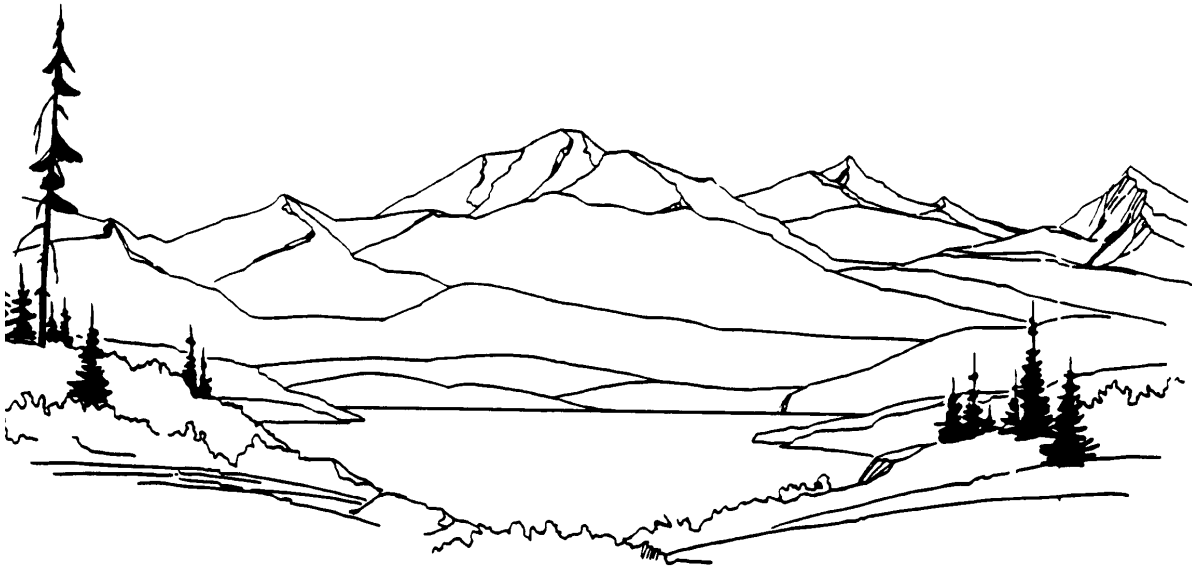


**STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES**

**DIVISION OF PARKS
AND
OUTDOOR RECREATION**



**PROPOSAL, CONTRACT, BOND
AND SPECIAL PROVISIONS**

**CRIPPLE CREEK
PIT RECLAMATION – PHASE II
PROJECT NO. 52959-6**

COPY _____

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Federal wage rates can be obtained at <http://www.wdol.gov/dba.aspx#0> for the State of Alaska. Use the federal wage rates that are in effect 10 days before Bid Opening. The Department will include a paper copy of the federal wage rates in the signed Contract.

6. State Wage Rates

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. The Department will include a paper copy of the State wage rates in the signed Contract.



INVITATION TO BID
for Construction Contract

Date: February 15, 2024

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6
Project Name and Number

The Department invites bidders to submit bids for furnishing all labor, equipment, and materials and performing all work for the project described below. The Department will only consider bids received **before 2:00 PM local time (per the Department's time source) on the 21st day of March 2024**. On that date, the Department will assemble, open, and then publicly announce the timely-received bids at **550 W. 7th Avenue, Suite 1340; Anchorage, AK 99501, at 2:15 PM**, or as soon thereafter as practicable.

Location of Project: Near Healy, AK
Contracting Officer: Rys Miranda, P.E.
Issuing Office: DNR, Division of Parks and Outdoor Recreation
State Funded Federal Aid

Description of Work:

Reclaim Phase II of Cripple Creek Pit as indicated in the bid documents. Improve and maintain the road as needed to access the Cripple Creek Pit with necessary heavy equipment and materials. Work includes clearing and grubbing, unclassified excavation, embankment, coal seam excavation and burial, drain installation, riprap, topsoil, and seeding.

Project DBE Utilization Goal: Race-Neutral, Goal is 0% Race-Conscious, Goal is 0%

The Engineer's Estimate is: less than \$100,000 between \$1,000,000 and \$2,500,000
 between \$100,000 and \$250,000 between \$2,500,000 and \$5,000,000
 between \$250,000 and \$500,000 greater than \$5,000,000
 between \$500,000 and \$1,000,000

All work shall be completed in NA Calendar Days, or by 10/01/2025. The Department will identify an interim completion date (for road work) in the Special Provisions.

The apparent successful bidder must furnish a payment bond in the amount of **100%** of the contract and a performance bond in the amount of **100%** of the contract as security conditioned for the full, complete and faithful performance of the contract. The apparent successful bidder must 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 their bid.

Submission of Bidding Documents

Bidders may submit bidding documents through the mail or hand delivered. For mailed or hand delivered bids with a paper bid guaranty, documents shall be submitted in a sealed envelope marked as follows:

Bidding Documents for Project: Cripple Creek Pit Reclamation - Phase II Project No. 52959-6	ATTN: DNR, Division of Parks and Outdoor Recreation 550 W. 7th Avenue, Suite 1340 Anchorage, AK 99501
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It is incumbent upon the bidder to ensure its bid, any amendments, and/or withdrawal arrive, in its entirety, at the location and before the deadline stated above. A bidder sending a bid amendment or withdrawal via email or fax must transmit its documentation to the Department at this email address: (Contact Staff on Page 2) or fax number: (907) 269-8917.

To be responsive, a bid must include a bid guaranty equal to 5% of the amount bid. (*When calculating the bid amount for purposes of determining the 5% value of the bid guaranty, a bidder shall include its base bid amount, plus the amount bid for alternate and supplemental bid items, if any.*)

The Department hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises 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

The following data may assist a bidder in preparing its bid:

1. **SEE SPECIAL NOTICE TO BIDDERS.**

A bidder may download project plans and specifications from: <http://dnr.alaska.gov/parks/designconstruct/bidcalresults.htm>.
For additional information contact:

Division of Parks and Outdoor Recreation
Design & Construction Section
Phone: (907) 269-8731

If a bidder has a question relating to design features, constructability, quantities, or other technical aspects of the project, it may direct its inquiry to the contact listed below.

A bidder requesting assistance in viewing the project site must make arrangements at least 48 hours in advance.

The point of contact for inquiries for this project is:

Katie Winter, P.E.
Engineer II, Design & Construction
550 W. 7th Ave., Suite 1340
Anchorage AK 99501
E-Mail: katie.winter@alaska.gov
Phone: (907) 269-6410

A bidder may direct questions concerning bidding procedures and requirements to:

Rys Miranda, P.E.
Chief, Design & Construction
550 W. 7th Ave., Suite 1340
Anchorage AK 99501
E-Mail: rys.miranda@alaska.gov
Phone: (907) 269-8736

Other Information:

Bid results are available approximately 30 minutes after bid opening at
<http://dnr.alaska.gov/parks/designconstruct/bidcalresults.htm>

SPECIAL NOTICE TO BIDDERS

The Department hereby notifies bidders that information to assist in preparing bids is available.

1. Publications. The following are available from the Plans Room, download online, or as noted:
 - a. Standard Specifications for Highway Construction, 2020 Edition comb bound (\$25.00), download at: www.dot.state.ak.us/stwddes/dcspecs/assets/pdf/hwyspecs/sshc2020.pdf, or order bound book from LuLu at: <https://www.lulu.com/en/us/shop/state-of-alaska-dept-of-transportation/2020-alaska-standard-specification-for-highway-construction/paperback/product-1qq9j9qk.html>.
 - b. Alaska Test Methods Manual (Lab & Field), May 15, 2023 Edition (\$25.00). Available online at: www.dot.state.ak.us/stwddes/desmaterials/mat_waqtc/testman.shtml.
 - c. Alaska Storm Water Pollution Prevention Plan Guide, March 2021. Available at: www.dot.state.ak.us/stwddes/desenviron/resources/stormwater.shtml.
2. Other Publications. These items are available upon request from the Department of Natural Resources, Division of Parks & Outdoor Recreation, Design & Construction Section at 550 West 7th Avenue, Suite 1340, Anchorage, AK:
 - a. Erosion, Sediment Control Plan (ESCP) in the appendix.
 - b. Channel Parameters and Coordinate Points for Ditch Lining Channels electronic file.
3. Build America, Buy America Act. Effective for Federal award obligations after October 23, 2023, meet the requirements at 2 CFR 184 for construction materials.
4. COVID-19 Management Plan. The Governor's emergency declaration and mandates relating to COVID-19 expired on February 14, 2021. However, contractors are encouraged to review COVID-19 Response and Recovery Health Advisories that can be accessed at: <https://covid19.alaska.gov/health-advisories/>.

Contractors will still be required to meet any applicable local ordinances or requirements currently in effect, and comply with any future federal, state, or local declarations or mandates that might be adopted while work on the project is ongoing.

Consistent with Section 107-1.01 of the Standard Specifications for Highway Construction, the Contractor will be responsible for paying all costs and expenses incurred to comply with any COVID-19 Health Mandates or Health Advisories in effect during times when the Contractor is performing project-related work activities. The Contractor will additionally be responsible for preparing any general or site-specific mitigation and response plans required for its forces, along with any attendant schedule delays or impacts.

5. Electronic Bidding. The Department is not able to receive bids electronically. All bidding documents must be submitted by mail or hand delivered. Documents shall be submitted in a sealed envelope.

6. Material Sources. All borrow or fill material must come from Department-permitted sources, material reclaimed from maintained roadside ditches (provided the designed width or depth of the ditch is not increased), or commercially procured material from a source existing prior to the event. For any federal-funded project requiring the use of a non-commercial source or a commercial source that was not permitted to operate prior to the event (e.g. a new pit, agricultural fields, road ROWs, etc.) in whole or in part, regardless of cost, the Applicant must notify the Department prior to extracting material. The Department must review the source for compliance with all applicable federal environmental planning and historic preservation laws and executive orders prior to a subrecipient or their contractor commencing borrow extraction. Consultation and regulatory permitting may be required. Non-compliance with this requirement may jeopardize receipt of federal funding. Documentation of borrow sources utilized is required at closeout.
7. Cultural and Archaeological Survey for Material Sources. All material sources associated with this project must conform to AS 41.35.070 and have documented survey showing no adverse effects to historic, prehistoric, or archaeological resources. A list of qualified consultants approved to perform cultural/archaeological surveys can be found at: <http://dnr.alaska.gov/parks/oha/grant/contractorlistcurrent.pdf>.
8. Contract Price Adjustment(s). The Department will not provide cost escalation or de-escalation price adjustment for this contract, except for specific items described in the bid package at the time of bid opening.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

REQUIRED DOCUMENTS

Federal-Aid Contracts (Non-FHWA)

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 Forms**
 - a. **Bid Form (Form 25D-09DNR)**
 - b. **Bid Schedule**
 - c. **Bid Attachments (as applicable)**
 - d. **Addenda Acknowledgement (as applicable)**
2. **Bid Bond (Form 25D-14DNR)**

REQUIRED FOR BID MODIFICATIONS. Any bid revisions must be submitted by the bidder prior to bid opening. Use the following form to modify Manual (paper) bids:

3. **Bid Modification (Form 25D-16DNR)**
-

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

1. **Subcontractor List (Form 25D-5DNR)**
 2. **Summary of Good Faith Effort Documentation (Form 25A-332A), and Contact Reports (Form 25A-321A)**
 3. **DBE Utilization Report (Form 25A-325C)**
 4. **Prime Contractor's Written DBE Commitment (Form 25A-326) for each DBE to be used on the project.**
-

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-10HDNR)**
2. **Payment Bond (Form 25D-12DNR)**
3. **Performance Bond (Form 25D-13DNR)**
4. **Contractor's Questionnaire (25D-08DNR)**
5. **Certificate of Insurance (from carrier)**
6. **EEO-1 Certification (Form 25A-304DNR)**
7. **Training Utilization Report (Form 25A-311), and/or DOT&PF Training Program Request (Form 25A-310), if required**
8. **Material Origin Certificate (Form 25D-60)**
9. **AML Contractor Information**



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

FEDERAL EEO BID CONDITIONS

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246). FOR ALL NON-EXEMPT FEDERAL AND FEDERALLY ASSISTED CONSTRUCTION CONTRACTS TO BE AWARDED IN THE STATE OF ALASKA

1. Definitions. As used in these specifications:
 - a. “**Covered area**” means the geographical area described in the solicitation from which this contract resulted;
 - b. “**Director**” means Director, Office of Federal Contract Compliance Programs (OFCCP), United States Department of Labor (DOL), or any persons to whom the Director delegates authority;
 - c. “**Employer**” identification number” means the Federal Social Security number used on the Employer’s Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. “**Minority**” includes:
 - (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race);
 - (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (4) American Indian or Alaska Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the DOL in the covered area, either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades that have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor’s or subcontractor’s failure to make good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) through 7(p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

Covered construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any OFCCP office or from federal procurement contracting officers.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period of an approved training program and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligations to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the DOL. The Contractor shall provide notice of these programs to the sources compiled under 7(b) above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendent, general foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and dispositions of the subject matter.
 - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
 - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are nonsegregated except that separate or single-used toilet, necessary changing facilities and necessary sleeping facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulations of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations 7(a) through 7(p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any or more of its obligations under 7(a) through 7(p) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.)
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunities. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic apprentice, trainees, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that the existing records satisfy this requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Programs).
16. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
17. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as set forth in item 20.

These goals as listed in item 20 are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally and non-federally involved construction.

The hours on minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women

evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

18. The Contractor shall provide written notification to the Department, for all subcontracts documents as follows: the name, address and telephone number of subcontractors and their employer identification number; the estimated dollar amount of the subcontracts; estimated starting and completion dates of the subcontracts; and the geographical area in which the contract is to be performed.

This written notification shall be required for all construction subcontracts in excess of \$10,000 at any tier for construction work under the contract resulting from this project's solicitation.

19. As used in the Bid Notice, and in the contract resulting from this project's solicitation, the "covered area" is the State of Alaska.

20. Goal and Timetable

- a. The following goal and timetable for female utilization shall be included in all federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goal is applicable to the Contractor's aggregate on-site construction work force whether or not part of that work force is performing work on a federal or federally assisted construction contract or subcontract.

ALASKA GOAL AND TIMETABLE FOR WOMEN*

<u>Timetable</u>	<u>Goal **</u>
Until Further Notice	6.9%

- b. The following goals and timetable for minority utilization shall be included in all federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in Alaska. The goals are applicable to the Contractor's aggregate on-site construction work force whether or not part of that work force is performing work on a federal or federally assisted construction contract or subcontract.

ALASKA GOALS AND TIMETABLE FOR MINORITY UTILIZATION

<u>Timetable</u>	<u>Economic Area (EA)***</u>	<u>Goals **</u>
Until Further Notice	Anchorage SMSA Area	08.7%
	Remainder of State	15.1%

* The goal and timetable for women listed above applies to Alaska as well as nationwide.

** The Director, from time to time, shall issue goals and timetables for minority and female utilization that shall be based on appropriate work force, demographic or other relevant data and which shall cover construction projects, or construction contracts performed in specific geographical areas. The goals shall be applicable to each construction trade in a covered Contractor's or subcontractor's entire work force which is working in the area covered by the goals and timetables, shall be published as notices in the FEDERAL REGISTER, and shall be inserted by the contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2. Covered construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed.

***Refer to the Standard Metropolitan Statistical Areas (SMSA) and Economic Areas (EA), Office of Management and Budget, 1975.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

SUBCONTRACTOR LIST

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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 on the fifth working day after receipt of written notice from the Department.

An apparent low bidder who fails to submit a completed Subcontractor List form within the time allowed will be declared non-responsible and may be required to forfeit 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

Or

List all first tier Subcontractors as follows:

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

CONTINUE SUBCONTRACTOR INFORMATION ON REVERSE

For projects with federal-aid funding, I hereby certify Alaska Business Licenses and Contractor Registrations will be valid for all subcontractors prior to award of the subcontract. For projects without federal-aid funding (State funding only), I hereby certify the listed Alaska Business Licenses and Contractor Registrations were valid at the time bids were opened for this project.

Signature of Authorized Company Representative

Title

Company Name

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

Date

Phone Number

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



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

CONTRACTOR'S QUESTIONNAIRE

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6
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 materials necessary for this project?
 Yes No If NO, please explain:

C. EXPERIENCE

1. Have you had previous construction contracts or subcontracts with the State of Alaska?
 Yes No

Describe the most recent or current contract, its completion date, and scope of work:

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 and Title of Person Signing
_____ Signature	_____ Date



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

BID FORM

for

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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 to Bid dated **February 15, 2024**, 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, located at or near **Healy**, Alaska, according to the plans and specifications and for the amount and prices named herein as indicated on the Bid Schedule consisting of **2** sheets, 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 Transportation and Public Facilities 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 **October 1, 2025**, 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



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

BID SCHEDULE

Project Name: Cripple Creek Pit Reclamation - Phase II

Project Number: 52959-6

Before preparing this bid schedule, read carefully, Section 102 of the 2020 edition of the Standard Specifications for Highway Construction, and the following:

The Bidder shall insert, as called for, a unit price or lump sum price in figures opposite each pay item for which an estimated quantity appears in the bid schedule. A unit price or lump sum price is not to be entered or tendered for any pay item not appearing in the bid schedule. The estimated quantity of work for payment on a lump sum basis will be "All Required" (All Req'd) and as further specified in the contract.

Whenever a Contingent Sum is shown for any item in this schedule, such amount shall govern and be included in the bid total.

Conditioned or qualified bids will be considered non-responsive.

Notice: Contract award will be made on the basis of the total adjusted basic bid.

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

Pay Item Number	Pay Item Description	Pay Unit	Quantity	Unit Bid Price	Amount Bid
***** BASIC BID *****					
201.0003.0000	Clearing & Grubbing	Acre	32.35	\$	\$
203.0003.0000	Unclassified Excavation	C.Y.	787,817	\$	\$
611.0002.0001	Riprap, Class I	Ton	3,000	\$	\$
618.0001.0000	Seeding	Acre	47.89	\$	\$
620.0001.0000	Topsoil	Sq. Yd.	231,788	\$	\$
640.0001.0000	Mobilization & Demobilization	L.S.	All Req'd	\$ (Lump Sum)	\$
641.0001.0000	Erosion, Sediment, & Pollution Control Administration	L.S.	All Req'd	\$ (Lump Sum)	\$
641.0002.0000	Temporary Erosion, Sediment & Pollution Control	C.S.	All Req'd	\$ 100,000.00	\$ 100,000.00
641.0006.0000	SWPPP Price Adjustment/ Withholding	C.S.	All Req'd	\$ 0.00	\$ 0.00

642.0001.0000	Construction Surveying	L.S.	All Req'd	\$ (Lump Sum)	\$
647.2001.0000	Wide Pad Dozer, 65 HP Minimum	Hour	10	\$	\$
647.2030.0000	Hydraulic Excavator, 1 CY, 100 HP Minimum	Hour	10	\$	\$
647.3000.0000	Motor Grader, 220 HP Minimum	Hour	10	\$	\$
680.0001.0000	Sediment Retention Pond	L.S.	All Req'd	\$ (Lump Sum)	\$

No: _____ Expires _____
Alaska Business License

No: _____ Expires _____
Alaska Contractor's License



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

CONSTRUCTION CONTRACT

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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. *The Alaska Standard Specifications for Highway Construction, 2020 Edition* is incorporated by reference and made a part hereof as if set forth in full. *The Alaska Standard Specifications for Highway Construction* can be downloaded at <http://www.dot.state.ak.us/stwddes/dcspsecs/index.shtml>.

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: **October 1, 2025** or within N/A calendar days. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Department, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Department shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Department shall have the right to recover **Two thousand five hundred and 00/100 dollars (\$2,500.00)** per day for each calendar day elapsing between the time stipulated for the completion and the actual date of completion in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

The bonds given by the Contractor in the sum of **\$100% (of the contract)** Payment Bond, and **\$100% (of the contract)** 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

Date

(Corporate Seal)

**STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES**

Signature of Contracting Officer

Typed Name

Date



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

PAYMENT BOND

Bond No. _____

For

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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

See Instructions on Reverse

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

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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 Transportation and Public Facilities 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

See Instructions on Reverse

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

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

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.

Corporate Seal

See Instructions on Reverse

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

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6

Project Name and Number

Modification Number: _____

Note: Use this form to modify Manual (paper) bids only.

- Group items and provide subtotals by bid schedule section.
- All revisions shall be made to the unadjusted bid amount(s).
- Changes to the adjusted bid amounts will be computed by the Department.

LINE NO.	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.



Certificate of Buy America Act Compliance

Federal-Aid Highway Contracts

Project Name and Number ¹	
Pay Item No. / Pay Item Description ²	Does 25D-60 need to be updated? <input type="checkbox"/> Yes <input type="checkbox"/> No

PRODUCT OR CONSTRUCTION MATERIAL ³	QUANTITY ⁴	NON-DOMESTIC OR UNKNOWN ORIGIN ⁵	DOMESTIC ⁵	PREDOMINANTLY IRON OR STEEL OR BOTH ⁶	CONSTRUCTION MATERIAL ⁷	MANUFACTURED PRODUCT ⁸	PROJECT SPECIFIC WAIVER ⁹	COST OF NON-DOMESTIC ORIGIN ¹⁰
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

As the Supplier's authorized representative, I certify that, as of the date of my signature below, all iron or steel products, all products predominantly of iron or steel or a combination of both, all manufactured products, and all construction materials listed and classified above as domestic meet the domestic requirements of 23 CFR §635.410 and 2 CFR Part 184. If an iron or steel product, a product predominantly of iron or steel or a combination of both, a manufactured product, or construction materials are non-domestic, then I further certify that the cost shown above is a true and accurate value of the product and/or material including shipping to the project location.

As the Contractor's authorized representative, I certify that the above products and/or materials will be incorporated into the project, and I further certify that the cumulative amount of all non-domestic iron or steel products, products predominantly of iron or steel or a combination of both, manufactured products, and construction materials do not exceed, as appropriate, the minimal use allowance under 23 C.F.R. §635.410(b)(4) or the de minimis allowance under the USDOT's "Waiver of Buy America Requirements for De Minimis Costs and Small Grants" published in the Federal Register at 88 FR 55817.

I acknowledge that submission of false or misleading statement information may result in civil and criminal penalties.

Supplier's Authorized Representative Signature

Date

Printed Name

Position

Prime Contractor's Authorized Representative Signature

Date

Printed Name

Position

Form 25D-62 Instructions:

1. Enter the project name, state number, and federal number as they appear on the contract.
2. Enter the pay item number and description as they appear on the bid schedule.
3. Use a description that allows identification of the product of material in the retained documentation and at the project site.
4. Do not enter a generic description like “all required”. Use a quantity that matches the retained documentation used to certify cost on Form 25D-60.
5. Choose either domestic or non-domestic as required by Section 106-1.01, Buy America Provision
6. Check this column if product is a Manufactured Product as defined in Section 106-1.01, Buy America Provision
7. Check this column if product is a Construction Materials as defined in Section 106-1.01, Buy America Provision
8. Enter the cost of the non-domestic product(s) for the associated quantity. Provide an updated Form 25D-60 when the non-domestic material counts towards the contract allowance.
9. Keep a copy of the waiver with the retained documentation when the non-domestic material is subject to an applicable waiver.
10. Enter the total cost of the products/materials that are non-domestic.
11. Attach additional form sheets if necessary to include more than one page of products and materials.



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES

EEO-1 CERTIFICATION
Federal-Aid Contracts

Cripple Creek Pit Reclamation - Phase II, Project No. 52959-6
Project Name and Number

This certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor [41 CFR 60-1.7 (b) (1)] and must be completed by the successful Bidder and each proposed Subcontractor participating in this contract.

PLEASE CHECK APPROPRIATE BOXES

The Bidder Proposed Subcontractor hereby CERTIFIES:

PART A Bidders and proposed Subcontractors with 50 or more year-round employees and a federal contract amounting to \$50,000 or more are required to submit one federal Standard Report Form 100 during each year that the two conditions exist (50 employees and a \$50,000 federal contract).

The company named below (Part C) is exempt from the requirements of submitting the Standard Report Form 100 this year.

NO (go to PART B) YES (go to PART C)

Instructions and blank Standard Report Form 100's may be obtained from a local U.S. Department of Labor office, or by writing to:

The Joint Reporting Committee
P.O. Box 779
Norfolk, Virginia 23501

Telephone number: (757) 461-1213

PART B The company named below has submitted the Standard Report Form 100 this year.

NO YES

Note: Bidders and proposed Subcontractors who have not filed the required Standard Report Form 100 and are not exempt from filing requirements will not be awarded this contract or subcontract until Form 100 has been filed for the current year ending June 30.

PART C

Signature of Authorized Company Representative	Title
Company Name	Company Address (Street or PO Box, City, State, Zip)
Date	() Phone Number

ABANDONED MINE LANDS (AML) CONTRACTOR INFORMATION FORM

You must complete this form for your AML contracting officer to request an eligibility evaluation from the Office of Surface Mining Reclamation and Enforcement (OSMRE) to determine if you are eligible to receive an AML contract. This requirement can be found under OSMRE's regulations at 30 CFR 874.16. **NOTE:** This form must be signed and **dated within 30 days** of submission to be considered for a current bid.

Part A: General Information

Business Name: _____

Tax ID #: _____

Address: _____

City, State, & Zip: _____

Phone Number: _____

Email Address: _____

Part B: Obtain an Organizational Family Tree (OFT) from the Applicant Violator System (AVS)

If you plan to certify the existing AVS information or submit updates under Part C, you must include an OFT. Instructions for downloading an OFT from the AVS can be found at:

<https://www.osmre.gov/resources/forms/OMB1029-0119instructions.pdf>

If you require assistance you may contact the AVS Office by phone at: 800-643-9748, or by email at:

avshelp@osmre.gov.

Part C: Certifying and updating information in the AVS

Select one of the options, follow the instructions for the selected option, sign, and date below.

I, _____, have express authority to certify that:
(Print Name)

1. Our business is listed in the AVS. The information is accurate, complete, and up to date. (If you select this option, you must attach an Entity OFT from the AVS to this form). Do not complete Part D.
2. Our business is in the AVS. The information needs to be updated. (If you select this option, you must attach an Entity OFT from the AVS to this form). Complete Part D to provide the missing or corrected information.
3. Our business is not listed in the AVS. The information needs to be added. Complete Part D to provide the information.

Date_____
Signature_____
Title

Part D: OFT Information

Contractor's Business Name: _____

If the current Entity OFT information for your business is incomplete in the AVS, or if there is no information in the AVS for your business, you must provide all of the following information as it applies to your business. Please include additional copies of this page if the space below is not sufficient to capture all information.

- Every officer (President, Vice President, Secretary, Treasurer, etc.);
- All Directors, Partners, and Members;
- All persons performing a function similar to a Director;
- Every person or business that owns 10% or more of the voting stock in your business;
- Any other person(s) who has the ability to determine the manner in which the AML reclamation project is being conducted.
- **Please list an end date for any person who is no longer with your business.**

Name: _____
 Address: _____
 City, State, Zip: _____
 Begin Date: _____
 End Date: _____
 % Ownership: _____
 Position/Title: _____
 Phone Number: _____

Name: _____
 Address: _____
 City, State, Zip: _____
 Begin Date: _____
 End Date: _____
 % Ownership: _____
 Position/Title: _____
 Phone Number: _____

Name: _____
 Address: _____
 City, State, Zip: _____
 Begin Date: _____
 End Date: _____
 % Ownership: _____
 Position/Title: _____
 Phone Number: _____

Name: _____
 Address: _____
 City, State, Zip: _____
 Begin Date: _____
 End Date: _____
 % Ownership: _____
 Position/Title: _____
 Phone Number: _____

PAPERWORK REDUCTION STATEMENT

The Paperwork Reduction Act of 1995 (44 U.S.C 3501) requires us to inform you that: Federal Agencies may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a current valid OMB control number. This information is necessary for all successful bidders prior to the distribution of AML funds, and is required to obtain a benefit.

