural Resources (DNR), Division of Mining, Land and Water (DMLW), is soliciting bids for road construction services to extend S. Millennium Loop near Nelchina, Alaska. This work is within the Matanuska-Susitna Borough (MSB).

CONTRACTOR RESPONSIBILITIES

Contractor shall provide all necessary materials, equipment, labor, maintenance, transportation, lodging, and per-diem to construct and install the following:

Pioneer Road with an alignment and profile that meets Residential Collector standard

S. Millennium Loop Road (extension): 2526' +/- from the currently constructed southerly terminus of S. Millennium Loop; construct temporary turnaround. Contractor must use the alignment and typical section (See Attachments A and B) provided by DNR.

For All Construction

Obtain MSB acceptance into road maintenance program.

Contractor is required to:

- Participate in pre-construction meeting with the DMLW Project Manager;
- Perform all work required for a Storm Water Pollution Prevention Plan (SWPPP) in compliance with all applicable requirements;
- Request inspection by MSB Public Works at the completion of clearing and grubbing (C&G). During the C&G inspection, coordinate with MSB inspector for additional inspections required throughout the remaining road construction;
- Construct 2526 ft. +/- of road plus one turnaround to MSB subdivision acceptable road standards. Contractor shall adhere to all applicable elements of the approved Construction Plan (Attachment F) and the 2022 Matanuska-Susitna Borough Public Works Department Subdivision Construction Manual (<https://matsugov.us/document/2021-subdivision-construction-manual>).
- Submit application for maintenance to the Road Service Area Board before September 1, 2022;
- Install all necessary cross drain culverts;

- Obtain approval from MSB Department of Public Works before final payment.

DNR/DMLW Responsibilities:

DNR/DMLW is required to:

- Provide Contractor with centerline alignment of road construction:
 - DNR's contracted surveyor has staked the proposed road centerline with lath and flagging every 50'.

MOBILIZATION AND DEMOBILIZATION

Mobilization and Demobilization costs must be included in the bid prices offered for this Invitation to Bid (ITB).

PROBLEMS AND/OR DISCREPANCIES

If at any time contract operations do not meet state standards, the problem or discrepancy will be brought to the attention of the Contractor. Upon such notice, the Contractor will take expedient actions to remedy the discrepancy to standards using methods identified by the state. Failure to correct operational problems in a timely manner will result in the immediate termination of the Contractor on the project. The state will then determine if any fiscal compensation for work completed is appropriate for payment to the Contractor.

CONTRACTOR REPRESENTATIVE

During all periods of operation, the Contractor shall have a representative in the contract area authorized to act on his/her behalf in response to notices and instructions given by the DMLW Project Manager or Designee regarding performance of this contract.

NOTICE REGARDING VEGETATION CLEARING

The Contractor shall complete vegetation clearing and mulching before May 1, 2023 to avoid violation of laws and regulations regarding disturbance of Migratory Birds. Note that clearing is specified as 40' each side of centerline (See Attachment B).

NOTICE REGARDING EROSION AND SEDIMENT CONTROL

The Contractor or its qualified agent shall prepare a Storm Water Pollution Prevention Plan and file a Notice of Intent with the Alaska Department of Environmental Conservation (DEC) before beginning Construction. The Contractor shall complete all SWPPP Construction Site Inspection Reports, Records of Rainfall, and any other elements required to comply with the SWPPP and DEC permitting and regulations.

NOTICE REGARDING CULVERTS

Five culverts (one 24" cmp and four 18" cmp) are anticipated (See Attachment C and p. 13 of Attachment E). As shown on the Bid Schedule, vendors shall provide a price per foot for additional culverts. The price per foot will be used in the event that additional culverts are required.

NOTICE REGARDING CONSTRUCTION MATERIAL

The Contractor shall provide all materials for the project. A material site managed by the DNR Material Sales unit exists near the project, casefile number ADL 231455, MS 42-3-0185 "Mile 136 Pit". DNR makes no warranty as to the suitability or availability of that material for this project. However, the Contractor may contact DNR Material Sales to assess the suitability and availability of material and to apply for a negotiated material sale contract at the Contractor's option and expense. Visit <https://dnr.alaska.gov/mlw/lands/material-sales/> for further information. Contact amber.taber@alaska.gov with questions regarding material sales.

NOTICE REGARDING DISPOSAL OF CLEARING DEBRIS

Clearing debris may be burned on site at the Contractor's sole risk and responsibility. Following burning, no slash piles may remain, and a natural material cover must be placed over the burn area. Disposal material shall be hauled away and disposed of at the Contractor's expense.

EQUIPMENT

All equipment will be in good working condition prior to the beginning of operations. The Contractor is responsible for all maintenance, repairs and supplies (fuel, oil/grease, gear etc.) on equipment required for operation. No equipment leaking any hazardous fluids will be allowed on the project. The Contractor will have adequate spill response equipment to contain any hazardous spill. The Contractor shall immediately notify the DMLW Project Manager of any spill and shall report all spills as required by law to DEC. The Contractor shall immediately clean up all spills unless directed otherwise by DEC and remove the hazardous material from the project area. No storage of hazardous materials will be allowed on State of Alaska lands.

The Contractor shall take care not to damage gravel, access roads (creating ruts in the roadway), and any culverts/bridges/drainage structures of any roads. The Contractor shall complete all repairs to damaged areas and at their own expense.

SURVEY MONUMENTS AND MARKERS

All Survey monuments and markers shall be protected. The Contractor will be responsible for all necessary repairs or required surveying to replace missing or damaged monuments or markers.

CONTRACT SCHEDULING

Contractor will be requested to submit an operating plan to the DMLW Project Manager or Designee for approval prior to operation beginning. The operating plan will identify all timelines, hours of operation, areas of concern, procedures for mitigating potential safety issues, equipment to be used, names of personnel working on the project, and contact numbers. The work schedule under this contract will be included in the operating plan and approved by the DMLW Project Manager or Designee. **The project schedule will consider the proximity to residential housing and prioritize these locations for normal day time hours during weekdays.**

SITE INSPECTION

Bidders are encouraged to visit the work site to evaluate this project and to see the conditions under which the work described in this ITB will be performed. The bidder's failure to visit the work site will in no way relieve the bidder of the responsibility of performing the work in strict compliance with the true intent and meaning of the terms, conditions and specifications of this ITB. Please see Attachment D for a report of site geotechnical conditions.

PRE-CONSTRUCTION MEETING

A pre-construction meeting will be required before the Contractor begins construction services. DMLW will coordinate a date and time with the Contractor to conduct the pre-construction meeting. The Contractor shall notify the DMLW Project Manager ten days before project completion.

METHOD OF AWARD

Contract award will be made on the basis of Basic Bid and availability of funding. Engineer's Estimate for Basic Bid is \$250,000.00 to \$500,000.00.

CONTRACT ADMINISTRATION

Contract administration will be the responsibility of DNR Procurement Officer Chris Brooks or his designated representative. Mr. Brooks may be contacted by phone at (907) 269-8666 or by email at christopher.brooks@alaska.gov. Only the Procurement Officer has full authority to alter, amend, or change a contract resulting from this ITB.

DAY-TO-DAY CONTRACT ADMINISTRATION

Day-to-day contract administration is the responsibility of the DMLW Project Manager, David Ciampa, or his designated representative. Mr. Ciampa may be contacted by phone at (907) 458-6795 or by email at david.ciampa@alaska.gov. Neither Mr. Ciampa nor his designated representative can substantially change or alter a contract resulting from this ITB.

INSPECTION & MODIFICATION - REIMBURSEMENT FOR UNACCEPTABLE DELIVERABLES

The Contractor is responsible for the completion of all work set out in the contract. All work is subject to inspection, evaluation, and approval by the DMLW Project Manager, responsible for coordinating this project. The State may employ all reasonable means to ensure that the work is progressing and being performed in compliance with the contract. The State may instruct the Contractor to make corrections or modifications if needed in order to accomplish the contract's intent. The Contractor will not unreasonably withhold such changes. Substantial failure of the Contractor to perform the contract may cause the State to terminate the contract. In this event, the State may require the Contractor to reimburse monies paid (based on the identified portion of unacceptable work received) and may seek associated damages.

SUBCONTRACTORS

A list of subcontractors must be provided along with the bidder's bid.

CONTRACT CHANGES – UNANTICIPATED AMENDMENTS

During the course of this contract, the Contractor may be required to perform additional work. That work will be within the general scope of the initial contract. When additional work is required, the DMLW Project Manager will provide the Contractor a written description of the additional work and request the Contractor to submit a firm time schedule for accomplishing the additional work and a firm price for the additional work. Cost and pricing data must be provided to justify the cost of such amendments per AS 36.30.400. The Contractor will not commence additional work until the State has secured any required approvals necessary for the amendment and issued a written contract amendment.

TERMINATION FOR DEFAULT

If the DMLW Project Manager determines that the Contractor has refused to perform the work or has failed to perform the work with such diligence as to ensure its timely and accurate completion, the State may, by providing written notice to the Contractor, terminate the Contractor's right to proceed with part or all of the remaining work.

PAYMENT OF WORK

Complete payment will be made 1) upon completion of the project to the satisfaction of the DMLW Project Manager 2) upon receipt of the Contractor's original, accurate and complete invoice, 3) upon receipt of an approved Notice of Completion from the Department of Labor and Workforce Development and 4) and a Final Completion letter issued by DNR.

DNR/DMLW Project Manager

David Ciampa, Land Surveyor 2
3700 Airport Way
Fairbanks, Alaska 99709
Email: david.ciampa@alaska.gov
Phone: (907) 458-6795

Contractor Shall Submit Invoices to:

State of Alaska
Department of Natural Resources
Division of Mining, Land and Water
David Ciampa, Land Surveyor 2
3700 Airport Way
Fairbanks, Alaska 99709
Email: david.ciampa@alaska.gov
Phone: (907) 458-6795

PROJECT COMPLETION DEADLINE

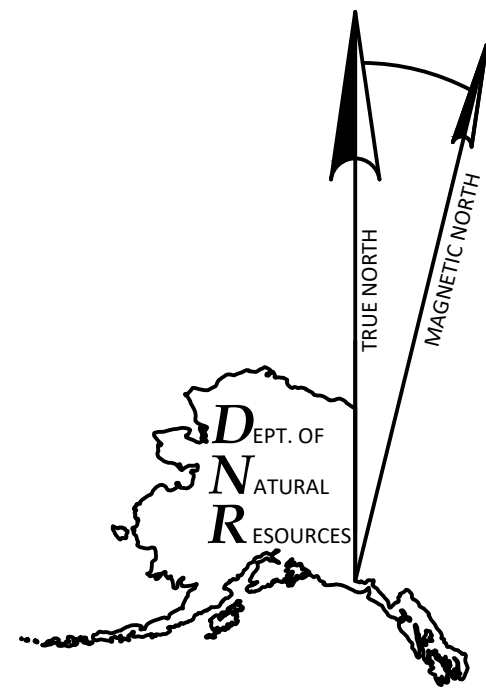
Work may begin as soon as weather permits and continue as weather allows with all project work completed by no later than September 1, 2023.

The Contractor is responsible for notifying the DMLW Project Manager prior to mobilization/beginning operations, anytime operations shut down or begin during the contract period, following completion of operations, and when all equipment is demobilized from the project site. The Contractor can request an extension of time from the DMLW Project Manager for completion of work, due to unforeseen weather conditions prohibiting work. Any extension for completion of services must be approved in writing by the Procurement Officer via written change order.

BID SUBMISSION

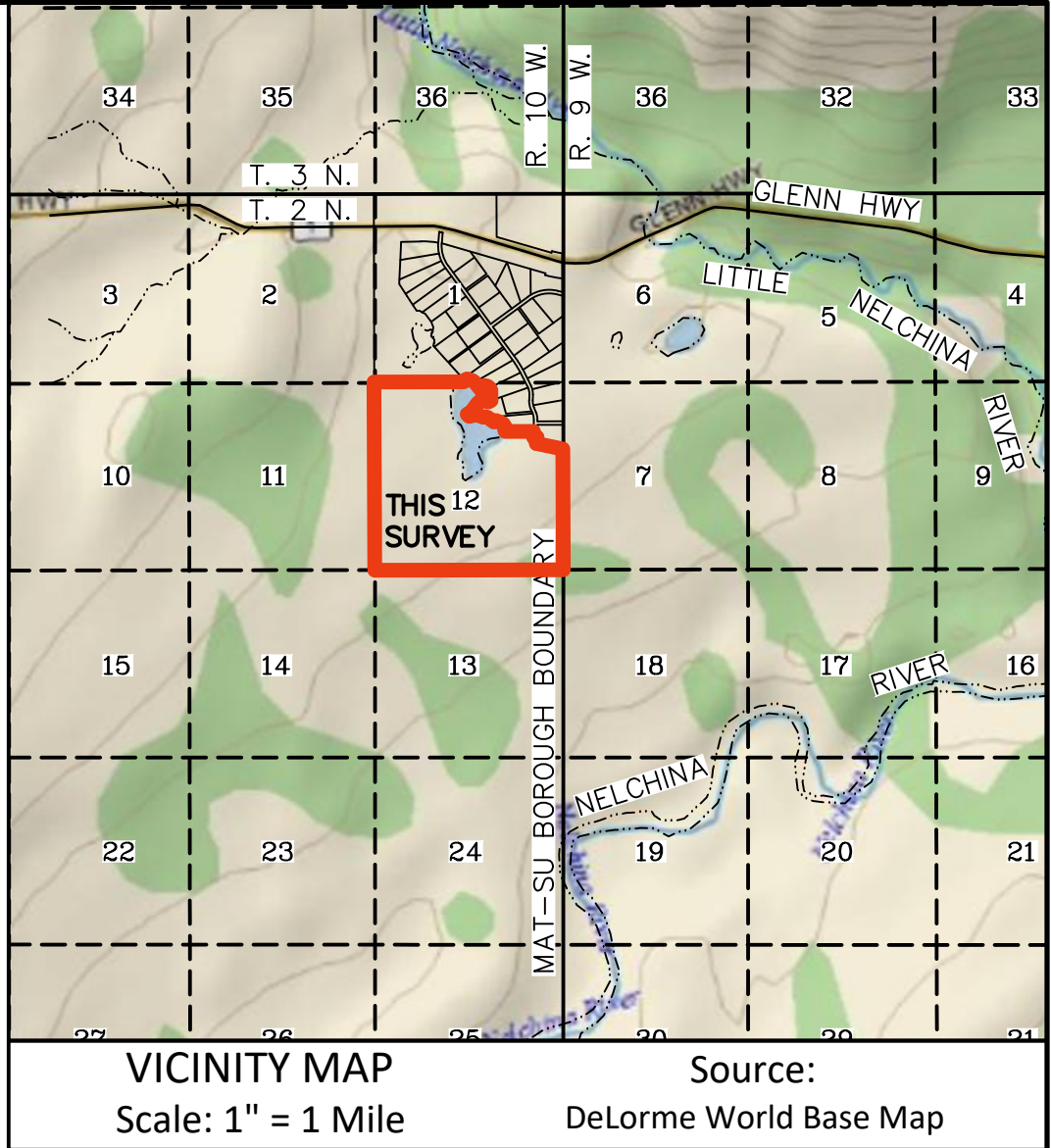
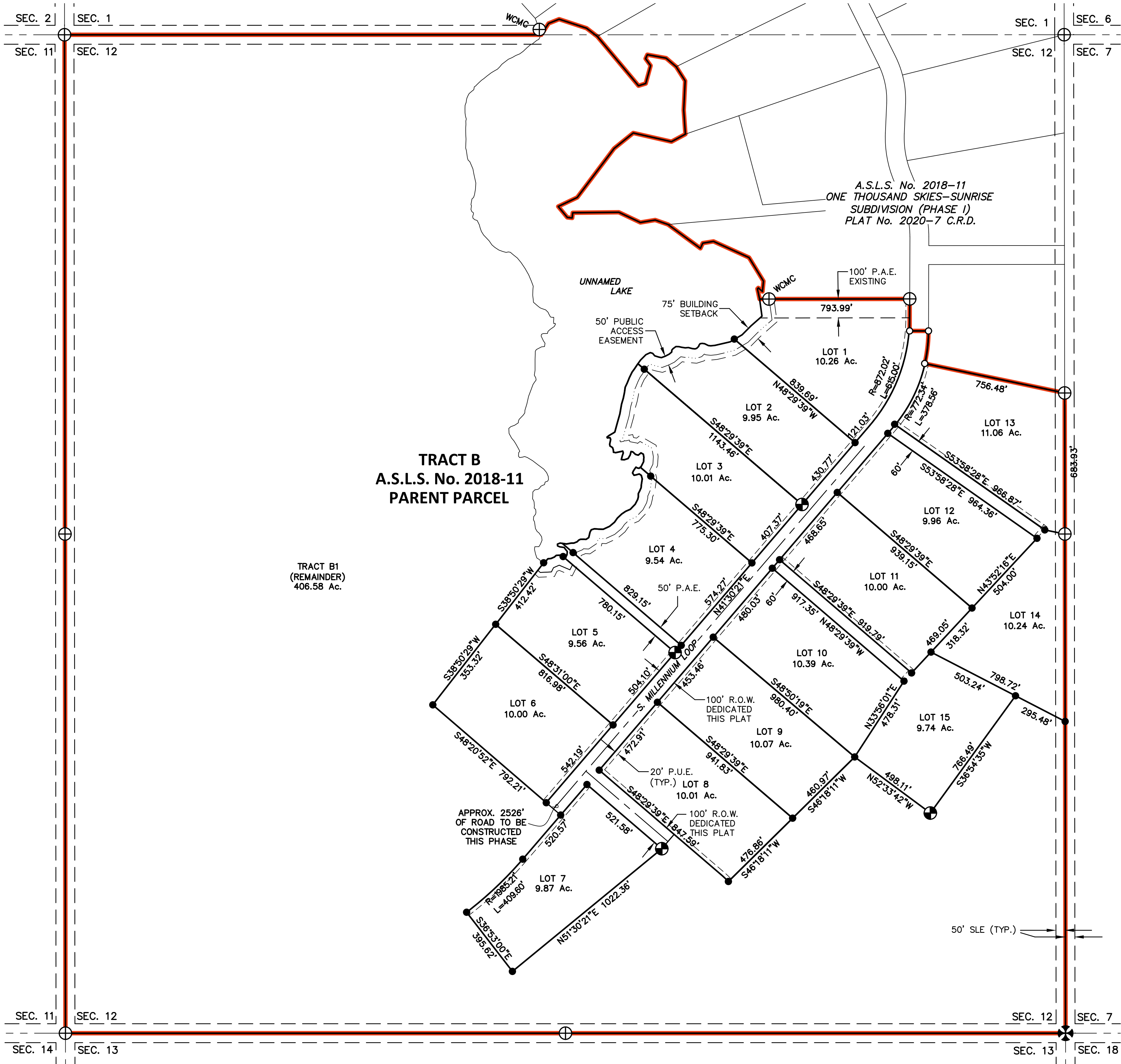
Bids shall be submitted to christopher.brooks@alaska.gov or to the mailing address below by no later than **March 17, 2023 2:00pm AK Time**:

State of Alaska
Department of Natural Resources
Procurement Section
Attn: Chris Brooks, Procurement Officer
550 W. 7th Ave, Suite 1330
Anchorage, AK 99501



NOTES

1. THE PARENT PARCEL IS TRACT B, ONE THOUSAND SKIES-SUNRISE SUBDIVISION, A.S.L.S. 2018-11, PLAT No. 2020-7, C.R.D.
2. A 50' PUBLIC ACCESS EASEMENT SHALL BE ESTABLISHED UPLAND OF AND ADJACENT TO THE ORDINARY HIGH WATER LINE OF THE UNNAMED LAKE AS SHOWN.
3. A 75' BUILDING SETBACK SHALL BE ESTABLISHED UPLAND OF AND ADJACENT TO THE ORDINARY HIGH WATER LINE OF THE UNNAMED LAKE AS SHOWN.
4. A 20' PUBLIC UTILITY EASEMENT SHALL BE ESTABLISHED AS SHOWN.
5. ALL PARCELS OF LAND OWNED BY THE STATE OF ALASKA, LOCATED WITHIN 50.00 FEET OF, OR BISECTED BY A SURVEYED OR PROTRACTED SECTION LINE, ARE SUBJECT TO A 50 FOOT (50') EASEMENT, ON EACH SIDE OF THE SECTION LINE, WHICH IS RESERVED TO THE STATE OF ALASKA FOR PUBLIC HIGHWAYS UNDER A.S.19.10.010.
6. THE EASEMENT SIDELINES SHALL BE EXTENDED OR SHORTENED TO MEET AT THE ANGLE POINTS AND TERMINATE AT THE BOUNDARIES WITH NON-STATE OWNED LANDS.

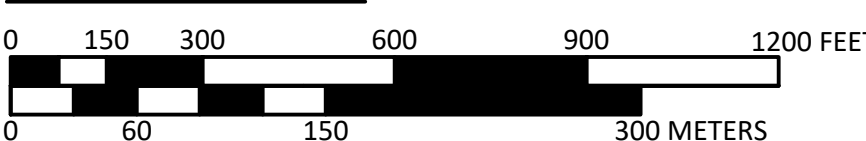


- ### LEGEND
- FOUND BLM/GLO MONUMENT - 2 1/2" DIA. BRASS CAP ON 2" IRON PIPE UNLESS OTHERWISE NOTED
 - BLM/GLO MONUMENT OF RECORD
 - SET PRIMARY MONUMENT-3 1/2" DIA. ALUM. CAP ON 30" LONG 2 1/2" DIA. ALUM. POST WITH MAGNET
 - FOUND PRIMARY MONUMENT-3 1/2" DIA. ALUM. CAP ON 2 1/2" DIA. ALUM. POST WITH MAGNET UNLESS OTHERWISE NOTED
 - PRIMARY MONUMENT OF RECORD
 - SECONDARY MONUMENT SET THIS SURVEY
 - SECONDARY MONUMENT RECOVERED
 - DOT/PF CONCRETE ROW MARKER
 - GEODETIC CONTROL MONUMENT RECOVERED
 - GEODETIC CONTROL MONUMENT OF RECORD
 - EASEMENT
 - SURVEYED
 - MHW MEAN HIGH WATER
 - OHW ORDINARY HIGH WATER
 - (R) (REC) RECORD PER PLAT NO. XXXX
 - (C) (CALC) COMPUTED
 - (M) (MEAS) MEASURED

PLAN OF SURVEY

DATE OF SURVEY: BEGINNING: ENDING:	SURVEYOR: DNR, DMLW, SURVEY SECTION 550 W. 7TH AVE, SUITE 650 ANCHORAGE, AK 99501-3576
STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES DIVISION OF MINING, LAND, AND WATER ANCHORAGE, ALASKA	
PLAN OF SURVEY ONE THOUSAND SKIES-SUNRISE SUBDIVISION PHASE 2 ALASKA STATE LAND SURVEY No. 2022-11 A SUBDIVISION OF TRACT B, ONE THOUSAND SKIES-SUNRISE SUBDIVISION WITHIN SECTION 12 T. 2 N., R. 10 W. COPPER RIVER MERIDIAN CHITINA RECORDING DISTRICT	
DRAWN BY: DNC DATE: 03/14/2022	DNR APPROVAL RECOMMENDED STATEWIDE PLATTING SUPERVISOR DATE
SCALE: 1"=300'	CHECKED BY: SHEET: 1 OF 1 FILE NO. ASLS 20220011

GRAPHIC SCALE



1 METER = 3.280833 U.S. SURVEY FEET, 1 U.S. ACRE = 0.4047 HECTARE

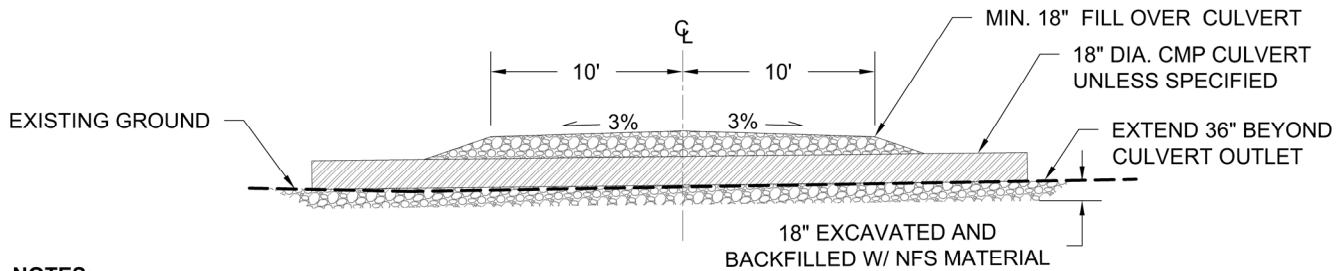
1 PIONEER ROAD TYPICAL SECTION - OVERLAY CONSTRUCTION
NTS



- | <u>SIEVE</u> | <u>PERCENT PASSING BY WEIGHT</u> |
|--------------|----------------------------------|
| NO. 4 | 20-60 |
| NO. 200 | 0-10 |

NOTES:	<div>ONE-THOUSAND SKIES - SUNRISE</div> <div>PHASE II</div> <div>PIONEER ROAD TYPICAL</div> <div>RECON LLC</div> <div>ROWLAND ENGINEERING CONSULTANTS</div> <div>565 WEST RECON CIRCLE PALMER, AK 99645</div> <div>(907)746-3630</div>		DATE	12/13/2022
REV 1			SCALE	NTS
DRAWN BY IJR			PERMIT NO.	
			SHEET	1 OF 2

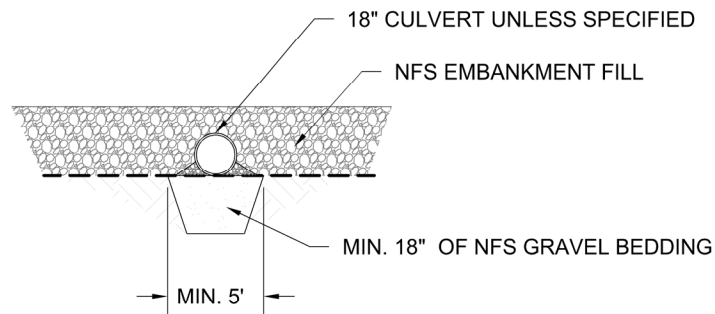
2 PIONEER ROAD TYPICAL SECTION - EQUALIZATION CULVERT
NTS



NOTES:

1. ALL EQUALIZATION CULVERTS TO HAVE A MINIMUM DIAMETER OF 18" UNLESS SPECIFIED.
2. NATIVE SOILS TO BE EXCAVATED A MINIMUM OF 18" BELOW CULVERT INVERT AND BACKFILLED WITH NON-FROST SUSCEPTIBLE MATERIAL.

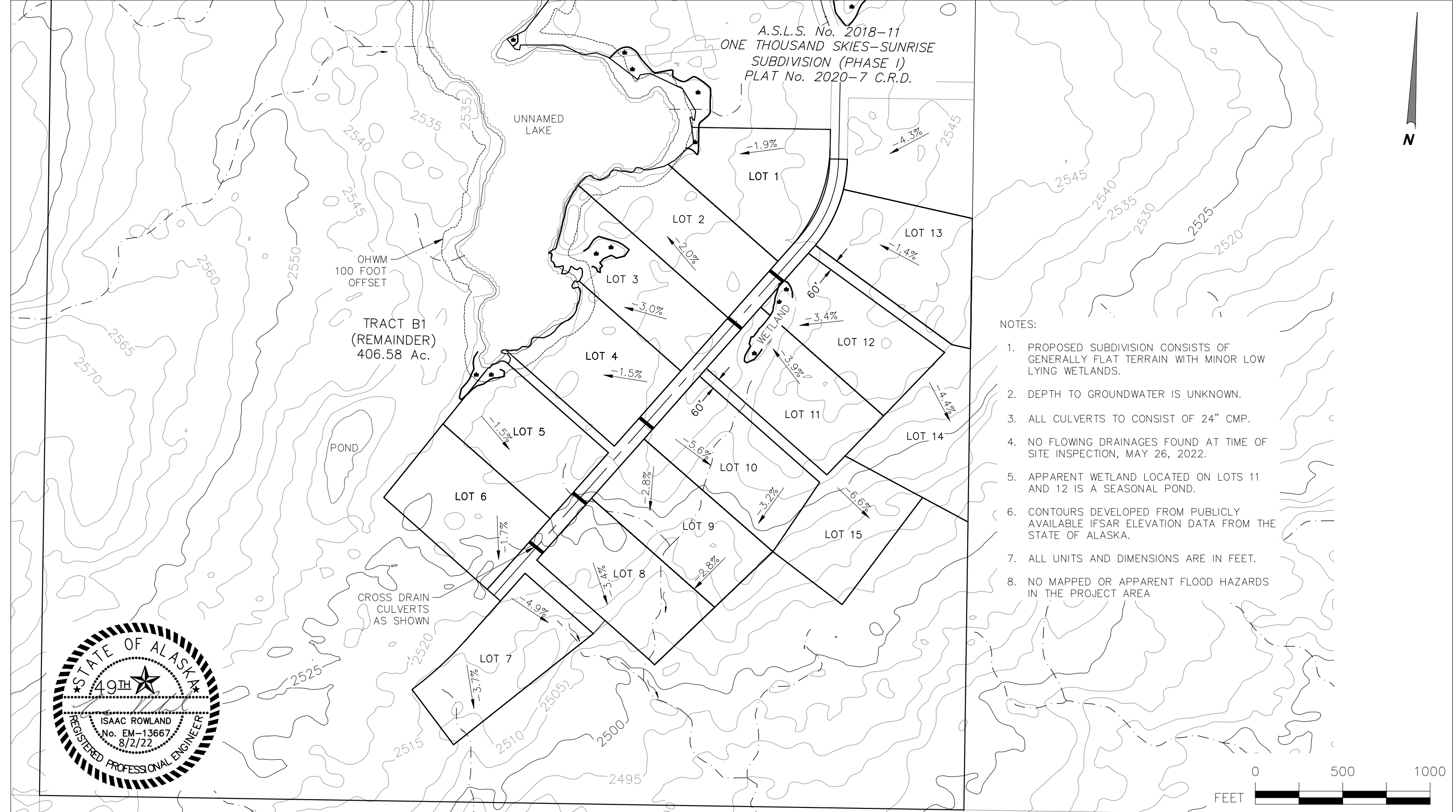
3 PIONEER ROAD CROSS SECTION - EQUALIZATION CULVERT
NTS



NOTES:

1. ALL EQUALIZATION CULVERTS TO HAVE A MINIMUM DIAMETER OF 18" UNLESS SPECIFIED.
2. NATIVE SOILS TO BE EXCAVATED A MINIMUM OF 18" BELOW CULVERT INVERT AND BACKFILLED WITH NON-FROST SUSCEPTIBLE MATERIAL.
3. SIDE FILL PLACED AND COMPACTED UNDER HAUNCHES OF PIPE AND SHALL BE BROUGHT UP EVENLY ON BOTH SIDES.
4. CULVERTS PLACED WITH MINIMUM 0.5% SLOPE.

NOTES:	ONE-THOUSAND SKIES PHASE II CULVERT TYPICAL RECON LLC ROWLAND ENGINEERING CONSULTANTS 565 WEST RECON CIRCLE PALMER, AK 99645 (907)746-3630		DATE
REV 1			12/13/2022
DRAWN BY IJR			SCALE
			NTS
			PERMIT NO.
			SHEET
			2 OF 2



- NOTES:
1. PROPOSED SUBDIVISION CONSISTS OF GENERALLY FLAT TERRAIN WITH MINOR LOW LYING WETLANDS.
 2. DEPTH TO GROUNDWATER IS UNKNOWN.
 3. ALL CULVERTS TO CONSIST OF 24" CMP.
 4. NO FLOWING DRAINAGES FOUND AT TIME OF SITE INSPECTION, MAY 26, 2022.
 5. APPARENT WETLAND LOCATED ON LOTS 11 AND 12 IS A SEASONAL POND.
 6. CONTOURS DEVELOPED FROM PUBLICLY AVAILABLE IFSAR ELEVATION DATA FROM THE STATE OF ALASKA.
 7. ALL UNITS AND DIMENSIONS ARE IN FEET.
 8. NO MAPPED OR APPARENT FLOOD HAZARDS IN THE PROJECT AREA



PROJECT: 1000 SKIES			
PROJECT ENGINEER:ISAAC ROWLAND, PE			
PREPARED BY: ISAAC ROWLAND, PE			
NO.	DESIGN/CONSTRUCTION/RECORD	DWN BY/DATE	CHKD BY/DATE
1	PRE-CONSTRUCTION DRAINAGE PLAN	WR/07-29-22	MCS/07-29-22

LEGEND:

EXISTING 5' CONTOURS **-2.8%** DESIGN DRAINAGE FLOW DIRECTION

2550 CONTOUR LABELS (FT)

APPARENT DRAINAGES

DRAINAGE FLOW DIRECTION

APPARENT WETLANDS

DRAWING NAME:
**ONE THOUSAND SKIES – PHASE II
PRELIMINARY DRAINAGE PLAN**

SCALE: 1" = 500'

11 X 17

SHEET 1 OF 1

*Rowland Engineering Consultants*

565 W Recon Circle, · Palmer, Alaska 99645
907.746.3630 · 907.322.5545 cell · isaac@reconllc.net

December 7, 2022

Attn: Dave Ciampa

State of Alaska
Department of Natural Resources
550 W. 7th Ave
Anchorage, AK 99501

Re: One Thousand Skies – Sunrise Phase II

Mr. Ciampa,

RECON LLC (RECON) prepared this report to summarize the findings of a geotechnical investigation completed 11 November 2022 to assess the subsurface conditions and classify the soils along a proposed State of Alaska Department of Natural Resources (DNR) pioneer access road in the proposed 1000 Skies Subdivision – Phase II Development of the site is planned to include construction of an access road and subdivision of Tract X into 10-acre parcels for sale by DNR to private individuals.

The geotechnical investigation was completed in support of the road design for the proposed 1000 Skies Subdivision – Phase II, located near milepost 137 of the Glenn Highway. This investigation assessed the proposed extension of the existing Millennial Loop pioneer access road designed to provide access to Phase II of the subdivision.

A previous soils investigation was completed in May of 2017 on Phase I of the subdivision that included nine test bores drilled by Discovery Drilling, Inc. (Discovery) under the supervision of Shannon & Wilson. This work was completed with a track mounted auger drill rig. Borehole depths ranged from 15 to 16.5 feet. Shannon & Wilson's report and soil logs are included in Attachment C.

The purpose of the 2022 soils investigation was to test the continuity of soil types found in the 2017 investigation over the proposed, 2,000-foot extension of Millennial Loop. RECON found the soils to consist of a thin organic mat over glacial till. Permafrost appeared to be encountered at a shallow depth, which is common of terrain in this area. Findings of the 2022 soils investigation are similar to what was found in previous test bores in the project area as well as during the construction of Phase I roads. A detailed site and subsurface description follow. See Attachment B for soil logs and results from the sieve analysis.



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APPENDICES

- Attachment A – Site Map
- Attachment B – 2022 Soil Logs and Laboratory Report
- Attachment C – Geotechnical Data Report, One Thousand Skies Subdivision, Nelchina, Alaska (Shannon & Wilson, 2017)



METHODOLOGY

The primary purpose of this soils investigation was to confirm the general continuity of soil types found during the 2017 Phase I soils investigation and the subsequent road construction efforts. RECON measured the depth of the organic mat, determined the active layer, and examined the sub-base soils along the proposed road extension.

Winter weather precluded the mobilization of a hydraulic excavator at the time of the investigation. As an alternative, RECON utilized a packable, power soil auger with a 2.25" solid flights. Although limited in capability, this method allowed relatively rapid testing of the road sub-base in a manner that was sufficient to ensure that the soils type found on the road extension were consistent with those found during the 2017 investigation. This method of investigation also allows more accurate determination of the depth of the permafrost layer than larger equipment when used in dense soils. A total of four test bore locations were spaced approximately equidistant along the proposed Millennial Loop extension in a manner that ensured the site's overall subsurface condition was captured.

Access was via snowmachine from the nearest Glenn Highway parking area, as the current road is not maintained. Field conditions at the time of the investigation were overcast, 12°F and approximately 12" of snow. Drilling was completed by a two-man crew from RECON.

All test borings were logged in accordance with Standard Practice for Description and Identification of Soils – Visual-Manual Method (ASTM D2488).

All test boring locations were recorded with a handheld GPS and photographed using digital camera.



Figure 1. TP01 – Auger and typical site conditions.

SITE DESCRIPTION

The 1000 Skies Subdivision is located north of the Chugach Mountains and immediately east of the Talkeetna Mountains. The project area is situated approximately 9 miles east of the divide between the Copper River and Matanuska River watersheds. The development site is situated on a south and east facing slope that descends from a plateau between the Little Nelchina River and the Nelchina River. Elevation of the property varies from approximately 2600 feet to 2450 feet and is consider classic subalpine terrain. All drainage from the property is toward the Nelchina river, which passes approximately 1.5 miles south of the property at an elevation of 2200 feet. The topography is gently sloping with very low undulating ridges and shallow depressions and swales.

The specific area of interest is accessed from near milepost 137 of the Glen Highway and approximately 1 mile south. The Phase II extension will follow a minor topographic high through relatively flat terrain. This portion is currently undeveloped and vegetated with black spruce and dwarf birch. Ground cover is primarily mosses and low-lying vegetation typical of interior forests at this elevation.



The subdivision is on glacial terrain identified as ground moraine (till). This material is highly variable and is typically an inhomogeneous mixture of boulders, cobbles, pebbles, sand, silt, and some clay. The material is dense to very dense and essentially impermeable. Permafrost is discontinuous but is known to occur at depths that vary from near surface (<10 ft) to upwards of 100 ft

Several small ponds were observed to be in the area, but none were encountered directly on the proposed centerline. One seasonal pond is located near the start of the proposed road extension near test bore TB01. No flowing water has been observed on any of RECON's site visits, including previous visits in May and June of 2022.



Figure 2. Typical terrain and vegetation.



SUBSURFACE CONDITIONS

A total of four test borings were completed. Locations of the four borings are shown in the attached map (Attachment A).

All four test sites were found to have similar subsurface conditions. Near surface organics consisted of moss and small roots to a depth of 0.7-0.8 ft. Soils below 0.8 ft consisted of dense glacial tills and were logged as either sandy silt or silty sand with rounded gravel clasts. Logs of the test bores are included as Attachment B.

Seasonal frost penetration at the time of the survey was minimal (<1 ft). No groundwater was encountered. All holes were TD'd between 2.6 and 3.2 ft due to drill refusal. This was interpreted as the bottom of the seasonal active layer and the likely top of the permafrost zone. No interstitial ice was observed in the cuttings.

Grab samples were taken from the auger flight between 1.0 – 3.0 ft on TB02 and TB04 as being representative of the typical soils. A sieve analysis was completed on the combined samples. Combining samples of the same material is a method used to obtain a more representative sample of the overall site. The results of the sieve analysis are included in Appendix B. The grain size distribution was effectively the same or better (less fines) than the near surface samples test in 2017.



Figure 3. TP04 typical soils -silty sand with gravel.



Figure 4. TP04 drill site



Figure 5. Soils from TB01 – typical for all soils in the project area

ENGINEERING RECOMMENDATIONS

In addition to reviewing the 2017 report by Shannon & Wilson, RECON also reviewed photos and documentation from the construction of the Phase I road completed in 2021. The road construction contractor for this section (K&H Civil Constructors) reported substantial issues during construction with very poor drainage and over saturated soils during rain events on the stripped and grubbed site. These issues were eventually mitigated by utilizing a specialized heavy geofabric and gravel import. The nearly flat terrain also limited the options for drainage and resulted in pooling of water adjacent to the road when using a typical 2 ft ditch.

RECON found the subsurface soil conditions between Phase I and Phase II of the subdivision to be effectively the same. All soils are expected to be frost susceptible, with underlying permafrost at variable depth. A possible shallower active layer depth was noted, but this may be attributed to either the flatter aspect of



the topography or the difficulty in accurately determining the permafrost layer with the larger drill used in 2017.

RECON recommends road design for overlay construction using geofabric underlayment and imported Non-Frost Susceptible (NSF) material. Soil disturbance during construction should be minimized. Ditches should generally be avoided on the Phase II section due to the flat nature of the terrain.

It was also noted soils encountered in the project area will not support conventional wastewater disposal (septic) systems. Foundation designs should also be engineered for permafrost soils.

CONCLUSION

RECON appreciates the opportunity to perform this geotechnical investigation. Should you require further information concerning this investigation or report, please contact me at your convenience.

Sincerely,

Isaac Rowland, PE
(907)322-5545
isaac@reconllc.net



12-7-22

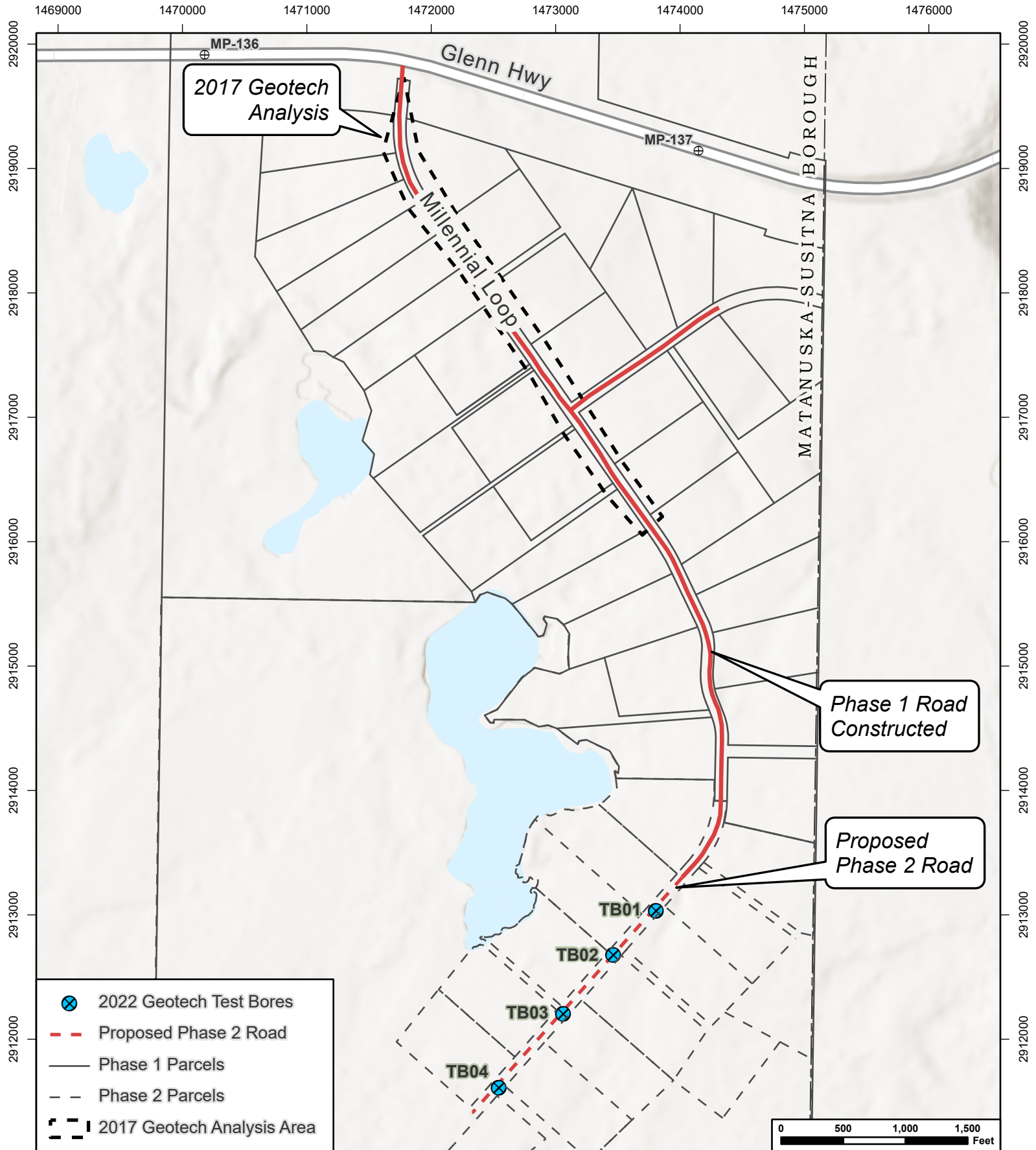
Attachment A – Site Map

Attachment B – 2022 Soil Logs and Laboratory Report

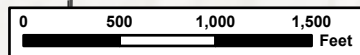
Attachment C – Geotechnical Data Report, One Thousand Skies Subdivision, Nelchina, Alaska (Shannon & Wilson, 2017)

APPENDIX A

SITE MAP



- 2022 Geotech Test Bores
- Proposed Phase 2 Road
- Phase 1 Parcels
- Phase 2 Parcels
- 2017 Geotech Analysis Area



Alaska DNR
1000 Skies Subd.