Public reporting burden for this form is estimated to range from 15 minutes to one hour, with an average of 30 minutes per response, including time for reviewing instructions, gather and maintaining data, and completing and reviewing the form. You may direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Office of Surface Mining Reclamation and Enforcement, 1849 C Street, NW, Room 4559, Washington, DC 20240.

SPECIAL PROVISIONS

to the

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
2020 STANDARD SPECIFICATIONS for HIGHWAY CONSTRUCTION

HEALY, ALASKA

CRIPPLE CREEK PIT RECLAMATION-PHASE II

PROJECT NUMBER 52959-6

2-15-24 Final

SECTION 101

DEFINITIONS AND TERMS

101-1.03 DEFINITIONS.

DEPARTMENT. Replace with the following: The Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation.

(01/01/01)PARKS-Special Provision

PROJECT. Replace with the following: The specific site together with all facilities and construction to be performed thereon under the contract.

(01/01/01)PARKS-Special Provision

ROADWAY. Replace with the following: The portion of a highway or park facility including shoulders within the limits of construction.

(01/01/01)PARKS-Special Provision

SPECIAL PROVISIONS

Project Number: 52959-6

Cripple Cr. Pit Reclamation – Phase II

SECTION 105

CONTROL OF WORK

105-1.02 PLANS AND WORKING DRAWINGS. Add the following to the first paragraph: Full size plan sheets are 11” by 17”. Plans are available upon request in CAD digital format.

(01/01/01)PARKS-Special Provision

105-1.06 UTILITIES. Add the following:

Request locates from the utilities having facilities in the area. Use the Alaska Digline, Inc. Locate Call Center for the following utilities.

ALASKA DIGLINE, INC.

Locate Call Centers:

Anchorage	278-3121
Statewide	(800) 478-3121

105-1.15 PROJECT COMPLETION. In the third paragraph, first sentence, replace: “Subsection 621-3.04” with “Subsection 618-3.06 and 621-3.04.”

(02/02/15) PARKS-Special Provision

105-1.17 CLAIMS. Add the following: Any appeal to the superior court under AS 36.30.685 must be filed in the third judicial district.

(03/21/01)R93-Special Provision

Add the following Subsection:

105-1.18 CONSTRUCTION LIMITATIONS. It is the intent of this contract to construct this project without entering land outside the project limits. Project egress is limited to established access road only. Equipment, materials, and manpower shall not be allowed outside project limits without prior approval of the Engineer. Excavation of any kind shall only be stored within project limits while awaiting final placement or disposal. The Contractor shall not use construction equipment or workers that, in the opinion of the Engineer, cannot consistently operate within project limits.

(01/08/09)AML-Special Provision

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SECTION 106

CONTROL OF MATERIAL

106-1.01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. *Replace the BUY AMERICA PROVISION with the following:*

BUY AMERICA PROVISION. On projects using federal funds, the Contractor shall comply with the requirements of Public Law No. 117-58, Sections 70901-52 and 23 CFR 635.410, Buy America requirements, and shall submit a completed Material Origin Certificate, Form 25D-60, prior to award of the contract. When the Contractor becomes aware of a change from or error in a previously submitted Material Origin Certificate (Form 25D-60), the Contractor shall submit an updated Material Origin Certificate (Form 25D-60). All construction materials, steel products and iron products which are incorporated into the work, shall be manufactured in the United States except that minor amounts of construction materials, steel products and iron products of foreign manufacture may be used, provided the aggregate cost of such does not exceed one tenth of one percent (0.001) of the total contract amount, or \$2,500, whichever is greater. For the purposes of this paragraph, the cost is the value of the products as they are delivered to the project including freight.

The Contractor shall ensure that all manufacturing processes for each covered product comply with this Buy America Provision. Non-conforming products shall be replaced at no expense to the State. Failure to comply may also subject the Contractor to default and debarment.

Provide a Certificate of Buy America Act Compliance Form 25D-62 from the supplier for each construction material, steel product, or iron product and each component that is manufactured predominantly of steel or iron, prior to incorporating any construction material, steel products, iron products or any components manufactured predominantly of steel or iron into the project. The supplier certifying Form 25D-62 may be the original manufacturer, fabricator, vendor, contractor, or subcontractor; provided the supplier has sufficient control and knowledge of the manufacturing process to accept responsibility and certify full and complete conformance with the certification statement on the form. Provide mill certificates when required by the Engineer. False statements may result in criminal penalties prescribed under AS 36.30.687 and Title 18 US Code Section 1001 and 1020.

Buy America does not apply to construction materials, steel products, and iron products brought to the construction site and removed at or before the completion of the project. Further, it does not apply to construction materials, steel products, and iron products which remain in place at the Contractor's convenience.

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The North American Free Trade Agreement (NAFTA) does not apply to the Buy America requirement. There is a specific exemption within NAFTA (article 1001) for grant programs such as the Federal-aid highway program.

Construction Materials

A construction material includes an article, material, or supply other than

1. an item of primarily iron or steel;
2. a manufactured product;
3. cement and cementitious materials;
4. aggregates such as stone, sand, or gravel;
5. or aggregate binding agents or additives

– that is or consists primarily of

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Lumber; or
5. Drywall.

For construction materials, manufactured in the United States means the final manufacturing process and the immediately preceding manufacturing stage were undertaken in the United States.

An item that consists of two or more construction materials combined together through a manufacturing process, and items that include at least one construction material combined with another material through a manufacturing process, will be treated as a manufactured product instead of a construction material. Manufactured products that are not predominantly steel or iron are not subject to Buy America requirements.

Steel and Iron Products

“Manufactured in the United States” means all manufacturing processes starting with the initial mixing and melting through the final shaping, welding, and coating processes must

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be undertaken in the United States. The definition of “manufacturing process” is smelting or any subsequent process that alters the material’s physical form, shape or chemical composition. These processes include rolling, extruding, machining, bending, grinding, drilling, etc. The application of coatings, such as epoxy coating, galvanizing, painting or any other coating that protects or enhances the value of steel or iron materials shall also be considered a manufacturing process subject to the requirements of Section 106-1.01, Buy America Provision and of the Buy America Act.

Buy America does not apply to iron ore, pig iron, and processed, pelletized and reduced iron ore.

When steel and iron products manufactured in the United States are shipped to a foreign country where non steel or iron products are installed on or in them (e.g., electronic components in a steel cabinet), the steel and iron is considered to meet the requirements of this subsection.

106-1.06 STORAGE OF MATERIALS. Add the following: Storage of any materials or equipment at the jobsite shall have the Engineer’s approval and will be restricted to within the project limits. There shall be no disturbance allowed to land outside the project boundaries.

(06/04/14)AML-Special Provision

SECTION 107

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107-1.02 PERMITS, LICENSES, AND TAXES.

Add the following to the second paragraph:

3. The Department has received the following permits on the Contractor's behalf and can be found in Appendix A:
 - a. Alaska State Historic Preservation Office – Section 106 Historic Properties Consultation
 - b. U.S. Army Corps of Engineers – Nationwide Permit 49: Coal Remining Activities

(03/05/20)PARKS-Special Provision

Add the following to the third paragraph:

10. The Hanger Pit, Cripple Creek, and Coal Creek are available water sources for compaction moisture and dust control, with the following conditions:
 - a. Limiting use to a maximum of 500 gallons per day, which may be taken from any source indefinitely, or
 - b. Limiting use to 5,000 gallons per day for up to 10 calendar days per source per calendar year.

Greater quantities of water use will require additional water sources or a water use permit.

(03/05/20)PARKS-Special Provision

Add the following to the fifth paragraph:

5. Provide a wetland specialist to conduct the determination and delineations of sites outside the project limits or not previously permitted, impacted by the Contractor's operations. These delineations will be subject to Corps of Engineers approval. The wetland specialist shall conduct wetlands determinations and delineations according to the Corps of Engineers 1987 Wetland Delineation Manual, and the Regional Supplement to the Corps of Engineers Wetland Delineations Manual (Alaska Region, Version 2.0, September 2007).

(03/21/11)PARKS-Special Provision

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.

Add the following: If more than 500 gallons per day of water is required for any

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construction purpose from a non-municipal water source, obtain a Temporary Water Use Permit from the Water Resource Manager, and provide a copy to the Engineer. The Water Resource Manager is with the Department of Natural Resources in Anchorage and may be contacted at (907) 269-8645.

(02/05/10)AML Special Provision

All clearing and/or grubbing activities shall take place outside of the Migratory Bird Treaty Act (MBTA) window as determined by the U.S. Fish and Wildlife Service (FWS) under the website publication for the construction year.

(06/30/98)PARKS-Special Provision

Add the following:

Bald Eagles are protected under the Bald Eagle Protection Act (16 U.S.C. 668-668c) which prohibits “takes” of bald eagles, their eggs, nests, or any part of the bird. The Act defines “taking” as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

Maintain a Primary Zone of a minimum 330 ft as an undisturbed habitat buffer around nesting bald eagles. If topography or vegetation does not provide an adequate screen or separation, extend this buffer to 0.25 miles, or a sufficient distance to screen the nest from human activities. The actual distance will depend on site conditions and the individual eagle’s tolerance for human activity. Within the Secondary Zone, between 330 ft and 660 ft from eagles nest tree no obtrusive facilities or major habitat modifications shall occur. If nesting occurs in sparse stands of trees, treeless areas, or where activities would occur within line-of-site of the nest, this buffer shall extend up to 0.5 miles. No blasting, logging and other noisy, disturbing activities should occur during the nesting period (March 1 – August 31) within the primary or secondary zones.

Extremely noisy activities such as road construction or other activities that occur within the Secondary Zone shall be conducted outside the nesting period to avoid disturbance to eagles. If activities occur in proximity to a nest site, employ an individual qualified to observe and assess the impact of such activities on nesting eagles. Behavior generally associated with disturbed eagles includes alarm calls, birds flushed from their nest or perch, and aggressiveness.

If nest trees are discovered within the vicinity of the project site, the U.S. Fish and Wildlife Service must be notified immediately by calling (907) 786-3503 or (907) 271-2772, before starting construction activities, for further site evaluation.

(08/12/10)CR1071-Special Provision

Add the following Subsection:

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107-1.21 FEDERAL AFFIRMATIVE ACTION. Affirmative steps must be taken to comply with Federal Equal Employment Opportunity (EEO) and Disadvantaged Business Enterprise (DBE) requirements as applicable to this Contract. The Alaska Department of Transportation and Public Facilities maintains a list of registered DBEs and may be contacted at (907) 269-0851 to obtain a copy of that list. Exercise good faith effort to comply with affirmative action requirements and make all documentation available to the Engineer upon request.

(03/09/17)PARKS-Special Provision

SECTION 108

PROSECUTION AND PROGRESS

108-1.01 SUBLETTING OF CONTRACT. Delete paragraph one and replace with the following: The Contractor shall submit a Contractor Self Certification for Subcontractors and Lower Tier Subcontractors, Form 25D-042, before the Contractor or any subcontractor sublets, sells, transfers, assigns, or otherwise disposes of the Contract or any portion of the Contract. The Department has authority to review subcontracts and to deny permission to sublet work. The Department may penalize the Contractor for false statements or omissions made in connection with Form 25D-042.

Delete paragraph four and replace with the following:

1. The Contractor shall ensure that for all subcontracts (agreements):

- a. The Department is furnished with one completed Contractor Self certification, Form 25D-042, for each subcontract;
- b. The required prompt payment provisions of AS 36.90.210, as well as other items listed in Form 25D-042, are included in the subcontracts;
- c. The subcontractors pay current prevailing rate of wages as per Subsection 107-1.04 and file certified payrolls with the Engineer and DOLWD for all work performed on the project; and
- d. Upon receipt of a request for more information regarding subcontracts, the requested information is provided to the Department within 5 calendar days.

(05/02/11)PARKS-Special Provision

108-1.02 NOTICE TO PROCEED. Add the following: The Contractor may request a Limited Notice to Proceed after the Award has been made, to allow ordering long lead materials which would cause delays in project completion. However, granting is within the sole discretion of the Contracting Officer, and refusal or failure to grant a Limited Notice to Proceed shall not be a basis for claiming for delay, extension of time, or alteration of price.

(6/30/98)PARKS-Special Provision

108-1.03 PROSECUTION AND PROGRESS. Replace the last sentence of the first paragraph with the following: Submit the following at the Preconstruction Conference:

Replace item 1. A progress schedule. with the following:

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1. A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order the work will be carried out and the contemplated dates the Contractor and subcontractors will start and finish each of the salient features of the work, including scheduled periods of shutdown. Indicate anticipated periods of multiple shift work in the CPM Schedule. Revise to the proposed CPM Schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer.

(12/13/02)R261-Special Provisions

SECTION 109

MEASUREMENT AND PAYMENT

109-1.02 MEASUREMENT OF QUANTITIES.

Add the following:

14. Hour. Measured items by the hour shall be full payment for the work described in the contract including labor, equipment, and operating costs of the equipment. Items to be measured by the hour will be recorded to the nearest quarter-hour by the Engineer. The measurement shall start when the required equipment & operator, surveyor, or survey party begins work at the specified location as directed by the Engineer. The measurement will stop when the required work is accomplished, when the equipment fails, when directed to stop work by the Engineer, or when the operator stops work. Times will be reconciled with the Contractor on a daily basis.

(02/23/15)PARKS-Special Provision

109-1.05 COMPENSATION FOR EXTRA WORK ON TIME AND MATERIALS BASIS.

Under item 3. Equipment, subitem a. Hourly Rental Rate, add the following to the second paragraph: The rental rate area adjustment factors for this project shall be as specified on the adjustment maps for the Alaska - Northern. (04/31/05)R14-Special Provision

Provide a printed copy of the current EquipmentWatch rate sheet for each piece of equipment utilized on the time and materials work.

(11/1/2018)CR109.2-Special Provision

109-1.08 FINAL PAYMENT. Add the following after the fifth paragraph of this subsection:

On federally funded projects, if the Department of Labor and Workforce Development Wage and Hour Administration notifies the Department of a pending prevailing wage investigation, and that the investigation is preventing the closing out of the project, the Contractor may place the notified amount in escrow under Wage and Hour for the exclusive purpose of satisfying unpaid prevailing wages. Upon receipt of notice from Wage and Hour that the contractor has satisfactorily transferred the necessary funds into escrow, the Department will proceed to issue final payment.

(11/30/2020)HSM20-3-Standard Modification

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SECTION 201

CLEARING AND GRUBBING

201-1.01 DESCRIPTION. Replace the entire Subsection with the following: Remove all vegetation and debris within excavation areas and stockpile at locations shown in the Plans or as designated by the Engineer within the project limits.

(03-05-20) AML Special Provision

201-3.01 GENERAL. Add the following: All clearing and grubbing activities shall abide by the Migratory Bird Treaty Act (MBTA).

(09/15/08) PARKS-Special Provision

Add the following: The Contractor shall perform the work necessary to preserve and restore land monuments and property corners from damage. A land monument or property corner that is disturbed shall be restored according to Section 642 at the Contractor's expense. An undisturbed area 5 feet in diameter may be left around existing monuments and property corners. Control points damaged or destroyed by earthwork shall be replaced by new control points located outside disturbance zones to ensure adequate job control. Locations and coordinates of Control Points are shown on the Plans.

(03-05-20) AML Special Provision

Add the following Subsection:

201-3.07 SALVAGE SOIL AND ORGANICS. Replace the first paragraph with the following: Remove and salvage all stumps, roots, moss, grass, turf, debris, and other ground cover to a depth less than 4 feet below.

Stockpile all salvaged organic materials as shown the plans. Salvaged materials shall be processed, blended with useable gravel excavation from the highwall, then re-spread onto final grade for stabilization. No burial or burning will be allowed.

The Contractor may need to mobilize grinding or chipping equipment to the project if necessary, to ensure the salvaged vegetation is processed into a uniform material for blending and spreading. See Section 620 for Topsoil.

(03-05-20) AML Special Provision

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201-4.01 METHOD OF MEASUREMENT.

Add the following: Removal of branches for vertical clearance in accordance with Subsection 201-3.02 will not be measured directly for payment but will be considered subsidiary to work in this Section.

(01/01/01)PARKS-Special Provision

Measurement includes approved stockpile and processing areas.

(03-05-20) AML Special Provision

201-5.01 BASIS OF PAYMENT.

Add the following: Material from screening and tub grinding incorporated into the project as topsoil will be paid for as topsoil under Section 620. Screening and tub grinding operations shall be subsidiary to Section 620 items.

Clearing and grubbing for site access beyond clearing and grubbing limits shown on the Plans is subsidiary.

(03-05-20) AML Special Provision

Payment will be made under:

Pay Item		
Item Number	Item Description	Unit
201.0003.0000	Clearing and Grubbing	Acre

SECTION 203

EXCAVATION AND EMBANKMENT

203-1.01 DESCRIPTION. Add the following: This item also includes coal seam excavation and backfill as shown on the Plans.

(03/05/20)AML-Special Provision

203-3.01 GENERAL. Add the following: Provide the Engineer 14 days in advance of construction a specific, graphic, and detailed Phasing Plan for the entire project. The plan will graphically show each phase of major work, including at minimum the following:

- Clearing & grubbing and stockpiling
- Sequencing of cuts and fills
- Interim management of water and BMPs
- Stability of all work areas during construction
- Project access, staging areas, and haul routes
- Traffic Control
- Coal seam excavation and placement
- Drainage channel installation
- Topsoil processing and spreading
- Seeding and final stabilization

No earth disturbing activities will commence until the engineer has approved this plan. Provide updates, progress, and changes in this plan on a monthly basis or when phases change, whichever comes first. Work the plan in conjunction with the SWPPP and the schedule.

Provide the original surface survey to the Engineer in 2021 AutoCAD format and allow a minimum of three (3) days for review. Work under this section can progress after approval. See Section 642 Construction Surveying and Monuments.

(03/05/20)AML-Special Provision

203-3.03 EMBANKMENT CONSTRUCTION.

Add the following to the first paragraph: All materials used for embankment construction must meet minimum compaction requirements, per 203-3.06.

Add the following to the second paragraph: The former out-of-pit spoil pile shown on the Plans is available should the material within grading limits be insufficient to complete designed final grade, or for benching to stabilize the interim fill slope.

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Replace the first sentence of the tenth paragraph with the following: Place embankment materials in horizontal layers not to exceed 24 inches uncompacted. Compact to specification before the next layer is placed.

Replace paragraph twelve with the following: Rocks and clumps of sandstone too large to be embanked, as specified in paragraph eleven, shall be reduced to a suitable size for incorporation into the embankment. Useable unclassified excavation materials shall not be wasted.

Eliminate paragraph thirteen in its entirety.

Add the following: Existing gravel (Nenana Gravels) from atop of the highwall is useable unclassified excavation and shall be apportioned by priority as follows:

1. Topsoil Production: Blend gravel with salvaged vegetation to meet topsoil requirement per Section 620.
2. Selected Material: Fill and backfill as shown on the Plans.

Add the following: Coal seams in rock formations shall be overcut and buried a minimum depth of 15 feet below finish grade, to ensure against potential combustion. Coal removed by excavation may be incorporated into embankment at depths no shallower than 15 feet. Temporary surface stockpiling or disposal within or outside the project is prohibited.

(03/05/20)AML-Special Provision

203-3.06 COMPACTION FOR EMBANKMENT. Compact until embankment does not rut under loaded hauling equipment. Do not cover any lift with additional material until the required compaction has been completed, or to the satisfaction of the project engineer.

(03/05/20)AML-Special Provision

203-5.01 BASIS OF PAYMENT. Add the following:

10. Coal seam excavation and backfilling as indicated.

(03/05/20)AML-Special Provision

Payment will be made under:

Pay Item		
Item Number	Item Description	Unit
203.0003.0000	Unclassified Excavation	CY

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SECTION 611

RIPRAP

611-1.01 DESCRIPTION. Replace this section with the following: Construct riprap channel lining at the locations shown on the Plans.

611-3.01 CONSTRUCTION REQUIREMENTS. Replace this section with the following: Excavate channel dimensions to the design parameters provided in Appendix D of these Special Provisions, and according to the details shown in the Plans. Place and spread riprap materials so that the finished face is reasonably uniform and conforms with the lines and grades shown on the Plans or as directed.

611-5.01 BASIS OF PAYMENT.

Payment will be made under:

Pay Item		Pay Unit
611.0002.0001	Riprap, Class I	Ton

(02/10/2020)AML-Special Provision

Replace this entire Section with the following:

SECTION 618

SEEDING

618-1.01 DESCRIPTION. This work consists of establishing a perennial stand of grass and other specified living vegetative cover in the areas indicated on the Plans and to acceptably maintain the cover for the term of the Contract, in order to establish a permanent revegetated cover.

Topsoil and seed all regraded slopes and any other areas disturbed by the Contractor during project activities except access roads and temporary stockpile/processing locations. Track walk soil then apply seed, flexible growth media (FGM), fertilizer and water.

(03/05/20)AML-Special Provision

618-2.01 MATERIALS. Use materials that conform to the Special Provisions and the following:

Seed	Section 724
Fertilizer	Section 725
Mulch / Flexible Growth Media	Subsection 727-2.01
Water	Subsection 712-2.01

CONSTRUCTION REQUIREMENTS

618-3.01 SOIL PREPARATION. Retain and distribute elements of surface roughness in all areas, to encourage microclimate diversity and aid reestablishment of vegetation. Desired elements include stones and boulders, native plant growth, sticks, stumps, and other debris or irregularities that encourage vegetative regrowth and wildlife habitat reestablishment.

Apply seed as detailed in Subsection 618-3.03 immediately after the shaping of the slopes. Cover all slopes to be seeded with mulch and topsoil in accordance with Sections 619 and 620. Complete surface preparation as soon as topsoil is placed on the slopes.

(06/09/2014)AML-Special Provision

Roughen the surface to be seeded by grooving the soil in a uniform pattern that is perpendicular to the fall of the slope. Use one or more of the following grooving methods with associated equipment before the application of seed:

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1. Mechanical track walking with track equipment; or
2. Bulldozer ripping on the contour.

(06/09/2014)AML-Special Provision

Flat surfaces shall also be topsoiled and roughened by using one of the methods described above.

(01/01/01)PARKS-Special Provision

618-3.02 SEEDING SEASONS. Seed disturbed areas that require seeding within 14 days of the permanent cessation of ground disturbing activities in that area.

(01/27/07)E42-Standard Modification

Seed and fertilize during the local growing season. Do not seed during windy conditions or when climatic conditions or ground conditions would hinder placement or proper growth. The seeding season is from May 15 and August 1. (Interior Alaska)
Written approval from the Engineer is required to seed at a different date.

618-3.03 APPLICATION. Apply seed, mulch and fertilizer as follows per 1000 ft². Apply seed, fertilizer, and mulch in one application using the hydraulic method.

Item	Ingredients	Application Rate (per 1000 S.F.)
Seed Mix	Arctared and/or Boreal Red Fescue	0.25 lbs
	Nortan Tufted Hairgrass	0.18 lbs
	Wainwright Slender Wheatgrass	0.20 lbs
	Kentucky Bluegrass	0.05 lbs
	American Sloughgrass	0.02 lbs
	Polar (Manchar) Brome	0.10 lbs
	Annual Ryegrass	0.10 lbs
	Tobin Rapseed	0.05 lbs
	Peace, Rangelander and/or Rangelander Alfalfa	<u>0.05 lbs</u>
		Total = 1.00 lbs
Mulch	Flexible Growth Media	80.0 lbs
Fertilizer	20-20-10	12.0 lbs

Do not remove the required tags from the seed bags.

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Upon the Engineer's approval, Nortran Tufted Hairgrass may be used as a substitute for Slender Wheatgrass (Wainwright) if Slender Wheatgrass (Wainwright) is commercially unavailable. If this substitution is made, apply at the same application rate.

(03/05/2020)AML-Special Provision

Use the following method unless otherwise specified:

Hydraulic Method.

- a. Furnish and place a slurry made of seed, fertilizer, water, FGM, and other components as required by the Special Provisions.
- b. Use hydraulic seeding equipment that will maintain a continuous agitation and apply a homogeneous mixture through a spray nozzle. The pump must produce enough pressure to maintain a continuous, non-fluctuating spray that will reach the extremities of the seeding area with the pump unit located on access routes. Provide enough hose to reach areas not practical to seed from the nozzle unit situated at access points.
- c. If mulch material is required, it may be added to the water slurry in the hydraulic seeder after adding the proportionate amounts of seed and fertilizer. Add seed to the slurry mixture no more than 30 minutes before application.
- d. Mix the slurry and apply it evenly.

618-3.04 PLANT ESTABLISHMENT AND MAINTENANCE. Protect seed areas against traffic and erosion. Promptly repair surfaces that are gullied or otherwise damaged following seeding by re-grading, reseeding, and re-mulching as needed.

Water and maintain seeded areas until acceptance of the work. Use equipment that can water all seeded areas without damaging the seed bed.

Reseed any areas not showing evidence of satisfactory growth within 3 weeks of seeding. Erosion gullies over 4 inches deep must be filled and reseeded. Fill the entire erosion gully to surrounding grade, including the portions less than 4 inches deep.

(2/1/2014)PARKS-Special Provision

618-3.05 ACCEPTANCE. During final inspection the Engineer will perform a visual inspection of seeding to determine final stabilization. The Engineer will accept seeding that has become a vegetative mat with 70% cover density in the inspection area.

(12/14/2023)AML-Special Provision

Reseed areas that are not acceptable to the Engineer.

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618-3.06 PERIOD OF ESTABLISHMENT. Establishment periods extend for one complete growing season following acceptable seeding. Employ all possible means to preserve the new vegetative mat in a healthy and vigorous condition to ensure successful establishment. Reseed areas that do not meet the specifications. Watering and reseeding after the final inspection are subsidiary.

The Engineer may, but is not required to, determine the Project is complete except for the period of establishment, and issue a letter of final acceptance. After final acceptance, work, or materials due under this subsection during any remaining period of establishment are considered warranty obligations that continue to be due following final acceptance in accordance with subsection 105-1.16.

(01/27/07)E42-Standard Modification

618-4.01 METHOD OF MEASUREMENT.

Seeding by the acre. By the area of ground surface acceptably seeded and maintained.

Water used in maintenance of seeded areas will not be measured directly for payment but will be considered subsidiary to the seeding item.

618-5.01 BASIS OF PAYMENT. At the contract unit price per unit of measurement for the pay items listed below that appear on the bid schedule.

Payment will be made under:

Pay Item		Pay Unit
618.0001.0000	Seeding	Acre

(03/05/2020)AML-Special Provision

SECTION 620

TOPSOIL

620-2.01 MATERIALS. Add the following: Organic materials from clearing and grubbing operations and gravels from usable excavation are available to produce topsoil.

Refer to Section 726 Topsoil for materials specifications. (12/14/2023)AML-Special Provision

The Engineer will inspect the topsoil before granting approval for its use. Topsoil shall be free of invasive material.

620-3.01 PLACING. Replace the first sentence with the following: Spread topsoil to a uniform thickness of four inches over area to be seeded. Topsoil thickness will be determined by available volume of topsoil, divided by required area of coverage. Materials may be mixed before or during spreading operations.