Map by RECON LLC
565 W Recon Cir, Palmer, AK 99645
NAD83 Alaska State Plane Z3 (usft)
Basemap by ESRI

1000 Skies Phase 2 Subd.
2022 Geotech Investigation
Site Map

1:12,000
1" = 1,000'
12/7/2022

1:70,000,000

APPENDIX B

TEST BORE SOIL LOGS AND LABORATORY REPORT

RECON LLC

PHASE II

2022

GEOLOGIC LOG TEST BORE: TB01

Sample Method	Sample Number	Depth In Feet	Sample Interval	Frozen Interval	Graphic Log	Ground Elev.: 2523 FT	Vegetation: Black	Location: 1000 Skies Ph 2
						Total Depth : 3.0 FT	Spruce < 12" DBH	Millenial Loop Ext
						Bottom Elev.:	Remarks:	
						Collar Elev.:		
						Reference:		
								N: 2,913,164
								E: 1,473,880
								Coord.: AKSP Z3

	0	
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	

0.0' – 0.7' Moss and Organic Mat

0.7' – 3.0' Sandy SILT (ML) w/ Gravel
Hard, brown, moist, gravel clasts – rounded

TD @ 3.0'. Refusal
Interpreted as permafrost



Overcast, 12° F, 12" snow
Dense Black Spruce and dwarf birch

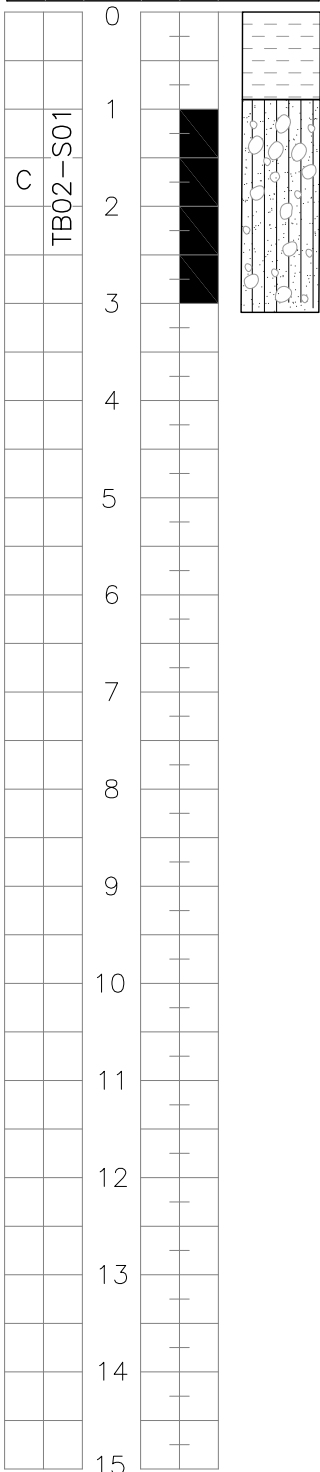
RECON, LLC

565 W. Recon Cir.
Palmer, Alaska 99645
Ph: (907) 746-3630

Project No.: _____ Sheet 1 of 1 Log #TB01
Project Name: 1000 Skies – Phase II
Location: Located near seasonal pond
Method Used: 2.25" Solid Flight
Logged by: IJR
Date Begun: 11/11/2022
Rig Type: Tanaka Soil Auger
Contractor: RECON LLC
Date Comp.: 11/11/2022

GEOLOGIC LOG TEST BORE: TB02

Sample Method	Sample Number	Depth In Feet	Sample Interval	Frozen Interval	Graphic Log	Ground Elev.: 2530 FT Total Depth : 3.1 FT Bottom Elev.: Collar Elev.: Reference:	Vegetation: Black Spruce < 12" DBH Remarks:	Location: 1000 Skies Ph 2 Millenial Loop Ext N: 2,912,785 E: 1,473,565 Coord.: AKSP NAD 83
---------------	---------------	---------------	-----------------	-----------------	-------------	---	---	--



0.0' – 0.8' Moss and Organic Mat

0.8' – 3.1' Silty SAND (SM) w/ Gravel,
Hard, brown, moist, gravel clasts – rounded

TD @ 3.1'. Refusal
Interpreted as permafrost



Overcast, 12° F, 12" snow
Scattered Black Spruce and dwarf birch

RECON, LLC

565 W. Recon Cir.
Palmer, Alaska 99645
Ph: (907) 746-3630

Project No.:
Project Name: 1000 Skies – Phase II
Location: Scattered Blk Spruce and brush
Method Used: 2.25" Solid Flight
Logged by: IJR
Date Begun: 11/11/2022

Sheet 1 of 1 Log #TB02
Rig Type: Tanaka Soil Auger
Contractor: RECON LLC
Date Comp.: 11/11/2022

GEOLOGIC LOG TEST BORE: TB03

Sample Method	Sample Number	Depth In Feet	Sample Interval	Frozen Interval	Graphic Log	Ground Elev.: 2530 FT	Vegetation: Black	Location: 1000 Skies Ph 2
						Total Depth : 2.2 FT	Spruce < 12" DBH	Millenial Loop Ext
						Bottom Elev.: _____	Remarks: _____	
						Collar Elev.: _____		N: 2,912,323
						Reference: _____		E: 1,473,148
								Coord.: AKSP NAD 83

	0	
	1	
	2	
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	4	
	5	
	6	
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	9	
	10	
	11	
	12	
	13	
	14	
	15	

0.0' – 0.7' Moss and Organic Mat

0.7' – 2.2' Sandy SILT (ML) w/ Gravel
Hard, brown, moist, gravel clasts – rounded

TD @ 2.2'. Refusal
Interpreted as permafrost



Overcast, 12° F, 12" snow
Scattered Black Spruce and dwarf birch
Large (20") tussocks

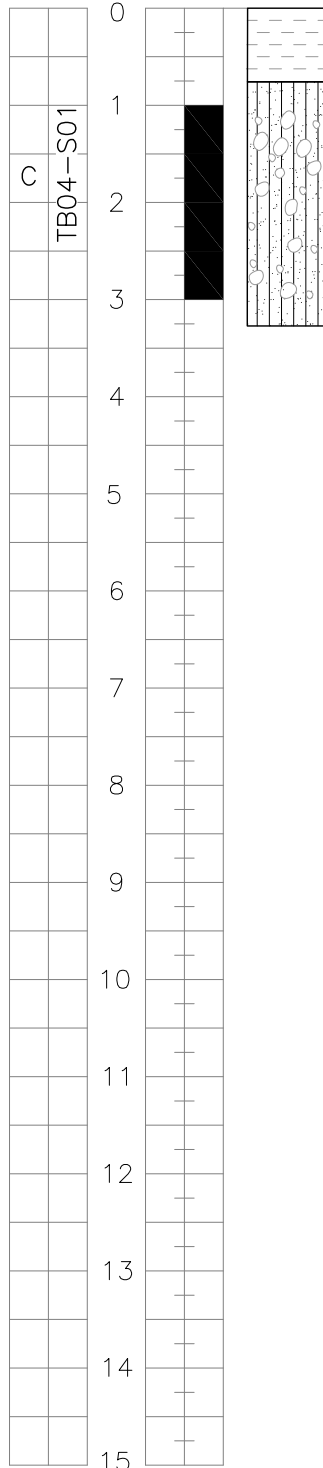
RECON, LLC

565 W. Recon Cir.
Palmer, Alaska 99645
Ph: (907) 746-3630

Project No.: _____ Sheet 1 of 1 Log #TB03
Project Name: 1000 Skies – Phase II
Location: Scattered Blk Spruce and brush
Method Used: 2.25" Solid Flight
Logged by: IJR
Date Begun: 11/11/2022
Rig Type: Tanaka Soil Auger
Contractor: RECON LLC
Date Comp.: 11/11/2022

GEOLOGIC LOG TEST BORE: TB04

Sample Method	Sample Number	Depth In Feet	Sample Interval	Frozen Interval	Graphic Log	Ground Elev.: 2523 FT Total Depth : 3.25 FT Bottom Elev.: Collar Elev.: Reference:	Vegetation: Black Spruce < 12" DBH Remarks:	Location: 1000 Skies Ph 2 Millennial Loop Ext N: 2,911,559 E: 1,472,473 Coord.: AKSP Z3
---------------	---------------	---------------	-----------------	-----------------	-------------	--	---	---



0.0' – 0.7' Moss and Organic Mat

0.7' – 3.25' Silty SAND (SM) w/ Gravel,
Hard, brown, moist, gravel clasts – rounded

TD @ 3.25'. Refusal
Interpreted as permafrost



Overcast, 12° F, 12" snow
Black Spruce and dwarf birch

RECON, LLC

565 W. Recon Cir.
Palmer, Alaska 99645
Ph: (907) 746-3630

Project No.:
Project Name: 1000 Skies – Phase II
Location: Located near seasonal pond
Method Used: 2.25" Solid Flight
Logged by: IJR
Date Begun: 11/11/2022
Sheet 1 of 1 Log #TB04
Rig Type: Tanaka Soil Auger
Contractor: RECON LLC
Date Comp.: 11/11/2022

AGGREGATE/SOILS TEST REPORT

PROJECT: 1000 SKIES
PROJECT NO.: 22-415
CLIENT: RECON
SAMPLE NO.: 22P1437
LOCATION: TP2+TP4

DATE TAKEN: 12/1/2022
DATE TESTED: 12/1/2022
TESTED BY: DEM
REVIEWED BY: JAB
DEPTH: UKN

SIEVE ANALYSIS TEST

(ASTM D422)

Sieve Size	Diameter (mm)	Total % Passing
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	98
3/4"	19.0	98
1/2"	12.7	91
3/8"	9.5	84
#4	4.75	69
#10	2.00	59
#20	0.85	52
#40	0.425	45
#60	0.25	40
#100	0.15	35
#200	0.075	28.9

% Gravel: 30.9
% Sand: 40.2
% Fines: 28.9
D60: 2.25
D30: 0.09
D10:
Cu:
Cc:
% .02 mm:
% Moisture: 10.9
Fine Modulus:

(ASTM D4318)

Liquid Limit:
Plastic Limit:
Plastic Index:

(ASTM C127)

Bulk SpG:
SSD SpG:
Apparent SpG:
% Absorption:

(ASTM C128)

Bulk SpG:
SSD SpG:
Apparent SpG:
% Absorption:

(ASTM D1557)

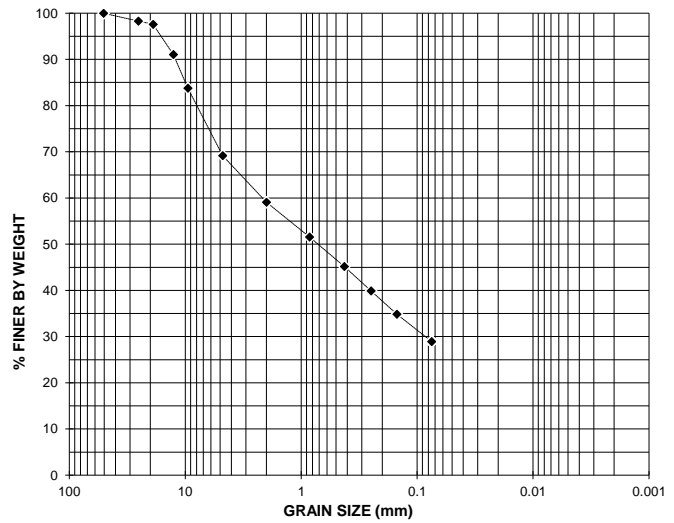
Dry Den (U):
Dry Den (C):
M% (U):
M% (C):

SpG (assumed):
M-D Test Method:

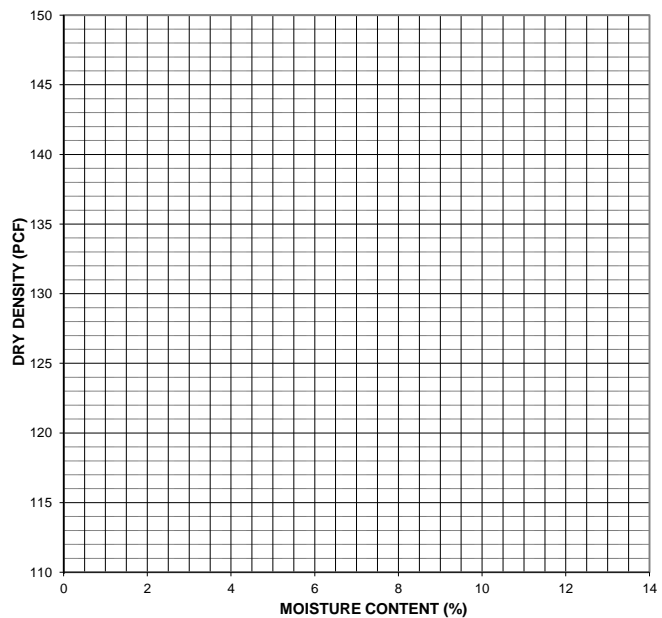
CLASSIFICATION: Silty Sand w/Gravel
USC: SM
FROST CLASS:

Remarks:

GRAIN SIZE DISTRIBUTION



MOISTURE-DENSITY RELATIONSHIP



JOHN A. BUZDOR, P.E. 12/2/2022

APPENDIX C

GEOTECHNICAL REPORT

SHANNON & WILSON

PHASE I

2017

**Geotechnical Data Report
One Thousand Skies Subdivision
Nelchina, Alaska**

May 2017



Submitted To:
Alaska Department of Natural Resources
550 West 7th Avenue, Suite 1230
Anchorage, Alaska 99501

By:

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Anchorage, Alaska 99518
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AECC125

E-mail: klb@sharwil.com

32-1-02580

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3.0 SUBSURFACE EXPLORATIONS.....	1
4.0 LABORATORY TESTING.....	3
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4	Frost Classification Legend
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7	Log of Boring B-2
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13	Log of Boring B-8
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A	Important Information About Your Geotechnical/Environmental Report
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*** GEOTECHNICAL DATA REPORT
ONE THOUSAND SKIES SUBDIVISION
NELCHINA, ALASKA**

1.0 INTRODUCTION

This report presents the results of subsurface explorations and laboratory testing conducted by Shannon & Wilson, Inc. at the proposed site for the One Thousand Skies Subdivision near Nelchina, Alaska. The purpose of this geotechnical study was to observe and document subsurface conditions. To accomplish this, we advanced nine geotechnical borings within the project area. Selected soil samples recovered from the borings were tested in our Anchorage laboratory. Presented in this report are descriptions of the site and project, subsurface exploration and laboratory test results, and an interpretation of subsurface conditions.

Authorization to proceed with this work was received in the form of a small procurement document (Agreement Number CT 170007898) from Ms. Marlys Hagen, Procurement Officer of Department of Natural Resources (DNR) on April 14, 2017. Our work was conducted in general accordance with our April 3, 2017 proposal.

2.0 SITE AND PROJECT DESCRIPTION

The project area is located near approximate milepost (MP) 136 of the Glenn Highway, approximately 7 miles west of Nelchina, Alaska. The proposed development consists of a new roadway south from the Glenn Highway in portions of Sections 1 and 12 of Township 2 North, Range 10 West, Copper River Meridian. The proposed new road alignment generally follows a local topographic high and slopes gently down to the south. At the time of our explorations, the project area was undeveloped and vegetation consisted of numerous spruce and alder trees with moss covering the ground surface. A vicinity map indicating the general project location is presented as Figure 1. A site plan, included as Figure 2, shows the approximate boring locations.

3.0 SUBSURFACE EXPLORATIONS

Subsurface explorations for this study consisted of drilling and sampling nine borings, designated Borings B-1 through B-9, along the proposed project alignment on May 3 and 4, 2017. The general proposed alignment was located by Mr. Clifford Baker of DNR and the boring locations were selected to provide relatively even coverage as directed by Mr. Baker. The boring locations, shown on Figure 2, were recorded with a handheld GPS unit that is generally

considered accurate to within 20 feet horizontally. It should be noted that GPS accuracy may be affected by geographic features, and atmospheric anomalies. Elevations shown on the boring logs were based on topographic contours provided by the DNR. The boring locations shown on the site plan and elevations shown on the boring logs should be considered approximate.

Drilling services for this project were provided by Discovery Drilling, using a track mounted CME-75 drill rig. Traffic control, including signage, flaggers, and lane closure coordination, was provided by Northern Dame Construction. An experienced engineer from our firm was present during drilling to locate the borings, observe drill action, collect samples, log subsurface conditions, and observe groundwater conditions.

The borings were advanced with 3¹/₄-inch inner diameter (ID), continuous flight, hollow-stem augers to depths ranging between 15.1 and 16.5 feet below ground surface (bgs). The final depth of the borings was dependent upon the penetration of the final sample. As the borings were advanced, samples were typically recovered using modified penetration test (MPT) methods at 2.5-foot intervals to 10 feet bgs with a final sample at 15 feet bgs. In the MPT method, samples are recovered by driving a 3-inch outer diameter (OD) split-spoon sampler into the bottom of the advancing hole with blows of a 340-pound hammer free falling 30 inches onto the drill rod. The number of blows required to advance the sampler the final 12 inches of an 18-inch penetration is termed the penetration resistance. Where the sampler did not penetrate the full 18 inches, our logs report the total blow count and corresponding penetration in inches. Blow counts are shown graphically on the boring logs as "penetration resistance" and are displayed adjacent to sample depth. The penetration resistance values give a measure of the relative density (compactness) or consistency (stiffness) of cohesionless or cohesive soils, respectively. In addition to the split-spoon samples, a grab sample of the near-surface soils was collected from the auger cuttings in the upper 2 feet of each boring.

The soils that were encountered in the borings were observed and described in the field in general accordance with the classification system described by ASTM International (ASTM) D2488. Selected samples recovered during drilling were tested in our laboratory to refine our soil descriptions in general accordance with the Unified Soil Classification System (USCS) described in Figure 3. Frost classifications were also estimated for samples based on laboratory testing (sieve analyses and percent passing the Number 200 sieve [P-200]) and are shown on the boring logs. The frost classification system is presented in Figure 4 and a legend to the frozen soil classification system is presented as Figure 5. Summary logs of the borings are presented in Figures 6 through 14.

Borings were backfilled with auger cuttings and in Borings B-3, B-5, and B-6, 1-inch PVC groundwater level monitoring casing was installed to the bottom of the borings to facilitate static water level measurements.

4.0 LABORATORY TESTING

Laboratory tests were performed on selected soil samples recovered from the borings. The laboratory testing was formulated with emphasis on determining gradation properties, natural water content, frost characteristics, and plasticity.

Water content tests were performed on the samples returned to our laboratory. Water content tests were performed in general accordance with ASTM D2216. The results of the water content measurements are presented graphically on the boring logs in Figures 6 through 14.

Grain size classification (gradation) testing was performed to estimate the particle size distribution of selected samples from the borings. The gradation testing generally followed the procedures described in ASTM C117/C136 and ASTM D421/422. The test results are presented in Figure 15 and summarized on the boring logs as percent gravel, percent sand, and percent fines. Percent fines on the boring logs are equal to the sum of the silt and clay fractions indicated by the percent passing the No. 200 sieve.

5.0 SUBSURFACE CONDITIONS

The subsurface conditions encountered in our explorations are presented graphically on the boring logs included in Figures 6 through 14. The borings generally encountered approximately 2 inches of moss and ground cover vegetation at the surface followed by granular material with varying amounts of silt and occasional fine grained layers. The seasonal frost zone generally extended from the surface to between 4 and 6.5 feet bgs in our borings, although the delineation of frozen material was difficult to discern due to the lack of excess ice, relatively weak ice bonding, the material type, and the compactness of the soils. Permafrost was noted in Borings B-5 and B-8 from approximately 10 feet bgs to the bottom of each boring, 15.3 and 15.5 feet bgs, respectively. Visible ice classified as Vr (random ice formations) to Vx (individual ice crystals) was observed in Boring B-4, Sample S2, Boring B-5, Sample S2, and Boring B-8, Sample S5b. Visible ice volume was estimated at 5 to 10 percent and ice crystal size was recorded from 1 to 3 millimeters. The remaining frozen soils were classified as Nf to Nbn (poorly bonded to well bonded).

Native material was dominated by silty sand with gravel but also contained silty gravel with sand and occasional cleaner (less than 12 percent fines) layers. Organic material was noted in the upper 2 feet of each boring. The material tested was generally moderately to highly frost susceptible (F3) and blow counts indicate that the non-frozen soils were very dense. Elevated blow counts were observed in the frozen soils and are considered unreliable in estimating soil density due to ice bonding. Moisture contents ranged from approximately 2 to 20 percent, with the higher values generally associated with fine grained material or surface soils.

Groundwater was not encountered during drilling except for Boring B-6, which found a significantly wetter zone at approximately 15 feet bgs. Note that water levels may fluctuate by several feet seasonally and may vary during periods of high precipitation or rapid snow melt.

6.0 CLOSURE AND LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives for evaluating the site as it relates to the geotechnical aspects discussed herein. The conclusions contained in this report are based on site conditions as they presently exist. It is assumed that the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations.

If there is a substantial lapse of time between the submittal of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the conclusions considering the changed conditions and time lapse. Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely taking soil samples or advancing borings. Shannon & Wilson has prepared the attachments in Appendix A *Important Information About Your Geotechnical/Environmental Report* to assist you and others in understanding the use and limitations of the reports.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT ²	FINE-GRAINED SOILS (50% or more fines) ¹	COARSE-GRAINED SOILS (less than 50% fines) ¹
Major	<i>Silt, Lean Clay, Elastic Silt, or Fat Clay³</i>	<i>Sand or Gravel⁴</i>
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: <i>Sandy or Gravelly⁴</i>	More than 12% fine-grained: <i>Silty or Clayey³</i>
Minor Follows major constituent	15% to 30% coarse-grained: <i>with Sand or with Gravel⁴</i> 30% or more total coarse-grained and lesser coarse-grained constituent is 15% or more: <i>with Sand or with Gravel⁵</i>	5% to 12% fine-grained: <i>with Silt or with Clay³</i> 15% or more of a second coarse-grained constituent: <i>with Sand or with Gravel⁵</i>

¹All percentages are by weight of total specimen passing a 3-inch sieve.

²The order of terms is: *Modifying Major with Minor*.

³Determined based on behavior.

⁴Determined based on which constituent comprises a larger percentage.

⁵Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.
NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.	

PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND Fine Medium Coarse	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.) #40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.) #10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL Fine Coarse	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.) 3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS

	Bentonite Cement Grout		Surface Cement Seal
	Bentonite Grout		Asphalt or Cap
	Bentonite Chips		Slough
	Silica Sand		Inclinometer or Non-perforated Casing
	Perforated or Screened Casing		Vibrating Wire Piezometer

PERCENTAGES TERMS ^{1,2}

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

¹Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

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One Thousand Skies Subdivision
Nelchina, Alaska

SOIL DESCRIPTION AND LOG KEY

May 2017

32-1-02580

SW SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 1 of 3

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)					
MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL	TYPICAL IDENTIFICATIONS	
COARSE-GRAINED SOILS (more than 50% retained on No. 200 sieve)	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Gravel (less than 5% fines)	GW		Well-Graded Gravel; Well-Graded Gravel with Sand
			GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel (more than 12% fines)	GM		Silty Gravel; Silty Gravel with Sand
			GC		Clayey Gravel; Clayey Gravel with Sand
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Sand (less than 5% fines)	SW		Well-Graded Sand; Well-Graded Sand with Gravel
			SP		Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand (more than 12% fines)	SM		Silty Sand; Silty Sand with Gravel
			SC		Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS (50% or more passes the No. 200 sieve)	Sils and Clays (liquid limit less than 50)	Inorganic	ML		Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Sils and Clays (liquid limit 50 or more)	Inorganic	MH		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat or other highly organic soils (see ASTM D4427)

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

1. Dual symbols (symbols separated by a hyphen, i.e., SP-SM, Sand with Silt) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).
2. Borderline symbols (symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand) indicate that the soil properties are close to the defining boundary between two groups.

One Thousand Skies Subdivision
Nelchina, Alaska

SOIL DESCRIPTION AND LOG KEY

May 2017

32-1-02580



SHANNON & WILSON, INC.
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FIG. 3
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS¹

Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

PLASTICITY²

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASTICITY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20
High	It takes considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS¹

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q _u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS¹

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

One Thousand Skies Subdivision
Nelchina, Alaska

SOIL DESCRIPTION AND LOG KEY

May 2017

32-1-02580

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FIG. 3
Sheet 3 of 3

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FROST CLASSIFICATION

(after Municipality of Anchorage, 2009 Rev. 3)

GROUP		0.02 Mil.	P-200*	USC SYSTEM (based on P-200 results)
NFS	Sandy Soils	0 to 3	0 to 6	SW, SP, SW-SM, SP-SM
	Gravelly Soils	0 to 3	0 to 6	GW, GP, GW-GM, GP-GM
F1	Gravelly Soils	3 to 10	6 to 13	GM, GW-GM, GP-GM
F2	Sandy Soils	3 to 15	6 to 19	SP-SM, SW-SM, SM
	Gravelly Soils	10 to 20	13 to 25	GM
F3	Sands, except very fine silty sands**	Over 15	Over 19	SM, SC
	Gravelly Soils	Over 20	Over 25	GM, GC
	Clays, PI>12			CL, CH
F4	All Silts			ML, MH
	Very fine silty sands**	Over 15	Over 19	SM, SC
	Clays, PI<12			CL, CL-ML
	Varved clays and other finer grained, banded sediments			CL and ML CL, ML, and SM; SL, SH, and ML; CL, CH, ML, and SM

PI = Plasticity Index

P-200 = Percent passing the number 200 sieve

0.02 Mil. = Percent material below 0.02 millimeter grain size

*Approximate P-200 value equivalent for frost classification.
Value range based on typical, well-graded soil curves.