620-5.01 BASIS OF PAYMENT. Replace this section with the following: Stripping, processing, gravel blending, re-handling, and stockpiling of topsoil, vegetation, and organic materials are subsidiary to Pay Items 201.0003 Clearing and Grubbing and 620.0001 Topsoil.

Gravel formation materials sourced from usable unclassified excavation for use as topsoil blend material requires preapproval and may require quantity survey prior to processing.

Repair, maintenance, and replacement are subsidiary.

Payment will be made under:

Pay Item		Pay Unit
620.0001.0000	Topsoil	Square Yard

(03/05/2020)AML-Special Provision

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SECTION 630

GEOTEXTILE FOR EMBANKMENT SEPARATION AND STABILIZATION

630-1.01 DESCRIPTION. Add the following: This item will install geotextile beneath retention pond inlet and outlet as shown in the Plans.

630-2.01 MATERIALS. Replace with the following: Use Class I or better in accordance with Subsection 729-2.01.

630-3.01 CONSTRUCTION. Under 2a. Separation. Add the following: Install geotextile beneath abutments using separation criteria.

Under 2b. Separation. Add the following: Install geotextile beneath Riprap, Class II, installations using stabilization criteria. Anchor upslope edges using permanent anchoring methods per manufacturer.

Under 4. Material Placing and Spreading. Add the following: Terminate where cover material will thin to less than 12 inches.

630-4.01 METHOD OF MEASUREMENT. Replace the entire Subsection with the following: By total area of the installation measured along the ground surface. No allowance will be made for overlap at joints or patches.

630-5.01 BASIS OF PAYMENT. This item is subsidiary to Section 680.

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SECTION 640

MOBILIZATION AND DEMOBILIZATION

640-1.01 DESCRIPTION. Add the following: Areas along Healy Creek road may require improvement to allow vehicle and heavy equipment access to the project site. The unpaved road portion extends approximately 10 miles from Healy power plant to the project site. It is the contractor's responsibility to make any necessary improvements, and to maintain access to the project site during project construction. Any work associated with access road repair and/or maintenance will be subsidiary to 640.0001 Maintenance of bridge structures is not included, however any bridge damage incurred is the Contractor's responsibility.

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640-4.01 METHOD OF MEASUREMENT. Replace Item 4 with the following:

4. Progress payments for Worker Meals and Lodging, or Per Diem will be subsidiary to 640.0001 Mobilization and Demobilization.

640-5.01 BASIS OF PAYMENT.

Payment will be made under:

Pay Item		Pay Unit
640.0001.0000	Mobilization and Demobilization	Lump Sum

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SECTION 641

EROSION, SEDIMENT, AND POLLUTION CONTROL

641-1.01 DESCRIPTION. Provide project administration and work relating to control of erosion, sedimentation, and discharge of pollutants, according to this section and applicable local, state, and federal requirements, including the Alaska Construction General Permit.

641-1.02 DEFINITIONS. These definitions apply only to Section 641.

Alaska Certified Erosion and Sediment Control Lead (AK-CESCL). A person who has completed training, testing, and other requirements of, and is currently certified as, an AK-CESCL from an AK-CESCL Training Program (a program developed under a Memorandum of Understanding between the Department and others). The Department recognizes AK-CESCLs as “qualified personnel” required by the ACGP. An AK-CESCL must be recertified every three years.

Alaska Construction General Permit (ACGP). The permit authorizing storm water discharges from Construction Activities, issued and enforced by ADEC. It authorizes storm water discharges provided permit conditions and water quality standards are met.

Alaska Department of Environmental Conservation (ADEC). The state agency authorized by EPA to administer the Clean Water Act’s National Pollutant Discharge Elimination System.

Alaska Pollutant Discharge Elimination System (APDES). A system administered by ADEC that issues and tracks permits for storm water discharges.

Best Management Practices (BMPs). Temporary or permanent structural and non-structural devices, schedules of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or minimize the discharge of pollutants to waters of the United States. BMPs also include, but are not limited to, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from material storage.

Clean Water Act (CWA). Federal Water Pollution Control Amendments of 1972, as amended (33 U.S.C. 1251 et seq.).

Construction Activity. Physical activity by the Contractor, Subcontractor or utility company; that may result in erosion, sedimentation, or a discharge of pollutants into storm water. Construction Activity includes soil disturbing activities (e.g. clearing, grubbing, grading, excavating); and construction materials or equipment storage or maintenance (e.g. material piles, borrow area, concrete truck chute washdown, fueling); and other industrial storm water directly related to the construction process (e.g. concrete or asphalt batch plants).

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Corp of Project Engineers Permit (COE Permit). A U.S. Army Corp of Project Engineers Permit for construction in waters of the US. Such permit may be issued under Section 10 of the Rivers and Harbors Act of 1899, or Section 404 of the Clean Water Act.

Electronic Notice of Intent (eNOI). The electronic Notice of Intent submitted to ADEC, to obtain coverage under the ACGP.

Electronic Notice of Termination (eNOT). The electronic Notice of Termination submitted to ADEC, to end coverage under the ACGP.

Environmental Protection Agency (EPA). A federal agency charged to protect human health and the environment.

Erosion and Sediment Control Plan (ESCP). The Department's project specific document that illustrates measures to control erosion and sediment on the project. The ESCP provides bidders with the basis for cost estimating and guidance for developing an acceptable Storm Water Pollutant Prevention Plan (SWPPP).

Final Stabilization. Is defined in this section as it is defined in the ACGP.

Hazardous Material Control Plan (HMCP). The Contractor's detailed project specific plan for prevention of pollution from storage, use, transfer, containment, cleanup, and disposal of hazardous material (including, but are not limited to, petroleum products related to construction activities and equipment). The HMCP is included as an appendix to the contractor modified SWPPP.

Inspection. An inspection required by the ACGP or the SWPPP, usually performed together by the Contractor's SWPPP Manager and Department's Project Engineer.

Multi-Sector General Permit (MSGP). The Alaska Pollutant Discharge Elimination System General Permit for storm water discharges associated with industrial activity.

Operator(s). The party or co-parties associated with a regulated activity that has responsibility to obtain permit coverage under the ACGP. "Operator" for the purpose of the ACGP and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day to day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g. they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Pollutant. Any substance or item meeting the definition of pollutant contained in 40 CFR § 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage,

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garbage, sewage sludge, chemical wastes, biological materials, wrecked or discarded equipment, rock, sand, cellar dirt and industrial or municipal waste.

Project Area. The physical area provided by the Department for Construction. The Project Zone includes the area of the facility under construction, project staging and equipment areas, and material and disposal sites; when those areas, routes and sites, are provided by the Department by the Contract and are directly related to the Contract.

Support Activities including material sites, material processing sites, disposal sites, haul routes, staging and equipment storage areas; that are furnished by the Contractor or a commercial operator, are not included in the Project Area.

Records. Any record, report, information, document, or photograph required to be created or maintained pursuant to the requirements of the ACGP, the ACGP storm water requirements of the Clean Water Act; and applicable local, state, and federal laws and regulations regarding document preservation.

Spill Prevention, Control, and Countermeasure Plan (SPCC Plan). The Contractor's detailed plan for petroleum spill prevention and control measures that meet the requirements of 40 CFR 112. The SPCC plan is included as an appendix to the HMCP.

Spill Response Field Representative. The Contractor's representative with authority and responsibility for managing, implementing, and executing the HMCP and SPCC Plan.

Storm Event. A rainfall event that produces more than 0.5 inch of precipitation in 24 hours and that is separated from the previous storm event by at least 3 days of dry weather.

Storm Water Pollution Prevention Plan (SWPPP). The Contractor's detailed project specific plan to minimize erosion and contain sediment within the Project Zone, and to prevent discharge of pollutants that exceed applicable water quality standards. The SWPPP includes, but is not limited to, amendments, records of activities, inspection schedules and reports, qualifications of key personnel, and all other documentation, required by the ACGP and this specification, and other applicable local, state, and federal laws and regulations.

Storm Water Lead. The Contractor's qualified representative who conducts Inspections and has authority to suspend work and to implement corrective actions required for CGP compliance.

Storm Water Pollution Prevention Plan Two (SWPPP2). The Contractor's detailed project specific plan to comply with ACGP or MSGP requirements, for Contractor construction-related Support Activities outside the Project Zone.

Subcontractor Spill Response Coordinator. The subcontractor's representative with authority and responsibility for coordinating the subcontractor's activities in compliance with the HMCP and SPCC Plan.

Subcontractor SWPPP Coordinator. The subcontractor's representative with authority to

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direct the subcontractor's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the subcontractor's compliance with the SWPPP.

Superintendent. The Superintendent has responsibility and authority for the overall operation of the Project and for Contractor furnished sites and facilities directly related to the Project.

Support Activities. See ADEC CGP definition. Further defined as construction activities in which the Department is not an operator and the activity is outside the Project Area.

SWPPP Amendment. A revision or document that adds to, deletes from, or modifies the SWPPP.

SWPPP Manager. The Contractor's qualified representative who conducts Inspections, updates SWPPP records, and has authority to suspend work and to implement corrective actions required for ACGP compliance.

SWPPP Preparer. The Contractor's qualified representative who is responsible for developing the initial SWPPP.

Utility Spill Response Coordinator. The Utility's representative with authority and responsibility for coordinating the Utility's activities in compliance with the HMCP and SPCC Plan.

Utility SWPPP Coordinator. The Utility's representative with authority to direct the Utility's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the Utility's compliance with the SWPPP.

641-1.03 PLAN AND PERMIT SUBMITTALS.

For plans listed in Subsection 108-1.03.5 (SWPPP and HMCP) use the Contractor submission and Department review deadlines identified in Subsection 641-1.03.

Partial and incomplete submittals will not be accepted for review. Any submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline. No additional Contract time or additional compensation will be allowed due to delays caused by partial or incomplete submittals, or required re-submittals.

1. Storm Water Pollution Prevention Plan. Submit one hard copy of the SWPPP to the Project Engineer for approval. Deliver this document to the Project Engineer at least 21 days before beginning Construction Activity. Organize and bind the SWPPP and related documents for submittal according to the requirements of Subsection 641-2.01.2.

The Department will review the SWPPP submittals within 14 days after they are received. Submittals will be returned to the Contractor, and marked as either "rejected" with reasons listed or as "approved" by the Department. When the submittal is rejected,

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the Contractor must revise and resubmit the SWPPP. The 14 day review period will restart when the contractor submits one hard copy of the revised SWPPP to the Project Engineer for approval.

Once the SWPPP is approved by the Department, submit two complete copies of the SWPPP to the Project Engineer.

2. Hazardous Material Control Plan. Submit the HMCP, as an appendix to the SWPPP, to the Project Engineer for approval. The HMCP submittal and review timeline, and signature requirements are the same as the SWPPP.
3. Spill Prevention, Control and Countermeasure Plan. When a SPCC Plan is required under Subsection 641-2.03, submit two signed hard copies of the SPCC Plan to the Project Engineer. Deliver these documents to the Project Engineer at least 21 days before beginning Construction Activity. The Department reserves the right to review the SPCC Plan and require modifications.
4. ACGP Coverage. The Contractor is responsible for permitting of Contractor and subcontractor Construction Activities related to the Project. The Contractor cannot use the SWPPP for Support Activities outside the Project Area where the Department is not an operator.

After Department approval of the SWPPP and prior to beginning Construction Activity, submit an eNOI with the required fee to ADEC for coverage under the Construction General Permit (ACGP). Submit a copy of the signed eNOI and ADEC's acknowledgement letter to the Project Engineer when the eNOI is submitted to ADEC

Do not begin Construction Activity until the conditions listed in Subsection 641-3.01.1 are completed.

The Department will submit an eNOI to ADEC for Construction Activities inside the Project Area. The Project Engineer will provide the Contractor with a copy of the Department's eNOI and ADEC's acknowledgment letter, for inclusion in the SWPPP.

5. Ending ACGP Coverage. Submit an eNOT to ADEC, and submit both a copy of the signed eNOT and ADEC's acknowledgment letter to the Department, within 30 days after the Project Engineer has determined the conditions listed in Subsection 641-3.01.6 have been met.
6. ADEC SWPPP Review. When ACGP, Part 2.1.3 - requires ADEC SWPPP review:
 - a. Transmit a copy of the Department-approved SWPPP to ADEC using delivery receipt confirmation;
 - b. Transmit a copy of the delivery receipt confirmation to the Project Engineer within seven days of receiving the confirmation; and
 - c. Retain a copy of delivery receipt confirmation in the SWPPP.
7. Local Government SWPPP Review. When local government or the ACGP Part 2.1.4

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requires local government review:

- a. Transmit a copy of the Department-approved SWPPP and other information, as required, to local government, with the required fee using delivery receipt confirmation;
 - b. Transmit a copy of the delivery receipt confirmation to the Project Engineer within seven days of receiving the confirmation;
 - c. Transmit a copy of any comments by the local government to the Project Engineer within seven days of receipt;
 - d. Amend the SWPPP as necessary to address local government comments and transmit SWPPP Amendments to the Project Engineer within seven days of receipt of the comments;
 - e. Include a copy of local government SWPPP review letter in the SWPPP; and
 - f. Before ending permit coverage file a project ending notification with local government and allow them to inspect the work.
8. Modifying Contractor's eNOI. When required by The ACGP Part 2.7, modify your eNOI to update or correct the information. Reasons for modification include change to the start or end dates, small changes in number of acres to be disturbed, change in decision to use or not use treatment chemicals, or changed location of SWPPP Records.

The Contractor must submit an eNOT and then submit a new eNOI instead of an eNOI modification when: the operator has changed, the original eNOI indicates disturbed area less than five acres and the project will disturb more than five acres, or a project over five disturbed acres grows by more than 50%.

641-1.04 PERSONNEL QUALIFICATIONS. The SWPPP Preparer must meet at least one of the following qualifications:.

- a. Current certification as a Certified Professional in Erosion and Sediment Control (CPESC);
- b. Current certification as AK-CESCL, and at least two years experience in erosion and sediment control, as a Storm Water Lead or SWPPP writer, or equivalent. Provide documentation including project names, project timelines, and work responsibilities demonstrating the experience requirement; or
- c. Professional Engineer registered in the State of Alaska with current certification as AK-CESCL.

For Projects disturbing more than 20 acres, the SWPPP Preparer is recommended to complete a Department-approved SWPPP Preparation course.

The Superintendent must meet the following qualifications:

- a. Current certification as AK-CESCL; and
- b. Duly authorized representative, as defined in the ACGP, Appendix A, Part 1.12.3

The Storm Water Lead must have current certification as AK-CESCL, and be knowledgeable in requirements of that position as defined in the ACGP, Appendix C,

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Qualified Person.

The Active Treatment System (ATS) operator must have current certification as AK-CESCL, and be knowledgeable in the principals and practices of treatment systems in general, and the operation of the project-specific ATS. The ATS operator must have at least three months field experience with ATS, or completion of an ATS manufacturer's training course, or completion of system operator's certification course.

The Department accepts people having any of the following certificates as equivalent to AK-CESCL, if the certificates are current according to the sponsoring organization's policies:

- a. CPESC, Certified Professional in Erosion and Sediment Control; or
- b. CISEC, Certified Inspector in Sediment and Erosion Control

641-1.05 SIGNATURE/CERTIFICATION REQUIREMENTS AND DELEGATIONS.

1. eNOI and eNOT. The eNOI and eNOT must be signed and certified by a responsible corporate officer according to ACGP Appendix A, Part 1.12.2. Signature and certification authority for the eNOI and eNOT cannot be delegated.
2. Delegation of Signature Authority for Other SWPPP Documents and Reports. Use Form 25D-108 to delegate signature authority and certification authority to the Superintendent position, according to ACGP Appendix A, Part 1.12.3, for the SWPPP, Inspection Reports and other reports required by the ACGP. The Project Engineer will provide the Department's delegation Form 25D-107, which the Contractor must include in the SWPPP.
3. Subcontractor Certification. Subcontractors must certify that they have read and will abide by the ACGP and the conditions of the project SWPPP.

641-1.06 RESPONSIBILITY FOR STORM WATER PERMIT COVERAGE.

1. The Department and the Contractor are jointly responsible for permitting and permit compliance within the Project Zone.
2. The Contractor is responsible for permitting and permit compliance outside the Project Zone. The Contractor has sole responsibility for compliance with ADEC and other applicable federal, state, and local requirements, and for securing all necessary clearances, rights, and permits. Subsection 107-1.02 describes the requirement to obtain permits, and to provide permit documents to the Project Engineer.
3. An entity that owns or operates, a commercial plant (as defined in Subsection 108-1.01.3) or material source or disposal site outside the Project Zone, is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has appropriate permit coverage. Subsection 107-1.02 describes the requirement to obtain permits, and to provide permit documents to the Project Engineer.

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4. The Department is not responsible for permitting or permit compliance, and is not liable for fines resulting from noncompliance with permit conditions:
 - a. For areas or Support Activities outside the Project Area;
 - b. For commercial plants, commercial material sources, and commercial disposal sites.

641-1.07 UTILITY RELOCATION COVERAGE. A Utility company is not an Operator when utility relocation is performed concurrently with the Project, as outlined in Section 105-1.06. The Department maintains operational control over the Utility's plans and specifications for coordination with project construction elements, and the Contractor has day-to-day control over the various utility construction activities that occur in support of the Project. A Utility company is considered a subcontractor for concurrent relocation.

After the Contractor has an active NOI for the Project, a Utility Company performing advance relocation work under a separate SWPPP no longer has Operator status and files the NOT for the Utility Company's SWPPP covering only the completed utility work. Remaining utility relocation work is included in and performed under the Project SWPPP.

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.

1. SWPPP Preparer and Pre-Construction Site Visit. Use a SWPPP Preparer to develop the SWPPP and associated documents, according to the requirements of the ACGP. The SWPPP Preparer must put their name, qualifications (including the expiration date of any certifications), title and company name in the SWPPP.

The SWPPP Preparer must conduct a pre-construction inspection at the Project site before construction activity begins. If the SWPPP Preparer is not a Contractor employee, the SWPPP Preparer must visit the site accompanied by the Contractor. Give the Department at least seven days notice of the site visit, so that the Department may participate.

During the pre-construction inspection, the SWPPP Preparer must identify, or if a draft of the SWPPP has already been prepared verify that the SWPPP fully addresses and describes:

- a. Opportunities to phase construction activities;
- b. Appropriate BMPs and their sequencing; and
- c. Sediment controls that must be installed prior to beginning Construction Activities.

Document the SWPPP Preparer's pre-construction inspection in the SWPPP on Form 25D-106, SWPPP Pre-Construction Site Visit, including the names of attendees and the date.

2. Developing the SWPPP. Use the Department's ESCP and other Contract documents

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as a starting point for developing the SWPPP. The approved SWPPP replaces the ESCP.

Develop the SWPPP framework according to the ADNR SWPPP template with additional information as required. Include information required by the ACGP, Part 5, and this specification.

When using the ADNR SWPPP template:

The following appendices can found on the ADNR D&C website:
<http://dnr.alaska.gov/parks/designconstruct/swppp.htm>

Include the following appendices:

- Appendix A– Site Maps and Drawings
- Appendix B– BMP Details
- Appendix C– Project Schedule
- Appendix D– Supporting Documentation: TMDLs, Endangered Species, & Project Permits
- Appendix E– Certifications and Delegation of Authority
- Appendix F– Subcontractor Certifications
- Appendix G– Permit Conditions: Copy of Signed Notice of Intent (Include both Department’s and Contractor’s), Confirmation of Delivery of NOI to ADEC (Include both Department’s and Contractor’s), Copy of Letter from ADEC Authorizing Coverage with ADEC NOI Tracking Number (Include both Department’s and Contractor’s), and Copy of 2011 Alaska Construction General Permit
- Appendix H– Personnel Qualifications and Training Certificates for:
 - SWPPP Preparer
 - SWPPP Manager/Inspector
 - Contractor’s ATS Operator
 - Qualified personnel must be described in a list with names and dates in positions
- Appendix I– SWPPP Pre-Construction Site Visit
- Appendix J– Amendment Log
- Appendix K– Corrective Action Log
- Appendix L– Grading and Stabilization Records
- Appendix M– Hazardous Material Control Plan
- Appendix N– Training Log
- Appendix O– Rainfall Record
- Appendix P– Inspection Reports
- Appendix Q– Delayed Action Item Report
- Appendix R– Project Staff Tracking Form
- Appendix S– Monitoring Plan (If applicable) and Reports

Obtain the following forms after they have been completed by the Department and include them in the SWPPP:

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- SWPPP Delegation of Signature Authority – ADNR (25D-107)
- SWPPP Certification for ADNR (25D-109)

Use the following Department forms for recording information in the SWPPP:

- SWPPP Amendment Log (25D-114)
- SWPPP Certification for Contractor (25D-111)
- SWPPP Construction Site Inspection Report (25D-100)
- SWPPP Corrective Action Log (25D-112)
- SWPPP Daily Record of Rainfall (25D-115)
- SWPPP Delegation of Signature Authority – Contractor (25D-108)
- SWPPP Grading and Stabilization Activities Log (25D-110)
- SWPPP Pre-Construction Site Visit (25D-106)
- SWPPP Project Staff Tracking (25D-127)
- SWPPP Subcontractor Certification (25D-105)
- SWPPP Training Log (25D-125)

SWPPP Forms are at: <http://dnr.alaska.gov/parks/designconstruct/swppp.htm>
 Compile the SWPPP in three ring binders with tabbed and labeled dividers for each section and appendix.

3. SWPPP Considerations and Contents.

The SWPPP must provide erosion and sediment control measures for all Construction Activity within the Project Area. Support Activities outside the Project Area must have permit coverage, using a separate SWPPP2, and separate Contractor Inspections.

The SWPPP must consider the activities of the Contractor and all subcontractors and utility companies performing work in the Project Area. The SWPPP must describe the roles and responsibilities of the Contractor, subcontractors, utility companies, and the Department with regard to implementation of the SWPPP. The SWPPP must identify all operators for the Project, including utility companies performing Construction Activity, and identify the areas:

- a. Over which each operator has operational control; and
- b. Where the Department and Contractor are co-operators.

For work outside the Project Area the SWPPP must identify the entity that has storm water permit coverage, the operator, and the areas that are:

- a. Dedicated to the Project and where the Department is not an operator; and
- b. Not dedicated to the project, but used for the project.

Develop the SWPPP according to the requirements of the ACGP and this specification, and account for the Contractor’s construction methods and phasing.

Design temporary BMPs for a 2 year 24 hour precipitation amount. Describe BMPs in

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the SWPPP and in SWPPP Amendments, including source controls, sediment controls, discharge points, and all temporary and permanent stabilization measures. Describe the design, placement, installation, and maintenance of each BMP, using words and drawings as appropriate. Provide a citation to the BMP Manual or publication used as a source for the BMP, including the title of the BMP Manual or publication, the author (individual or agency), and date of publication. If no published source was used to select or design a BMP, then the SWPPP or SWPPP amendment must state that “No BMP manual or publication was used for this design.”

Describe the sequence and timing of activities that disturb soils and of BMP implementation and removal. Phase earth disturbing activities to minimize unstabilized areas, and to achieve temporary or final stabilization quickly. Whenever practicable incorporate final stabilization work into excavation, embankment, and grading activities.

Identify the inspection frequency in the SWPPP:

- a. Areas where the mean annual precipitation is 15 inches or less, inspect at least once every 14 days during construction and within 24 hours of the end of a storm event that resulted in a discharge from the project area;
- b. Areas where the mean annual precipitation is between 15 to 40 inches, inspect either once every seven 7 days;
- c. Areas where the mean annual precipitation is 40 inches or greater, inspect once every 7 days, and twice every 7 days during periods of relatively continuous precipitation or sequential storm events.

The SWPPP must cite and incorporate applicable requirements of the Project permits, environmental commitments, COE permit, and commitments related to historic preservation. Make additional consultations or obtain permits as necessary for Contractor specific activities which were not included in the Department’s permitting and consultation.

The SWPPP is a dynamic document. Keep the SWPPP current by noting installation, modification, and removal of BMPs, and by using amendments, SWPPP amendment logs, Inspection Reports, corrective action logs, records of land disturbance and stabilization, and any other records necessary to document storm water pollution prevention activities and to satisfy the requirements of the ACGP and this specification. See Subsection 641-3.03 for more information.

4. Recording Personnel and Contact Information in the SWPPP.

Include in the SWPPP, Records of the AK-CESCL cards or certificates for the Storm Water Lead, and for any acting Storm Water Lead. If the Storm Water Lead is replaced permanently or temporarily, by an acting Storm Water Lead, record in the SWPPP (use Form 25D-127) the names of the replacement personnel, the date of the replacement. For temporary personnel record their beginning and ending dates.

Provide 24 hour contact information for the Superintendent and SWPPP Manager. The Superintendent and SWPPP Manager must have 24 hour contact information for all

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Subcontractor SWPPP Coordinators and Utility SWPPP Coordinators.

Include in the SWPPP, Records of the AK-CESCL cards or certificates of storm water inspectors, and ATS operators. Record their beginning and ending dates.

641-2.02 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS.

Prepare the HMCP for prevention of pollution from storage, use, containment, cleanup, and disposal of all hazardous material, including petroleum products related to construction activities and equipment. Include the HMCP as an appendix to the SWPPP. Compile Material Safety Data Sheets in one location and reference that location in the HMCP.

Designate a Contractor's Spill Response Field Representative with 24 hour contact information. Designate a Subcontractor Spill Response Coordinator for each subcontractor. The Superintendent and Contractor's Spill Response Field Representative must have 24 hour contact information for each Subcontractor Spill Response Coordinator and the Utility Spill Response Coordinator.

List and give the location and estimated quantities of hazardous materials (Including materials or substances listed in 40 CFR 117 and 302, and petroleum products) to be used or stored on the Project. Hazardous materials must be stored in covered storage areas. Include secondary containment for all hazardous material storage areas.

Identify the locations where fueling and maintenance activities will take place, describe the activities, and list controls to prevent the accidental spillage of petroleum products and other hazardous materials. Controls include placing absorbent pads or other suitable containment under fill ports while fueling, under equipment during maintenance or repairs.

Use secondary containment under all stationary equipment (equipment that does not have a seat for driving) that contains petroleum products. Use secondary containment under pumps, compressors, and generators.

List the types and approximate quantities of response equipment and cleanup materials available on the Project. Include a list and location map of cleanup materials, at each different work site and readily available off site (materials sources, material processing sites, disposal sites, staging areas, etc). Spill response materials must be stored in sufficient quantity at each work location, appropriate to the hazards associated with that site.

Describe procedures for containment and cleanup of hazardous materials. Describe a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by spills. Describe a plan for dealing with contaminated soil and water encountered during construction. Clean up spills or contaminated surfaces immediately.

Describe methods of disposing of waste petroleum products and other hazardous materials generated by the Project, including routine maintenance. Identify haul methods and final disposal areas. Assure final disposal areas are permitted for hazardous material disposal. Describe methods of complying with the requirements of AS 46.04.010-900, Oil and Hazardous Substances Pollution Control, and 18 AAC 75. Include contact information for

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reporting hazardous materials and petroleum product spills to the Project Engineer and reporting to federal, state and local agencies.

641-2.03 SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN (SPCC Plan) REQUIREMENTS.

Prepare and implement an SPCC Plan when required by 40 CFR 112; when both of the following conditions are present on the Project:

- a. Oil or petroleum products from a spill may reach navigable waters (as defined in 40 CFR 112); and
- b. Total above ground storage capacity for oil and any petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons).

Reference the SPCC Plan in the HMCP and SWPPP.