** Very fine sand : greater than 50% of sand
fraction passing the number 100 sieve

One Thousand Skies Subdivision
Nelchina, Alaska

FROST CLASSIFICATION LEGEND

May 2017

32-1-02580



SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. 4

FROZEN SOIL CLASSIFICATION SYSTEM

Description		Designation
Segregated ice is not visible by eye	Friable, poorly-bonded * Material is easily broken up	Nf *
	Well bonded, soil particles strongly held together by ice	Nbn
	Excess ice	Nbe
Segregated ice is visible by eye (less than 1-inch thick)	Individual ice crystals or inclusions	Vx
	Ice coatings on soil particles	Vc
	Stratified or distinctly oriented ice formations	Vs
	Randomly or irregularly oriented ice formations	Vr
Ice greater than 1-inch thick	Ice with soil inclusions	ICE+ soil type
	Ice without soil inclusions	ICE

Based on Linell, K.A. and C.W. Kaplar 1966. Description and classification of frozen soils. *U.S. Army Cold Regions Research & Engineering Laboratory, Technical Report 150*. Hanover, NH

One Thousand Skies Subdivision
Nelchina, Alaska

FROZEN SOIL CLASSIFICATION LEGEND

May 2017

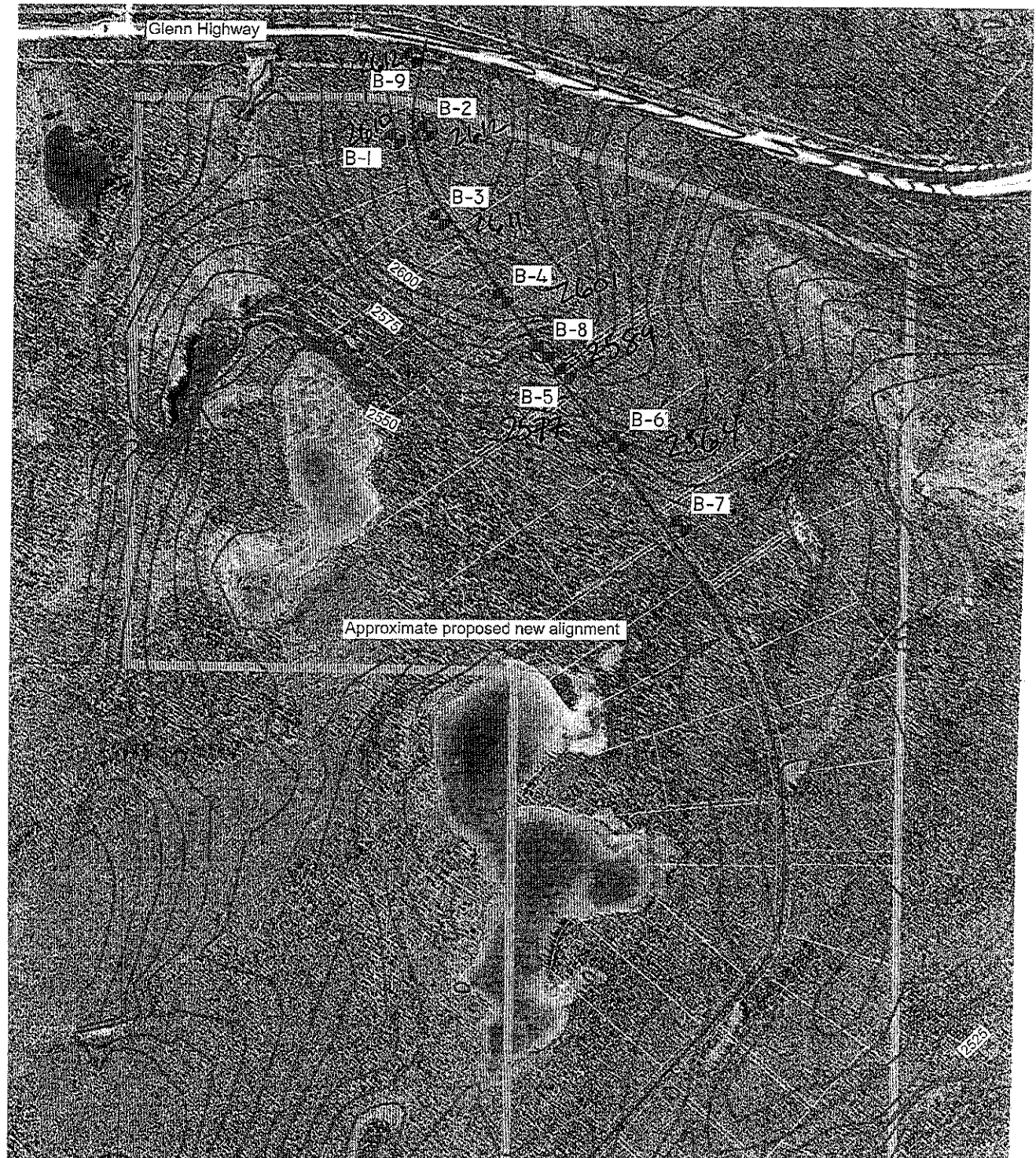
32-1-02580



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FIG. 5

5,000 sf skg. area

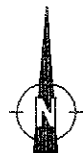


Adapted from drawing provided by Department of Natural Resources.
Contour interval = 5 feet

LEGEND

B-1  Approximate Location of Boring B-1, Advanced by
Shannon & Wilson, May 2017

0 500 1000 2000
APPROXIMATE SCALE IN FEET



One Thousand Skies Subdivision
Nelchina, Alaska

SITE PLAN

May 2017

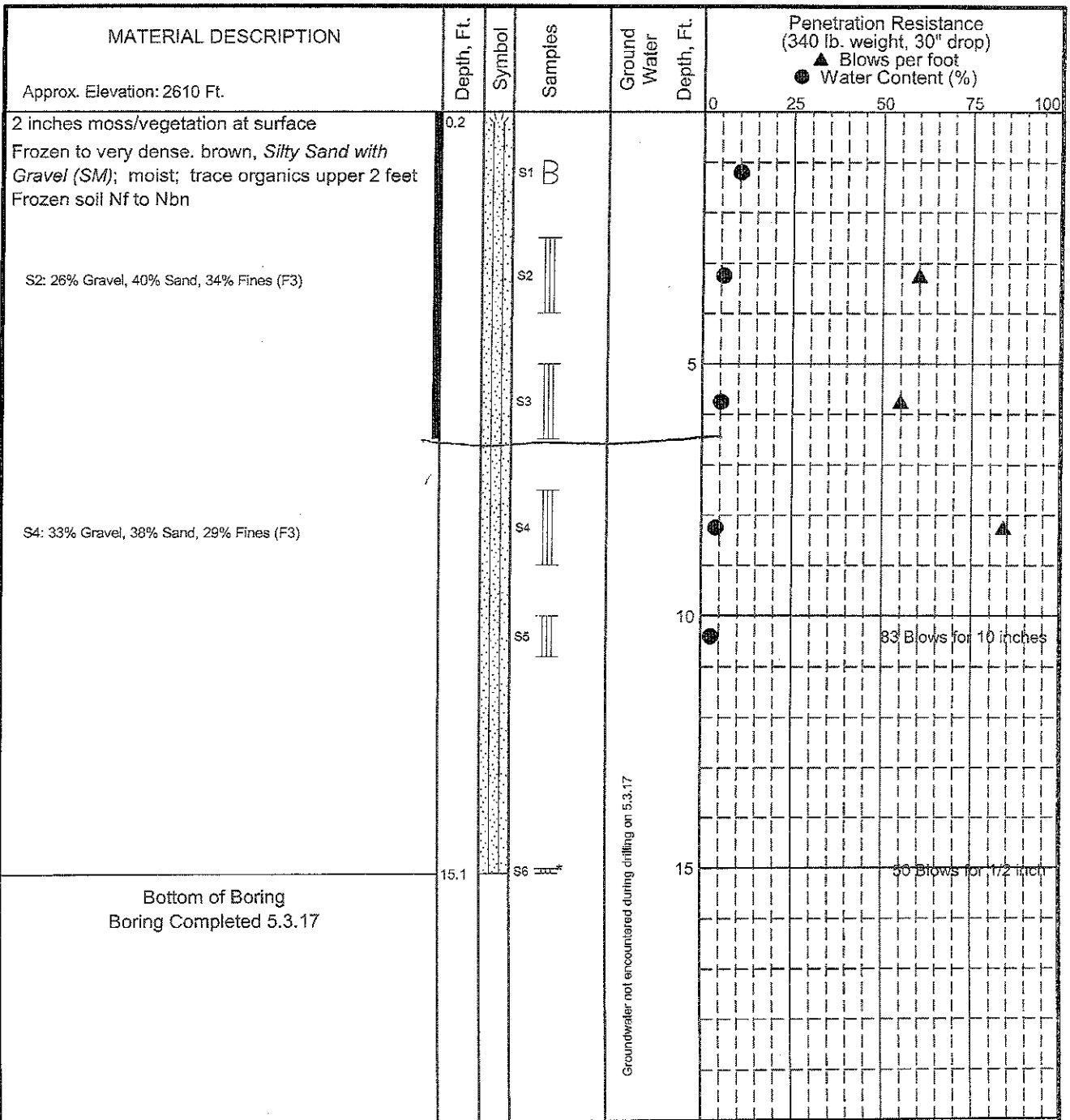
32-1-02580



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FIG. 2

No
Soils
Report



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-1

May 2017

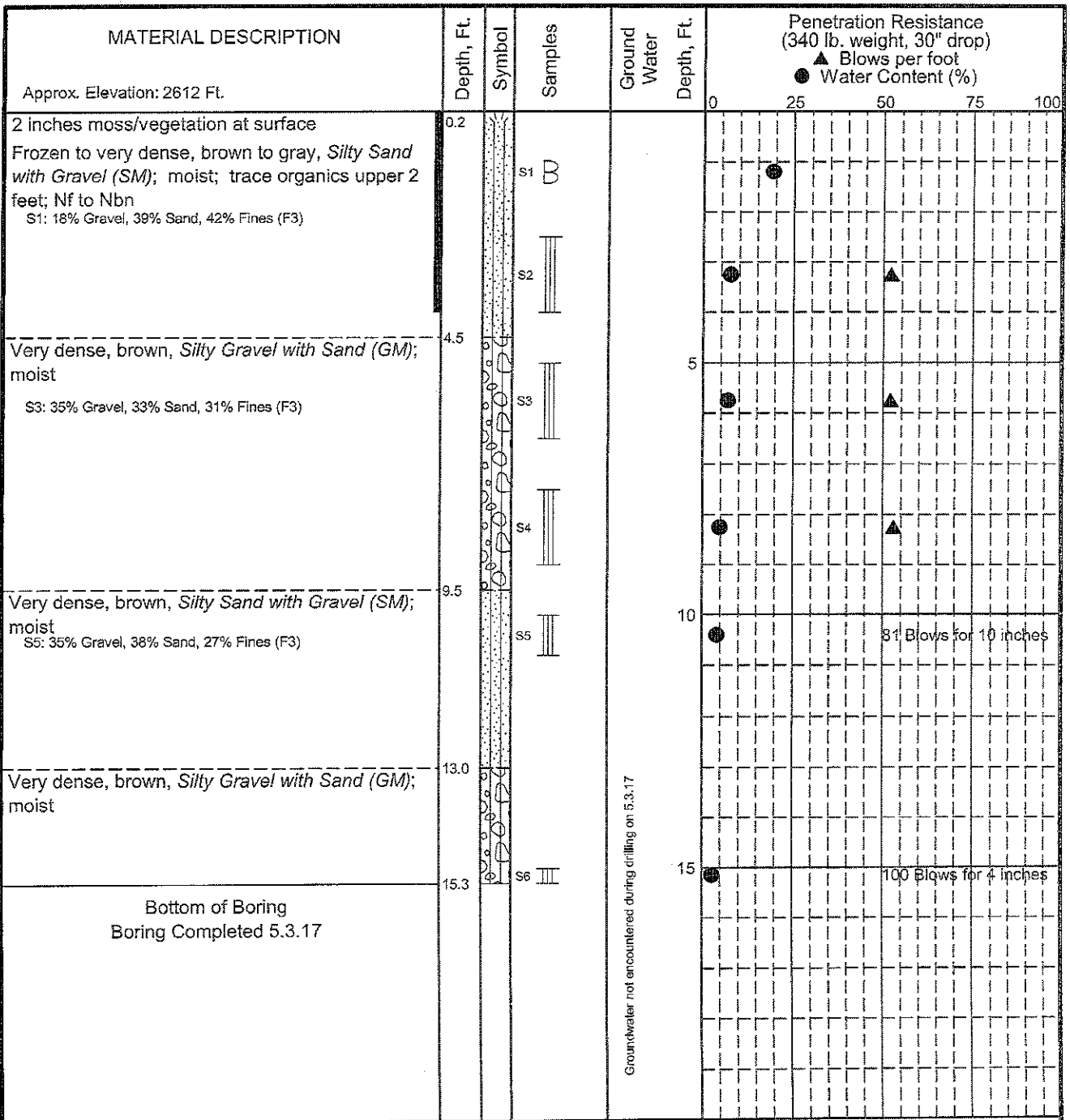
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FIG. 6

GEOTECHNICAL LOG 02580 GINT.GPJ S&W GE01.GDT 5/18/17



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- ||| 3" O.D. Split Spoon Sample
- Frozen

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

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One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-2

May 2017

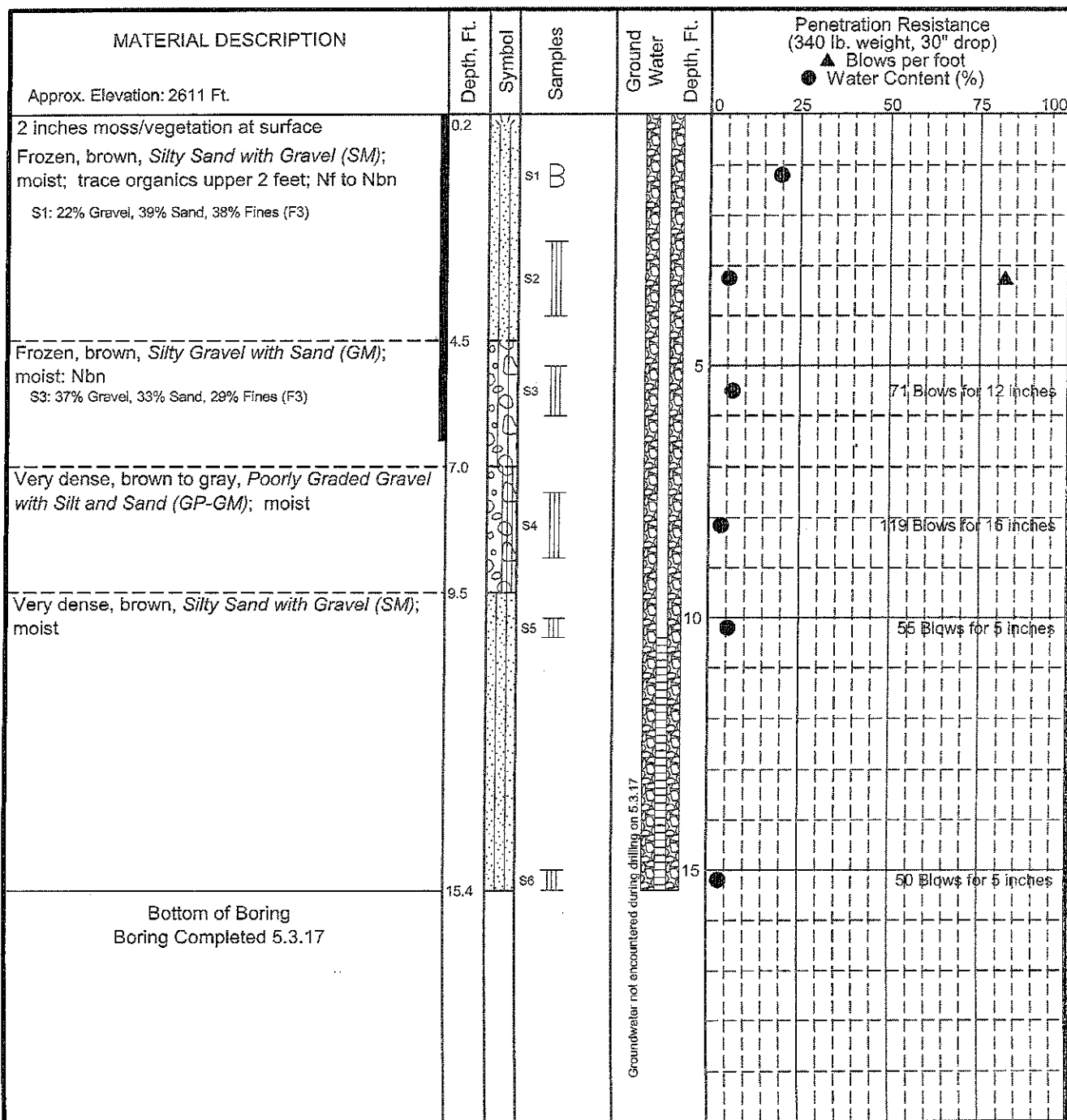
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FIG. 7

GEOTECHNICAL LOG 02580 CINT GPU S&W GE01.GDT 5/18/17

REV 3 - Approved for Submittal



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen
- Blank Section, Cuttings Backfill
- Slotted Section, Cuttings Backfill

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

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- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
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One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-3

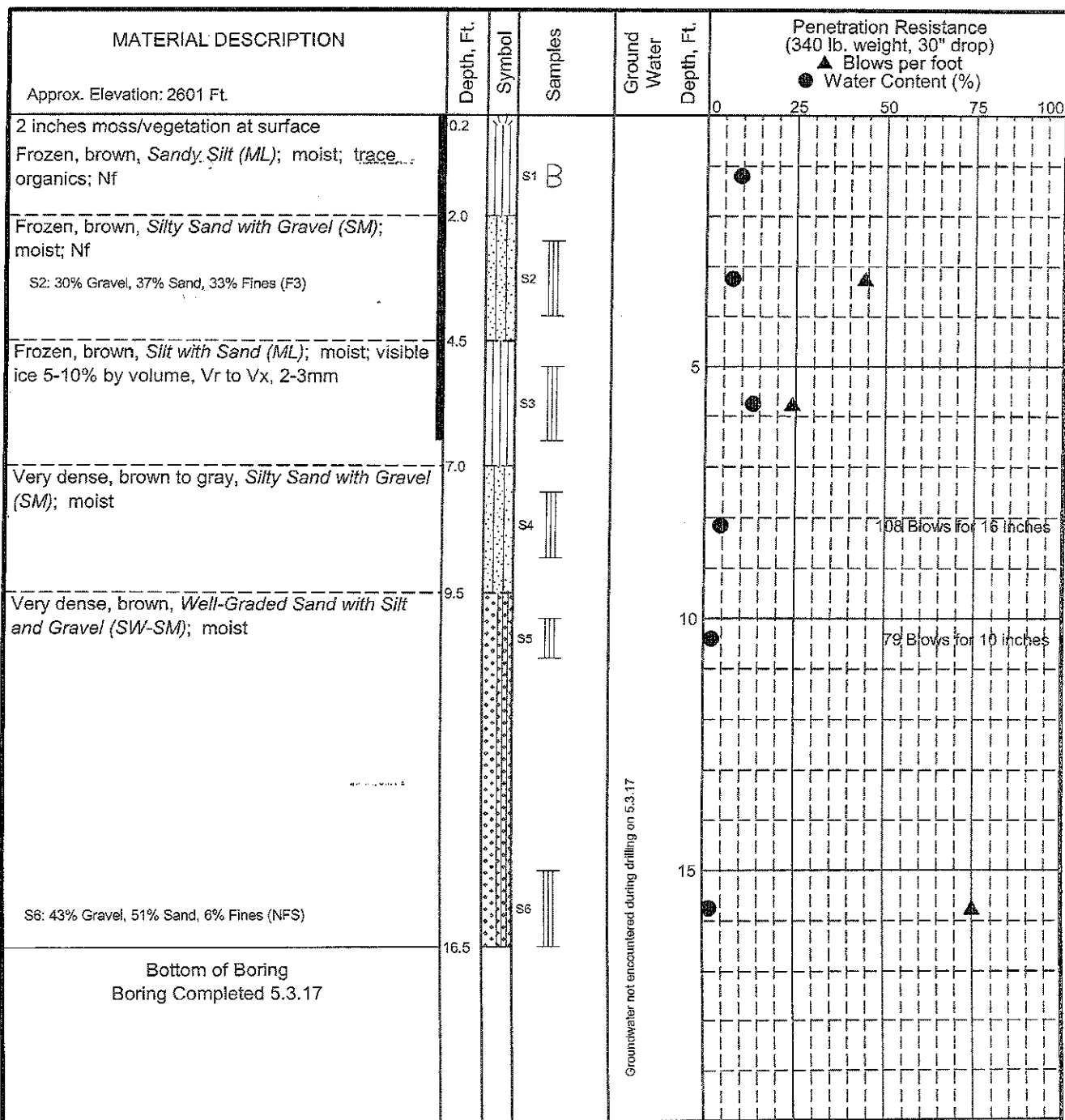
May 2017

32-1-02580

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FIG. 8

GEOTECHNICAL LOG 02580 GINT.GPJ S&W GEO1.GDT 5/18/17



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

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- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-4

May 2017

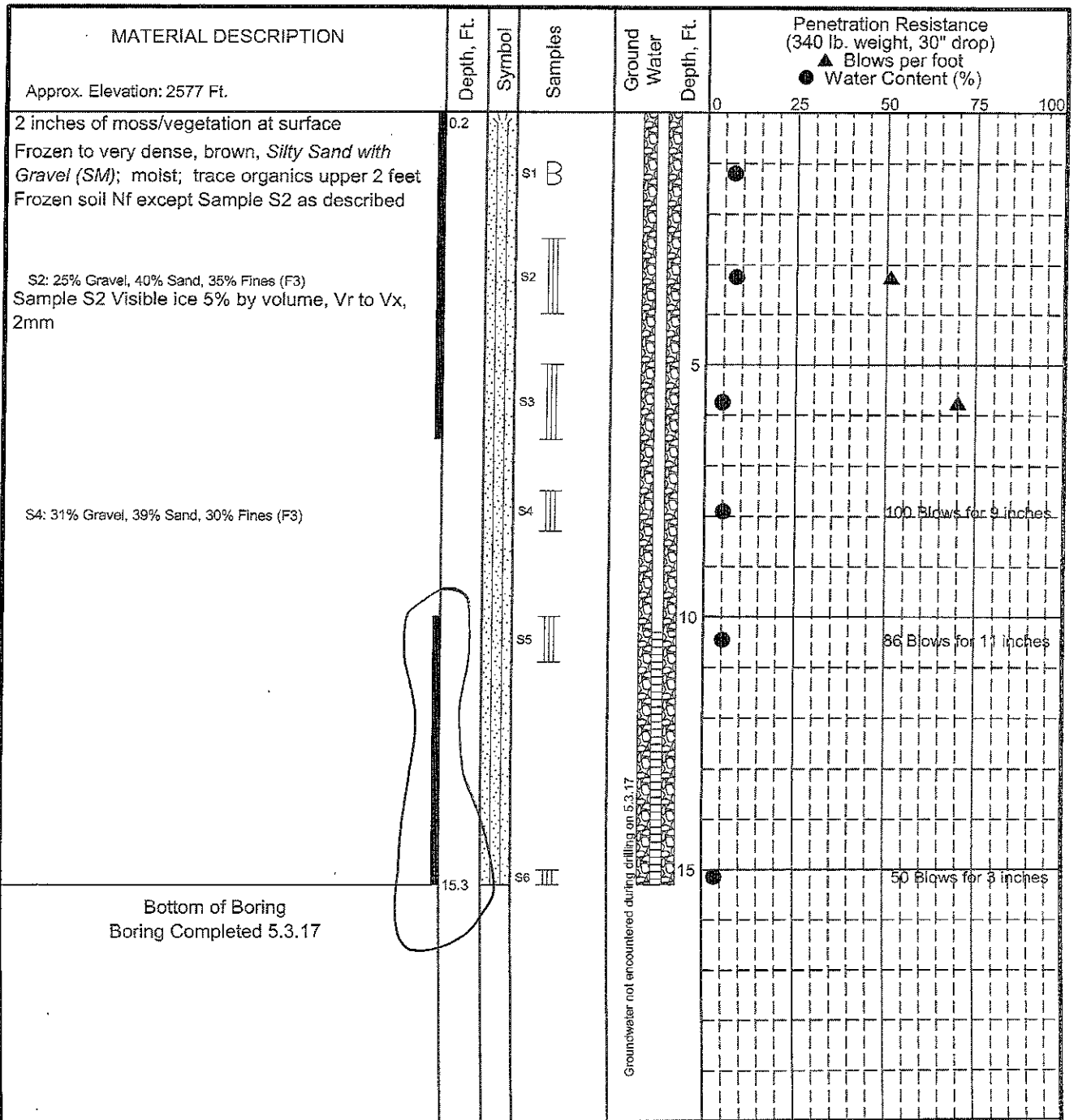
32-1-02580

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FIG. 9

GEOTECHNICAL LOG 02580 GINT.GPJ S&W GEO1.GDT 5/18/17

REV 3 - Approved for Submittal



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- Blank Section, Cuttings Backfill
- Slotted Section, Cuttings Backfill

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

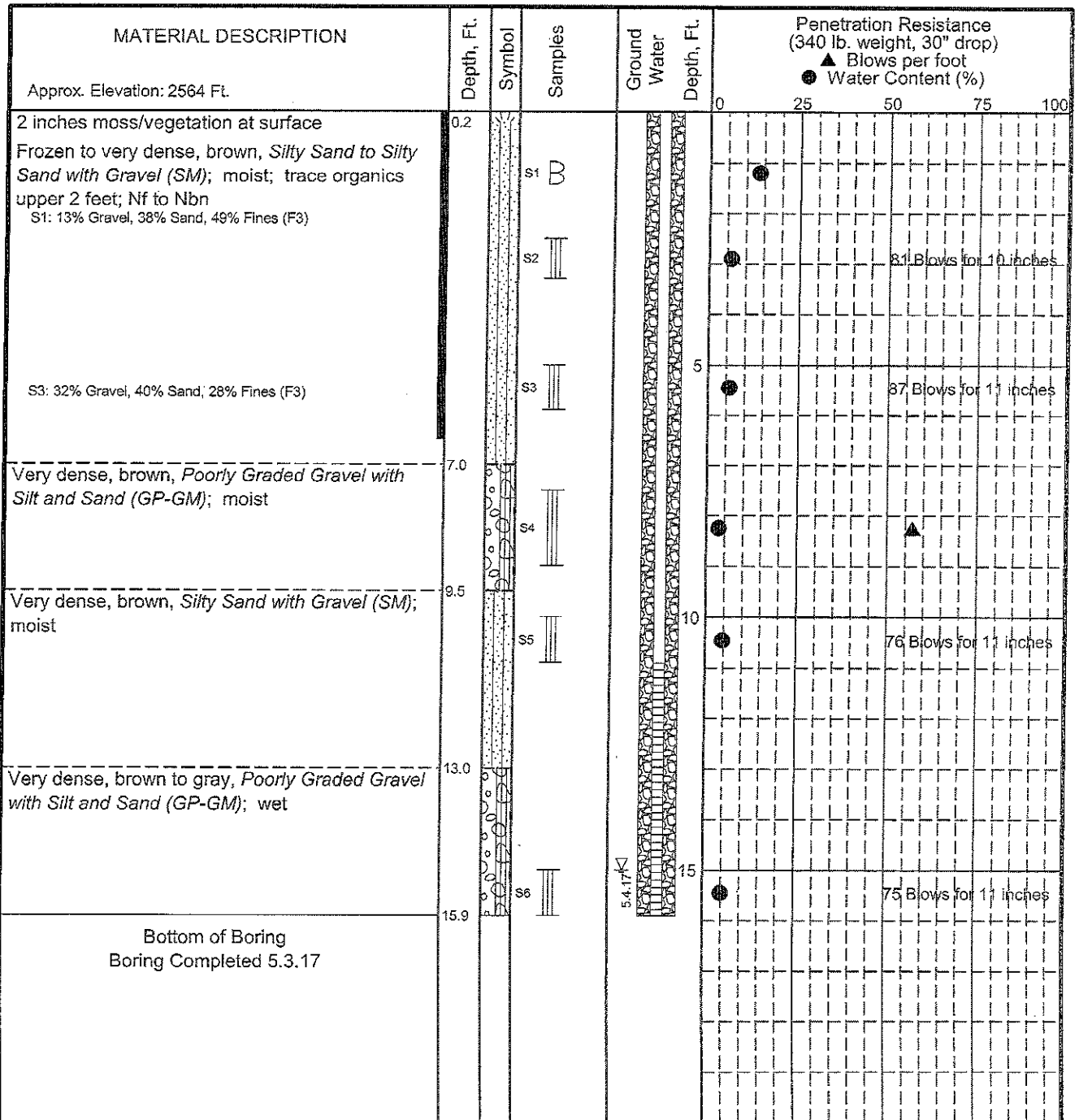
LOG OF BORING B-5

May 2017

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FIG. 10



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- ▽ Ground Water Level At Time Of Drilling
- Blank Section, Cuttings Backfill
- Slotted Section, Cuttings Backfill

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-6

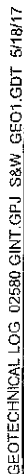
May 2017

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FIG. 11

GEOTECHNICAL LOG 02580 GINT.GPJ SAW GEO1.GDT 5/18/17



● Water Content (%)

Plastic Limit ———●———— Liquid Limit

Natural Water Content

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

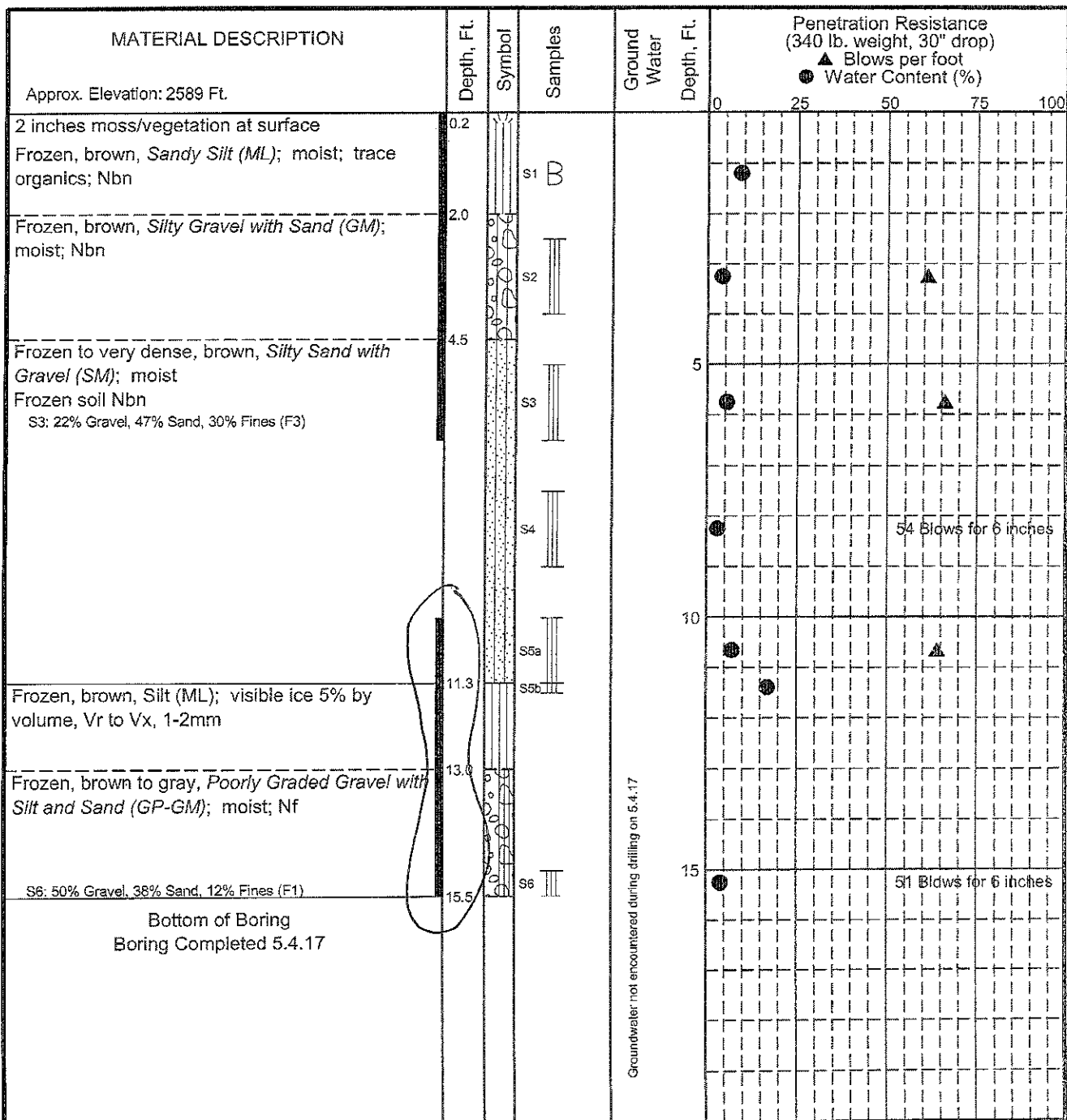
LOG OF BORING B-7

May 2017

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FIG. 12



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-8

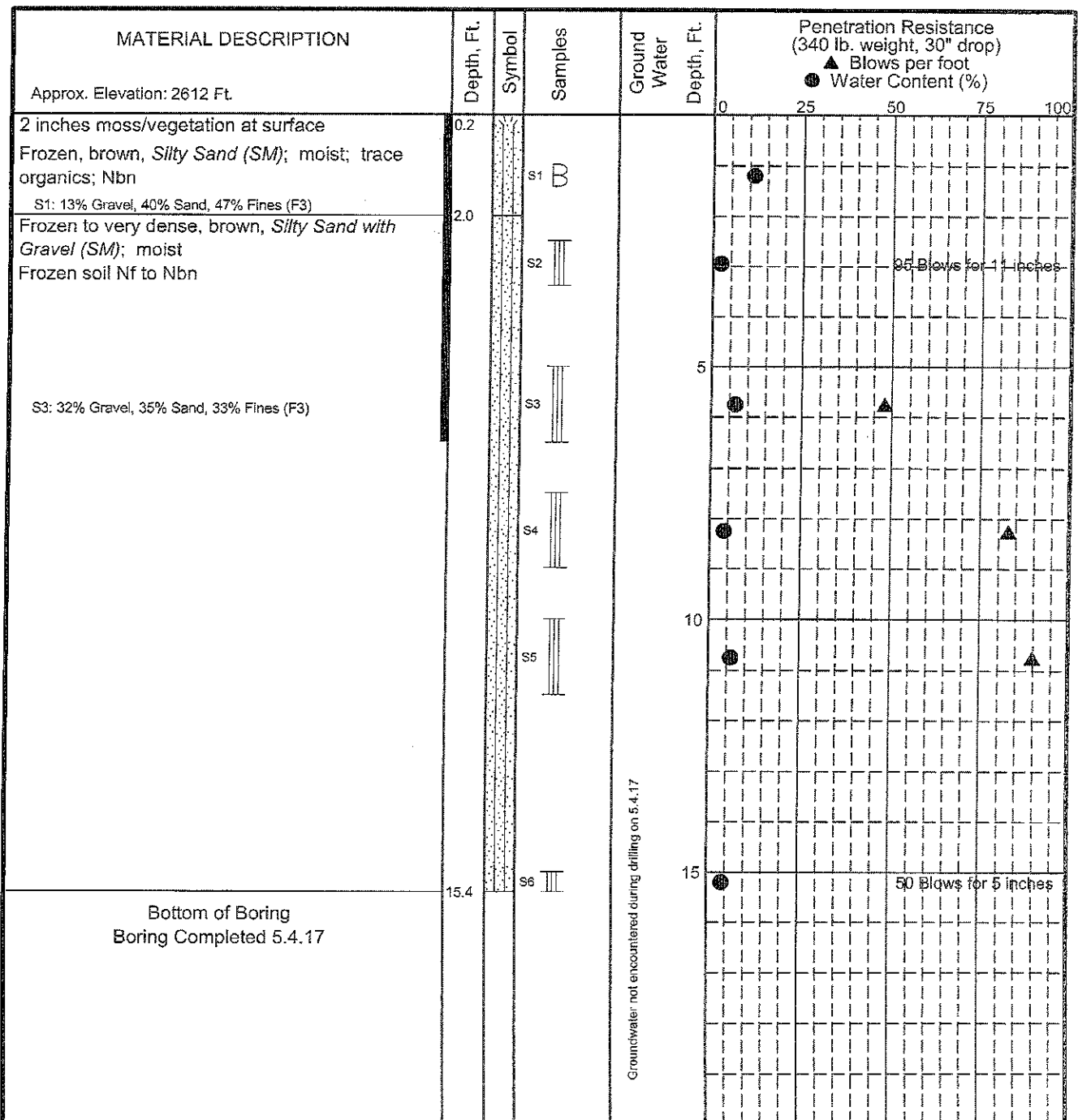
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FIG. 13

GEOTECHNICAL LOG 02580 GINT.GPJ S&W GEOLOGIST 5/18/17



LEGEND

- * Sample Not Recovered
- B Auger Cuttings
- III 3" O.D. Split Spoon Sample
- Frozen

- Water Content (%)
- Plastic Limit —●— Liquid Limit
- Natural Water Content

NOTES

- The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
- The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
- Water level, if indicated above, is for the date specified and may vary.

One Thousand Skies Subdivision
Nelchina, Alaska

LOG OF BORING B-9

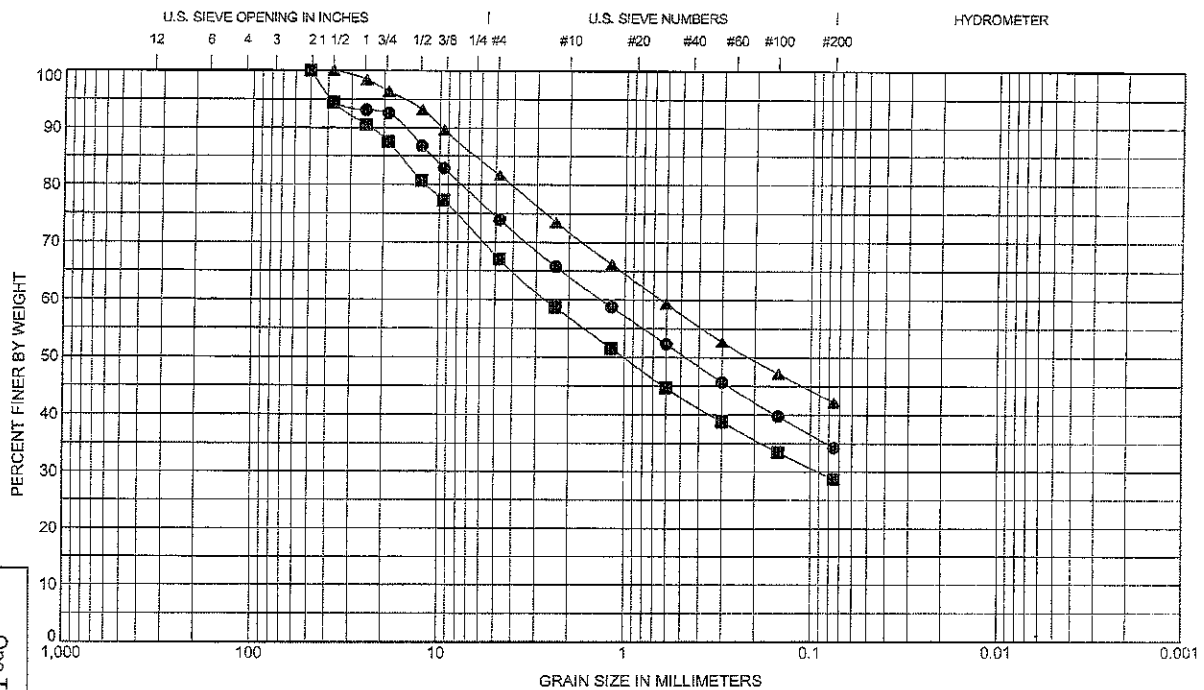
May 2017

32-1-02580

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FIG. 14

GEOTECHNICAL LOG 02580 GINT.GPJ S&W GEOLOGIST 5/18/17



COBBLES	GRAVEL		SAND			SILT OR CLAY				
	coarse	fine	coarse	medium	fine	LL	PL	PI	Cc	Cu
Sample	Depth, Ft		Classification							
● B-1 S2	2.5 - 4.0		Silty Sand with Gravel (SM)							
■ B-1 S4	7.5 - 9.0		Silty Sand with Gravel (SM)							
▲ B-2 S1	0.2 - 1.7		Silty Sand with Gravel (SM)							
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● B-1 S2	2.5 - 4.0	50	1.34			26	40	34		
■ B-1 S4	7.5 - 9.0	50	2.65	0.09		33	38	29		
▲ B-2 S1	0.2 - 1.7	37.5	0.64			18	39	42		

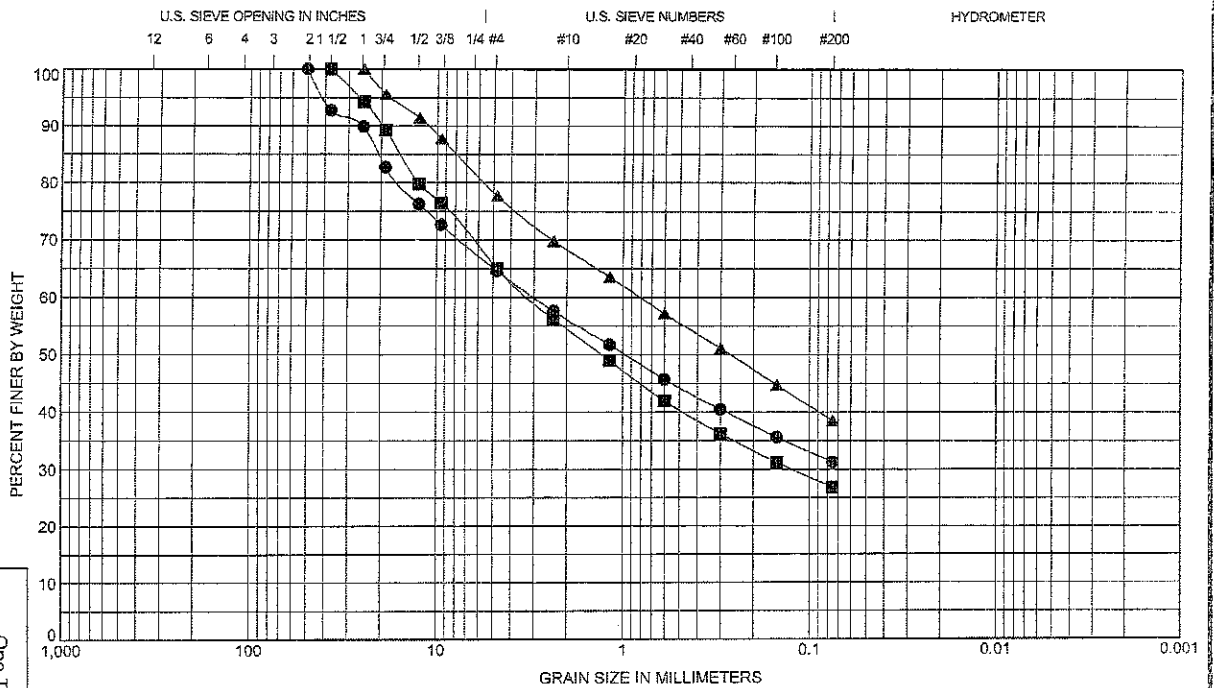
GRAIN SIZE CLASSIFICATION

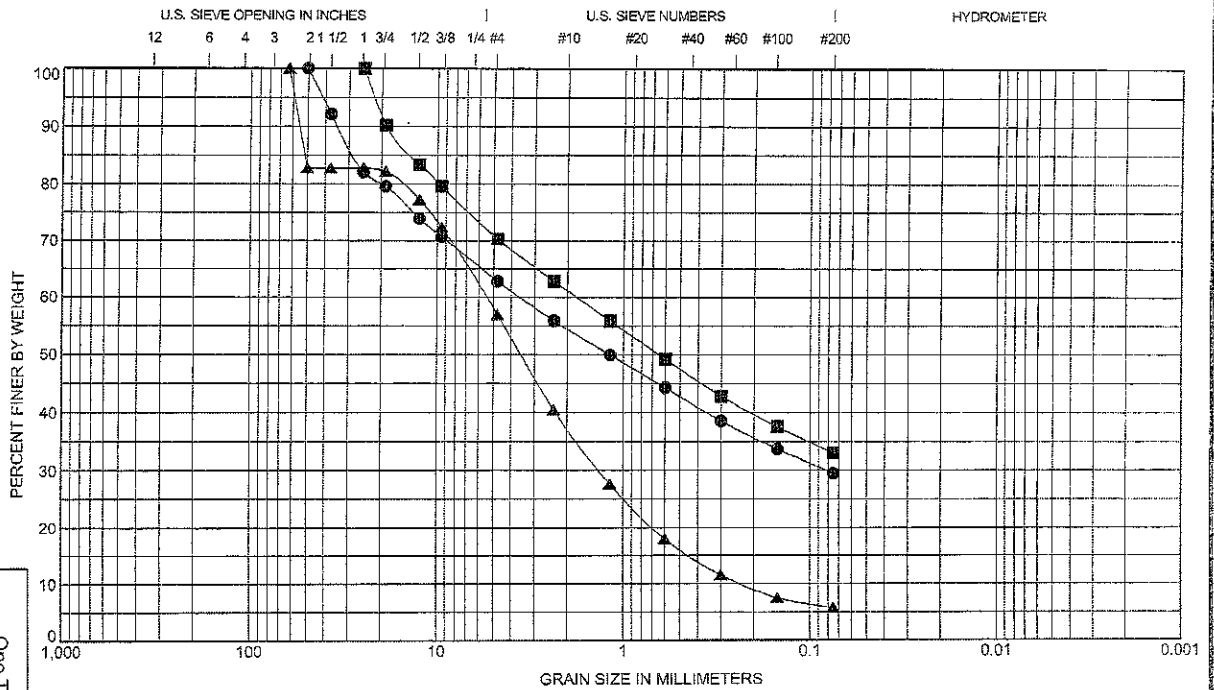
One Thousand Skies Subdivision
Nelchina, Alaska

May 2017

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32-1-02580
FIG. 15
Sheet 1 of 7





COBBLES		GRAVEL		SAND			SILT OR CLAY					
		coarse	fine	coarse	medium	fine						
Sample	Depth, Ft	Classification						LL	PL	PI	Cc	Cu
● B-3 S3	5.0 - 6.5	Silty Gravel with Sand (GM)										
■ B-4 S2	2.5 - 4.0	Silty Sand with Gravel (SM)										
▲ B-4 S6	15.0 - 16.5	Well-Graded Sand with Silt and Gravel (SW-SM)									1.4	23.6
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay		
● B-3 S3	5.0 - 6.5	50	3.58	0.08		37	33			29		
■ B-4 S2	2.5 - 4.0	25	1.79			30	37			33		
▲ B-4 S6	15.0 - 16.5	63	5.45	1.34	0.23	43	51			6		