641-2.04 RESPONSIBILITY AND AUTHORITY OF THE SUPERINTENDENT AND STORM WATER LEAD

The Storm Water Lead is responsible for the overall operation of the Project and all Contractor furnished sites and facilities directly related to the Project. The Superintendent shall sign and certify the SWPPP. The Storm Water Lead shall sign Inspection Reports and other reports required by the ACGP, except the NOI and NOT. The Superintendent and Storm Water Lead may not delegate the task or responsibility of signing and certifying the SWPPP submitted under Subsection 641-1.03.1, Inspection Reports, and other reports required by the ACGP.

The Superintendent may assign certain duties to the Storm Water Lead; those duties may include:

1. Ensuring Contractor's and subcontractor's compliance with the SWPPP and ACGP;
2. Ensuring the control of erosion, sedimentation, or discharge of pollutants;
3. Directing and overseeing installation, maintenance, and removal of BMPs;
4. Performing Inspections; and
5. Updating the SWPPP including adding amendments and forms.

The Storm Water Lead has authority to work in the following positions named in the CGP, Appendix C, Qualified Person: Storm Water Lead and Storm Water Inspector. The Storm Water Lead has authority to work in all the positions of ATS Operator if they meet the knowledge and experience qualifications listed in 1.04.

The Superintendent and Storm Water Lead shall be knowledgeable in the requirements of this Section 641, the SWPPP, ACGP, BMPs, HMCP, SPCC Plan, environmental permits, environmental commitments, and historic preservation commitments.

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The Superintendent and Storm Water Lead shall have the Contractor's complete authority and be responsible for suspending construction activities that do not conform to the SWPPP or ACGP.

641-2.05 MATERIALS. Use materials suitable to withstand hydraulic, wind, and soil forces, and to control erosion and trap sediments according to the requirements of the ACGP and the Specifications.

- Use the temporary seed mixture specified by special provision, or use annual rye grass if no temporary seed mix is specified.
- Use soil stabilization material as specified in Section 727.
- Use silt fences as specified in Section 729.
- Use straw that is certified as free of noxious weed by the United States Department of Agriculture, Natural Resources Conservation Service, Local Soil and Water Conservative District. Alaska Weed Free Forage Certification Program must be used when available. Hay may not be substituted for straw.
- Use rain gauge.

641-2.06 CONTRACTOR REQUIREMENTS. The Contractor must be familiar with the requirements of the CGP because Contractor's employees will be conducting duties that relate to compliance with the CGP.

641-3.01 CONSTRUCTION REQUIREMENTS. Comply with the SWPPP and ACGP requirements.

1. Before Construction Activity may Begin.

The following actions must be completed before Construction Activity begins:

- a. The SWPPP Preparer must visit the Project, the visit must be documented in the SWPPP, and the SWPPP must be developed (or amended) with findings from the visit;
- b. The SWPPP must be approved by the Project Engineer;
- c. The Contractor must be authorized to begin by the Project Engineer;
- d. The Project eNOIs for the Department and for the Contractor, as well as any other eNOIs if there are additional operators, must be listed as Active Status on the ADEC website;
- e. The Department approved SWPPP must be submitted to ADEC and Local Government (when required); and

Post notices containing the following information:

- a. Copy of all eNOIs related to this project;
- b. Name and 24 hour phone number of SWPPP Manager; and
- c. Location of the SWPPP.

Post notices on the outside wall of the Contractor's project office, and near the main entrances of the construction project. Protect postings from the weather. Locate postings so the public can read them without obstructing construction activities or the traveling public

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(for example, at an existing pullout). Do not use retroreflective signs for the SWPPP posting. Do not locate SWPPP signs in locations where the signs may be confused with traffic control signs or devices. Update the notices if the listed information changes.

Install an outdoor rain gauge per manufacturer's guidance, in a readily accessible location on the Project.

Delineate the site for both land disturbing activities and areas that will be left undisturbed. Install sediment controls and other BMPs that must be placed prior to the initiation of Construction Activity.

The ACGP Part 4.10.3 allows cutting of trees and brush while the ground is frozen, without disturbing the vegetative mat, prior to submitting an eNOI.

2. During Construction.

Make copies of the applicable portions of the SWPPP available to subcontractors and utility companies before they begin soil disturbing activities. Inform subcontractors and utility companies of SWPPP amendments that affect them in a timely manner. Ensure all subcontractors who engage in soil-disturbing activities understand and comply with the SWPPP and CGP, and signed a SWPPP Subcontractor Certification, Form 25D-105, before they conduct the activity. Include SWPPP Subcontractor Certifications as an appendix to the SWPPP. Provide SWPPP information to utility companies. Coordinate with subcontractors and utility companies doing work in the Project Area so that BMP's, including temporary and permanent stabilization, are installed, maintained, and protected from damage.

Provide on-going training to employees and subcontractors, on control measures at the site and applicable storm water pollution prevention procedures. Training must be specific to the installation, maintenance, protection, and removal of control measures. Training must be given at a frequency that will be adequate to ensure proper implementation and protection of control measures. Document on the SWPPP Training Log. Form 25D-125, the dates and attendees to these trainings. Include the SWPPP Training Log as an appendix to the SWPPP.

Notify the Project Engineer immediately if the actions of any utility company or subcontractor do not comply with the SWPPP and the ACGP.

Comply with Subsection 107-1.11 Protection and Restoration of Property and Landscape. Concrete washout must be fully contained.

Fuel the equipment in designated areas. Place absorbent pads or other suitable containment under fill ports while fueling, under equipment during maintenance or repairs. Install secondary containment under all stationary equipment that contains petroleum products.

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Comply with requirements of the HMCP and SPCC Plan, and all local, state and federal regulations that pertain to the handling, storage, containment, cleanup, and disposal of petroleum products or other hazardous materials.

Keep the SWPPP and HMCP current (refer to Subsection 641-2.01.3, SWPPP Considerations and Contents)

3. Pollutant and Hazardous Materials Reporting Requirements.

If there has been an incident of non-compliance with the ACGP that may endanger health or the environment, immediately report the incident to ADEC according to the ACGP, Appendix A, Part 3.0. Notify the Project Engineer immediately and to the extent possible coordinate reports to ADEC with the Project Engineer.

The report must include:

- a. A description of the noncompliance and its causes;
- b. The exact dates and times of noncompliance ;
- c. If not yet corrected the anticipated time the project will be brought back into compliance; and
- d. The corrective actions taken, or planned, to reduce, eliminate and prevent reoccurrence.

Report spills of petroleum products or other hazardous materials to the Project Engineer and other agencies as required by law. Use the HMCP and SPCC Plan (if available) for contact information to report spills to regulatory agencies. See CGP Part 4.8.

4. Corrective Action and Maintenance of BMPs.

Implement maintenance as required by the ACGP, SWPPP, and manufacturer's specifications, whichever is more restrictive.

Implement corrective action:

- a. If an incident of non-compliance with the SWPPP or ACGP is identified;
- b. If an Inspection or the Project Engineer identifies the SWPPP or any part of the SWPPP is ineffective in preventing erosion, sedimentation or the discharge of pollutants;
- c. If the Project Engineer determines the SWPPP or any part of the SWPPP is ineffective in preventing the erosion, sedimentation, or the discharge of pollutants;
- d. If a required BMP was never installed, was installed incorrectly, or not in accordance with the CGP Part 4.0;

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- e. If any BMP is not operating as intended, or has not been maintained in an effective operational condition, or is unable to effectively perform the intended function;
- f. Before sediment or debris fills a BMP to the percentage of design capacity or available storage allowed by the CGP (or manufacturer's specifications or SWPPP requirements, whichever is lower);
- g. Whenever there is a change in conditions, design, construction, operation, or maintenance that could result in erosion, sedimentation, or the discharge of pollutants;
- h. If a prohibited discharge as specified in CGP Part 4.6 is occurring or will occur; or
- i. If there are accumulations and tracking of sediment or other pollutants, in or near any storm water conveyance channels, on roadways or parking lots within and adjacent to the project area, in the immediate vicinity of control measures, at discharge points or entry points into the storm sewer system, or in other areas within the project area.

Implement corrective actions so that they comply with the following time requirements:

- a. Conditions that are easily remedied (i.e. removal of tracked sediment, maintenance of control measure, or spill clean-up), initiate corrective action within 24 hours and complete as soon as possible;
- b. Corrective action is completed before the next storm event;
- c. Corrective action is completed in time to protect water quality; and
- d. Corrective action is completed no later than the Complete-by-Date that was entered in an Inspection Report (see Subsection 641-3.03.2 for more information).

If a corrective action is not implemented within the time requirements of this section, document the situation in the SWPPP, notify the Project Engineer, and implement corrective action as soon as possible.

If a corrective action could affect a subcontractor, notify the subcontractor within three days of taking the corrective action.

5. Stabilization.

Stabilization may be accomplished using temporary or permanent measures. Initiate stabilization of disturbed soils, erodible stockpiles, disposal sites, and of erodible aggregate layers so that all of the following conditions are satisfied:

- a. As soon as practicable;
- b. As soon as necessary to avoid erosion, sedimentation, or the discharge of

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pollutants; and

- c. As identified in the SWPPP.

Land may be disturbed and stabilized multiple times during a project. Coordinate work to minimize the amount of disturbed soil at any one time. Do not disturb more soil than you can stabilize with the resources available.

Temporarily stabilize from wind and water erosion portions of disturbed soils, portions of stockpiles, and portions of disposal sites, that are not in active construction. Temporary stabilization measures may require a combination of measures including but not limited to vegetative cover, mulch, stabilizing emulsions, blankets, mats, soil binders, non-erodible cover, dust palliatives, or other approved methods.

Temporary or Permanent Seeding

When temporary or permanent seeding is required, provide a working hydro seeding equipment located within 100 miles of the project by road; with 1,000 gallon or more tank capacity, paddle agitation of tank, and the capability to reach the seed areas with an uniform mixture of water, seed, mulch and tackifier. If the project is located in an isolated community the hydro-seeder must be located at the project.

Before applying temporary or permanent seeding, prepare the surface to be seeded to reduce erosion potential and to facilitate germination and growth of vegetative cover. Apply seed and maintain seeded areas. Reseed areas where growth of temporary vegetative cover is inadequate to stabilize disturbed ground.

Apply permanent seed according to Sections 618 and 724, within the time periods allowed by the ACGP and the Contract, at locations where seeding is indicated on the plans and after land-disturbing activity is permanently ceased.

Stream Bypass

When installing a culvert or other drainage structure where stream bypass is not used, install temporary or permanent stabilization concurrently or immediately after placing the culvert or drainage structure in a manner that complies with the SWPPP, applicable project permits and prevents discharge of pollutants.

Install temporary and permanent stabilization:

- a. At the culvert or drainage structure inlet and outlet; and
- b. In the areas upstream and downstream that may be disturbed by the process of installing the culvert, culvert end walls, culvert end sections, or drainage structure.

Before deactivating a stream bypass or stream diversion used for construction of a bridge, culvert, or drainage structure, install permanent stabilization:

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- a. At the inlet and outlet of the culvert, drainage structure, or bridge;
- b. In the area upstream and downstream of the culvert, drainage structure, or bridge, that is disturbed during installation or construction of the culvert, drainage structure, or bridge; and
- c. Under the bridge.

Within seven days of initiating final stabilization, either complete final stabilization or continue maintenance of work until final stabilization is complete.

6. Ending ACGP Coverage and BMP Maintenance.

The Project Engineer will determine the date that all the following conditions for ending ACGP coverage have been met within the Project Area:

- a. Land disturbing activities have ceased;
- b. Final Stabilization has been achieved (including at Department furnished material sources, disposal sites, staging areas, equipment areas, etc.); and
- c. Temporary BMPs have been removed.

After the Project Engineer has determined the conditions for ending CGP coverage have been met, the Department will:

- a. Send written notice to the Contractor with the date that the conditions were met;
- b. Submit an eNOT to ADEC; and
- c. Provide a copy of the eNOT and ADEC's acknowledgement letter to the Contractor.

The Contractor is responsible for ending permit coverage within the Project Area, by submitting an eNOT to ADEC within 30 days of meeting the conditions for ending CGP coverage. The Contractor is responsible for BMP maintenance and SWPPP updates until permit coverage is ended.

If the Contractor's CGP eNOI acreage includes Support Activities and any other areas where the Department is not an Operator, the Contractor may not be able to file an eNOT at the same time as the Department. In this case, the Contractor must amend the SWPPP and separate SWPPP2(s), to indicate the Department's CGP coverage has ended, and the Department is no longer an Operator within the Project Area.

The Contractor must indicate in the SWPPP the areas that have reached Final Stabilization, and the dates land disturbing activities ended and Final Stabilization was achieved. The Contractor must submit an eNOT to ADEC, and insert copies of the Department's and the

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Contractor's eNOTs with ADEC's acknowledgement letters in the appendix of the SWPPP.

The Contractor must submit a copy of each signed eNOT and ADEC's acknowledgement letter to the Department within 30 days of receiving a written them.

7. Transmit final SWPPP.

Transmit one copy of the final SWPPP, including all amendments, appendices, and maps to the Project Engineer when the project eNOTs are filed, or within 30 days of the Department's eNOT being filed, whichever is sooner. Transmittal must be by both electronic and hard copy.

641-3.02 SWPPP DOCUMENTS, LOCATION ON-SITE, AVAILABILITY, AND RECORD RETENTION.

The SWPPP and related documents maintained by the Contractor are the Record for demonstrating compliance with the CGP. Copies of SWPPP documents transmitted to the Project Engineer under the requirements of this specification are informational and do not relieve the Contractor's responsibility to maintain complete records as required by the CGP and this specification.

Keep the SWPPP, HMCP and SPCC Plan at the on-site project office. If there is not an on-site project office, keep the documents at a locally available location that meets CGP requirements and is approved by the Project Engineer. Records may be moved to another office for record retention after the eNOTs are filed. Records may be moved to another office during winter shutdown, but this will require updating on-site posted notices. Provide the Department with copies of all Records.

Retain Records and a copy of the SWPPP, for at least three years after the date of eNOT. If EPA or ADEC inspects the project, Issues a Notice of Violation (NOV), or begins investigation for a potential NOV before the retention period expires, retain the SWPPP and all Records related to the SWPPP and CGP until at least three years after EPA and/or ADEC has determined all issues related to the investigation are settled.

The SWPPP and related documents must be made available for review and copy, to the Department and other regulatory agencies that request them. The Project, including any related off-site areas or support activities, must be made available for inspection, or sampling and monitoring, by the Department and other regulatory agencies. See CGP Parts 5.10, 6.6, and 9.4.

641-3.03 SWPPP INSPECTIONS, AMENDMENTS, REPORTS, AND LOGS.

Perform Inspections, prepare Inspection Reports, and prepare SWPPP Amendments in compliance with the SWPPP and the CGP. Update SWPPP Corrective Action Log, SWPPP Amendment Log, SWPPP Grading and Stabilization Activities Log, and SWPPP Daily Record of Rainfall forms. For active projects update the Records daily.

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1. Inspection during Construction.

Conduct Inspections according to the schedule and requirements of the SWPPP and CGP.

- a. Areas where the mean annual precipitation is 15 inches or less, inspect at least once every 14 days during construction and within 24 hours of the end of a storm event that resulted in a discharge from the project area;
- b. Areas where the mean annual precipitation is between 15 to 40 inches, inspect either once every seven 7 days;
- c. Areas where the mean annual precipitation is 40 inches or greater, inspect once every 7 days, and twice every 7 days during periods of relatively continuous precipitation or sequential storm events.

Inspections required by the CGP and SWPPP must be performed by the Contractor's Storm Water Lead. The Department's Project Engineer shall be contacted 24 hours prior to an Inspection. The Department's Project Engineer shall be present during inspections if available. If Department's Project Engineer is unavailable to attend the Inspection, the Contractor shall provide a copy of the Inspection to Project Engineer within three days of the Inspection date and pictures taken during the inspection.

2. Inspection Reports.

Use only the ADNR SWPPP Construction Site Inspection Report, Form 25D-100 to record Inspections. Changes or revisions to Form 25D-100 are not permitted; except for adding or deleting data fields that list: Location of Discharge Points and Site Specific BMPs. Complete all fields included on the Inspection Report form; do not leave any field blank.

Unless otherwise directed by the Project Engineer, insert a Complete-by-Date for each corrective action listed that is (1) a date that complies with the time requirement listed in Subsection 641-3.01.4, or (2) seven days from the date of the Inspection, whichever is sooner. Provide a copy of the completed, unsigned Inspection Report to the Project Engineer by noon of the day after inspection.

The Superintendent must review the Inspection Report. The Project Engineer may coordinate with the Superintendent to review the Inspection Report. Corrections are limited to adding missing information or correcting entries to match field notes and conditions present at the time the Inspection was performed. Deliver a copy of the signed and certified Inspection Report to the Project Engineer within three days.

The Project Engineer may recommend corrections on the Inspection Report after the Superintendent has signed and certified the Inspection Report. If the Superintendent makes corrections, the Superintendent must recertify the Inspection Report by entering a new signature and date in the white space below the original signature and date lines.

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Send a copy of the recertified Inspection Report to the Project Engineer on the day it is recertified.

3. Inspection before Seasonal Suspension of Work.

Conduct an Inspection before seasonal suspension of work to confirm BMPs are installed and functioning according to the requirements of the SWPPP and CGP.

4. Reduced Inspection Frequencies.

Conduct Inspections according to the inspection schedule indicated in the approved SWPPP. Any change in inspection frequency must be approved by the Project Engineer, and beginning and ending dates documented as an amendment to the SWPPP.

The Project Engineer may waive winter Inspection requirements 14 days after the freeze-up. Inspections must be resumed 21 days before thawing conditions are expected to result in a discharge, if all the following requirements are met:

- a. Frozen conditions are anticipated to continue for more than one month; and
- b. Soil disturbing or stabilizing activities have been suspended.

Inspections must resume according to the normal inspection schedule identified in the SWPPP, at least 21 days before anticipated spring thaw.

The Project Engineer may waive requirements for updating the Grading and Stabilization Activities Log and Daily Record of Rainfall during seasonal suspension of work. If so, resume collecting and recording weather data on the Daily Record of Rainfall form one month before thawing conditions are expected to result in runoff. Resume recording land disturbance and stabilization activities on the Grading and Stabilization Activities Log when Construction Activity resumes.

5. Stabilization before Seasonal Thaw.

Construction Activities within the Project Area must be stabilized with appropriate BMPs prior to seasonal thaw. Seasonal thaw is the annual (first) recurrence of snow and ice melting after a prolonged period of freezing conditions.

6. Inspection before Project Completion.

Conduct Inspection to ensure Final Stabilization is complete throughout the Project, and temporary BMPs that are required to be removed are removed. Temporary BMPs that are biodegradable and are specifically designed and installed with the intent of remaining in place until they degrade, may remain in place after project completion.

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7. Items and Areas to Inspect.

Conduct Inspections of the areas required by the CGP and SWPPP.

8. SWPPP Amendments and SWPPP Amendment Log.

The Superintendent and the Storm Water Lead are the only persons authorized to amend the SWPPP and update the SWPPP Amendment Log, Form 25D-114. The Superintendent or the Storm Water Lead must sign and date amendments to the SWPPP and updates to the SWPPP Amendment Log.

SWPPP Amendments must be approved by the Project Engineer.

Amendments must occur:

- a. Whenever there is a change in design, construction operation, or maintenance at the construction site that has or could cause erosion, sedimentation or the discharge of pollutants that has not been previously addressed in the SWPPP;
- b. If an Inspection identifies that any portion of the SWPPP is ineffective in preventing erosion, sedimentation, or the discharge of pollutants;
- c. Whenever an Inspection identifies a problem that requires additional or modified BMPs
- d. Whenever a BMP is modified during construction, or a BMP not shown in the original SWPPP is added;
- e. If the Inspection frequency is modified (note beginning and ending dates); or
- f. When there is a change in personnel who are named in the SWPPP, according to Subsection 641-2.01.4.

Do not record removal of BMPs as amendments to the SWPPP. See Subsection 641-3.03.9 for documenting removal of BMPs.

Amend the SWPPP narrative as soon as practicable after any change or modification, but in no case, later than seven days following identification of the need for an amendment. Every SWPPP Amendment must be signed and dated. Cross-reference the amendment number with the Corrective Action Log or SWPPP page number, as applicable. When a BMP is modified or added, describe the BMP according to Subsection 641-2.01.3.

Keep the SWPPP Amendment Log current. Prior to performing each scheduled Inspection, submit to the Project Engineer a copy of the pages of the Amendment Log that contain new entries since the last submittal. Include copies of any documents

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amending the SWPPP.

Keep the SWPPP Amendment Log as an appendix to the SWPPP.

9. Site Maps.

Document installation, routine maintenance, and removal of BMPs by making notes on the SWPPP Site Maps. Include the date and the recording person's initials by these notes. Identify areas where Construction Activities begin, areas where Construction Activities temporarily or permanently cease, and areas that are temporarily or permanently stabilized.

10. Corrective Action Log.

The Storm Water Lead is the only persons authorized to make entries on the SWPPP Corrective Action Log, Form 25D-112. Document the need for corrective action within 24 hours of discovery.

Modification or replacement of a BMP, installation of a new BMP not shown in the original SWPPP, or overdue maintenance (after a sediment trap exceeds 50% of design capacity) is a corrective action and must be documented on the Corrective Action Log. Do not record removal of BMPs on the Corrective Action Log.

After each Inspection Report has been signed and certified, update the corrective action log with the date of inspection and include all proposed corrective actions noted on the Inspection Report.

After the corrective action has been accomplished, note the action taken, if a SWPPP amendment was needed. Date and initial the entry.

Keep the Corrective Action Log current and submit a copy to the Project Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Corrective Action Log as an appendix to the SWPPP.

11. Grading and Stabilization Activities Log.

The Storm Water Lead is the only persons authorized to date and initial entries on the SWPPP Grading and Stabilization Activities Log, Form 25D-110. Use the SWPPP Grading and Stabilization Activities Log, to record land disturbance and stabilization activities.

Keep the Grading and Stabilization Activities Log current and submit a copy to the Project Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Grading and Stabilization Activities Log as an appendix to the SWPPP.

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12. Daily Record of Rainfall.

Use SWPPP Daily Record of Rainfall, Form 25D-115, to record weather conditions at the Project. Update the form daily and include the initials of the person recording each day's entry. Submit a copy to the Project Engineer prior to performing each scheduled Inspection. Keep the Daily Record of Rainfall as an appendix to the SWPPP.

641-3.04 FAILURE TO PERFORM WORK. The Project Engineer has authority to suspend work and withhold monies, for an incident of non-compliance with the CGP or SWPPP that may endanger health or the environment. If the suspension is to protect workers, the public, or the environment from imminent harm, the Project Engineer may orally order the suspension of work. Following an oral order of suspension, the Project Engineer will promptly give written notice of suspension. In other circumstances, the Project Engineer will give the Contractor written notice of suspension before suspension of work. A notice of suspension will state the defects or reasons for a suspension, the corrective actions required to stop suspension, and the time allowed to complete corrective actions.

1. If the Contractor fails to take the corrective action within the specified time, the Project Engineer may:
 - a. Suspend the work until corrective action is completed;
 - b. Withhold monies due the Contractor until corrective action is completed;
 - c. Assess damages or equitable adjustments against the Contract Amount; and
 - d. Employ others to perform the corrective action and deduct the cost from the Contract amount.
2. Reasons for the Project Engineer to take action under this section include, but are not limited to, the Contractor's failure to:
 - a. Obtain appropriate permits before Construction Activities occur;
 - b. Perform SWPPP Administration;
 - c. Perform timely Inspections;
 - d. Update the SWPPP;
 - e. Transmit updated SWPPP, Inspection Reports, and other updated SWPPP forms to the Project Engineer;
 - f. Maintain effective BMPs to control erosion, sedimentation, and pollution in accordance with the SWPPP, the CGP, and applicable local, state, and federal requirements;
 - g. Perform duties according to the requirements of this Section 641; or

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- h. Meet requirements of the CGP, SWPPP, or other permits, laws, and regulations related to erosion, sediment, or pollution control.

No additional Contract time or additional compensation will be allowed due to delays caused by the Project Engineer's suspension of work under this subsection.

641-4.01 METHOD OF MEASUREMENT. Section 109.

641-5.01 BASIS OF PAYMENT. See Subsection 641-3.04 Failure to Perform Work, for additional work and payment requirements.

The total value of this Contract will be adjusted as specified herein. Withholding will be determined by the Department and assessed under Pay Item 641.0006 SWPPP Price Adjustment, as follows:

1. Fines and Penalties: A Price adjustment equal to any penalties and fines levied against the Department by local, state, or federal agencies for pollutant violations, including violations of the CWA and CGP, except when due to Department negligence. An amount equal to the anticipated penalties and fines for the violation or violations, excluding any due to negligence by the Department, will be withheld until the actual cost of the penalties and fines is known. Anticipated penalties and fines will be determined by the Project Engineer. The Contractor is also responsible for the payment of penalties and fines levied against the Contractor.

2. Failure to perform Inspections: By each 24 hour period, that a required SWPPP inspection is delayed or is not signed, certified, or completed in accordance with the schedule identified in the approved SWPPP a price adjustment of \$750 will be assessed.

3. Failure to perform Corrective Action: By each 24 period following 24 hours after written notice by the Project Engineer, per occurrence, a price adjustment of \$750 will be assessed where the Contractor:

- fails to complete SWPPP administrative requirements as identified in the Contract or the CGP,
- fails to initiate work required by the SWPPP, or
- fails to initiate corrective action to respond to a deficiency notes during an inspection or by the Project Engineer.

The same deficiency remaining uncorrected will be considered an additional occurrence for each additional 24 hour period, without requiring additional written notice by the Project Engineer.

Item 641.0001 Erosion, Sediment and Pollution Control Administration. At the Contract lump sum price for administration of all work under this Section. Includes, but is not limited to, SWPPP and HMCP and SPCC Plan preparation, agency fees for SWPPP reviews,

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Storm Water Lead (when not included as a separate Pay Item under 641.0006) SWPPP amendments, pre-construction Inspections, Inspections, monitoring, reporting, and Record keeping or copying Records related to the SWPPP and required by the CGP, and Record retention.

Work required by the HMCP and SPCC Plan including hazardous material storage, containment, removal, cleanup and disposal, are subsidiary to Pay Item 641.0001 Erosion, Sediment and Pollution Control Administration.

Item 641.0002 Temporary Erosion, Sediment and Pollution Control. At the contingent sum prices specified for all labor, supervision, material, equipment, and incidentals to install, maintain, remove and dispose of approved temporary erosion, sedimentation, and pollution control BMPs required to implement the SWPPP and SPCC Plan.

Item 641.0006 SWPPP Price Adjustment. Withholding according to Section 641-3.04, equal to any penalties and fines levied against the Department by local, state, and federal agencies for pollutant violations, including violations of the CWA, CGP, and any other Permit, except when due to the Department's sole negligence. The Contractor is also responsible for the payment of any and all penalties and fines levied against the Department or Contractor by entities (including agencies) other than the Department.

The Department will not release performance bonds until Liquidated Damages assessed according to Section 641 are paid to the Department, and all requirements according to Subsection 103-1.05 are satisfied.

Subsidiary Items. Temporary erosion, sediment, and pollution control measures that are required outside the Project Area are subsidiary. Work required by the HMCP and SPCC Plan including hazardous material storage, containment, removal, cleanup and disposal, are subsidiary to Item 641.0001 Erosion, Sediment and Pollution Control Administration.

Work under other pay items. Work that is paid for directly or indirectly under other pay items will not be measured and paid for under Section 641. This work includes but is not limited to:

- a. Dewatering;
- b. Shoring;
- c. Bailing;
- d. Permanent seeding;
- e. Installation and removal of temporary work pads;
- f. Temporary accesses;
- g. Temporary drainage pipes and structures;

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- h. Diversion channels;
- i. Settling impoundment; and
- j. Filtration.