GRAIN SIZE CLASSIFICATION

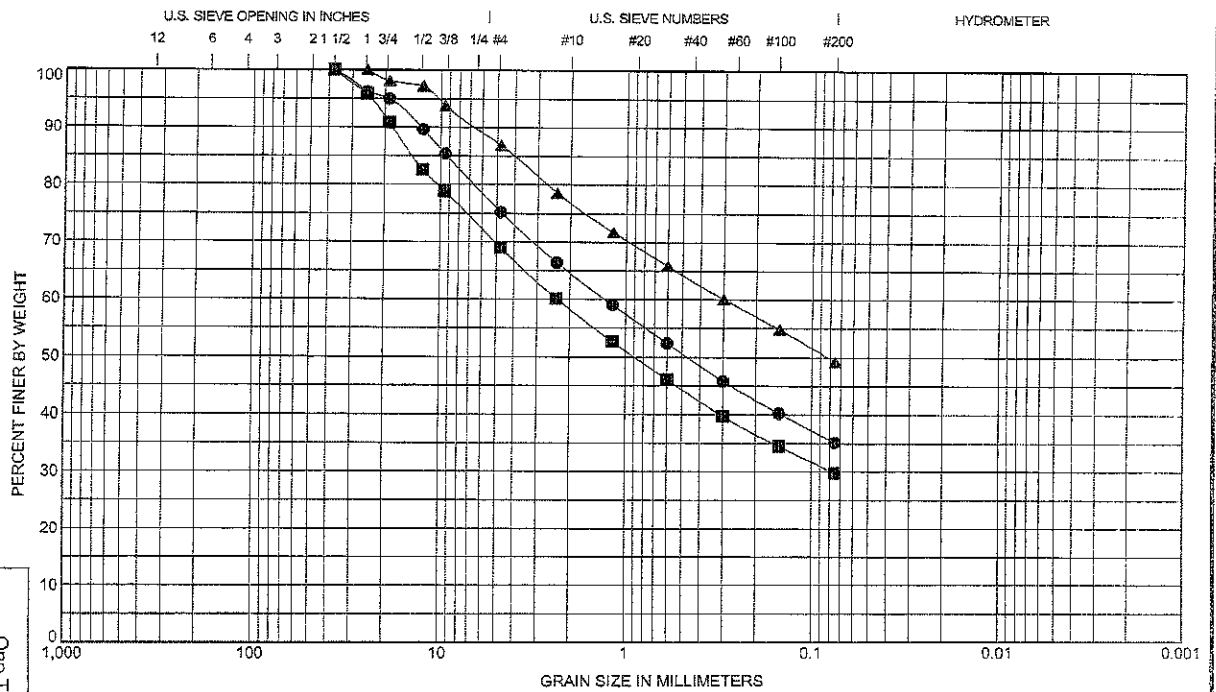
One Thousand Skies Subdivision
Nelchima, Alaska

May 2017

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FIG. 15
Sheet 3 of 7

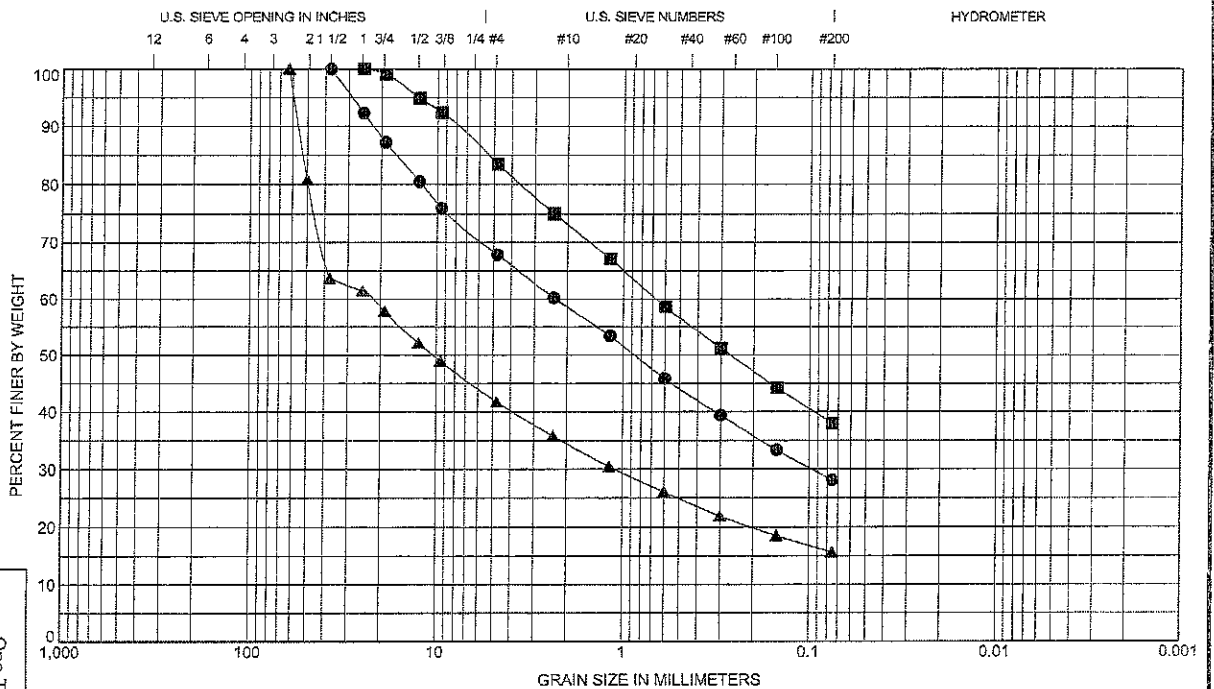
32-1-02580



COBBLES		GRAVEL		SAND			SILT OR CLAY				
		coarse	fine	coarse	medium	fine					
Sample	Depth, Ft	Classification									
● B-5 S2	2.5 - 4.0	Silty Sand with Gravel (SM)									LL
■ B-5 S4	7.5 - 9.0	Silty Sand with Gravel (SM)									PL
▲ B-6 S1	0.2 - 1.7	Silty Sand (SM)									PI
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		Cc
● B-5 S2	2.5 - 4.0	37.5	1.29			25	40		35		
■ B-5 S4	7.5 - 9.0	37.5	2.34	0.08		31	39		30		
▲ B-6 S1	0.2 - 1.7	25	0.3			13	38		49		

One Thousand Skies Subdivision
Nelchina, Alaska

GRAIN SIZE CLASSIFICATION



COBBLES		GRAVEL		SAND			SILT OR CLAY					
		coarse	fine	coarse	medium	fine						
Sample	Depth, Ft	Classification						LL	PL	PI	Cc	Cu
● B-6 S3	5.0 - 6.5	Silty Sand with Gravel (SM)										
■ B-7 S2	2.5 - 4.0	Silty Sand with Gravel (SM)										
▲ B-7 S4	7.5 - 9.0	Silty Gravel with Sand (GM)										
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
● B-6 S3	5.0 - 6.5	37.5	2.31	0.1		32	40	28				
■ B-7 S2	2.5 - 4.0	25	0.67			16	46	38				
▲ B-7 S4	7.5 - 9.0	63	22.45	1.1		58	26	16				

One Thousand Skies Subdivision
Nelchira, Alaska

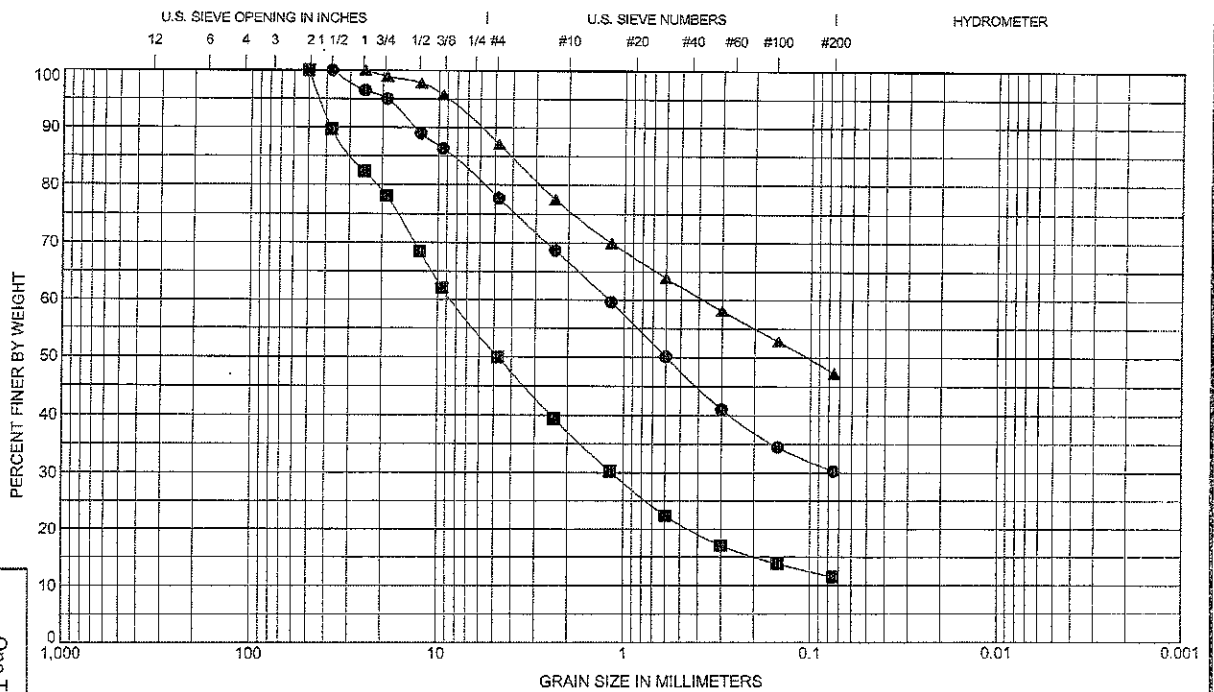
GRAIN SIZE CLASSIFICATION

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Geotechnical and Environmental Consultants

32-1-02580

FIG. 15
Sheet 5 of 7



COBBLES		GRAVEL		SAND			SILT OR CLAY				
		coarse	fine	coarse	medium	fine					
Sample	Depth, Ft	Classification					LL	PL	PI	Cc	Cu
● B-8 S3	5.0 - 6.5	Silty Sand with Gravel (SM)									
■ B-8 S6	15.0 - 16.5	Poorly Graded Gravel with Silt and Sand (GP-GM)								3.3	178.3
▲ B-9 S1	0.2 - 1.7	Silty Sand (SM)									
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● B-8 S3	5.0 - 6.5	37.5	1.21			22	47	30			
■ B-8 S6	15.0 - 16.5	50	8.45	1.15		50	38	12			
▲ B-9 S1	0.2 - 1.7	25	0.38			13	40	47			

One Thousand Skies Subdivision
Natchina, Alaska

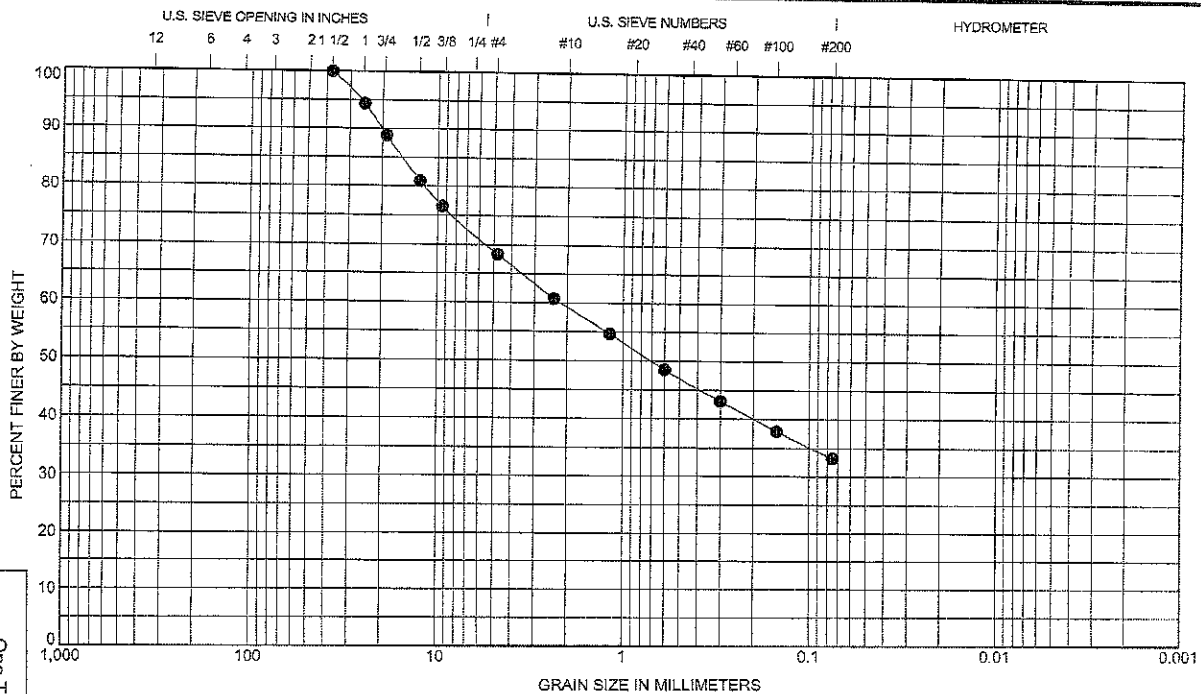
GRAIN SIZE CLASSIFICATION

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Geotechnical and Environmental Consultants

FIG. 15
Sheet 6 of 7

32-1-02580



COBBLES		GRAVEL		SAND			SILT OR CLAY					
		coarse	fine	coarse	medium	fine						
Sample	Depth, Ft	Classification						LL	PL	PI	Cc	Cu
● B-9 S3	5.0 - 6.5	Silty Sand with Gravel (SM)										
Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
● B-9 S3	5.0 - 6.5	37.5	2.17			32	35	33				

One Thousand Skies Subdivision
Nelchina, Alaska

GRAIN SIZE CLASSIFICATION

May 2017

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FIG. 15
Sheet 7 of 7

32-1-02580



Rowland Engineering Consultants

565 W Recon Circle, · Palmer, Alaska 99645
907.746.3630 · 907.322.5545 cell · isaac@reconllc.net

24 January, 2022

Attn: Ms Jamie Taylor

Matanuska-Susitna Borough
Department of Public Works
350 E. Dahlia Ave
Palmer, AK 99645

Re: One Thousand Skies – Sunrise Phase II, Drainage Plan

Ms. Taylor

RECON LLC (RECON) prepared this report to summarize the Drainage Plan for the proposed State of Alaska Department of Natural Resources (DNR) the proposed One Thousand Skies – Sunrise, Phase II Subdivision. The drainage plan was completed by RECON LLC with additional support by Professional and Technical Services, Inc (PTS)

The following document includes pre and post construction plans, catchment area maps, and drainage calculations.

Sincerely,

A handwritten signature in black ink, appearing to read "Isaac Rowland", is written over a light gray rectangular background.

Isaac Rowland



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COMPUTATION METHODS 3

CONVEYANCE DESIGN 5

APPENDICES

- Appendix A – Site Map
- Appendix B – Pre- and Post-Construction Catchment
- Appendix C – Typical Culvert Construction
- Appendix D – Hydrological Calculations



PROJECT DESCRIPTION

The proposed One Thousand Skies – Sunrise Phase II subdivision is located near milepost 136.3 of the Glenn Highway and accessed via a 1.5-mile gravel road previously constructed during Phase I.

The project area is situated approximately 9 miles east of the divide between the Copper River and Matanuska River watersheds. The development site is situated on a south and east facing slope that descends from a plateau between the Little Nelchina River and the Nelchina River. Elevation of the property varies from approximately 2550 feet to 2500 feet and is consider classic subalpine terrain. All drainage from the property is toward the Nelchina river, which passes approximately 1.5 miles south of the property at an elevation of 2200 feet. The topography is flat to gently sloping with very low undulating ridges and shallow depressions and swales.

The development is planned to include construction of a road and subdivision of Tract B into 15 lots and 1 Tract. All lots are +/- 10-acres and intended for sale by DNR to private individuals. A 2500 ft extension of the Millennial Loop Road will be constructed to access the lots.

A site map is included as Appendix A

EXISTING CONDITIONS

Phase II is currently undeveloped and vegetated with black spruce and dwarf birch. Ground cover is primarily mosses and low-lying vegetation typical of interior forests at this elevation. Typical depth of organics (primarily moss) was measured at 0.5 to 1.0-ft in several areas.

The subdivision is located on glacial terrain identified as ground moraine (till). The underlying soils are variable and is typically an inhomogeneous mixture of boulders, cobbles, pebbles, sand, silt, and some clay. The material is dense to very dense and essentially impermeable. Permafrost is generally found at shallow depth.

Lots 1-5 contain frontage on an Unnamed Lake on the west with various perimeter wetlands. One seasonal pond is located near the start of the proposed road extension on Lots 11 and 12. This pond was observed to be bank full during May of 2022 and essentially dry by mid-summer. Minor swales were mapped through Lots 11-8, but no flowing water has been observed on any of RECON's site visits, including visits in May, June and November of 2022. Snowmelt was observed to primarily pool in localized depressions and low areas during break-up. Sheet drainage on the site is typical. The existing drainage pattern is shown in Appendix B. Lots 1-4 were considered to be part of Basin #1 and Lots 5-15 were considered to be part of Basin #2.

The Pre-Construction drainage pattern is shown in Appendix B. Lots 1-4 were considered to be part of Basin #1 and Lots 5-15 were considered to be part of Basin #2.



Existing Conditions Basin Data

Basin 1: Lots 1 - 4

Total Area 1768536 SF
40.60 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr) ^{F1}	Runoff Coefficient ^{F2}
Land Cover: Natural (Good)	100.0%	40.60	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	0.0%	0.00	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number $C_c^{Eqn.1}$ 60
Runoff Coef. $C_c^{Eqn.1}$ 0.160

Basin 2: Lots 5-15

Total Area 5214132 SF
119.70 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr) ^{F1}	Runoff Coefficient ^{F2}
Land Cover: Natural (Good)	100.0%	119.70	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	0.0%	0.00	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number $C_c^{Eqn.1}$ 60
Runoff Coef. $C_c^{Eqn.1}$ 0.160



PROPOSED CONDITIONS

Construction for Phase II is expected to primarily consist of the development of 2500 linear feet of new road. Future development on each lot is expected to typically consist of driveways and clearing for construction of cabins or residential structures. Development of each 10 acre lot is generally expected to be <1 acre (10%) of the useable area.

The proposed road extension follows a generally slight topographic high through largely flat terrain. The high point point was used as the dividing line between drainage basins. No drainage crossings are anticipated. All lots drain away from the road except for the eastern portions of Lot 5 and 6 and the western portion of Lot 13. The actual topographic high point may meander across the centerline, but due to the flat terrain and limited level of detail available in the IFSAR 5m surface model, a more accurate representation of the basin boundary was considered impractical and would result in no substantial change to the design or calculations.

The natural drainage patterns of the Phase II area are expected to be retained post construction. No stream crossings are required, and wetlands will remain intact. The majority of the road extension is located along the divide between Basins #1 and #2. The total catchment area up-gradient of the road is minimal, and substantially flat and forested.

A drawing of the Post-Construction catchment basins are shown in Appendix B. Road extension and locations of culverts are shown.

DRAINAGE PLAN

Design Storms were acquired from NOAA Precipitation Frequency Data Server for this location.

Design Requirement	Design Storm	Depth (in)
Conveyance Design	10 yr, 24 hr	2.11
Water Quality	24 hr period	0.50
Detention	1 yr, 24 hr	0.938
Flood Hazard Protection	10 yr, 24 hr	2.11
Project Flood Bypass	100 yr, 24 hr	2.63

COMPUTATION METHODS

Computations are included in Appendix D. The methods used for the calculations are as follows.



Time of Concentration (TOC) : Modified Kinematic Wave Method

Peak Flow: Rational Method

Runoff: Direct Determination Method

Time of Concentration

TOC calculated as:

Basin #1 – 6 hrs

Basin #2 – 12 hrs

Peak Flow

The majority of flow in both Basins is considered to be sheet flow. The Rational Method was used to calculate the Peak Runoff Rate in cubic ft / sec (Q).

Basin #1

Storm Event	Pre-Development i (in/hr) ^{F5}	Post-Development i (in/hr) ^{F5}	Pre-Development Q (CFS)	Post-Development Q (CFS)	Percent Change (%)
10-YR, 24-HR	0.987	0.987	6.41	6.78	5.8%
100-YR, 24-HR	1.49	1.49	9.68	10.24	5.7%

Basin #2

Storm Event	Pre-Development i (in/hr) ^{F5}	Post-Development i (in/hr) ^{F5}	Pre-Development Q (CFS)	Post-Development Q (CFS)	Percent Change (%)
10-YR, 24-HR	1.34	1.34	25.66	26.75	4.2%
100-YR, 24-HR	2.01	2.01	38.50	40.13	4.2%

Runoff

Runoff was calculated as simplified volumetric approach called using the Direct Determination Method as shown in Appendix D. Increases to the gravel area were due to the construction of the road.



	Pre-development		Post-development	
	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15
Area _{nat.veg} =	40.60	119.70	39.59	117.78
Area _{lawn} =	0.00	0.00	0.00	0.00
Area _{gravel} =	0.00	0.00	0.97	2.03
Area _{impervious} =	0.00	0.00	0.00	0.00

	10-YR, 24-HR Storm Event		100-YR, 24-HR Storm Event	
	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15
Runoff _{SITE-PRE} (in.)	0.00	0.00	0.21	0.21
Runoff _{SITE-POST} (in.)	0.01	0.00	0.23	0.22
Difference (in.)	0.01	0.00	0.01	0.01

CONVEYANCE DESIGN

Due to the flat terrain, relatively impermeable soils, and shallow permafrost the road will be constructed using a simple overlay construction with no ditches. Conveyance on the road will be limited to one 24" culvert at approximately STA 72+50 (CMP-1) and four 18" culverts (CMP 2-5) as shown in the post-construction drainage plan. All culverts will be constructed per the typical section in Appendix C and are generally intended as equalization culverts with little or no active water flow. CMP-1 (24") is located in a depression adjoining the small wetlands area to the south, and is expected to be partially flooded by standing pond water during spring breakup. Sizing accounts for this eventuality rather than any expected flow volumes.

Culvert designs will conform to the 2022 Mat-Su Borough Design Manual Section D05.

Wetland Retention

Road construction is not expected to impact wetlands with any new disturbance.

Water Quality Protection

Water Quality Protection is generally expected to be provided by existing vegetation and terrain. No collected water flow is expected. Calculations for Water Quality Protection flows are included in Appendix D.

Extended Detention

Post-development runoff for the 1-yr, 24 hr storm event is equal to the pre-development conditions, and extended detention for the 1 yr, 24 hr storm will be provided by the substantial natural vegetation and rough topography in the project area.



Flood Hazard Protection

Runoff discharging from the site sheet flows to the Un-Named Lake or Nelchina River outside the project area. A downstream impact analysis was not performed as the flows from the project area are significantly smaller than those of the river or contributing basins adjacent to the lake.

Project Flood Bypass

Flood bypass is expected to occur through normal existing swales and drainage routes. The low point in the new road construction at STA 72+50 will have a final constructed elevation above the outfall elevation of the adjacent pond and is not expected be submerged at any time.