Permanent erosion, sediment and pollution control measures will be measured and paid for under other Contract items, when shown on the bid schedule.

Work at the Contractor's Expense. Temporary erosion, sediment, and pollution control measures that are required due to carelessness, negligence, or failure to install temporary or permanent controls as scheduled or ordered by the Project Engineer, or for the Contractor's convenience, are at the Contractor's expense.

Payment will be made under:

Pay Item		Pay Unit
641.0001.0000	Erosion, Sediment, and Pollution Control Administration	Lump Sum
641.0002.0000	Temporary Erosion, Sediment, and Pollution Control	Contingent Sum
641.0006.0000	SWPPP Price Adjustment	Contingent Sum

SECTION 642

CONSTRUCTION SURVEYING AND MONUMENTS

642-3.01 GENERAL: Add the following to the eighth paragraph:

11. Using, furnishing, placing, replacing, and maintaining construction layout stakes, baseline stations, primary control points, or any disturbed property location monuments as necessary for the proper performance of the work under this contract.
12. Generation of cross-sections, AutoCAD drawings, or TINS of the site, measuring pre- and post- construction surfaces.
13. Measuring and calculating quantities for payment.
14. Providing all documentation for review and payment on a CD or via electronic transmission compatible with Microsoft Office and AutoCAD Civil 3D, 2021 and a hard copy.

Add the following:

Several control points have been established, referenced to NAD83 State Plane 4 datum, in feet coordinates, as detailed in the Plans. Recover and verify the position of these points as needed and establish new points for project control if needed, before commencing construction. Notify the Engineer immediately of any error determined.

The contractor shall submit for approval a plan of the proposed survey methods to the Engineer. The engineer will review the plan to ensure adequacy of survey methods for accurate pay item quantity calculations. No fieldwork on this item shall be performed without written approval of the methods from the Engineer.

Clearing for surveying outside the clearing and grubbing limits will not be allowed without written approval from the Engineer.

The Engineer will locate and reference one time, and one time only the control points necessary for proper layout of the work. The Contractor shall make all calculations involved and shall furnish and place all temporary control and staking.

The Contractor shall set all additional stakes needed, such as offset stakes, reference point stakes, slope stakes, grade stakes, road stationing, stakes for drainage, or other structures, supplementary bench marks, and any other horizontal or vertical controls necessary to secure a correct layout of the work.

The Contractor shall be responsible for staking the work, to conform to the lines, grades, elevations, and dimensions called for on the Plans.

Perform all other surveying and staking necessary to complete the project.

SPECIAL PROVISIONS

Project Number: 52959-6

Cripple Cr. Pit Reclamation – Phase II

This includes measurement of quantities for pay items 203.0003 and 618.0001.

Keep field notes in standard bound notebooks in a clear, orderly, and neat manner consistent with Departmental procedures, including titles, numbering, and indexing. Make field books available for inspection by the Department's project personnel at any time.

Furnish a note keeper to record all field survey notes, including those which become documentation from which quantities for payment are computed. The note keeper shall be thoroughly familiar with generally accepted standards of good survey note keeping practice and the Department of Transportation & Public Facilities Construction Surveying Requirements, which are located in Appendix B.

Any inspection or checking of the Contractor's layout by the Department and the acceptance of all or any part of it shall not relieve the contractor of his responsibility to secure the proper dimensions, grades, and elevations.

The Contractor shall exercise care in the preservation of existing stakes and bench marks and shall have them reset at his expense when any are damaged, lost, displaced, or removed. The Contractor shall use primary control points for re-establishing baseline stations wherever previously surveyed stations have been destroyed or removed. At a minimum, the Contractor shall confirm the location of existing baseline stations by field survey of each station's relationship to a suitable primary control point. Should any discrepancies be found, primary control points shall supersede any existing baseline stations.

The Contractor shall use competent personnel and suitable equipment for the layout work required and shall provide that it be done under the supervision, directed by, or to the standards of a Professional Engineer or Professional Land Surveyor.

Ditch Lining material is Riprap, Class I and will be measured for payment. The Contractor shall survey prepared surfaces before and after riprap placement, to calculate pay item volumes.

(03/05/20)AML-Special Provision

642-5.01 BASIS OF PAYMENT. Add the following: Construction Surveying includes all field and office work required to accomplish the work described in the contract including, but not limited to, furnishing all personnel, equipment, transportation and supplies.

Maintenance of stakes will not be measured. Clearing required for stake visibility is subsidiary to Item 642.0001 Construction Surveying and no separate payment shall be made. (01/01/06)PARKS-Special Provision

Add the following pay item:

Pay Item		Pay Unit
642.0001.0000	Construction Surveying	Lump Sum

(02/25/10)CR6422-Special Provision

SPECIAL PROVISIONS

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Cripple Cr. Pit Reclamation – Phase II

Add the following Section:

SECTION 647

EQUIPMENT RENTAL

647-1.01 DESCRIPTION. This item consists of furnishing construction equipment, operated, fueled and maintained, on a rental basis for use in construction of extra or unanticipated work at the direction of the Engineer. Construction equipment is defined as that equipment actually used for performing the items of work specified and shall not include support equipment such as hand tools, power tools, electric power generators, welders, small air compressors and other shop equipment needed for maintenance of the construction equipment.

The Engineer will provide direction to the Contractor's supervisory personnel only, not to the operators or laborers. In no case shall direction by the Engineer be construed as making the Department liable for the Contractor's responsibility to prosecute the work in the safest and most expeditious manner.

647-2.01 EQUIPMENT FURNISHED. In the performance of this work, furnish, operate, maintain, service, and repair equipment of the numbers, kinds, sizes, and capacities set forth on the Bid Schedule or as directed by the Engineer. The kinds, sizes, capacities, and other requirements set forth shall be understood to be minimum requirements. The number of pieces of equipment to be furnished and used shall be, as the Engineer considers necessary for economical and expeditious performance of the work. The equipment shall be used only at such times and places as the Engineer may direct.

Equipment shall be in first class working condition and capable of full output and production. The minimum ratings of various types of equipment shall be as manufactured and based on manufacturer's specifications. Alterations will not be considered acceptable in achieving the minimum rating. Equipment shall be replaced when, in the opinion of the Engineer, their condition is below that normal for efficient output and production.

Equipment shall be fully operated, which shall be understood to include the operators, oilers, tenders, fuel, oil, air hose, lubrication, repairs, maintenance, insurance, and incidental items and expenses.

647-2.02 EQUIPMENT OPERATORS AND SUPERVISION PERSONNEL. Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. Personnel furnished by the Contractor shall be, and shall remain during the work hereunder, employees solely of the Contractor.

Furnish, without direct compensation, a job superintendent or Contractor's representative together with such other personnel as are needed for Union, State, or Federal requirements and in servicing, maintaining, repairing and caring for the equipment, tools, supplies, and materials provided by the Contractor and involved in the performance of the work.

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Cripple Cr. Pit Reclamation – Phase II

647-3.01 CONSTRUCTION REQUIREMENTS. The performance of the work shall be according to the instructions of the Engineer, and with recognized standards and efficient methods.

Furnish equipment, tools, labor, and materials in the kinds, number, and at times directed by the Engineer and shall begin, continue, and stop the several operations involved in the work only as directed by the Engineer.

Normally, the work is to be done when weather conditions are reasonably favorable, six days per week, Mondays through Saturdays, holidays excepted.

The Engineer will begin recording time for payment each shift when the equipment begins work on the project. The serial number and brief description of each item of equipment listing in the bid schedule and the number of hours, or fractions thereof to the nearest one quarter hour, during which equipment is actively engaged in construction of the project shall be recorded by the Engineer. Each day's activity will be recorded on a separate sheet or sheets, which shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative.

647-4.01 METHOD OF MEASUREMENT. The number of hours of equipment operation to be paid for shall be the actual number of hours each fully operated specified unit of equipment is actually engaged in the performance of work in the designated areas according to the direction of the Engineer. The pay time will not include idle periods, time used in oiling, servicing, or repairing of equipment, or in making changeovers of parts to the equipment. Travel time to or from the work site project will not be authorized for payment.

647-5.01 BASIS OF PAYMENT. Payment for Item 647.2001 Wide Pad Dozer, 65 HP Minimum, Item 647.2030 Hydraulic Excavator, 1 CY, 100 HP, Minimum, and Item 647.3000 Motor Grader, 220 HP Minimum will be paid at the contract price for the number of hours required to complete the work according to the Engineer's direction. This shall be full compensation for furnishing, operating, maintaining, servicing and repairing the equipment, and for incidental costs related to the equipment. Furnishing and operating of equipment of heavier type, larger capacity, or higher wattage than specified will not entitle the Contractor to extra compensation.

Payment will be made under:

Pay Item		Pay Unit
647.2001.0000	Wide Pad Dozer, 65 HP Minimum	Hour
647.2030.0000	Hydraulic Excavator, 1 CY, 100 HP, Minimum	Hour
647.3000.0000	Motor Grader, 220 HP Minimum	Hour

(03/01/2017)AML-Special Provision

SPECIAL PROVISIONS
 Project Number: 52959-6
 Cripple Cr. Pit Reclamation – Phase II

Add the following section:

SECTION 680

SEDIMENT RETENTION POND

680-1.01 DESCRIPTION. Provide a sediment retention pond to trap and accumulate sediment to settle and filter discharge prior to leaving the project.

680-2.01 MATERIALS. Use Rip Rap, Class I, as specified in section 611, for inlet and outlet as shown in the Plans. Use materials that help dam sediment and allow slow filtration through outlet. Materials will remain stable to accommodate pond capacity.

680-3.01 CONSTRUCTION REQUIREMENTS. Design and build retention pond according to the design parameters shown on the drawings. Provide a construction plan for retention pond to the engineer 14 days prior to planned installation. Plan shall include dimensions, materials, slopes, and all other pertinent elements for construction and removal.

680-4.01. METHOD OF MEASUREMENT. Final acceptance by the project engineer will constitute measurement.

680-5.01 BASIS OF PAYMENT. All work, equipment, and materials used to construct pond. Maintenance due to sediment accumulation including cleanouts will be paid under item 641.0002 Temporary Erosion, Sediment, and Pollution Control.

Payment will be made under:

Pay Item		Pay Unit
680.0001.0000	Sediment Retention Pond	Lump Sum

(03/05/2020)AML-Special Provision

SPECIAL PROVISIONS

Project Number: 52959-6

Cripple Cr. Pit Reclamation – Phase II

Add the following Section:

SECTION 690

EROSION, SEDIMENT AND POLLUTION CONTROL - MEASURES

690-1.01 DESCRIPTION. Furnish, install, and maintain measures, countermeasures and associated materials as part of BMP(s) to prevent, control and contain erosion, erosion materials, sediments and pollution contaminants, on and off project site.

Measures:

- Permanent Measures – include the materials, hardware, equipment, and labor required for installation and maintenance of erosion, sediment, and pollution control material(s).
- Temporary Measures - include, in addition to the requirements of Permanent Measures, removal and disposal of the erosion, sediment, and pollution control material(s).

Related Specifications:

Seeding	Section 618
Soil Stabilization	Section 619
Silt Fence	Section 633
Erosion, Sediment and Pollution Control	Section 641

690-2.01 MATERIALS.

Erosion Sediment and Pollution Control – Materials Section 744

Others as specified in related Sections.

CONSTRUCTION REQUIREMENTS

690-3.01 GENERAL. BMP(s) may include individual or a combination of measures and countermeasures, including but not limited to temporary seeding, mulch, matting, staples, stabilizing emulsions, blankets and mats, soil binders, non-erodible cover, dustless sweeping, dust palliatives. Refer to Subsection 690-1.01, Related Specifications, for measures not included here.

690-3.02 MATERIAL STORAGE AND PROTECTION. General: Store materials elevated off the ground and covered protecting them from construction and or damage from the environment and as follows:

Fiber Rolls. Additionally, protect fiber rolls from: precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or other corrosive reagents, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property value of the rolls.

690-3.04 PLACEMENT AND INSTALLATION. Place and install where shown and detailed

SPECIAL PROVISIONS

Project Number: 52959-6

Cripple Cr. Pit Reclamation – Phase II

in the Plans and Specifications including Section 641, and as recommended by the manufacturer, directed by the Engineer and as follows:

Prepare the surface to be seeded to reduce erosion potential and to facilitate germination and growth of vegetation cover. Maintain seeded areas. Refer to Section 620 for further surface/topsoil preparation requirements.

Reseed where water quality standards are being exceeded as a result of insufficient vegetative cover. Review with Engineer prior to reseeding.

Refer to Section 618 for further information.

690-3.05 MAINTENANCE. Maintain the integrity of the erosion, sediment and pollution control measures for the duration of the project. Inspect as required by the APDES CGP and SWPPP and correct any deficiencies immediately. Remove and dispose of temporary measures including trapped sediment contaminants off project at approved locations. Materials manufactured as biodegradable may be left in place when approved by the Engineer.

690-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Seeding: Section 618.

Stabilization: Section 619.

Fiber Rolls: By length, measured along the centerline of the fiber roll, complete in place.

Silt Fence: Section 633.

690-5.01 BASIS OF PAYMENT. Section 641.

Erosion, sediment, and pollution control measures that are not listed on the bid schedule or not included in other items are subsidiary to item 641.0002 Temporary Erosion, Sediment, and Pollution Control.

SPECIAL PROVISIONS

Project Number: 52959-6

Cripple Cr. Pit Reclamation – Phase II

APPENDIX A

PERMITS

PERMIT DESCRIPTION	ISSUE DATE	EXPIRE DATE
SHPO – No Historic Properties Affected Alaska State Historic Preservation Officer File no.: 3130-2R DMLW	11/04/2019	N.A.
U.S. Army Corps of Engineers – Nationwide 49: Coal Remining Activities	2/2/24	3/14/26

Temporary Water Use:

The Hanger Pit, Cripple Creek, and Coal Creek are available water sources for compaction moisture and dust control, with the following conditions:

- a. Limiting use to a maximum of 500 gallons per day, which may be taken from any source indefinitely, or
- b. Limiting use to 5,000 gallons per day for up to 10 calendar days per source per calendar year.

Greater quantities of water use will require a Temporary Water Use Authorization, which may be acquired at:

<https://dnr.alaska.gov/mlw/water/twua/>

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114.17

330-1R05M

MEMORANDUM

DEPARTMENT OF NATURAL RESOURCES

STATE OF ALASKA
DIVISION OF MINING, LAND
AND WATER

TO: Judith E. Bittner
SHPO
Office of History and Arch.

DATE: September 23, 2019

TELEPHONE NO.: 269-8603

FROM: Justin Ireys
AML Program Manager

SUBJECT: SHPO Clearance
Section 106 Consultation
Cripple Creek Pit

During the summer of 2020 the Abandoned Mine Lands (AML) program is planning to begin reclamation work on the Cripple Creek pit located in the Healy Valley. The pit is located entirely on state land, approximately 9 miles east of Healy, AK. The project will eliminate human health and safety hazards thereby eliminating injury liability to the state. The Cripple Creek pit will be the third large scale reclamation project undertaken by the Department of Natural Resources. On several occasions staff from both AML and the Office of History and Archeology (OHA) have visited adjacent abandoned pits together (previous reports are available).

The Cripple Creek pit is located entirely on state land in T12S, R6W, Section 15 of the Fairbanks Meridian. There are no known historical artifacts in the area, and none have been encountered during previous projects.

Your review of the project pursuant to Section 106 of the National Historic Preservation Act as implemented by 36 CFR 800 is requested. Your consultation comments are requested so that they can be sent with the approval package to the Federal Office of Surface Mining prior to the bidding process.

If you have any questions, please do not hesitate to call me at 269-8603.

155 No Historic Properties Affected
Alaska State Historic Preservation Officer
Date: 11/04/19 File No.: 2019-01190
Please review 36 CFR 800.13 / A.S. 41.35.070(d)

2019-01190



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
1046 MARKS ROAD
FORT WAINWRIGHT, AK 99703

February 2, 2024

Regulatory Division
POA-2019-00656

State of Alaska
Dept. of Natural Resources
Div. of Mining, Lands, and Water
Abandoned Mine Lands Program
Attention: Ms. Grace Petersen

Dear Ms. Petersen:

This is in response to your November 7, 2023, application for a Department of the Army (DA) permit to mechanically land clear, reconfigure, and stockpile topsoil into 2.2-acres of wetlands for the ecological reclamation of Cripple Creek Mine Pit Phase II. It has been assigned file number POA-2019-00656, Cripple Creek, which should be referred to in all future correspondence with this office. The project site is located within Section 14, T. 12 S., R. 6 W., Fairbanks Meridian; USGS Quad Map Healy D-4, Latitude 63.8707° N, Longitude 148.7038 ° W; near Healy, Alaska.

Based on our review of the information you provided and information available to us, we have preliminarily determined the above project site contains waters of the United States (U.S.), including wetlands, under the U.S Army Corps of Engineers (Corps) regulatory jurisdiction. Enclosed is a Preliminary Jurisdictional Determination (PJD) Form. Please sign and return the form to our office. If you have additional information, you would like the Corps to consider, you may submit that information at any time. A PJD is not appealable. You also have the right to request and obtain an Approved Jurisdictional Determination (AJD), which can be appealed. If it is your intent to request an AJD, we recommend that work not commence until one is obtained.

DA authorization is necessary because your project will involve work in and placement of fill material into waters of the U.S. under our regulatory jurisdiction.

Based upon the information and plans you provided, we hereby verify that the work described above, which will be performed in accordance with the enclosed plan (sheets 1-12), dated November 7, 2023, is authorized by Nationwide Permit (NWP) No. 49, Coal Remining Activities. NWP No.49, as well as its Regional and General Conditions are available on our website at www.poa.usace.army.mil/Missions/Regulatory/Permits/Nationwide-Permits. **Regional Condition D, Site Restoration for**

Projects with Ground Disturbing Activities, and Regional Condition E - Delineation of Project Footprint, applies to your project. You must comply with all terms and conditions of NWP. 49, as well as the Special Condition below:

Historic Properties/Cultural Resources

Compliance with Section 106 of the National Historic Preservation Act (16 USC 470, 33 CFR 320.3(g); 33 CFR 325.2(b)(3); 33 CFR 325, Appendix C; 36 CFR 800).

If human remains, historic resources, or archaeological resources are encountered during construction, all ground disturbing activities shall cease in the immediate area and you shall immediately (within one business day of discovery) notify the U.S. Army Corps of Engineers (Corps), Alaska District, Regulatory Office at (907) 753-2712 or Regulatory Specialist, Laurel Gale at Laurel.A.Gale@usace.army.mil, or by phone at (907) 347-6496. Upon notification the Corps shall notify the appropriate Tribal Historic Preservation Office (THPO) and State Historic Preservation Office (SHPO). Based on the circumstances of the discovery, equity to all parties, and consideration of the public interest, the Corps may modify, suspend, or revoke the permit in accordance with 33 CFR Part 325.7. After such notification, project activities on federal lands shall not resume without written authorization from the Corps. After such notification, project activities on tribal lands shall not resume without written authorization from the SHPO and the Corps.

Further, please note General Condition 30 requires that you submit a signed certification to us once any work and required mitigation are completed. Enclosed is the form for you to complete and return to our office.

Unless this NWP is modified or revoked, it expires on March 14, 2026. If you commence or are under contract to commence this activity before the date that the NWPs are modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWPs to complete the activity under the present terms and conditions of these nationwide permits. It is incumbent upon you to remain informed of the changes to the NWPs.

Nothing in this letter excuses you from compliance with other Federal, state, or local statutes, ordinances, or regulations.

Please contact me via email at Laurel.A.Gale@usace.army.mil, by mail at the address above, by phone at (907) 347-6496, if you have questions or to request paper copies of the jurisdictional determination. For more information about the Regulatory Program, please visit our website at www.poa.usace.army.mil/Missions/Regulatory.

Sincerely,



Laurel A. Gale
Regulatory Specialist

ENCLOSURE



**US Army Corps of Engineers
Alaska District**

Permit Number: POA-2019-00656

Name of Permittee: State of Alaska, Dept. of Mining, Lands, and Water, Abandoned Mine Lands Program

Date of Issuance: February 2, 2024

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to Ms. Laurel Gale at regpagemaster@usace.army.mil, or the following address:

U.S. Army Corps of Engineers
Alaska District
Regulatory Division
1046 Marks Road
Fort Wainwright, AK 99703

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above-referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

APPENDIX B

SURVEY REQUIREMENTS

1. Alaska Construction Surveying Requirements (U.S. Customary Units)



**Alaska
Department of
Transportation
and
Public Facilities**

**Alaska
Construction
Surveying
Requirements (US
Customary Units)**

Alaska Construction Surveying Requirements (US Customary Units)

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1. Survey accuracy requirements

Third order survey

- ✓ Use a 1/5000 horizontal closure.
- ✓ Use an angle closure of $30\sqrt{N}$ seconds, where N equals the number of angles in the traverse.
- ✓ An Alaska-registered professional land surveyor must perform or supervise replacement of survey monuments (property, USGS, USC&GS, BLM, etc.) or establishment of monuments (including centerline).
- ✓ All monument work must comply with AS 34.65.040 and meet standards in the latest version of the Alaska Society of Professional Land Surveyors' *Standards of Practice Manual*.
- ✓ The allowable vertical error for misclosure is $e = 0.05\sqrt{M}$ e = maximum misclosure in feet, M = length of the level circuit in miles.

Table 1—Survey accuracy requirements (in feet)

	Stationing	HI	Closure	Horizontal Angle	Distance To center line	Grade
Additional cross sections	1.0	0.01	0.04	**	0.1	0.1
Benches		0.01	0.02			
Blue tops***	1.0	0.01	0.04		0.1	0.02
Bridges	*	0.01	0.02			0.01
Centerline	*			*		
Clearing & Grubbing	1.0				1.0	
Culverts	1.0	0.01	0.04	**	0.1	0.1
Curb & gutter	1.0	0.01	0.02		0.1	0.02
Grade stakes	1.0				0.1	0.1
Guardrail	1.0				0.1	
Manholes, catch basins & inlets	1.0	0.01	0.02		0.1	0.02
Monuments	*			*		
Red tops***	1.0	0.01	0.02		0.1	0.05
Riprap	1.0	0.1	0.04		1.0	0.1
Signs	1.0				0.1	
Slope stakes & RP's	1.0	0.01	0.04	**	0.1	0.1
Under drains & sewer	1.0	0.01	0.02		0.1	0.02

* Third order survey

**Right angle prism or transit angles from center line

*** Use blue tops for top of base course and red tops for the bottom of base course.

1. Survey frequency requirements

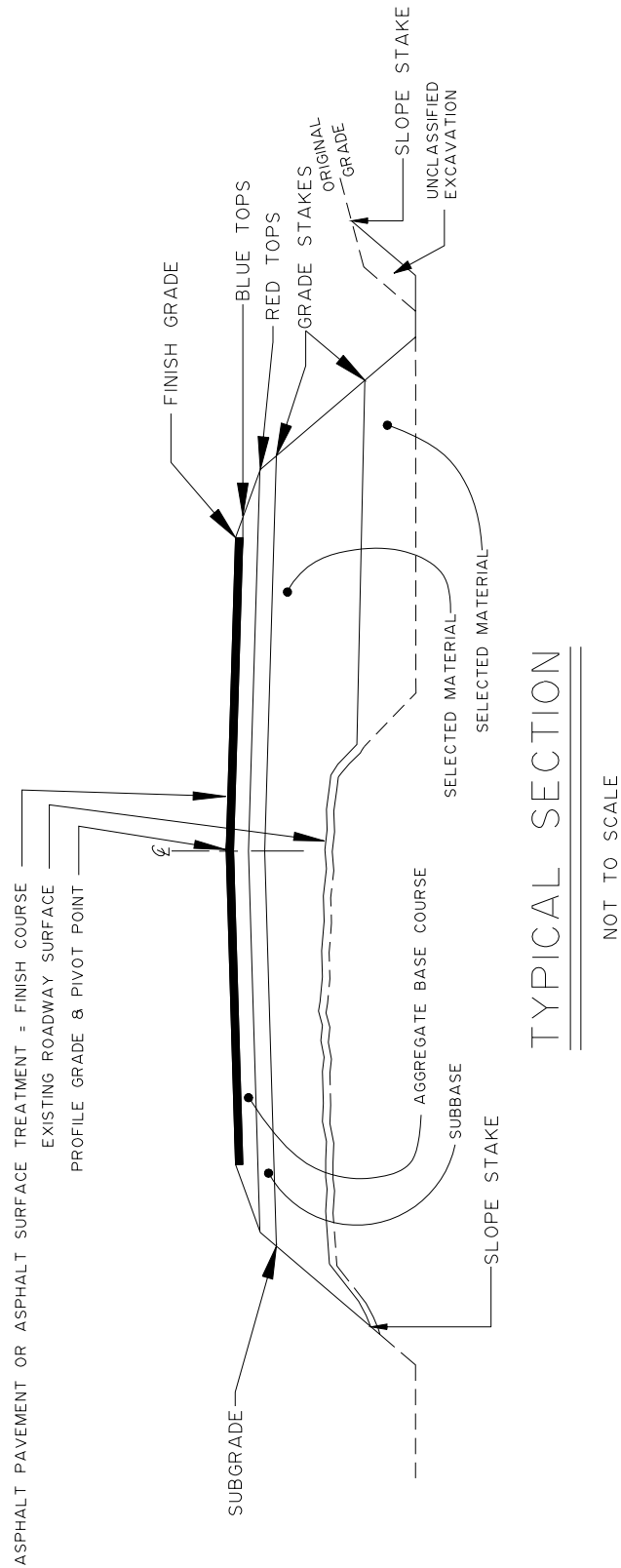
Table 2—Survey frequency requirements (in feet)

	Tangents	Curves	Interchange ramps	Stake each per plan	See special instructions on sample notes
Additional cross sections	*	*	*		
Bench marks					X
Blue tops	100	100**	25		X
Blue tops within 100 feet both sides of railroad track crossings and bridge approaches	25	25	25		X
Bridges				X	X
Center line	100	100**	25		
Clearing	100	100**	25		X
Culverts				X	X
Curb and gutter	25	25	25		
Grade stakes	100	100**	50		
Guardrail	25	25	25		
Manholes, catch basins & inlets				X	
Monuments				X	
Red tops	100	100**	25		X
Riprap	50	50	50		
Signs				X	
Slope stake / cross sections	100	100**	25		X
Under drains and sewers	50	25	25		

* Establish additional cross sections and slope stakes at all breaks in topography and where structures begin and end.

**Curves shall be staked on 50-foot stations if the curve is greater than six degrees.

2. Typical Section Drawing



3. Survey point materials requirements

- ✓ These are minimum requirements; larger sizes may be necessary.
- ✓ Use only stakes with planed sides.