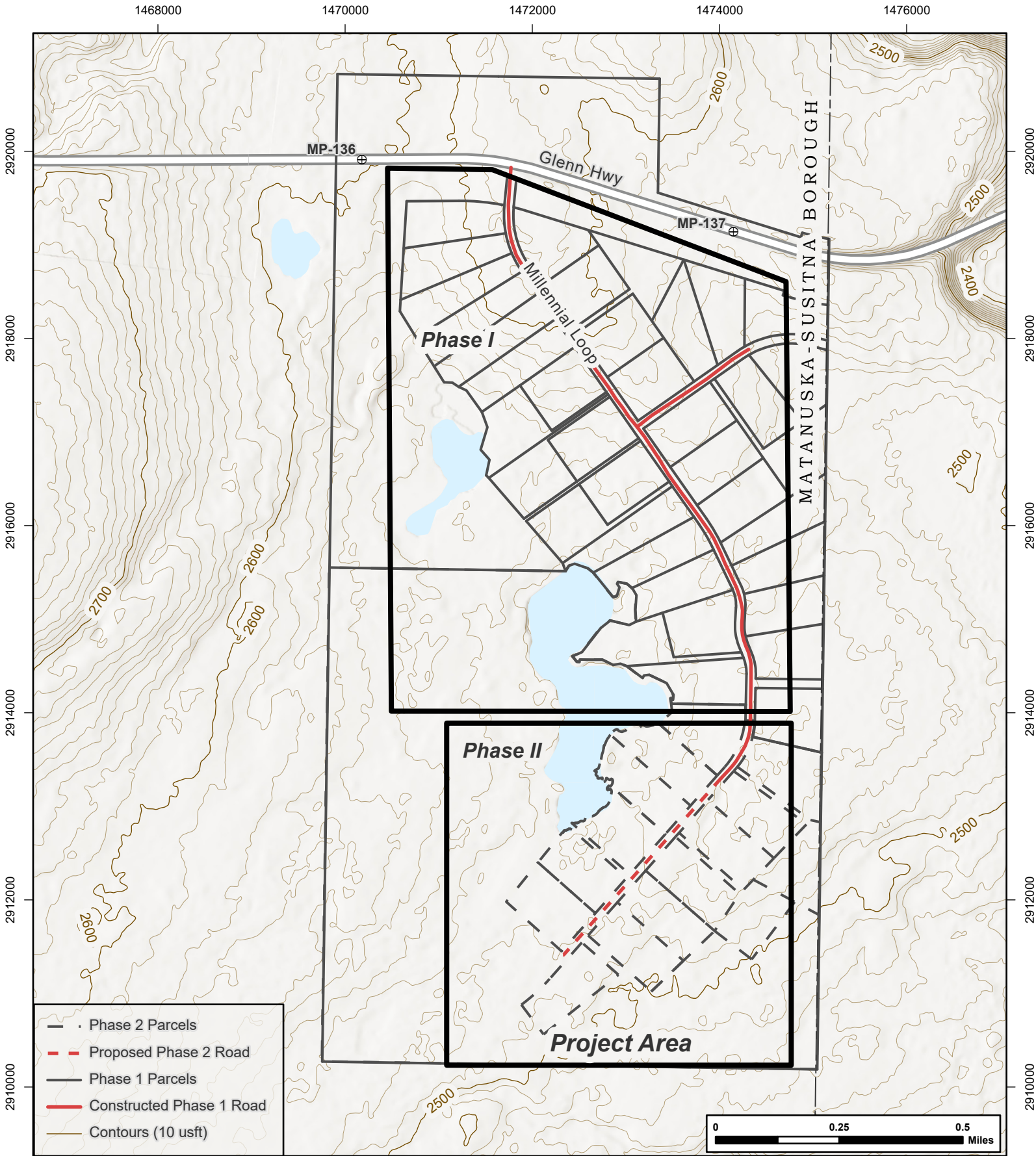
Sincerely,

Isaac Rowland, PE
(907)322-5545



APPENDIX A

SITE MAP



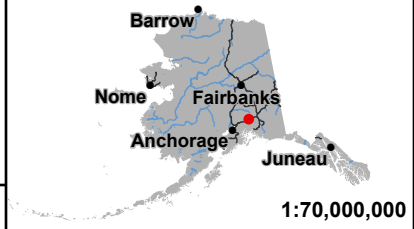
**Alaska DNR
One Thousand Skies
Subdivision**

Map by RECON LLC
565 W Recon Cir, Palmer, AK 99645
NAD83 Alaska State Plane Z3 (usft)
Basemap by ESRI



**One Thousand Skies
Subdivision Project Area**

1:16,000
1" = 0.25 mi
12/13/2022

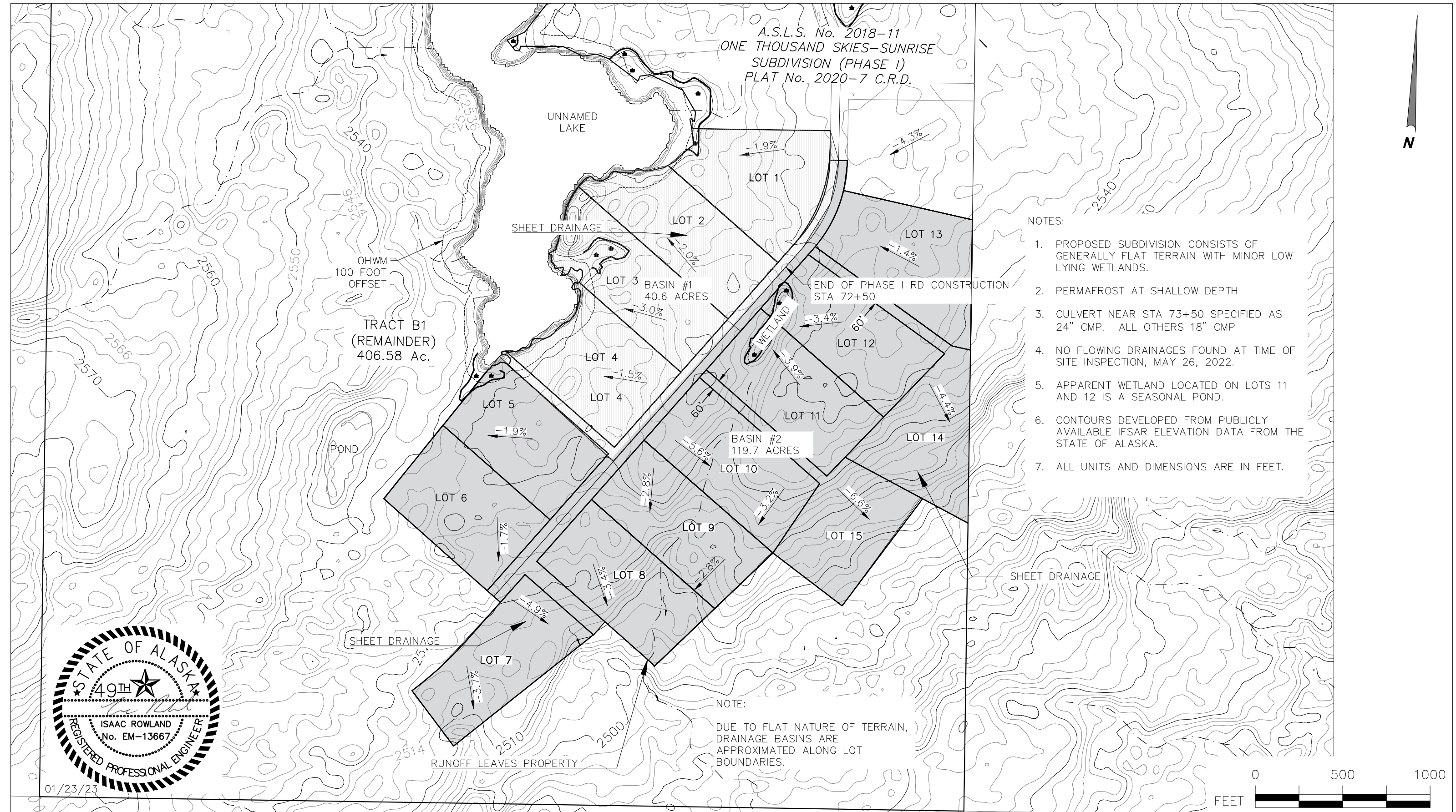


1:70,000,000

APPENDIX B

PRE- AND POST-CONSTRUCTION

DRAINAGE BASINS



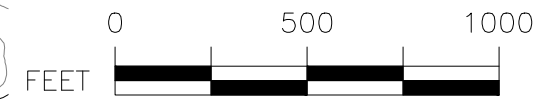
A.S.L.S. No. 2018-11
ONE THOUSAND SKIES-SUNRISE
SUBDIVISION (PHASE I)
PLAT No. 2020-7 C.R.D.

TRACT B1
(REMAINDER)
406.58 Ac.



- NOTES:
1. PROPOSED SUBDIVISION CONSISTS OF GENERALLY FLAT TERRAIN WITH MINOR LOW LYING WETLANDS.
 2. PERMAFROST AT SHALLOW DEPTH
 3. CULVERT NEAR STA 73+50 SPECIFIED AS 24" CMP. ALL OTHERS 18" CMP
 4. NO FLOWING DRAINAGES FOUND AT TIME OF SITE INSPECTION, MAY 26, 2022.
 5. APPARENT WETLAND LOCATED ON LOTS 11 AND 12 IS A SEASONAL POND.
 6. CONTOURS DEVELOPED FROM PUBLICLY AVAILABLE IFSAR ELEVATION DATA FROM THE STATE OF ALASKA.
 7. ALL UNITS AND DIMENSIONS ARE IN FEET.

NOTE:
DUE TO FLAT NATURE OF TERRAIN,
DRAINAGE BASINS ARE
APPROXIMATED ALONG LOT
BOUNDARIES.



PROJECT: ONE THOUSAND SKIES - SUNRISE			
PROJECT ENGINEER: ISAAC ROWLAND, PE			
PREPARED BY: ISAAC ROWLAND, PE			
NO.	DESIGN/CONSTRUCTION/RECORD	DWN BY/DATE	CHKD BY/DATE
1	PRE-CONSTRUCTION DRAINAGE	IJR/07-29-22	MCS/07-29-22
2	PRE-CONSTRUCTION DRAINAGE BASINS ADDED	IJR/1/23/23	



LEGEND:	
	EXISTING 2' CONTOURS
2550	CONTOUR LABELS (FT)
	NATURAL DRAINAGE SWALE
	DRAINAGE FLOW DIRECTION
	APPARENT WETLANDS
	DESIGN DRAINAGE FLOW DIRECTION

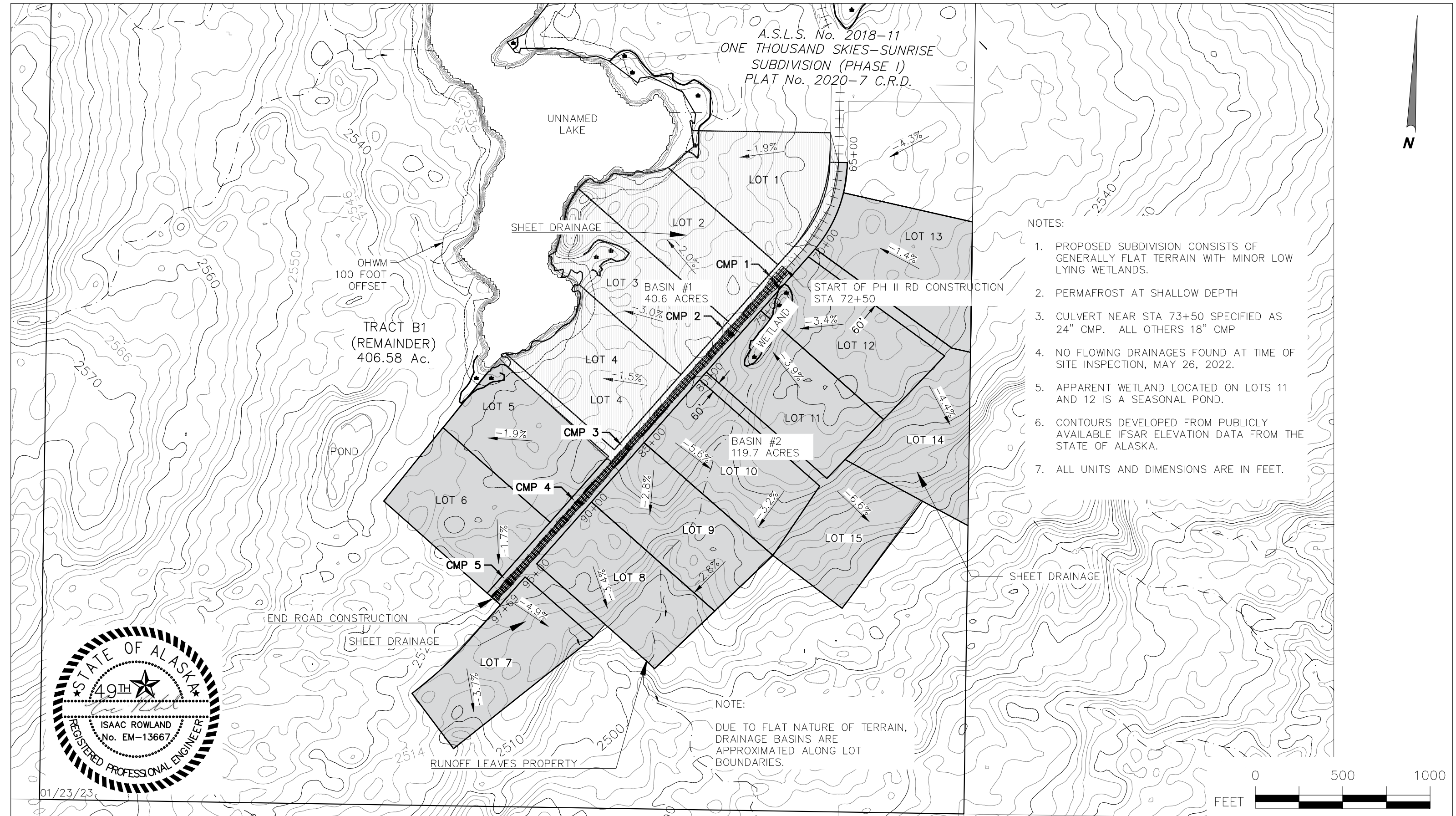
DRAWING NAME:

ONE THOUSAND SKIES - SUNRISE
PHASE II
PRE-CONSTRUCTION DRAINAGE

SCALE: 1" = 500'

11 X 17


SHEET 1 OF 1



PROJECT: ONE THOUSAND SKIES - SUNRISE			
PROJECT ENGINEER:ISAAC ROWLAND, PE			
PREPARED BY: ISAAC ROWLAND, PE			
NO.	DESIGN/CONSTRUCTION/RECORD	DWN BY/DATE	CHKED BY/DATE
1	PRE-CONSTRUCTION DRAINAGE PLAN	IJR/07-29-22	MCS/07-29-22
2	PRE-CONSTRUCTION DRAINAGE BASINS ADDED	IJR/1/23/23	
3	POST-CONSTRUCTION DRAINAGE PLAN	IJR/1/23/23	




LEGEND:

 EXISTING 2' CONTOURS

2550 CONTOUR LABELS (FT)

 APPARENT DRAINAGES

 DRAINAGE FLOW DIRECTION

 APPARENT WETLANDS

 -2.8% DESIGN DRAINAGE FLOW DIRECTION

DRAWING NAME:

ONE THOUSAND SKIES - SUNRISE
PHASE II
POST-CONSTRUCTION DRAINAGE

SCALE: 1" = 500'

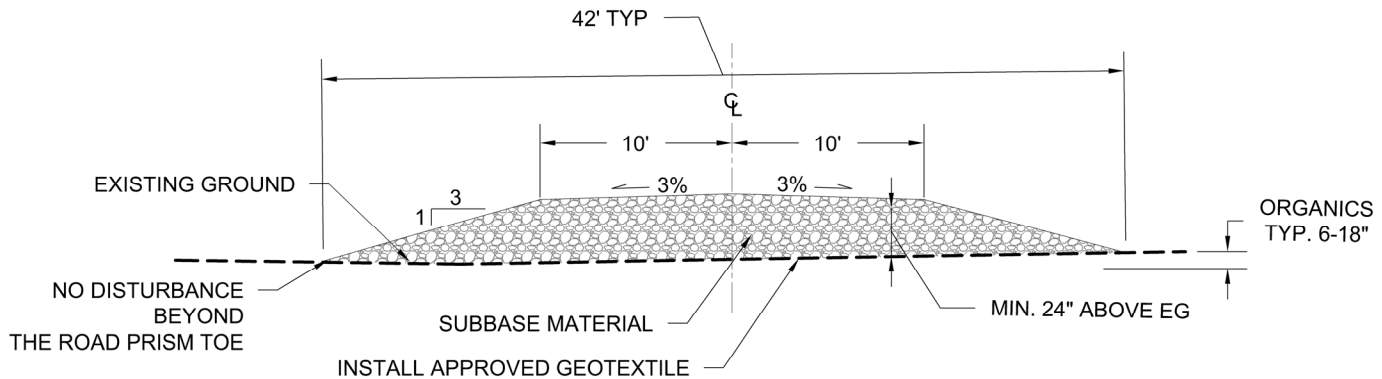
11 X 17

SHEET 1 OF 1

APPENDIX C

TYPICAL ROAD AND CULVERT SECTIONS

PIONEER ROAD TYPICAL SECTION - OVERLAY CONSTRUCTION

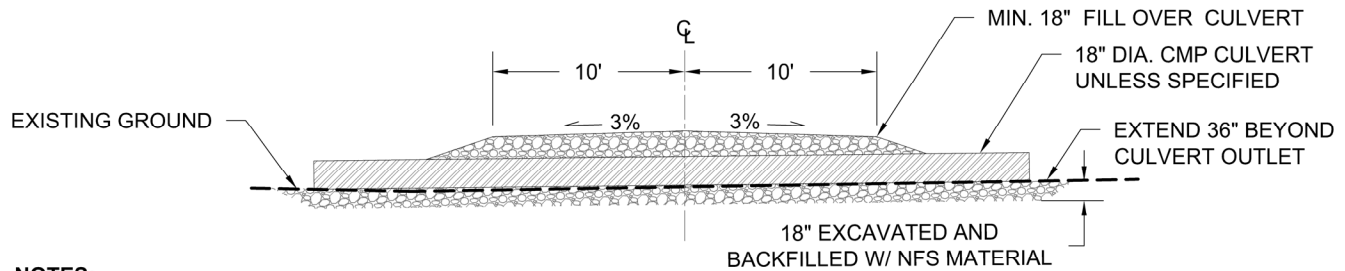


1. ROAD IS TO BE CONSTRUCTED TO THE MINIMUM STANDARDS OF A PIONEER ROAD AS DEFINED BY THE MATANUSKA-SUSITNA BOROUGH.
2. ALIGNMENT TO BE CLEARED AND MULCHED TO GROUND LEVEL 40' EACH SIDE OF CENTERLINE USING ROTARY MULCHING EQUIPMENT. DISTURBANCE OF VEGETATIVE MAT TO BE MINIMIZED.
3. ROAD IS TO BE OVERLAY CONSTRUCTION ONLY DUE TO THE NATURE OF THE NATIVE SOILS AND THE PRESENCE OF PERMAFROST.
4. NO CUT DITCHES TO BE CONSTRUCTED DUE TO EXISTING GROUND CONDITIONS AND MINIMAL TOPOGRAPHIC RELIEF.
5. NO GROUND DISTURBANCE BEYOND THE TOE OF THE ROAD PRISM.
6. GEOTEXTILE MEETING AK DOT SPECIFICATION FOR TYPE 1, WOVEN.
7. EMBANKMENT MATERIAL MEET MSB STANDARDS FOR SUBBASE AND BE FREE OF MUCK, FROZEN MATERIAL, ROOTS, SOD OR OTHER DELETERIOUS MATTER; HAVE A PLASTICITY INDEX NOT GREATER THAN 6 PER ATM 204 AND GRADE THE FOLLOWING:

<u>SIEVE</u>	<u>PERCENT PASSING BY WEIGHT</u>
NO. 4	20-60
NO. 200	0-10

NOTES:	<p align="center">ONE-THOUSAND SKIES - SUNRISE</p> <p align="center">PHASE II</p> <p align="center">PIONEER ROAD TYPICAL</p>		DATE	12/13/2022
REV 1			SCALE	NTS
DRAWN BY IJR			PERMIT NO.	
			SHEET	1 OF 2
	<p align="center">RECON LLC</p> <p align="center">ROWLAND ENGINEERING CONSULTANTS</p> <p align="center">565 WEST RECON CIRCLE PALMER, AK 99645</p> <p align="center">(907)746-3630</p>			

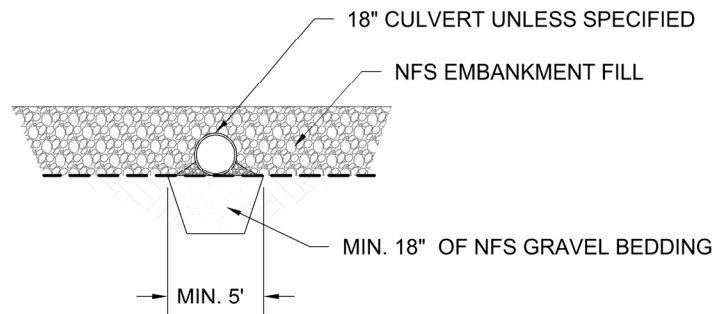
2 PIONEER ROAD TYPICAL SECTION - EQUALIZATION CULVERT
NTS



NOTES:

1. ALL EQUALIZATION CULVERTS TO HAVE A MINIMUM DIAMETER OF 18" UNLESS SPECIFIED.
2. NATIVE SOILS TO BE EXCAVATED A MINIMUM OF 18" BELOW CULVERT INVERT AND BACKFILLED WITH NON-FROST SUSCEPTIBLE MATERIAL.

3 PIONEER ROAD CROSS SECTION - EQUALIZATION CULVERT
NTS



NOTES:

1. ALL EQUALIZATION CULVERTS TO HAVE A MINIMUM DIAMETER OF 18" UNLESS SPECIFIED.
2. NATIVE SOILS TO BE EXCAVATED A MINIMUM OF 18" BELOW CULVERT INVERT AND BACKFILLED WITH NON-FROST SUSCEPTIBLE MATERIAL.
3. SIDE FILL PLACED AND COMPACTED UNDER HAUNCHES OF PIPE AND SHALL BE BROUGHT UP EVENLY ON BOTH SIDES.
4. CULVERTS PLACED WITH MINIMUM 0.5% SLOPE.

NOTES:	ONE-THOUSAND SKIES PHASE II CULVERT TYPICAL RECON LLC ROWLAND ENGINEERING CONSULTANTS 565 WEST RECON CIRCLE PALMER, AK 99645 (907)746-3630		DATE
REV 1			12/13/2022
DRAWN BY IJR			SCALE
			NTS
			PERMIT NO.
			SHEET
			2 OF 2

APPENDIX D

HYDROLOGICAL CALCULATIONS

Existing Conditions Basin Data

Basin 1: Lots 1 - 4

Total Area 1768536 SF
40.60 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr) ^{F1}	Runoff Coefficient ^{F2}
Land Cover: Natural (Good)	100.0%	40.60	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	0.0%	0.00	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number $C_c^{Eqn.1}$ 60
Runoff Coef. $C_c^{Eqn.1}$ 0.160

Basin 2: Lots 5-15

Total Area 5214132 SF
119.70 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr) ^{F1}	Runoff Coefficient ^{F2}
Land Cover: Natural (Good)	100.0%	119.70	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	0.0%	0.00	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number $C_c^{Eqn.1}$ 60
Runoff Coef. $C_c^{Eqn.1}$ 0.160

Eqn. 1 Curve Number / Runoff Coefficient $C_c = \frac{\sum_{j=1}^n C_j A_j}{\sum_{j=1}^n A_j}$

Where:

A_j = Area of land cover j ,

C_j = Curve Number / Runoff Coefficient for area j , and

n = Total number of land cover types being evaluated.

^{F1} : Curve Number, C , chosen from Table 4.4-3 on page 4-12 of the ASM.

^{F2} : Runoff Coefficient, C , chosen from Table 4.4-2 on page 4-11 of the ASM.

^{F3} : Hydrologic Soil Group selected based on descriptions provided on page 4-14 to 4-15 of the ASM.