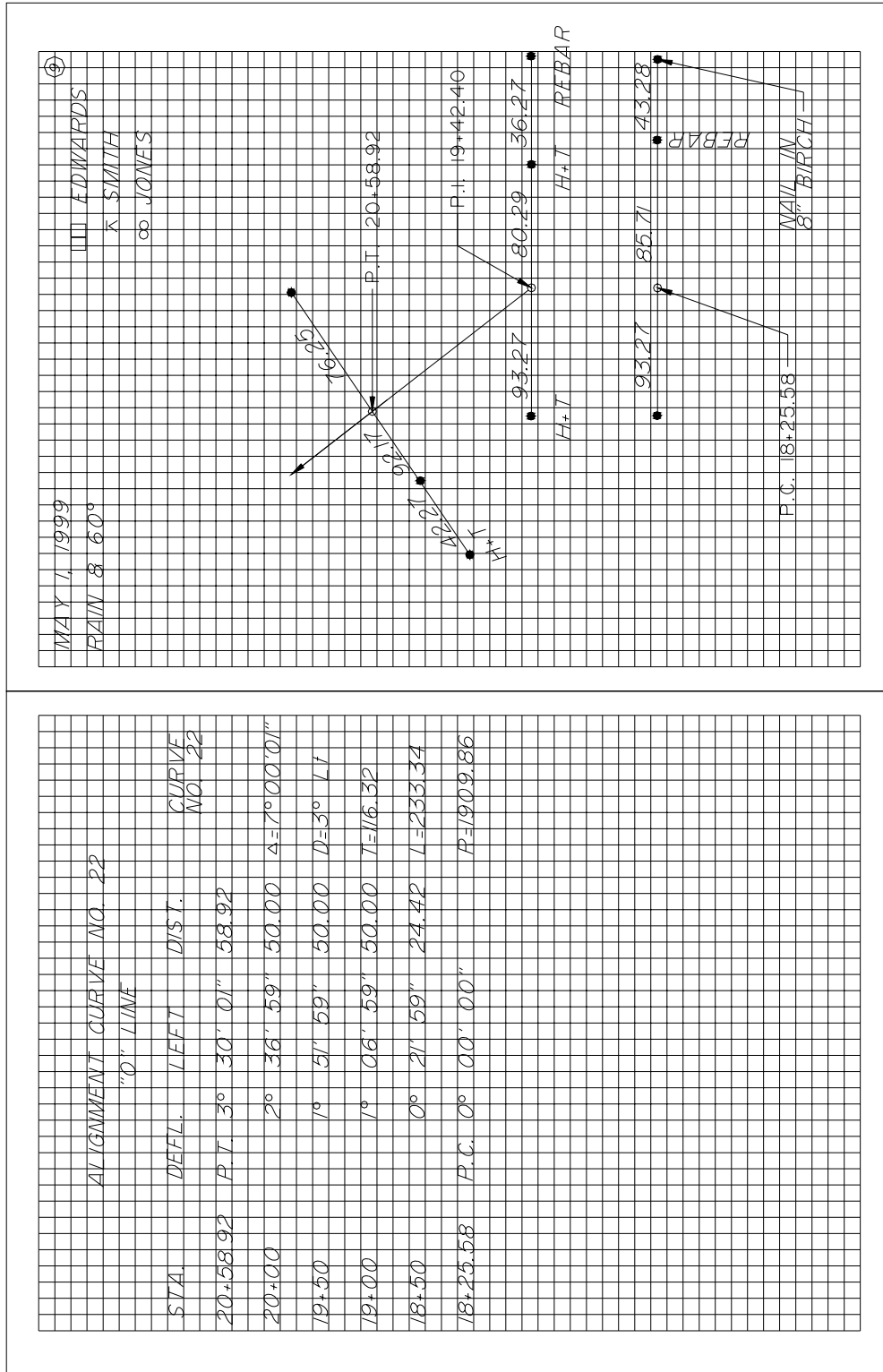
Table 3—Survey point materials requirements

	24" lath or whiskers	2" x 2" x 8" hub	2" x 2" x 12" hub	1" x 2" x 18" stake	1" x 2" x 24" stake	48" lath	Hub and tack	40d nail	60d nail	1/2" x 24" rebar
Benchmarks									X	
Blue tops	X	X								
Centerline P.C., P.T., P.O.T.			X	X			X *			X *
Centerline reference points			X	X			X *			X *
Centerline station				X				X		
Clearing						X				
Culvert stake			X		X	X				
Culvert stake references			X		X	X				
Curb and gutter			X		X		X			
Guardrail								X		
Major structures			X	X *	X *	X	X *			X *
Red tops	X	X								
Signs						X				
Slope stake					X	X				
Slope stake references			X		X	X				

* Optional depending on conditions, and to be determined by the Project Engineer.

4. Typical alignment notes

- ✓ The Chief of Parties must prepare the alignment book before actual staking.
- ✓ Don't use swing ties for reference points.
- ✓ Use three point right angle ties, two to the right and one left, or vice versa.
- ✓ Reference P.C., P.I., P.T., and P.O.T.



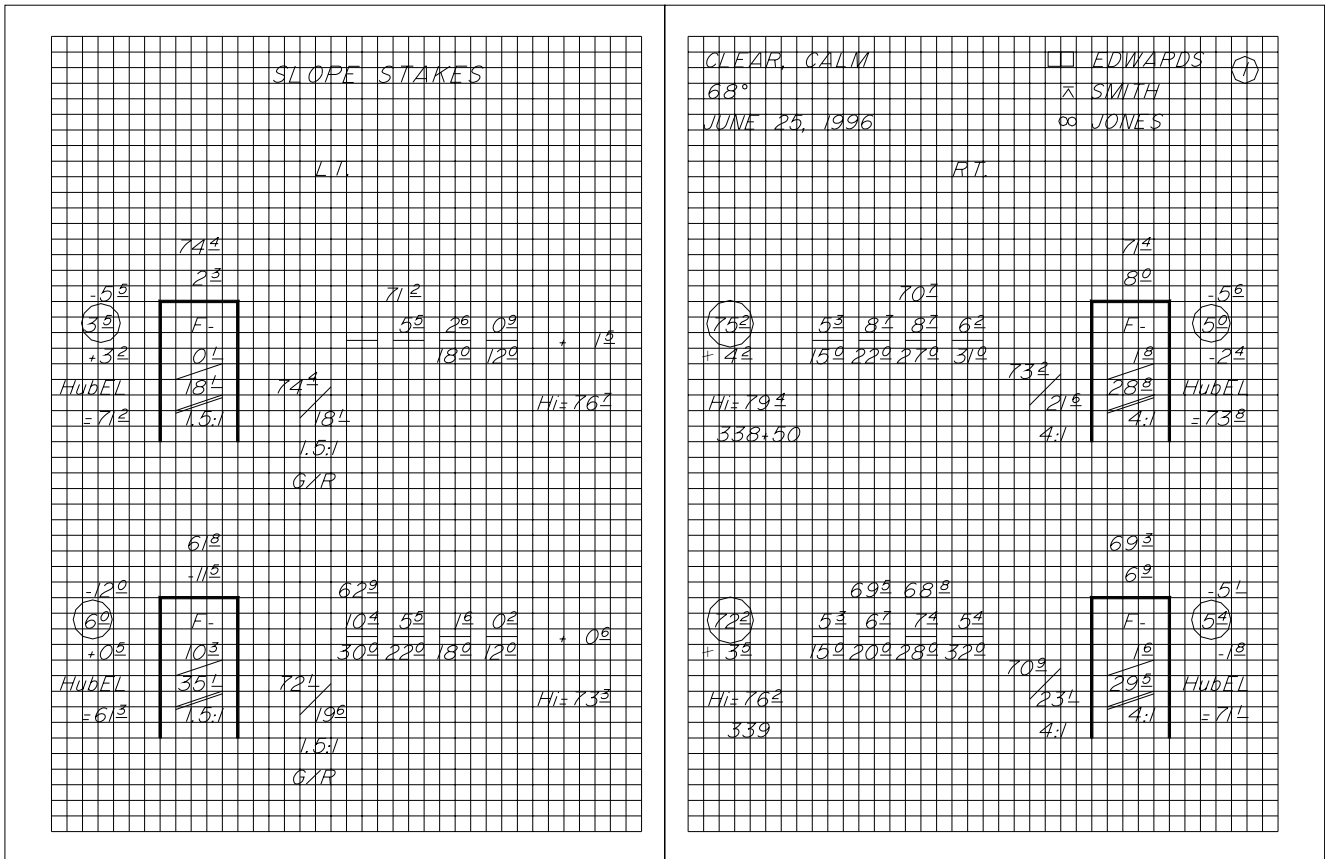
6. Typical level notes

- ✓ Balance back sights and foresights.
- ✓ Establish all benchmarks and take the centerline profile before doing any staking involving elevations.
- ✓ Don't set benchmarks in utility poles.
- ✓ Don't use side shots on benchmarks.
- ✓ Use the turn through method when establishing benchmarks.
- ✓ Re-check benchmarks after each major freeze/thaw cycle and/or any environmental event that may change the benchmark elevation.
- ✓ Do not use double rodding.
- ✓ Run separate level loops between all benchmarks.
- ✓ Set benchmarks in trees of at least six-inch diameter, unless approved by the Project Engineer.
- ✓ Correct errors in benchmark elevations so they will not affect the elevations of succeeding benchmarks.
- ✓ Consult with the Project Engineer before placing benchmarks in areas of permafrost or other unstable ground.
- ✓ Establish benchmarks at intervals and locations consistent with good engineering practice, and generally not more than 1000 feet.
- ✓ Completely describe benchmarks when establishing or re-establishing their elevation. Give centerline stationing, offset, benchmark projection, and observable benchmark characteristics. When checking into or out of benchmarks, note the book and page number that contains the most recent elevation establishment for that benchmark.
- ✓ Write the station on the top twelve inches facing centerline, with numerals a minimum of one inch in height.

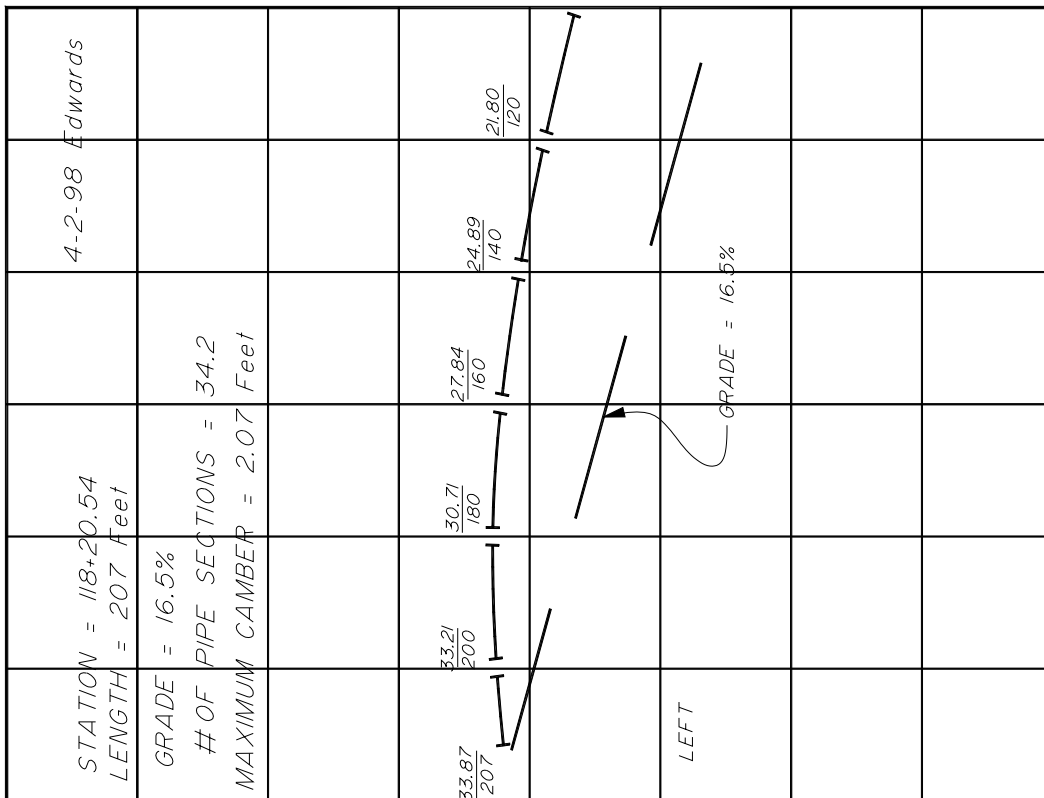
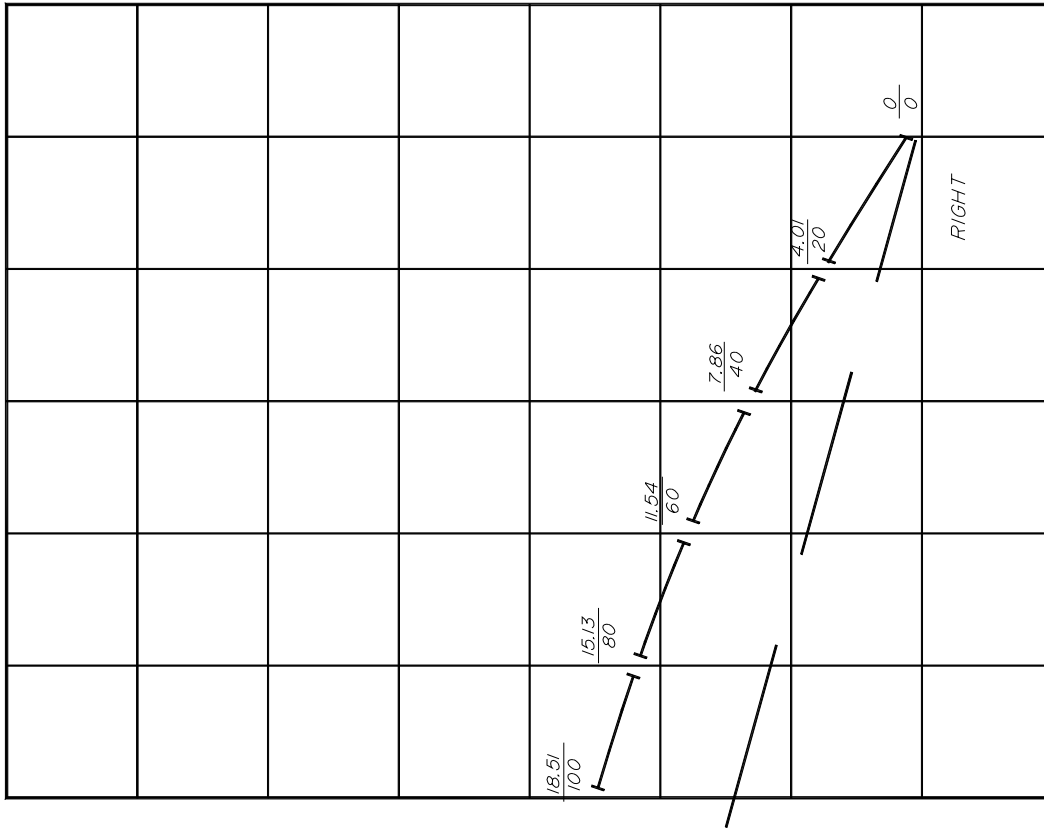
STA.	BS+	HI	FS-	ELEV.	45'± CLEAR WARM CALM			⊗ □ EDWARDS
					WILD 413579	3-23-90		⊕ SMITH
TBM #101 6+72				161.309	Nail in base of 12" Spruce			
	3.877	165.186			85' 10" LT.			6+72
6+00			1.95	163.24				
6+25			2.32	162.87				
6+50			2.96	162.23				
T.P.			3.246	161.940				
	1.103	163.043						
6+75			2.31	160.73				
7+00			2.56	160.48				
T.P.			2.823	160.220				
	2.332	162.552						
					Nail in base of 18" stump			
TBM #102			1.143	161.409	60' 4" RT	7+21	Elev.	161.413

7. Typical slope stake notes

- ✓ Enter the station, elevations, shoulder distance or ditch distances, and slope in the slope stake book before staking begins.
- ✓ In areas where slides or overbreak are anticipated, extend the sections beyond the construction limits.
- ✓ Slope-stake each section that is cross-sectioned.
- ✓ Final re-cross sections are required where there are overbreaks, undercuts, etc. Re-cross section book and page numbers shall be noted on the original cross-section and slope staking page for the relevant stations.
- ✓ Include at least the following information on the stake: (1) where to begin the cut or fill (2) the slope ratio (3) the depth of cut or height of fill and (4) the station.
- ✓ Use a hand level only for one turn up or down from the instrument.
- ✓ Clearly note hand level turns.
- ✓ Use a reference point that is 10-20 feet beyond the slope stake.
- ✓ The reference point must show the cut or fill to the slope stake and must include the slope stake information.
- ✓ Slope stake all abrupt changes in typical sections.
- ✓ Position all laths to face centerline.

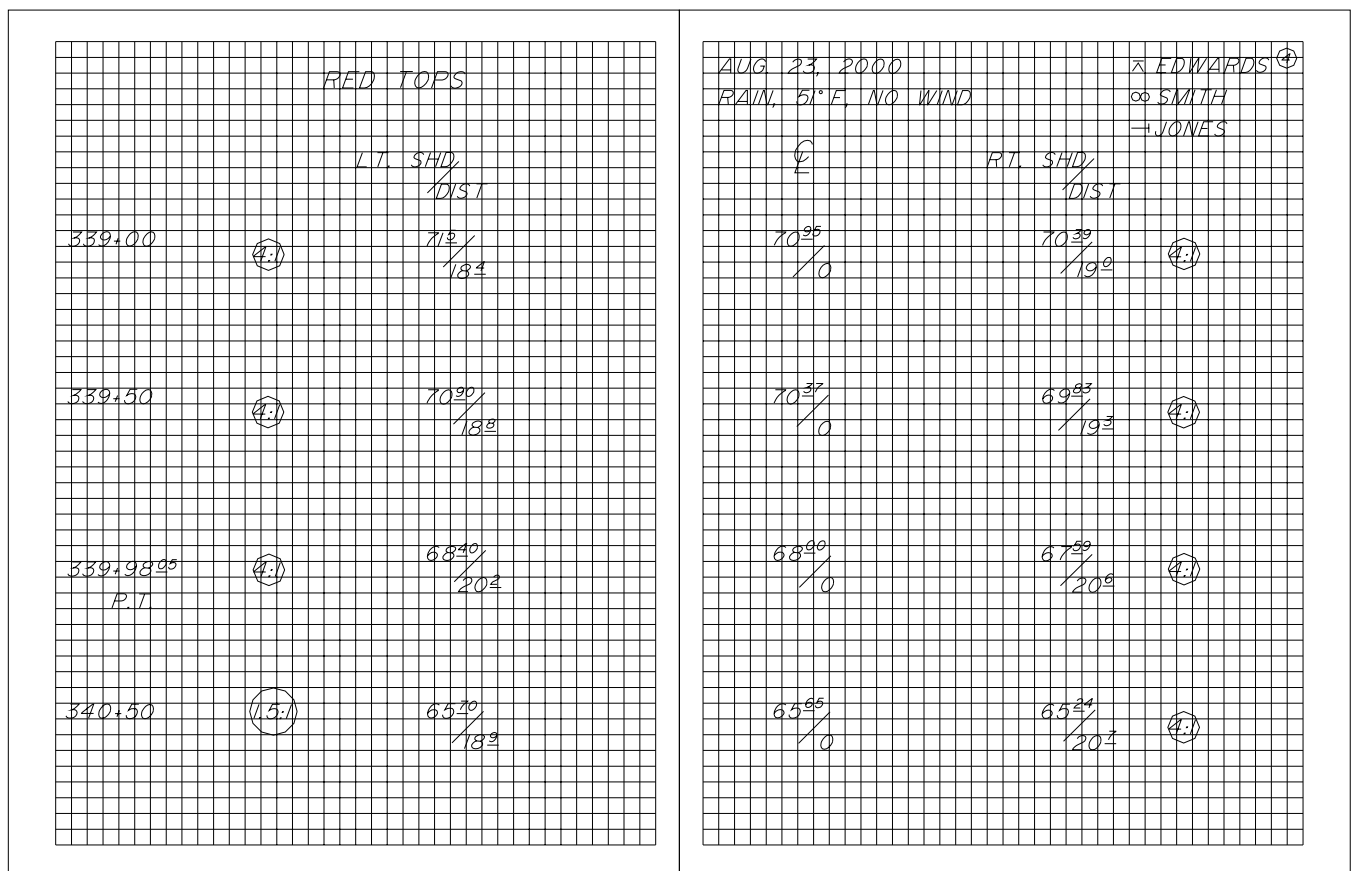


9. Typical culvert camber diagram



10. Typical blue or red tops and grade stake notes

- ✓ Place blue and red tops at each break in typical section and on centerline.
- ✓ Use blue tops for top of base course.
- ✓ Use red tops for the bottom of the base course.
- ✓ Evenly space red/blue tops at and between crown section break points with a maximum spacing of 25 feet between red/blue tops.
- ✓ Establish horizontal control from centerline references and vertical control from benchmarks.
- ✓ Place blue tops at the same interval as slope stakes.
- ✓ Stake all curve transitions.



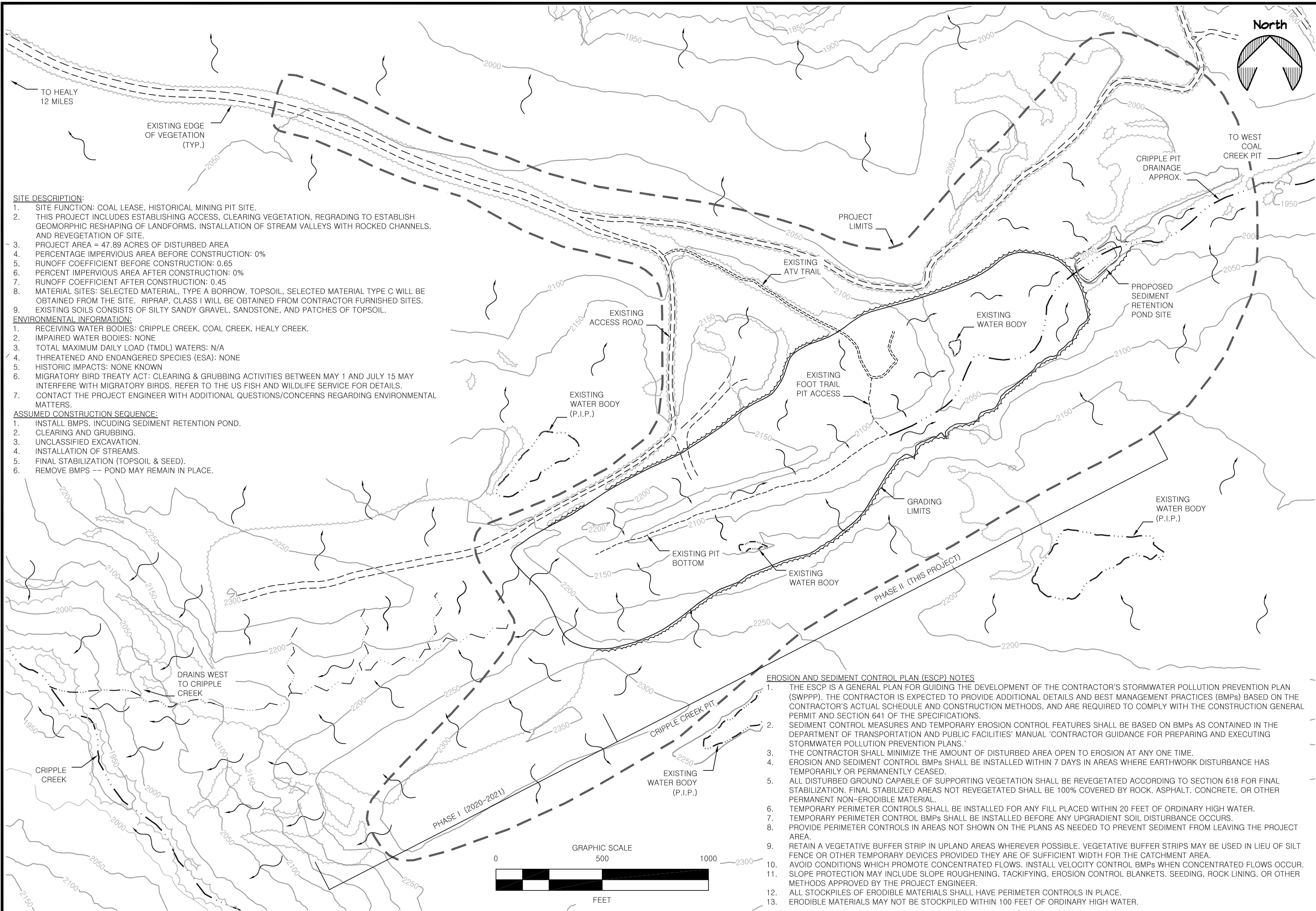
APPENDIX C

EROSION AND SEDIMENT CONTROL PLAN

To help you develop your construction site SWPPP, the Alaska Department of Natural Resources (ADNR) Division of Parks and Outdoor Recreation Design and Construction Section (D&C) has created this Erosion and Sediment Control Plan (ESCP).

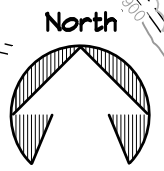
It is based on the Environmental Protection Agency (EPA) SWPPP Template and can be used along with EPA's *Developing Your Stormwater Pollution Prevention Plan* to develop the SWPPP.

Both are available on EPA's website at www.epa.gov/npdes/swpppguide



- SITE DESCRIPTION:**
1. SITE FUNCTION: COAL LEASE, HISTORICAL MINING PIT SITE.
 2. THIS PROJECT INCLUDES ESTABLISHING ACCESS, CLEARING VEGETATION, REGRADING TO ESTABLISH GEOMORPHIC RESHAPING OF LANDFORMS, INSTALLATION OF STREAM VALLEYS WITH ROCKED CHANNELS, AND REVEGETATION OF SITE.
 3. PROJECT AREA = 47.89 ACRES OF DISTURBED AREA
 4. PERCENTAGE IMPERVIOUS AREA BEFORE CONSTRUCTION: 0%
 5. RUNOFF COEFFICIENT BEFORE CONSTRUCTION: 0.65
 6. PERCENT IMPERVIOUS AREA AFTER CONSTRUCTION: 0%
 7. RUNOFF COEFFICIENT AFTER CONSTRUCTION: 0.45
 8. MATERIAL SITES: SELECTED MATERIAL, TYPE A BORROW, TOPSOIL, SELECTED MATERIAL TYPE C WILL BE OBTAINED FROM THE SITE. RIPRAP, CLASS I WILL BE OBTAINED FROM CONTRACTOR FURNISHED SITES. EXISTING SOILS CONSISTS OF SILTY SANDY GRAVEL, SANDSTONE, AND PATCHES OF TOPSOIL.
 9. EXISTING SOILS CONSISTS OF SILTY SANDY GRAVEL, SANDSTONE, AND PATCHES OF TOPSOIL.
- ENVIRONMENTAL INFORMATION:**
1. RECEIVING WATER BODIES: CRIPPLE CREEK, COAL CREEK, HEALY CREEK.
 2. IMPAIRED WATER BODIES: NONE
 3. TOTAL MAXIMUM DAILY LOAD (TMDL) WATERS: N/A
 4. THREATENED AND ENDANGERED SPECIES (ESA): NONE
 5. HISTORIC IMPACTS: NONE KNOWN
 6. MIGRATORY BIRD TREATY ACT: CLEARING & GRUBBING ACTIVITIES BETWEEN MAY 1 AND JULY 15 MAY INTERFERE WITH MIGRATORY BIRDS. REFER TO THE US FISH AND WILDLIFE SERVICE FOR DETAILS.
 7. CONTACT THE PROJECT ENGINEER WITH ADDITIONAL QUESTIONS/CONCERNS REGARDING ENVIRONMENTAL MATTERS.
- ASSUMED CONSTRUCTION SEQUENCE:**
1. INSTALL BMPs, INCLUDING SEDIMENT RETENTION POND.
 2. CLEARING AND GRUBBING.
 3. UNCLASSIFIED EXCAVATION.
 4. INSTALLATION OF STREAMS.
 5. FINAL STABILIZATION (TOPSOIL & SEED).
 6. REMOVE BMPs -- POND MAY REMAIN IN PLACE.

- EROSION AND SEDIMENT CONTROL PLAN (ESCP) NOTES**
1. THE ESCP IS A GENERAL PLAN FOR GUIDING THE DEVELOPMENT OF THE CONTRACTOR'S STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR IS EXPECTED TO PROVIDE ADDITIONAL DETAILS AND BEST MANAGEMENT PRACTICES (BMPs) BASED ON THE CONTRACTOR'S ACTUAL SCHEDULE AND CONSTRUCTION METHODS, AND ARE REQUIRED TO COMPLY WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 641 OF THE SPECIFICATIONS.
 2. SEDIMENT CONTROL MEASURES AND TEMPORARY EROSION CONTROL FEATURES SHALL BE BASED ON BMPs AS CONTAINED IN THE DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES' MANUAL 'CONTRACTOR GUIDANCE FOR PREPARING AND EXECUTING STORMWATER POLLUTION PREVENTION PLANS.'
 3. THE CONTRACTOR SHALL MINIMIZE THE AMOUNT OF DISTURBED AREA OPEN TO EROSION AT ANY ONE TIME.
 4. EROSION AND SEDIMENT CONTROL BMPs SHALL BE INSTALLED WITHIN 7 DAYS IN AREAS WHERE EARTHWORK DISTURBANCE HAS TEMPORARILY OR PERMANENTLY CEASED.
 5. ALL DISTURBED GROUND CAPABLE OF SUPPORTING VEGETATION SHALL BE REVEGETATED ACCORDING TO SECTION 618 FOR FINAL STABILIZATION. FINAL STABILIZED AREAS NOT REVEGETATED SHALL BE 100% COVERED BY ROCK, ASPHALT, CONCRETE, OR OTHER PERMANENT NON-ERODIBLE MATERIAL.
 6. TEMPORARY PERIMETER CONTROLS SHALL BE INSTALLED FOR ANY FILL PLACED WITHIN 20 FEET OF ORDINARY HIGH WATER.
 7. TEMPORARY PERIMETER CONTROL BMPs SHALL BE INSTALLED BEFORE ANY UPGRADIENT SOIL DISTURBANCE OCCURS.
 8. PROVIDE PERIMETER CONTROLS IN AREAS NOT SHOWN ON THE PLANS AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE PROJECT AREA.
 9. RETAIN A VEGETATIVE BUFFER STRIP IN UPLAND AREAS WHEREVER POSSIBLE. VEGETATIVE BUFFER STRIPS MAY BE USED IN LIEU OF SILT FENCE OR OTHER TEMPORARY DEVICES PROVIDED THEY ARE OF SUFFICIENT WIDTH FOR THE CATCHMENT AREA.
 10. AVOID CONDITIONS WHICH PROMOTE CONCENTRATED FLOWS. INSTALL VELOCITY CONTROL BMPs WHEN CONCENTRATED FLOWS OCCUR. SLOPE PROTECTION MAY INCLUDE SLOPE ROUGHENING, TACKIFYING, EROSION CONTROL BLANKETS, SEEDING, ROCK LINING, OR OTHER METHODS APPROVED BY THE PROJECT ENGINEER.
 11. ALL STOCKPILES OF ERODIBLE MATERIALS SHALL HAVE PERIMETER CONTROLS IN PLACE.
 12. ERODIBLE MATERIALS MAY NOT BE STOCKPILED WITHIN 100 FEET OF ORDINARY HIGH WATER.



STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES
 PLANS DEVELOPED BY: DIVISION OF MINING, LAND, & WATER, AML PROGRAM
 550 W 7TH AVE. SUITE 920, ANCHORAGE, AK 99501 - 907.269.8603

CRIPPLE CREEK PIT RECLAMATION
 PHASE II -- PROJECT NO. 52959-6

ESCP



PREPARED: RDA
 DRAWN: RDA
 REVIEWED: KW, RM
 DATE: 2/13/2024

SHEET
 1
 OF 1 SHEET

APPENDIX D

MISCELLANEOUS

1. Channel Parameters and Coordinate Points for Ditch Lining Channels

Natural Regrade Design Summary Report on Channel 'main'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	42.67
add'l watershed area (ac.)	37.87
valley length (ft.)	2839.28
drainage density (ft./ac.)	156.01
head elevation (ft.)	2192.53
base elevation (ft.)	2000.72
relief (ft.)	192.28
head slope	-0.09
base slope	-0.022
slope range	-0.091 to -0.022
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.28 to 10.90
bankfull depth range (ft.)	0.03 to 0.91
flood prone width range (ft.)	0.65 to 22.96
flood prone depth range (ft.)	0.07 to 2.44
entrenchment ratio	2.11 to 2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.16 to 2.57
Tractive force, flood prone width (lbs/sq.ft.)	0.23 to 3.70
manual Qpk?	no
bankfull Qpk (cfs)	43.36
flood prone Qpk (cfs)	146.00

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 3299.96(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.09
flood prone width (ft.)	0.65
flood prone depth (ft.)	0.07
flood prone area (sq.ft.)	0.03
bankfull width (ft.)	0.28
bankfull depth (ft.)	0.03
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.06
Tractive force, bankfull width (lbs/sq.ft.)	0.16

Tractive force, flood prone width (lbs/sq.ft.) 0.23
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.09
flood prone width (ft.) 2.23
flood prone depth (ft.) 0.25
flood prone area (sq.ft.) 0.31
bankfull width (ft.) 0.96
bankfull depth (ft.) 0.10
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.19
Tractive force, bankfull width (lbs/sq.ft.) 0.53
Tractive force, flood prone width (lbs/sq.ft.) 0.76
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.09
flood prone width (ft.) 3.16
flood prone depth (ft.) 0.36
flood prone area (sq.ft.) 0.62
bankfull width (ft.) 1.36
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.11
bottom width (ft.) 0.27
Tractive force, bankfull width (lbs/sq.ft.) 0.74
Tractive force, flood prone width (lbs/sq.ft.) 1.06
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.09
flood prone width (ft.) 3.88
flood prone depth (ft.) 0.44
flood prone area (sq.ft.) 0.93
bankfull width (ft.) 1.67
bankfull depth (ft.) 0.17
bankfull area (sq.ft.) 0.17
bottom width (ft.) 0.33
Tractive force, bankfull width (lbs/sq.ft.) 0.89
Tractive force, flood prone width (lbs/sq.ft.) 1.29
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.)	200.00		
slope at station (%)	-0.09		
flood prone width (ft.)	4.49		
flood prone depth (ft.)	0.51		
flood prone area (sq.ft.)	1.25		
bankfull width (ft.)	1.93		
bankfull depth (ft.)	0.19		
bankfull area (sq.ft.)	0.22		
bottom width (ft.)	0.39		
Tractive force, bankfull width	(lbs/sq.ft.)	1.03	
Tractive force, flood prone width	(lbs/sq.ft.)	1.48	
right side slope (%)	25.00		
left side slope (%)	25.00		

station (ft.)	250.00		
slope at station (%)	-0.09		
flood prone width (ft.)	5.00		
flood prone depth (ft.)	0.57		
flood prone area (sq.ft.)	1.55		
bankfull width (ft.)	2.15		
bankfull depth (ft.)	0.21		
bankfull area (sq.ft.)	0.28		
bottom width (ft.)	0.43		
Tractive force, bankfull width	(lbs/sq.ft.)	1.13	
Tractive force, flood prone width	(lbs/sq.ft.)	1.62	
right side slope (%)	25.00		
left side slope (%)	25.00		

station (ft.)	300.00		
slope at station (%)	-0.09		
flood prone width (ft.)	5.48		
flood prone depth (ft.)	0.63		
flood prone area (sq.ft.)	1.86		
bankfull width (ft.)	2.35		
bankfull depth (ft.)	0.24		
bankfull area (sq.ft.)	0.33		
bottom width (ft.)	0.47		
Tractive force, bankfull width	(lbs/sq.ft.)	1.22	
Tractive force, flood prone width	(lbs/sq.ft.)	1.75	
right side slope (%)	25.00		
left side slope (%)	25.00		

station (ft.)	350.00		
slope at station (%)	-0.08		
flood prone width (ft.)	7.40		
flood prone depth (ft.)	0.85		
flood prone area (sq.ft.)	3.40		

bankfull width (ft.)	3.18	
bankfull depth (ft.)	0.32	
bankfull area (sq.ft.)	0.61	
bottom width (ft.)	0.64	
Tractive force, bankfull width	(lbs/sq.ft.)	1.62
Tractive force, flood prone width	(lbs/sq.ft.)	2.34
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	400.00	
slope at station (%)	-0.08	
flood prone width (ft.)	7.73	
flood prone depth (ft.)	0.88	
flood prone area (sq.ft.)	3.71	
bankfull width (ft.)	3.32	
bankfull depth (ft.)	0.33	
bankfull area (sq.ft.)	0.66	
bottom width (ft.)	0.66	
Tractive force, bankfull width	(lbs/sq.ft.)	1.67
Tractive force, flood prone width	(lbs/sq.ft.)	2.41
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	450.00	
slope at station (%)	-0.08	
flood prone width (ft.)	8.04	
flood prone depth (ft.)	0.92	
flood prone area (sq.ft.)	4.01	
bankfull width (ft.)	3.45	
bankfull depth (ft.)	0.35	
bankfull area (sq.ft.)	0.72	
bottom width (ft.)	0.69	
Tractive force, bankfull width	(lbs/sq.ft.)	1.73
Tractive force, flood prone width	(lbs/sq.ft.)	2.49
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	500.00	
slope at station (%)	-0.08	
flood prone width (ft.)	8.35	
flood prone depth (ft.)	0.95	
flood prone area (sq.ft.)	4.32	
bankfull width (ft.)	3.58	
bankfull depth (ft.)	0.36	
bankfull area (sq.ft.)	0.77	
bottom width (ft.)	0.72	
Tractive force, bankfull width	(lbs/sq.ft.)	1.77

Tractive force, flood prone width (lbs/sq.ft.) 2.54
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 550.00
slope at station (%) -0.08
flood prone width (ft.) 8.64
flood prone depth (ft.) 0.99
flood prone area (sq.ft.) 4.63
bankfull width (ft.) 3.71
bankfull depth (ft.) 0.37
bankfull area (sq.ft.) 0.83
bottom width (ft.) 0.74
Tractive force, bankfull width (lbs/sq.ft.) 1.80
Tractive force, flood prone width (lbs/sq.ft.) 2.60
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 600.00
slope at station (%) -0.08
flood prone width (ft.) 9.46
flood prone depth (ft.) 1.08
flood prone area (sq.ft.) 5.55
bankfull width (ft.) 4.06
bankfull depth (ft.) 0.41
bankfull area (sq.ft.) 0.99
bottom width (ft.) 0.81
Tractive force, bankfull width (lbs/sq.ft.) 1.95
Tractive force, flood prone width (lbs/sq.ft.) 2.80
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 650.00
slope at station (%) -0.08
flood prone width (ft.) 9.72
flood prone depth (ft.) 1.11
flood prone area (sq.ft.) 5.86
bankfull width (ft.) 4.17
bankfull depth (ft.) 0.42
bankfull area (sq.ft.) 1.04
bottom width (ft.) 0.83
Tractive force, bankfull width (lbs/sq.ft.) 1.97
Tractive force, flood prone width (lbs/sq.ft.) 2.84
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 700.00
slope at station (%) -0.08
flood prone width (ft.) 10.84
flood prone depth (ft.) 1.24
flood prone area (sq.ft.) 7.29
bankfull width (ft.) 4.65
bankfull depth (ft.) 0.47
bankfull area (sq.ft.) 1.30
bottom width (ft.) 0.93
Tractive force, bankfull width (lbs/sq.ft.) 2.16
Tractive force, flood prone width (lbs/sq.ft.) 3.12
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 750.00
slope at station (%) -0.08
flood prone width (ft.) 11.07
flood prone depth (ft.) 1.26
flood prone area (sq.ft.) 7.60
bankfull width (ft.) 4.75
bankfull depth (ft.) 0.48
bankfull area (sq.ft.) 1.35
bottom width (ft.) 0.95
Tractive force, bankfull width (lbs/sq.ft.) 2.20
Tractive force, flood prone width (lbs/sq.ft.) 3.16
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 800.00
slope at station (%) -0.07
flood prone width (ft.) 11.29
flood prone depth (ft.) 1.29
flood prone area (sq.ft.) 7.91
bankfull width (ft.) 4.85
bankfull depth (ft.) 0.48
bankfull area (sq.ft.) 1.41
bottom width (ft.) 0.97
Tractive force, bankfull width (lbs/sq.ft.) 2.21
Tractive force, flood prone width (lbs/sq.ft.) 3.18
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 850.00
slope at station (%) -0.07
flood prone width (ft.) 11.51
flood prone depth (ft.) 1.32
flood prone area (sq.ft.) 8.22

bankfull width (ft.)	4.94	
bankfull depth (ft.)	0.49	
bankfull area (sq.ft.)	1.47	
bottom width (ft.)	0.99	
Tractive force, bankfull width	(lbs/sq.ft.)	2.22
Tractive force, flood prone width	(lbs/sq.ft.)	3.19
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	900.00	
slope at station (%)	-0.07	
flood prone width (ft.)	11.73	
flood prone depth (ft.)	1.34	
flood prone area (sq.ft.)	8.53	
bankfull width (ft.)	5.03	
bankfull depth (ft.)	0.50	
bankfull area (sq.ft.)	1.52	
bottom width (ft.)	1.01	
Tractive force, bankfull width	(lbs/sq.ft.)	2.22
Tractive force, flood prone width	(lbs/sq.ft.)	3.20
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	950.00	
slope at station (%)	-0.07	
flood prone width (ft.)	11.93	
flood prone depth (ft.)	1.36	
flood prone area (sq.ft.)	8.84	
bankfull width (ft.)	5.12	
bankfull depth (ft.)	0.51	
bankfull area (sq.ft.)	1.57	
bottom width (ft.)	1.02	
Tractive force, bankfull width	(lbs/sq.ft.)	2.23
Tractive force, flood prone width	(lbs/sq.ft.)	3.21
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	1000.00	
slope at station (%)	-0.07	
flood prone width (ft.)	12.52	
flood prone depth (ft.)	1.43	
flood prone area (sq.ft.)	9.73	
bankfull width (ft.)	5.38	
bankfull depth (ft.)	0.54	
bankfull area (sq.ft.)	1.73	
bottom width (ft.)	1.08	
Tractive force, bankfull width	(lbs/sq.ft.)	2.32

Tractive force, flood prone width (lbs/sq.ft.) 3.34
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1050.00
slope at station (%) -0.07
flood prone width (ft.) 12.72
flood prone depth (ft.) 1.45
flood prone area (sq.ft.) 10.04
bankfull width (ft.) 5.46
bankfull depth (ft.) 0.55
bankfull area (sq.ft.) 1.79
bottom width (ft.) 1.09
Tractive force, bankfull width (lbs/sq.ft.) 2.32
Tractive force, flood prone width (lbs/sq.ft.) 3.34
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1100.00
slope at station (%) -0.07
flood prone width (ft.) 12.91
flood prone depth (ft.) 1.48
flood prone area (sq.ft.) 10.35
bankfull width (ft.) 5.54
bankfull depth (ft.) 0.55
bankfull area (sq.ft.) 1.84
bottom width (ft.) 1.11
Tractive force, bankfull width (lbs/sq.ft.) 2.32
Tractive force, flood prone width (lbs/sq.ft.) 3.34
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1150.00
slope at station (%) -0.07
flood prone width (ft.) 13.72
flood prone depth (ft.) 1.57
flood prone area (sq.ft.) 11.68
bankfull width (ft.) 5.89
bankfull depth (ft.) 0.59
bankfull area (sq.ft.) 2.08
bottom width (ft.) 1.18
Tractive force, bankfull width (lbs/sq.ft.) 2.43
Tractive force, flood prone width (lbs/sq.ft.) 3.50
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1200.00
slope at station (%) -0.07
flood prone width (ft.) 13.90
flood prone depth (ft.) 1.59
flood prone area (sq.ft.) 11.99
bankfull width (ft.) 5.97
bankfull depth (ft.) 0.60
bankfull area (sq.ft.) 2.14
bottom width (ft.) 1.19
Tractive force, bankfull width (lbs/sq.ft.) 2.42
Tractive force, flood prone width (lbs/sq.ft.) 3.49
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1250.00
slope at station (%) -0.07
flood prone width (ft.) 14.08
flood prone depth (ft.) 1.61
flood prone area (sq.ft.) 12.30
bankfull width (ft.) 6.04
bankfull depth (ft.) 0.60
bankfull area (sq.ft.) 2.19
bottom width (ft.) 1.21
Tractive force, bankfull width (lbs/sq.ft.) 2.41
Tractive force, flood prone width (lbs/sq.ft.) 3.48
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1300.00
slope at station (%) -0.07
flood prone width (ft.) 14.60
flood prone depth (ft.) 1.67
flood prone area (sq.ft.) 13.23
bankfull width (ft.) 6.27
bankfull depth (ft.) 0.63
bankfull area (sq.ft.) 2.36
bottom width (ft.) 1.25
Tractive force, bankfull width (lbs/sq.ft.) 2.48
Tractive force, flood prone width (lbs/sq.ft.) 3.58
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1350.00
slope at station (%) -0.06
flood prone width (ft.) 14.77
flood prone depth (ft.) 1.69
flood prone area (sq.ft.) 13.54

bankfull width (ft.) 6.34
bankfull depth (ft.) 0.63
bankfull area (sq.ft.) 2.41
bottom width (ft.) 1.27
Tractive force, bankfull width (lbs/sq.ft.) 2.47
Tractive force, flood prone width (lbs/sq.ft.) 3.56
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1400.00
slope at station (%) -0.06
flood prone width (ft.) 14.94
flood prone depth (ft.) 1.71
flood prone area (sq.ft.) 13.85
bankfull width (ft.) 6.41
bankfull depth (ft.) 0.64
bankfull area (sq.ft.) 2.47
bottom width (ft.) 1.28
Tractive force, bankfull width (lbs/sq.ft.) 2.46
Tractive force, flood prone width (lbs/sq.ft.) 3.54
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1450.00
slope at station (%) -0.06
flood prone width (ft.) 15.11
flood prone depth (ft.) 1.73
flood prone area (sq.ft.) 14.16
bankfull width (ft.) 6.48
bankfull depth (ft.) 0.65
bankfull area (sq.ft.) 2.52
bottom width (ft.) 1.30
Tractive force, bankfull width (lbs/sq.ft.) 2.45
Tractive force, flood prone width (lbs/sq.ft.) 3.53
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1500.00
slope at station (%) -0.06
flood prone width (ft.) 15.79
flood prone depth (ft.) 1.80
flood prone area (sq.ft.) 15.47
bankfull width (ft.) 6.78
bankfull depth (ft.) 0.68
bankfull area (sq.ft.) 2.76
bottom width (ft.) 1.36
Tractive force, bankfull width (lbs/sq.ft.) 2.52

Tractive force, flood prone width (lbs/sq.ft.) 3.63
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1550.00
slope at station (%) -0.06
flood prone width (ft.) 15.95
flood prone depth (ft.) 1.82
flood prone area (sq.ft.) 15.78
bankfull width (ft.) 6.85
bankfull depth (ft.) 0.68
bankfull area (sq.ft.) 2.81
bottom width (ft.) 1.37
Tractive force, bankfull width (lbs/sq.ft.) 2.52
Tractive force, flood prone width (lbs/sq.ft.) 3.63
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1600.00
slope at station (%) -0.06
flood prone width (ft.) 16.10
flood prone depth (ft.) 1.84
flood prone area (sq.ft.) 16.09
bankfull width (ft.) 6.91
bankfull depth (ft.) 0.69
bankfull area (sq.ft.) 2.87
bottom width (ft.) 1.38
Tractive force, bankfull width (lbs/sq.ft.) 2.50
Tractive force, flood prone width (lbs/sq.ft.) 3.61
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1650.00
slope at station (%) -0.06
flood prone width (ft.) 16.26
flood prone depth (ft.) 1.86
flood prone area (sq.ft.) 16.40
bankfull width (ft.) 6.98
bankfull depth (ft.) 0.70
bankfull area (sq.ft.) 2.92
bottom width (ft.) 1.40
Tractive force, bankfull width (lbs/sq.ft.) 2.49
Tractive force, flood prone width (lbs/sq.ft.) 3.58
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1700.00
slope at station (%) -0.06
flood prone width (ft.) 16.41
flood prone depth (ft.) 1.87
flood prone area (sq.ft.) 16.70
bankfull width (ft.) 7.04
bankfull depth (ft.) 0.70
bankfull area (sq.ft.) 2.98
bottom width (ft.) 1.41
Tractive force, bankfull width (lbs/sq.ft.) 2.47
Tractive force, flood prone width (lbs/sq.ft.) 3.55
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1750.00
slope at station (%) -0.06
flood prone width (ft.) 17.18
flood prone depth (ft.) 1.96
flood prone area (sq.ft.) 18.32
bankfull width (ft.) 7.38
bankfull depth (ft.) 0.74
bankfull area (sq.ft.) 3.26
bottom width (ft.) 1.48
Tractive force, bankfull width (lbs/sq.ft.) 2.54
Tractive force, flood prone width (lbs/sq.ft.) 3.66
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1800.00
slope at station (%) -0.06
flood prone width (ft.) 17.66
flood prone depth (ft.) 2.02
flood prone area (sq.ft.) 19.35
bankfull width (ft.) 7.58
bankfull depth (ft.) 0.76
bankfull area (sq.ft.) 3.45
bottom width (ft.) 1.52
Tractive force, bankfull width (lbs/sq.ft.) 2.57
Tractive force, flood prone width (lbs/sq.ft.) 3.70
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1850.00
slope at station (%) -0.06
flood prone width (ft.) 17.80
flood prone depth (ft.) 2.03
flood prone area (sq.ft.) 19.66

bankfull width (ft.) 7.64
bankfull depth (ft.) 0.76
bankfull area (sq.ft.) 3.50
bottom width (ft.) 1.53
Tractive force, bankfull width (lbs/sq.ft.) 2.57
Tractive force, flood prone width (lbs/sq.ft.) 3.69
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1900.00
slope at station (%) -0.05
flood prone width (ft.) 17.94
flood prone depth (ft.) 2.05
flood prone area (sq.ft.) 19.97
bankfull width (ft.) 7.70
bankfull depth (ft.) 0.77
bankfull area (sq.ft.) 3.56
bottom width (ft.) 1.54
Tractive force, bankfull width (lbs/sq.ft.) 2.54
Tractive force, flood prone width (lbs/sq.ft.) 3.66
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 1950.00
slope at station (%) -0.05
flood prone width (ft.) 18.08
flood prone depth (ft.) 2.07
flood prone area (sq.ft.) 20.27
bankfull width (ft.) 7.76
bankfull depth (ft.) 0.78
bankfull area (sq.ft.) 3.61
bottom width (ft.) 1.55
Tractive force, bankfull width (lbs/sq.ft.) 2.52
Tractive force, flood prone width (lbs/sq.ft.) 3.62
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2000.00
slope at station (%) -0.05
flood prone width (ft.) 18.22
flood prone depth (ft.) 2.08
flood prone area (sq.ft.) 20.59
bankfull width (ft.) 7.82
bankfull depth (ft.) 0.78
bankfull area (sq.ft.) 3.67
bottom width (ft.) 1.56
Tractive force, bankfull width (lbs/sq.ft.) 2.49

Tractive force, flood prone width (lbs/sq.ft.) 3.59
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2050.00
slope at station (%) -0.05
flood prone width (ft.) 18.35
flood prone depth (ft.) 2.10
flood prone area (sq.ft.) 20.90
bankfull width (ft.) 7.88
bankfull depth (ft.) 0.79
bankfull area (sq.ft.) 3.72
bottom width (ft.) 1.58
Tractive force, bankfull width (lbs/sq.ft.) 2.47
Tractive force, flood prone width (lbs/sq.ft.) 3.55
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2100.00
slope at station (%) -0.05
flood prone width (ft.) 18.49
flood prone depth (ft.) 2.11
flood prone area (sq.ft.) 21.20
bankfull width (ft.) 7.94
bankfull depth (ft.) 0.79
bankfull area (sq.ft.) 3.78
bottom width (ft.) 1.59
Tractive force, bankfull width (lbs/sq.ft.) 2.46
Tractive force, flood prone width (lbs/sq.ft.) 3.54
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2150.00
slope at station (%) -0.05
flood prone width (ft.) 18.86
flood prone depth (ft.) 2.16
flood prone area (sq.ft.) 22.07
bankfull width (ft.) 8.10
bankfull depth (ft.) 0.81
bankfull area (sq.ft.) 3.93
bottom width (ft.) 1.62
Tractive force, bankfull width (lbs/sq.ft.) 2.47
Tractive force, flood prone width (lbs/sq.ft.) 3.55
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2200.00
slope at station (%) -0.05
flood prone width (ft.) 18.99
flood prone depth (ft.) 2.17
flood prone area (sq.ft.) 22.38
bankfull width (ft.) 8.15
bankfull depth (ft.) 0.82
bankfull area (sq.ft.) 3.99
bottom width (ft.) 1.63
Tractive force, bankfull width (lbs/sq.ft.) 2.44
Tractive force, flood prone width (lbs/sq.ft.) 3.51
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2250.00
slope at station (%) -0.05
flood prone width (ft.) 19.58
flood prone depth (ft.) 2.24
flood prone area (sq.ft.) 23.79
bankfull width (ft.) 8.41
bankfull depth (ft.) 0.84
bankfull area (sq.ft.) 4.24
bottom width (ft.) 1.68
Tractive force, bankfull width (lbs/sq.ft.) 2.47
Tractive force, flood prone width (lbs/sq.ft.) 3.56
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2300.00
slope at station (%) -0.05
flood prone width (ft.) 19.71
flood prone depth (ft.) 2.25
flood prone area (sq.ft.) 24.09
bankfull width (ft.) 8.46
bankfull depth (ft.) 0.85
bankfull area (sq.ft.) 4.29
bottom width (ft.) 1.69
Tractive force, bankfull width (lbs/sq.ft.) 2.44
Tractive force, flood prone width (lbs/sq.ft.) 3.51
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2350.00
slope at station (%) -0.05
flood prone width (ft.) 19.83
flood prone depth (ft.) 2.27
flood prone area (sq.ft.) 24.40

bankfull width (ft.)	8.51	
bankfull depth (ft.)	0.85	
bankfull area (sq.ft.)	4.35	
bottom width (ft.)	1.70	
Tractive force, bankfull width	(lbs/sq.ft.)	2.41
Tractive force, flood prone width	(lbs/sq.ft.)	3.47
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	2400.00	
slope at station (%)	-0.05	
flood prone width (ft.)	19.96	
flood prone depth (ft.)	2.28	
flood prone area (sq.ft.)	24.71	
bankfull width (ft.)	8.57	
bankfull depth (ft.)	0.86	
bankfull area (sq.ft.)	4.40	
bottom width (ft.)	1.71	
Tractive force, bankfull width	(lbs/sq.ft.)	2.40
Tractive force, flood prone width	(lbs/sq.ft.)	3.46
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	2450.00	
slope at station (%)	-0.05	
flood prone width (ft.)	20.08	
flood prone depth (ft.)	2.29	
flood prone area (sq.ft.)	25.02	
bankfull width (ft.)	8.62	
bankfull depth (ft.)	0.86	
bankfull area (sq.ft.)	4.46	
bottom width (ft.)	1.72	
Tractive force, bankfull width	(lbs/sq.ft.)	2.37
Tractive force, flood prone width	(lbs/sq.ft.)	3.42
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	2500.00	
slope at station (%)	-0.04	
flood prone width (ft.)	20.21	
flood prone depth (ft.)	2.31	
flood prone area (sq.ft.)	25.33	
bankfull width (ft.)	8.67	
bankfull depth (ft.)	0.87	
bankfull area (sq.ft.)	4.51	
bottom width (ft.)	1.73	
Tractive force, bankfull width	(lbs/sq.ft.)	2.34