Proposed Conditions Basin Data

Basin 1: Lots 1 - 4

Total Area 1768536 SF
 40.60 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr)	Runoff Coefficient
Land Cover: Natural (Good)	97.5%	39.59	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	2.4%	0.97	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number C_C^{Eqn.1} 60.54

Runoff Coef. C_C^{Eqn.1} 0.169

Basin 2: Lots 5-15

Total Area 5214132 SF
 119.70 Acres

Hydrologic Soil Group: C^{F3}

	% of Total	Acres	C (10-yr,24-hr) ^{F1}	Runoff Coefficient ^{F2}
Land Cover: Natural (Good)	98.4%	117.78	60	0.16
Lawn (Flat Slopes)	0.0%	0.00	61	0.21
Gravel	1.7%	2.03	85	0.55
Paved	0.0%	0.00	98	0.96

Curve Number C_C^{Eqn.1} 60.49

Runoff Coef. C_C^{Eqn.1} 0.167

Eqn. 1 Curve Number / Runoff Coefficient $C_C = \frac{\sum_{j=1}^n C_j A_j}{\sum_{j=1}^n A_j}$

Where:

A_j = Area of land cover j,

C_j = Curve Number / Runoff Coefficient for area j, and

n = Total number of land cover types being evaluated.

^{F1} : Curve Number, C, chosen from Table 4.4-3 on page 4-12 of the ASM.

^{F2} : Runoff Coefficient, C, chosen from Table 4.4-2 on page 4-11 of the ASM.

^{F3} : Hydrologic Soil Group selected based on descriptions provided on page 4-14 to 4-15 of the ASM.

Rational Method Peak Flow Calculations

Eqn. 5: $Q_p = C_c i A$

$Q_p =$	Peak runoff rate in cubic feet per second (CFS)
$C_c =$	Composite Runoff Coefficient. See Equation E1 on sheet A-3
$i =$	Rainfall intensity in inches per hour (in/hr)
$A =$	Drainage area in acres

Basin 1: Lots 1 - 4

Basin 1 Area	40.60 Acres
Pre-Development Runoff Area	40.60 Acres
Post-Development Runoff Area	40.60 Acres
Pre-Development Runoff C_c^{F4}	0.160
Post-Development Runoff C_c^{F5}	0.169
Time of Concentration	6 hrs

Storm Event	Pre-Development i (in/hr) F5	Post-Development i (in/hr) F5	Pre-Development Q (CFS)	Post-Development Q (CFS)	Percent Change (%)
10-YR, 24-HR	0.987	0.987	6.41	6.78	5.8%
100-YR, 24-HR	1.49	1.49	9.68	10.24	5.7%

Basin 2: Lots 5-15

Basin 2 Area	119.70 Acres
Pre-Development Runoff Area	119.70 Acres
Post-Development Runoff Area	119.70 Acres
Pre-Development Runoff C_c^{F4}	0.160
Post-Development Runoff C_c^{F4}	0.167
Time of Concentration	12 hrs

Storm Event	Pre-Development i (in/hr) F5	Post-Development i (in/hr) F5	Pre-Development Q (CFS)	Post-Development Q (CFS)	Percent Change (%)
10-YR, 24-HR	1.34	1.34	25.66	26.75	4.2%
100-YR, 24-HR	2.01	2.01	38.50	40.13	4.2%

F4 : Runoff Coefficient from Basin Data, Page B-1 and B-2

F5 : Storm intensities from Precipitation Frequency Data Server Table for Project Area based on time of concentration

Time of Concentration Calculations

2. Modified Kinematic Wave	$T_c = \frac{0.42 L^{0.8} n^{0.8}}{P_{24}^{0.5} S^{0.4}}$	Applicable only to overland/sheet flow. This modification of the Kinematic Wave method eliminates the need for an iterative solution. P_{24} is the 2-year, 24-hour rainfall depth in inches, regardless of which storm event the system is being designed to accommodate.
T_c	Time of Concentration (minutes)	
L	Length of flow path (feet)	
S	average slope (feet/foot)	
P_{24}	2-yr, 24-hr rainfall depth (inches)	
n	mannings n for overland flow	

Basin 1		Basin 2	
L	1000 ft	L	3000 ft
n	0.8	n	0.8
P_{24}	1.19 inches	P_{24}	1.19 inches
S	0.021 ft/ft	S	0.039364 ft/ft
T_c	379.4 minutes 6.3 hrs	T_c	710.6 minutes 11.8 hrs

Direct Determination Method Calculations**Eqn. 2: Runoff = Rainfall - Depression Storage - Infiltration Loss****Rainfall**

10-yr, 24-hr	2.11 in.
Orographic	1
Rain x Multiplier	2.11 in.

100-yr, 24-hr	2.63 in.
Orographic	1
Rain x Multiplier	2.63 in.

Depression Storage

Natural Vegetative Areas	0.25 in.
Landscaped Areas	0.25 in.
Gravel Areas	0.15 in.
Impervious Areas	0.1 in.

Infiltration Loses

Vegetation Area (ΣF_t) =	2.17 in.
No Vegetation (ΣF_t) =	1.68 in.

Runoff

10-YR, 24-HR Runoff	
Runoff _{nat.veg} =	0.00 in.
Runoff _{lawn} =	0.00 in.
Runoff _{gravel} =	0.28 in.
Runoff _{impervious} =	2.01 in.

100-YR, 24-HR Runoff	
Runoff _{nat.veg} =	0.21 in.
Runoff _{lawn} =	0.21 in.
Runoff _{gravel} =	0.80 in.
Runoff _{impervious} =	2.53 in.

Eqn. 3:
$$\text{Runoff}_{\text{SITE}} = \frac{[(R.O._{\text{nat.veg}} * A_{\text{nat.veg}}) + (R.O._{\text{lawn}} * A_{\text{lawn}}) + (R.O._{\text{gravel}} * A_{\text{gravel}}) + (R.O._{\text{impervious}} * A_{\text{impervious}})]}{A_{\text{SITE}}}$$

	Pre-development		Post-development	
	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15
Area _{nat.veg} =	40.60	119.70	39.59	117.78
Area _{lawn} =	0.00	0.00	0.00	0.00
Area _{gravel} =	0.00	0.00	0.97	2.03
Area _{impervious} =	0.00	0.00	0.00	0.00

	10-YR, 24-HR Storm Event		100-YR, 24-HR Storm Event	
	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15
Runoff _{SITE-PRE} (in.)	0.00	0.00	0.21	0.21
Runoff _{SITE-POST} (in.)	0.01	0.00	0.23	0.22

Difference (in.)	0.01	0.00	0.01	0.01

Time Steps for Direct Determination Method: Vegetated Areas

Eqn. 4: $F_t = f_{\min} + (f_{\max} - f_{\min}) * e^{-kt}$

$F_t =$	Infiltration rate at time t (in/hr)
$f_{\min} =$	minimum or saturated infiltration rate (in/hr)
$f_{\max} =$	maximum or initial infiltration rate (in/hr)
$k =$	infiltration rate decay factor (hr^{-1})
$t =$	time (hr) measured from time runoff first discharged into infiltration area

Vegetated Areas		
f_{\min}	0.05	in/hr
f_{\max}	3	in/hr
k	4	hr-1

t (hr)	F_t (in/hr)	$f * \Delta t$ (in.)
0	3.00	0
0.5	0.45	0.862
1	0.10	0.138
1.5	0.06	0.040
2	0.05	0.027
2.5	0.05	0.025
3	0.05	0.025
3.5	0.05	0.025
4	0.05	0.025
4.5	0.05	0.025
5	0.05	0.025
5.5	0.05	0.025
6	0.05	0.025
6.5	0.05	0.025
7	0.05	0.025
7.5	0.05	0.025
8	0.05	0.025
8.5	0.05	0.025
9	0.05	0.025
9.5	0.05	0.025
10	0.05	0.025
10.5	0.05	0.025
11	0.05	0.025
11.5	0.05	0.025
12	0.05	0.025

t (hr)	F_t (in/hr)	$f * \Delta t$ (in.)
12.5	0.05	0.025
13	0.05	0.025
13.5	0.05	0.025
14	0.05	0.025
14.5	0.05	0.025
15	0.05	0.025
15.5	0.05	0.025
16	0.05	0.025
16.5	0.05	0.025
17	0.05	0.025
17.5	0.05	0.025
18	0.05	0.025
18.5	0.05	0.025
19	0.05	0.025
19.5	0.05	0.025
20	0.05	0.025
20.5	0.05	0.025
21	0.05	0.025
21.5	0.05	0.025
22	0.05	0.025
22.5	0.05	0.025
23	0.05	0.025
23.5	0.05	0.025
24	0.05	0.025

$$\Sigma F_t = 2.17$$

Time Steps for Direct Determination Method: Non Vegetated Areas

Non Vegetated Areas		
f_{\min}	0.05	in/hr
f_{\max}	1.5	in/hr
k	4	hr-1

t (hr)	F_t (in/hr)	$f \cdot \Delta t$ (in.)
0	1.50	0
0.5	0.25	0.437
1	0.08	0.081
1.5	0.05	0.033
2	0.05	0.026
2.5	0.05	0.025
3	0.05	0.025
3.5	0.05	0.025
4	0.05	0.025
4.5	0.05	0.025
5	0.05	0.025
5.5	0.05	0.025
6	0.05	0.025
6.5	0.05	0.025
7	0.05	0.025
7.5	0.05	0.025
8	0.05	0.025
8.5	0.05	0.025
9	0.05	0.025
9.5	0.05	0.025
10	0.05	0.025
10.5	0.05	0.025
11	0.05	0.025
11.5	0.05	0.025
12	0.05	0.025

t (hr)	F_t (in/hr)	$f \cdot \Delta t$ (in.)
12.5	0.05	0.025
13	0.05	0.025
13.5	0.05	0.025
14	0.05	0.025
14.5	0.05	0.025
15	0.05	0.025
15.5	0.05	0.025
16	0.05	0.025
16.5	0.05	0.025
17	0.05	0.025
17.5	0.05	0.025
18	0.05	0.025
18.5	0.05	0.025
19	0.05	0.025
19.5	0.05	0.025
20	0.05	0.025
20.5	0.05	0.025
21	0.05	0.025
21.5	0.05	0.025
22	0.05	0.025
22.5	0.05	0.025
23	0.05	0.025
23.5	0.05	0.025
24	0.05	0.025

$$\Sigma F_t = 1.68$$

Depression Storage Values for Convey		
Site Slope	Impervious Street or Driveway	Lawn/ Landscaped
0-2%	0.1	0.25
2-6%	0.06	0.15
6%	0	0.05

Depression Storage Values for Water Que		
Site Slope	Impervious Street or Driveway	Lawn/ Landscaped
0-2%	0.1	0.25
2-6%	0.06	0.15
6%	0	0.05

Maximum Infiltration Rate

Soils	Infiltration (in/hr)	
	Partially dried out with	
	No Vegetation	Dense Vegetation
Sandy	2.5	5
Loam	1.5	3
Silt or Clay	0.5	1

Minimum Infiltration Rate

Hydrologic Soil Group	Infiltration (in/hr)
A	0.45 - 0.30
B	0.30 - 0.15
C	0.15 - 0.05
D	0.05 - 0

Typical Decay Coefficient

Soils	k (sec ⁻¹)	k (hr ⁻¹)
Sandy ↑↓ Silt/Clay	0.00056	2
	0.00083	3
	0.00115	4
	0.00139	5

Water Quality Treatment Calculations

Site Conditions: Post Development ^{F13}

	Basin 1: Lots 1 - 4	Basin 2: Lots 5-15
Impervious Area (Acres)	0.00	0.00
Lawn Area (Acres)	0.00	0.00
Barren Surface Area (Acres)	0.97	2.03
Naturally Vegetated Area (Acres)	39.59	117.78

Infiltration Rates

Vegetated Area ^{F6}	2.17	inches	2.17	inches
Non-Vegetated Areas ^{F7}	1.68	inches	1.68	inches

Rainfall ^{F8}

0.52 inches

0.52 inches

Depression Storage Values ^{F9}

Natural Vegetative Areas	0.25	inches	0.25	inches
Landscaped/Lawn Areas	0.25	inches	0.25	inches
Gravel Areas	0.15	inches	0.15	inches
Impervious Areas	0.1	inches	0.1	inches

	Project Property	Project Property
Runoff _{nat.veg} (in.) ^{F10} =	0.00	0.00
Runoff _{lawn} (in.) ^{F10} =	0.00	0.00
Runoff _{gravel} (in.) ^{F10} =	0.00	0.00
Runoff _{impervious} (in.) ^{F10} =	0.42	0.42

Runoff _{water treatment} (in.) ^{F11} =	0.00	0.00
--	------	------

Runoff Volume (CF) ^{F12}	0.00	0.00
--	-------------	-------------

^{F6} : Vegetated Infiltration rates as calculated by the Direct Determination Method

^{F7} : Non-vegetated infiltration rates as calculated by the Direct Determination Method for gravel and bare soil surfaces

^{F8} : Rainfall depth as required for Water Treatment in the Section 3.3.2.1 of the ASM

^{F9} : Depression Storage Values from Chapter 4 of the ASM

^{F10} : Runoff depth calculated using the Direct Determination Method

^{F11} : Runoff for water treatment calculated for 0.52-inches of rainfall using the Direct Determination Method and as described in Section 3.3.2.1 of the ASM

^{F12} : Runoff Volume calculated by multiplying the Runoff depth with the Subbasin area

^{F13} : Subbasin areas from Post Development data on sheet B-2

Date _____

SUBDIVISION CONSTRUCTION PLAN

Subdivision Name _____

Platting Case File # _____

RSA # _____

Developer/Petitioner _____

Phone # _____

email _____

Engineer _____

Phone # _____

email _____

Surveyor _____

Phone # _____

email _____

Contractor _____

Phone # _____

email _____

Required Submittals

☐ Drainage Report

☐ Cost Estimate

☐ Proof of compliance with APDES _____

☐ Permits _____

☐ _____

☐ _____

THE FOLLOWING IS THE PLAN FOR THE REQUIRED IMPROVEMENTS:

- 1) The Developer's Professional Civil Engineer (PE) shall be the spokesperson for implementation and completion of this PLAN.
- 2) The PE shall submit the required data and reports in a timely manner. All submittals must be sent/delivered to the Borough's Platting Office.
- 3) The PE shall supervise all phases of the PLAN and be the point of contact for all contractor and subcontractor work on the PLAN.
- 4) Any proposed changes to this PLAN must be approved by the Borough's Public Works Department prior to the changes being made.
- 5) Upon acceptance of all improvements and approval of the Final Report by the Borough's Public Works Department, a Certificate of Construction Acceptance will be issued to the Developer and the warranty period will begin.

Where will driveway approaches be constructed? _____

Will winter construction be performed? _____

Is a subdivision agreement anticipated? _____

Will paving be performed? _____

Will a community water or sewer system be installed? _____

Permits to be acquired: _____

Types of utilities to be installed: _____

Note: If utilities are not installed prior to road construction, the Developer shall coordinate with the utility to either install conduits at the proposed crossing locations or ensure through their Engineer that the road crossings are excavated and backfilled properly. It is strongly encouraged that the road surfacing material be placed AFTER the utilities have been installed.

Planned Work Schedule

Clearing and Grubbing _____

Subbase Construction _____

Drainage Improvements _____

Installation of Utilities _____

Import and Grading top 6" _____

Property Corners set by PLS _____

Additional Comments:

AGREEMENT:

It is hereby agreed that the above PLAN is acceptable and will be implemented for the required improvements. It is further agreed that no deviation will be made to the above PLAN without signed acceptance by the Professional Civil Engineer and the Borough Public Works Representative.

Developer's Signature

Date

Professional Civil Engineer's Signature

Date

Surveyor's Signature

Date

Contractor's Signature

Date

Borough Public Works Representative's Signature

Date



BID SCHEDULE
STATE OF ALASKA – DEPARTMENT OF NATURAL RESOURCES

Project Name: 1000 Skies-Sunrise Phase 2 Road Construction

Project Number: 10-015-23

The Bidder shall insert, as called for, a lump sum price in figures opposite each pay item as it appears on the bid schedule. A lump sum price is not to be entered or tendered for any pay item not appearing in the bid schedule. An additional area has been provided on this Bid Schedule for bidders to identify the price per foot for each additional 18" culvert. The price will be used in the event that additional culverts are required.

Conditioned or qualified bids or a bidders failure to provide pricing for the Basic Bid will be considered non-responsive.

Notice: Contract award will be made on the basis of Basic Bid and to the extent of available funding.

The bidder shall insert a bid price for each pay item listed below. Type or print legibly.

Pay Item Number	Pay Item Description	Bid Price
-----------------	----------------------	-----------

BASIC BID

1A	1000 Skies-Sunrise Phase 2 Road Construction (including five culverts per scope of work)	\$
----	--	----

Total Bid Price of Basic Bid

Written Amount: _____ DOLLARS

Price per foot for each additional 18" culvert \$ _____

Company Name:

Authorized Representative's Printed Name:

Authorized Representative's Signature:

Date Bid Schedule Signed:

BID SCHEDULE
1000 Skies-Sunrise Phase 2 Road Construction
Project No. 10-015-23



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

CONSTRUCTION CONTRACT

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

This CONTRACT, between the STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES, herein called the Department, acting by and through its Contracting Officer, and

Company Name

Company Address (Street or PO Box, City, State, Zip)

a/an ☐ Individual ☐ Partnership ☐ Joint Venture ☐ Sole Proprietorship ☐ Corporation incorporated under the laws of the State of _____ its successors and assigns, herein called the Contractor, is effective the date of the signature of the Contracting Officer on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the Department, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor required in the construction of the above-referenced project at the prices bid by the Contractor for the respective estimated quantities aggregating approximately the sum of

Dollars

(\$ _____), and such other items as are mentioned in the original Bid, which Bid and prices named, together with the Contract Documents are made a part of this Contract and accepted as such.

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Department, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Department. In no event shall the Department be liable for any materials furnished or used, or for any work or labor done, unless the materials, work, or labor are required by the Contract or on written order furnished by the Department. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost, and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered and all labor shall be done and performed, in every respect, to the satisfaction of the Department, on or before: **September 1, 2023** or within N/A calendar days.

The bonds given by the Contractor in the sum of \$ _____ Payment Bond, and \$ _____ Performance Bond, to secure the proper compliance with the terms and provisions of this Contract, are submitted herewith and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions.

CONTRACTOR

Company Name

Signature of Authorized Company Representative

Typed Name and Title

Email Address

Date

(Corporate Seal)

STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES

Design & Construction Duly Authorized Representative (Signature)

Date

Typed Name

Signature of Contracting Officer

Date

Typed Name



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

PAYMENT BOND

Bond No. _____

For

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____ A.D., 20____, for construction of the above-referenced project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall comply with all requirements of law and pay, as they become due, all just claims for labor performed and materials and supplies furnished upon or for the work under said contract, whether said labor be performed and said materials and supplies be furnished under the original contract, any subcontract, or any and all duly authorized modifications thereto, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____, this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Natural Resources Authorized Representative

Date

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, shall be used whenever a payment bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

PERFORMANCE BOND

Bond No. _____

For

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof,
well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns,
jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____
A.D., 20____, for construction of the above-named project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall well and truly perform and
complete all obligations and work under said contract and if the Principal shall reimburse upon demand of the Department of Natural
Resources any sums paid him which exceed the final payment determined to be due upon completion of the project, then these
presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____,
_____ this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Natural Resources Authorized Representative

Date

INSTRUCTIONS

1. This form shall be used whenever a performance bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

BID BOND

For

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

DATE BOND EXECUTED: _____

PRINCIPAL (Legal name and business address):

TYPE OF ORGANIZATION:

	<input type="checkbox"/> Individual	<input type="checkbox"/> Partnership
	<input type="checkbox"/> Joint Venture	<input type="checkbox"/> Corporation
STATE OF INCORPORATION:		

SURETY(IES) (Name and business address):

A.	B.	C.
PENAL SUM OF BOND:		DATE OF BID:

We, the PRINCIPAL and SURETY above named, are held and firmly bound to the State(State of Alaska), in the penal sum of the amount stated above, for the payment of which sum will be made, we bind ourselves and our legal representatives and successors, jointly and severally, by this instrument.

THE CONDITION OF THE FOREGOING OBLIGATION is that the Principal has submitted the accompanying bid in writing, date as shown above, on the above-referenced Project in accordance with contract documents filed in the office of the Contracting Officer, and under the Invitation for Bids therefor, and is required to furnish a bond in the amount stated above.

If the Principal's bid is accepted and he is offered the proposed contract for award, and if the Principal fails to enter into the contract, then the obligation to the State created by this bond shall be in full force and effect.

If the Principal enters into the contract, then the foregoing obligation is null and void.

PRINCIPAL

Signature(s)	1.	2.	3.
Name(s) & Title(s) (Typed)	1.	2.	3.

See Instructions on Reverse

Corporate
Seal

CORPORATE SURETY(IES)

Surety A	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety B	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety C	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

INSTRUCTIONS

1. This form shall be used whenever a bid bond is submitted.
2. Insert the full legal name and business address of the Principal in the space designated. If the Principal is a partnership or joint venture, the names of all principal parties must be included (e.g., "Smith Construction, Inc. and Jones Contracting, Inc. DBA Smith/Jones Builders, a joint venture"). If the Principal is a corporation, the name of the state in which incorporated shall be inserted in the space provided.
3. Insert the full legal name and business address of the Surety in the space designated. The Surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. Individual sureties will not be accepted.
4. The penal amount of the bond may be shown either as an amount (in words and figures) or as a percent of the contract bid price (a not-to-exceed amount may be included).
5. The scheduled bid opening date shall be entered in the space marked Date of Bid.
6. The bond shall be executed by authorized representatives of the Principal and Surety. Corporations executing the bond shall also affix their corporate seal.
7. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
8. The states of incorporation and the limits of liability of each surety shall be indicated in the spaces provided.
9. The date that bond is executed must not be later than the bid opening date.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

BID MODIFICATION

1000 Skies-Sunrise Phase 2 Road Construction – ITB No. 10-015-23

Project Name and Number

Modification Number: _____

Note: All revisions shall be made to the unadjusted bid amount(s).

Changes to the adjusted bid amounts will be computed by the Department.

PAY ITEM NO.	PAY ITEM DESCRIPTION	REVISION TO UNIT BID PRICE +/-	REVISION TO BID AMOUNT +/-

TOTAL REVISION: \$ _____

Name of Bidding Firm

Responsible Party Signature

Date

This form may be duplicated if additional pages are needed.

APPENDIX B¹

INDEMNITY AND INSURANCE

Article 1. Indemnification

The Contractor shall indemnify, hold harmless, and defend the contracting agency from and against any claim of, or liability for error, omission or negligent act of the Contractor under this agreement. The Contractor shall not be required to indemnify the contracting agency for a claim of, or liability for, the independent negligence of the contracting agency. If there is a claim of, or liability for, the joint negligent error or omission of the Contractor and the independent negligence of the Contracting agency, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. "Contractor" and "Contracting agency", as used within this and the following article, include the employees, agents and other contractors who are directly responsible, respectively, to each. The term "independent negligence" is negligence other than in the Contracting agency's selection, administration, monitoring, or controlling of the Contractor and in approving or accepting the Contractor's work.

Article 2. Insurance

Without limiting contractor's indemnification, it is agreed that contractor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the contractor's policy contains higher limits, the state shall be entitled to coverage to the extent of such higher limits. Certificates of Insurance must be furnished to the contracting officer prior to beginning work and must provide for a notice of cancellation, non-renewal, or material change of conditions in accordance with policy provisions. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach of this contract and shall be grounds for termination of the contractor's services. All insurance policies shall comply with and be issued by insurers licensed to transact the business of insurance under AS 21.

2.1 Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees engaged in work under this contract, coverage as required by AS 23.30.045, and; where applicable, any other statutory obligations including but not limited to Federal U.S.L. & H. and Jones Act requirements. The policy must waive subrogation against the State.

2.2 Commercial General Liability Insurance: covering all business premises and operations used by the Contractor in the performance of services under this agreement with minimum coverage limits of \$300,000 combined single limit per claim.

2.3 Commercial Automobile Liability Insurance: covering all vehicles used by the Contractor in the performance of services under this agreement with minimum coverage limits of \$300,000 combined single limit per claim.