Tractive force, flood prone width (lbs/sq.ft.) 3.37
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2550.00
slope at station (%) -0.04
flood prone width (ft.) 20.57
flood prone depth (ft.) 2.35
flood prone area (sq.ft.) 26.26
bankfull width (ft.) 8.83
bankfull depth (ft.) 0.88
bankfull area (sq.ft.) 4.68
bottom width (ft.) 1.77
Tractive force, bankfull width (lbs/sq.ft.) 2.34
Tractive force, flood prone width (lbs/sq.ft.) 3.37
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2600.00
slope at station (%) -0.04
flood prone width (ft.) 20.69
flood prone depth (ft.) 2.36
flood prone area (sq.ft.) 26.57
bankfull width (ft.) 8.88
bankfull depth (ft.) 0.89
bankfull area (sq.ft.) 4.74
bottom width (ft.) 1.78
Tractive force, bankfull width (lbs/sq.ft.) 2.31
Tractive force, flood prone width (lbs/sq.ft.) 3.32
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2650.00
slope at station (%) -0.04
flood prone width (ft.) 20.81
flood prone depth (ft.) 2.38
flood prone area (sq.ft.) 26.87
bankfull width (ft.) 8.93
bankfull depth (ft.) 0.89
bankfull area (sq.ft.) 4.79
bottom width (ft.) 1.79
Tractive force, bankfull width (lbs/sq.ft.) 2.30
Tractive force, flood prone width (lbs/sq.ft.) 3.31
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2700.00
slope at station (%) -0.04
flood prone width (ft.) 20.93
flood prone depth (ft.) 2.39
flood prone area (sq.ft.) 27.18
bankfull width (ft.) 8.99
bankfull depth (ft.) 0.90
bankfull area (sq.ft.) 4.84
bottom width (ft.) 1.80
Tractive force, bankfull width (lbs/sq.ft.) 2.27
Tractive force, flood prone width (lbs/sq.ft.) 3.26
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2750.00
slope at station (%) -0.04
flood prone width (ft.) 21.31
flood prone depth (ft.) 2.44
flood prone area (sq.ft.) 28.18
bankfull width (ft.) 9.15
bankfull depth (ft.) 0.91
bankfull area (sq.ft.) 5.02
bottom width (ft.) 1.83
Tractive force, bankfull width (lbs/sq.ft.) 2.26
Tractive force, flood prone width (lbs/sq.ft.) 3.26
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 2800.00
slope at station (%) -0.04
flood prone width (ft.) 21.68
flood prone depth (ft.) 2.25
flood prone area (sq.ft.) 28.52
bankfull width (ft.) 10.29
bankfull depth (ft.) 0.82
bankfull area (sq.ft.) 5.76
bottom width (ft.) 3.70
Tractive force, bankfull width (lbs/sq.ft.) 1.37
Tractive force, flood prone width (lbs/sq.ft.) 3.23
right side slope (%) 21.65
left side slope (%) 29.57

station (ft.) 2850.00
slope at station (%) -0.04
flood prone width (ft.) 21.69
flood prone depth (ft.) 2.25
flood prone area (sq.ft.) 28.62

bankfull width (ft.)	10.29	
bankfull depth (ft.)	0.82	
bankfull area (sq.ft.)	5.77	
bottom width (ft.)	3.70	
Tractive force, bankfull width	(lbs/sq.ft.)	1.23
Tractive force, flood prone width	(lbs/sq.ft.)	2.90
right side slope (%)	20.05	
left side slope (%)	33.46	

station (ft.)	2900.00	
slope at station (%)	-0.03	
flood prone width (ft.)	21.84	
flood prone depth (ft.)	2.26	
flood prone area (sq.ft.)	28.96	
bankfull width (ft.)	10.37	
bankfull depth (ft.)	0.83	
bankfull area (sq.ft.)	5.85	
bottom width (ft.)	3.73	
Tractive force, bankfull width	(lbs/sq.ft.)	1.12
Tractive force, flood prone width	(lbs/sq.ft.)	2.63
right side slope (%)	33.35	
left side slope (%)	20.01	

station (ft.)	2950.00	
slope at station (%)	-0.03	
flood prone width (ft.)	21.98	
flood prone depth (ft.)	2.28	
flood prone area (sq.ft.)	29.32	
bankfull width (ft.)	10.43	
bankfull depth (ft.)	0.83	
bankfull area (sq.ft.)	5.92	
bottom width (ft.)	3.76	
Tractive force, bankfull width	(lbs/sq.ft.)	1.02
Tractive force, flood prone width	(lbs/sq.ft.)	2.39
right side slope (%)	29.89	
left side slope (%)	21.51	

station (ft.)	3000.00	
slope at station (%)	-0.03	
flood prone width (ft.)	22.24	
flood prone depth (ft.)	2.31	
flood prone area (sq.ft.)	30.05	
bankfull width (ft.)	10.56	
bankfull depth (ft.)	0.85	
bankfull area (sq.ft.)	6.07	
bottom width (ft.)	3.80	
Tractive force, bankfull width	(lbs/sq.ft.)	0.95

Tractive force, flood prone width (lbs/sq.ft.) 2.22
right side slope (%) 20.02
left side slope (%) 33.36

station (ft.) 3050.00
slope at station (%) -0.02
flood prone width (ft.) 22.42
flood prone depth (ft.) 2.32
flood prone area (sq.ft.) 30.48
bankfull width (ft.) 10.64
bankfull depth (ft.) 0.85
bankfull area (sq.ft.) 6.16
bottom width (ft.) 3.83
Tractive force, bankfull width (lbs/sq.ft.) 0.89
Tractive force, flood prone width (lbs/sq.ft.) 2.09
right side slope (%) 24.21
left side slope (%) 25.82

station (ft.) 3100.00
slope at station (%) -0.02
flood prone width (ft.) 22.44
flood prone depth (ft.) 2.33
flood prone area (sq.ft.) 30.61
bankfull width (ft.) 10.65
bankfull depth (ft.) 0.85
bankfull area (sq.ft.) 6.18
bottom width (ft.) 3.83
Tractive force, bankfull width (lbs/sq.ft.) 0.83
Tractive force, flood prone width (lbs/sq.ft.) 1.95
right side slope (%) 33.42
left side slope (%) 20.02

station (ft.) 3150.00
slope at station (%) -0.02
flood prone width (ft.) 22.78
flood prone depth (ft.) 2.36
flood prone area (sq.ft.) 31.50
bankfull width (ft.) 10.81
bankfull depth (ft.) 0.87
bankfull area (sq.ft.) 6.36
bottom width (ft.) 3.89
Tractive force, bankfull width (lbs/sq.ft.) 0.81
Tractive force, flood prone width (lbs/sq.ft.) 1.91
right side slope (%) 20.28
left side slope (%) 32.57

station (ft.) 3200.00
slope at station (%) -0.02
flood prone width (ft.) 22.78
flood prone depth (ft.) 2.36
flood prone area (sq.ft.) 31.51
bankfull width (ft.) 10.81
bankfull depth (ft.) 0.87
bankfull area (sq.ft.) 6.36
bottom width (ft.) 3.89
Tractive force, bankfull width (lbs/sq.ft.) 0.79
Tractive force, flood prone width (lbs/sq.ft.) 1.85
right side slope (%) 20.02
left side slope (%) 33.37

station (ft.) 3250.00
slope at station (%) -0.02
flood prone width (ft.) 22.95
flood prone depth (ft.) 2.38
flood prone area (sq.ft.) 31.94
bankfull width (ft.) 10.89
bankfull depth (ft.) 0.87
bankfull area (sq.ft.) 6.45
bottom width (ft.) 3.92
Tractive force, bankfull width (lbs/sq.ft.) 0.79
Tractive force, flood prone width (lbs/sq.ft.) 1.86
right side slope (%) 33.31
left side slope (%) 19.99

station (ft.) 3300.00
slope at station (%) -0.02
flood prone width (ft.) 22.96
flood prone depth (ft.) 2.38
flood prone area (sq.ft.) 31.99
bankfull width (ft.) 10.90
bankfull depth (ft.) 0.87
bankfull area (sq.ft.) 6.46
bottom width (ft.) 3.92
Tractive force, bankfull width (lbs/sq.ft.) 0.81
Tractive force, flood prone width (lbs/sq.ft.) 1.90
right side slope (%) 26.41
left side slope (%) 23.73

station (ft.) 3305.08
slope at station (%) -0.02
flood prone width (ft.) 22.96
flood prone depth (ft.) 2.38
flood prone area (sq.ft.) 31.99

bankfull width (ft.)	10.90		
bankfull depth (ft.)	0.87		
bankfull area (sq.ft.)	6.46		
bottom width (ft.)	3.92		
Tractive force, bankfull width		(lbs/sq.ft.)	0.81
Tractive force, flood prone width		(lbs/sq.ft.)	1.90
right side slope (%)	25.63		
left side slope (%)	24.40		

Main Channel

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,020.91	3,609,481.13	2,193.00				
				S 13°12' E	5.13'		
0+05.13	1,850,022.08	3,609,476.14	2,192.53			101°44'	Left
				N 65°04' E	27.47'		
0+32.59	1,850,046.98	3,609,487.72	2,190.03			06°02'	Left
				N 59°02' E	26.72'		
0+50.00	1,850,061.91	3,609,496.68	2,188.45				
0+59.32	1,850,069.90	3,609,501.47	2,187.61			56°22'	Right
				S 64°36' E	27.49'		
0+86.81	1,850,094.73	3,609,489.68	2,185.14			03°03'	Right
				S 61°33' E	26.79'		
1+00.00	1,850,106.33	3,609,483.40	2,183.96				
1+13.60	1,850,118.29	3,609,476.92	2,182.75			56°36'	Left
				N 61°51' E	27.50'		
1+41.10	1,850,142.53	3,609,489.89	2,180.31			02°02'	Left
				N 59°49' E	26.52'		
1+50.00	1,850,150.23	3,609,494.37	2,179.52				
1+67.62	1,850,165.46	3,609,503.22	2,177.97			55°40'	Right
				S 64°31' E	27.47'		
1+95.09	1,850,190.26	3,609,491.40	2,175.57			07°55'	Left
				S 72°25' E	28.77'		
2+00.00	1,850,194.94	3,609,489.92	2,175.14				
2+23.87	1,850,217.69	3,609,482.71	2,173.07			63°59'	Left
				N 43°36' E	27.48'		
2+50.00	1,850,235.71	3,609,501.64	2,170.81				
2+51.35	1,850,236.64	3,609,502.62	2,170.69			04°16'	Left
				N 39°20' E	27.33'		
2+78.68	1,850,253.96	3,609,523.75	2,168.35			58°33'	Right
				S 82°07' E	27.50'		
3+00.00	1,850,275.08	3,609,520.83	2,166.54				
3+06.18	1,850,281.20	3,609,519.98	2,166.01			00°24'	Left
				S 82°32' E	27.39'		
3+33.57	1,850,308.36	3,609,516.42	2,163.70			58°48'	Left
				N 38°41' E	27.49'		
3+50.00	1,850,318.63	3,609,529.25	2,162.32				
3+61.06	1,850,325.54	3,609,537.89	2,161.39			03°11'	Right
				N 41°51' E	27.92'		
3+88.98	1850344.167	3609558.68	2159.05972			60°44'	Right
				S 77°25' E	27.49'		
4+00.00	1850354.922	3609556.28	2158.1474				
4+16.47	1850370.996	3609552.694	2156.78402			00°26'	Right

4+44.53	1850398.338	3609546.374	2154.47723	S 76°59' E	28.06'	61°17'	Left
				N 41°44' E	27.50'		
4+50.00	1850401.978	3609550.454	2154.03094				
4+72.03	1850416.644	3609566.895	2152.23277			00°54'	Left
				N 40°50' E	27.22'		
4+99.25	1850434.443	3609587.49	2150.02672			58°12'	Right
				S 80°58' E	27.50'		
5+00.00	1850435.181	3609587.373	2149.96655				
5+26.75	1850461.597	3609583.172	2147.81405			01°07'	Left
				S 82°05' E	27.18'		
5+50.00	1850484.628	3609579.97	2145.95607				
5+53.93	1850488.519	3609579.429	2145.6421			58°01'	Left
				N 39°54' E	27.50'		
5+81.43	1850506.156	3609600.526	2143.46049			00°13'	Right
				N 40°07' E	27.18'		
6+00.00	1850518.122	3609614.731	2141.99736				
6+08.61	1850523.67	3609621.316	2141.31906			58°02'	Right
				S 81°52' E	27.50'		
6+36.11	1850550.891	3609617.423	2139.16832			00°45'	Left
				S 82°37' E	27.87'		
6+50.00	1850564.667	3609615.637	2138.08975				
6+63.98	1850578.527	3609613.839	2137.00453			60°32'	Left
				N 36°51' E	27.50'		
6+91.47	1850595.017	3609635.842	2134.8851			01°32'	Left
				N 35°19' E	26.71'		
7+00.00	1850599.946	3609642.8	2134.23253				
7+18.19	1850610.459	3609657.639	2132.84079			56°19'	Right
				S 88°22' E	27.49'		
7+45.68	1850637.941	3609656.856	2130.75193			00°50'	Left
				S 89°12' E	27.54'		
7+50.00	1850642.262	3609656.797	2130.42597				
7+73.21	1850665.474	3609656.475	2128.67509			59°19'	Left
				N 31°29' E	27.50'		
8+00.00	1850679.461	3609679.319	2126.66965				
8+00.71	1850679.834	3609679.928	2126.61619			01°51'	Left
				N 29°38' E	27.10'		
8+27.81	1850693.232	3609703.481	2124.60224			57°43'	Right
				N 87°21' E	27.49'		
8+50.00	1850715.396	3609704.506	2122.96527				
8+55.30	1850720.694	3609704.751	2122.57402			01°27'	Left
				N 85°54' E	27.45'		
8+82.75	1850748.075	3609706.71	2120.56378			59°00'	Left
				N 26°54' E	27.50'		
9+00.00	1850755.877	3609722.09	2119.31031				
9+10.25	1850760.516	3609731.234	2118.56506			03°06'	Right
				N 30°00' E	28.34'		

9+38.59	1850774.687	3609755.773	2116.52106			62°20'	Right
				S 87°40' E	27.49'		
9+50.00	1850786.087	3609755.308	2115.70432				
9+66.08	1850802.156	3609754.653	2114.55315			01°59'	Left
				S 89°39' E	29.11'		
9+95.19	1850831.263	3609754.471	2112.48567			65°17'	Left
				N 25°04' E	27.49'		
10+00.00	1850833.302	3609758.827	2112.1467				
10+22.68	1850842.914	3609779.372	2110.5482			04°43'	Left
				N 20°22' E	27.23'		
10+49.92	1850852.389	3609804.905	2108.64344			58°13'	Right
				N 78°34' E	27.50'		
10+50.00	1850852.471	3609804.921	2108.63762				
10+77.42	1850879.343	3609810.353	2106.73468			12°43'	Right
				S 88°43' E	25.38'		
11+00.00	1850901.922	3609809.845	2105.17866				
11+02.80	1850904.719	3609809.782	2104.98588			51°44'	Left
				N 39°34' E	27.48'		
11+30.28	1850922.223	3609830.968	2103.10639			02°17'	Right
				N 41°51' E	27.40'		
11+50.00	1850935.379	3609845.658	2101.76813				
11+57.68	1850940.5	3609851.377	2101.24721			58°48'	Right
				S 79°21' E	27.50'		
11+85.18	1850967.526	3609846.295	2099.39543			03°23'	Left
				S 82°44' E	28.48'		
12+00.00	1850982.231	3609844.421	2098.40508				
12+13.65	1850995.775	3609842.696	2097.49297			62°49'	Left
				N 34°27' E	27.49'		
12+41.15	1851011.326	3609865.369	2095.67084			00°28'	Right
				N 34°55' E	27.64'		
12+50.00	1851016.393	3609872.629	2095.08872				
12+68.79	1851027.148	3609888.037	2093.85319			59°43'	Right
				S 85°22' E	27.50'		
12+96.29	1851054.556	3609885.814	2092.05936			00°57'	Right
				S 84°24' E	27.57'		
13+00.00	1851058.25	3609885.452	2091.81917				
13+23.86	1851081.997	3609883.126	2090.27493			59°27'	Left
				N 36°09' E	27.50'		
13+50.00	1851097.414	3609904.235	2088.5967				
13+51.36	1851098.217	3609905.334	2088.50933			01°25'	Right
				N 37°34' E	27.76'		
13+79.13	1851115.143	3609927.343	2086.741			60°10'	Right
				S 82°16' E	27.50'		
14+00.00	1851135.827	3609924.533	2085.42222				
14+06.62	1851142.391	3609923.642	2085.00375			01°07'	Right
				S 81°09' E	27.57'		
14+34.20	1851169.636	3609919.397	2083.27573			59°27'	Left

				N 39°24' E	27.50'		
14+50.00	1851179.667	3609931.608	2082.29339				
14+61.70	1851187.091	3609940.646	2081.56626			00°43'	Left
				N 38°42' E	27.45'		
14+89.15	1851204.251	3609962.07	2079.87377			59°00'	Right
				S 82°19' E	27.50'		
15+00.00	1851215.007	3609960.618	2079.20997				
15+16.65	1851231.504	3609958.391	2078.19192			01°21'	Left
				S 83°39' E	27.78'		
15+44.42	1851259.111	3609955.322	2076.50707			60°13'	Left
				N 36°07' E	27.50'		
15+50.00	1851262.398	3609959.827	2076.17159				
15+71.92	1851275.322	3609977.536	2074.85278			03°40'	Left
				N 32°27' E	27.18'		
15+99.10	1851289.904	3610000.47	2073.23129			58°04'	Right
				S 89°29' E	27.50'		
16+00.00	1851290.803	3610000.462	2073.17808				
16+26.60	1851317.403	3610000.221	2071.60407			00°37'	Left
				N 89°54' E	27.80'		
16+50.00	1851340.802	3610000.264	2070.23104				
16+54.40	1851345.204	3610000.272	2069.97273			60°18'	Left
				N 29°36' E	27.50'		
16+81.90	1851358.788	3610024.181	2068.3727			00°55'	Left
				N 28°41' E	27.15'		
17+00.00	1851367.473	3610040.06	2067.32837				
17+09.05	1851371.818	3610048.003	2066.80597			57°55'	Right
				N 86°36' E	27.50'		
17+36.55	1851399.269	3610049.636	2065.23247			02°41'	Left
				N 83°55' E	28.08'		
17+50.00	1851412.64	3610051.06	2064.46967				
17+64.63	1851427.189	3610052.611	2063.63963			61°23'	Left
				N 22°32' E	27.50'		
17+92.13	1851437.729	3610078.008	2062.09311			02°08'	Left
				N 20°24' E	27.31'		
18+00.00	1851440.474	3610085.385	2061.65419				
18+19.44	1851447.252	3610103.606	2060.57008			58°30'	Right
				N 78°55' E	27.50'		
18+46.94	1851474.239	3610108.895	2059.04966			04°42'	Left
				N 74°13' E	27.45'		
18+50.00	1851477.182	3610109.727	2058.88198				
18+74.39	1851500.654	3610116.364	2057.545			59°02'	Left
				N 15°11' E	27.50'		
19+00.00	1851507.358	3610141.079	2056.15346				
19+01.89	1851507.853	3610142.901	2056.05085			02°33'	Right
				N 17°44' E	28.08'		
19+29.97	1851516.403	3610169.652	2054.53816			61°21'	Right
				N 79°05' E	27.49'		

19+50.00	1851536.068	3610173.448	2053.46892				
19+57.46	1851543.393	3610174.862	2053.07062			03°11'	Right
				N 82°16' E	26.41'		
19+83.87	1851569.561	3610178.419	2051.67282			55°15'	Left
				N 27°00' E	27.50'		
20+00.00	1851576.886	3610192.791	2050.82637				
20+11.37	1851582.049	3610202.92	2050.22981			02°50'	Right
				N 29°51' E	27.94'		
20+39.31	1851595.954	3610227.154	2048.77679			60°51'	Right
				S 89°18' E	27.47'		
20+50.00	1851606.644	3610227.023	2048.22575				
20+66.78	1851623.423	3610226.819	2047.36088			04°59'	Right
				S 84°20' E	27.74'		
20+94.52	1851651.024	3610224.076	2045.94413			60°04'	Left
				N 35°36' E	27.49'		
21+00.00	1851654.216	3610228.534	2045.66658				
21+22.01	1851667.029	3610246.425	2044.5527			03°06'	Left
				N 32°31' E	27.52'		
21+49.53	1851681.819	3610269.634	2043.17215			59°17'	Right
				S 88°13' E	27.49'		
21+50.00	1851682.293	3610269.619	2043.1486				
21+77.01	1851709.291	3610268.775	2041.80589			06°18'	Left
				N 85°29' E	28.12'		
22+00.00	1851732.208	3610270.584	2040.67364				
22+05.13	1851737.323	3610270.987	2040.42095			61°29'	Left
				N 24°00' E	27.50'		
22+32.63	1851748.506	3610296.108	2039.07911			00°47'	Left
				N 23°13' E	27.43'		
22+50.00	1851755.352	3610312.074	2038.23919				
22+60.06	1851759.316	3610321.318	2037.75289			58°56'	Right
				N 82°09' E	27.50'		
22+87.56	1851786.557	3610325.077	2036.43555			02°13'	Right
				N 84°21' E	27.13'		
23+00.00	1851798.94	3610326.301	2035.84493				
23+14.69	1851813.559	3610327.746	2035.14763			57°51'	Left
				N 26°30' E	27.49'		
23+42.19	1851825.829	3610352.352	2033.85467			00°44'	Left
				N 25°46' E	27.67'		
23+50.00	1851829.225	3610359.389	2033.49066				
23+69.86	1851837.857	3610377.274	2032.56552			59°49'	Right
				N 85°35' E	27.50'		
23+97.36	1851865.275	3610379.389	2031.29658			00°30'	Left
				N 85°06' E	27.43'		
24+00.00	1851867.907	3610379.615	2031.17582				
24+24.78	1851892.6	3610381.735	2030.04295			58°55'	Left
				N 26°11' E	27.50'		
24+50.00	1851903.725	3610404.365	2028.90126				

24+52.28	1851904.732	3610406.414	2028.79786			01°30'	Right
				N 27°41' E	27.30'		
24+79.59	1851917.419	3610430.592	2027.57337			58°30'	Right
				N 86°11' E	27.48'		
25+00.00	1851937.786	3610431.949	2026.6667				
25+07.07	1851944.841	3610432.419	2026.35264			01°57'	Left
				N 84°14' E	27.95'		
25+35.02	1851972.654	3610435.226	2025.12302			60°58'	Left
				N 23°16' E	27.50'		
25+50.00	1851978.571	3610448.983	2024.47075				
25+62.52	1851983.519	3610460.488	2023.92523			01°39'	Left
				N 21°37' E	27.15'		
25+89.68	1851993.522	3610485.73	2022.75402			57°57'	Right
				N 79°35' E	27.50'		
26+00.00	1852003.676	3610487.598	2022.31299				
26+17.18	1852020.568	3610490.705	2021.5793			03°27'	Left
				N 76°08' E	28.54'		
26+45.71	1852048.273	3610497.549	2020.37249			63°13'	Left
				N 12°55' E	27.49'		
26+50.00	1852049.231	3610501.727	2020.19301				
26+73.21	1852054.418	3610524.348	2019.22146			09°06'	Right
				N 22°01' E	29.13'		
27+00.00	1852064.463	3610549.186	2018.11131				
27+02.33	1852065.338	3610551.35	2018.01459			65°30'	Right
				N 87°31' E	27.50'		
27+29.83	1852092.812	3610552.538	2016.88685			02°40'	Right
				S 89°49' E	26.40'		
27+50.00	1852112.978	3610552.473	2016.06799				
27+56.23	1852119.212	3610552.452	2015.81485			55°15'	Left
				N 34°56' E	27.49'		
27+83.73	1852134.957	3610574.99	2014.70951			16°01'	Left
				N 18°56' E	12.76'		
27+96.49	1852139.095	3610587.058	2014.20584			00°39'	Right
				N 19°35' E	1.11'		
27+97.59	1852139.466	3610588.1	2014.16281			03°48'	Right
				N 23°22' E	1.11'		
27+98.70	1852139.904	3610589.115	2014.11989			02°56'	Right
				N 26°18' E	1.10'		
27+99.80	1852140.394	3610590.105	2014.07709			02°56'	Right
				N 29°14' E	1.10'		
28+00.00	1852140.491	3610590.279	2014.06938				
28+00.91	1852140.933	3610591.069	2014.03439			02°56'	Right
				N 32°10' E	1.10'		
28+02.01	1852141.521	3610592.004	2013.9918			02°56'	Right
				N 35°05' E	1.10'		
28+03.11	1852142.156	3610592.907	2013.9493			02°56'	Right
				N 38°01' E	1.10'		

28+04.22	1852142.836	3610593.777	2013.90691			02°56'	Right
				N 40°57' E	1.10'		
28+05.32	1852143.559	3610594.611	2013.8646			02°56'	Right
				N 43°52' E	1.10'		
28+06.43	1852144.324	3610595.407	2013.82242			02°56'	Right
				N 46°48' E	1.10'		
28+07.53	1852145.129	3610596.163	2013.78032			02°56'	Right
				N 49°43' E	1.10'		
28+08.63	1852145.971	3610596.876	2013.73832			02°56'	Right
				N 52°39' E	1.10'		
28+09.74	1852146.849	3610597.546	2013.69642			02°56'	Right
				N 55°35' E	1.10'		
28+10.84	1852147.759	3610598.17	2013.65461			02°56'	Right
				N 58°30' E	1.10'		
28+11.95	1852148.7	3610598.747	2013.6129			02°56'	Right
				N 61°26' E	1.10'		
28+13.05	1852149.67	3610599.275	2013.57128			02°56'	Right
				N 64°21' E	1.10'		
28+14.15	1852150.665	3610599.752	2013.52975			02°56'	Right
				N 67°17' E	1.10'		
28+15.26	1852151.683	3610600.179	2013.48832			02°56'	Right
				N 70°12' E	1.10'		
28+16.36	1852152.721	3610600.552	2013.44698			02°56'	Right
				N 73°08' E	1.10'		
28+17.46	1852153.778	3610600.873	2013.40573			02°56'	Right
				N 76°04' E	1.10'		
28+18.57	1852154.849	3610601.139	2013.36458			02°56'	Right
				N 78°59' E	1.10'		
28+19.67	1852155.933	3610601.349	2013.32352			02°56'	Right
				N 81°55' E	1.10'		
28+20.78	1852157.025	3610601.505	2013.28255			02°56'	Right
				N 84°50' E	1.10'		
28+21.88	1852158.125	3610601.604	2013.24167			02°56'	Right
				N 87°46' E	1.10'		
28+22.98	1852159.228	3610601.647	2013.20089			02°56'	Right
				S 89°18' E	1.10'		
28+24.09	1852160.332	3610601.634	2013.16018			02°56'	Right
				S 86°23' E	1.10'		
28+25.19	1852161.434	3610601.564	2013.11956			02°56'	Right
				S 83°27' E	1.10'		
28+26.30	1852162.531	3610601.438	2013.07903			02°56'	Right
				S 80°31' E	1.10'		
28+27.40	1852163.62	3610601.256	2013.03859			02°56'	Right
				S 77°36' E	1.10'		
28+28.51	1852164.699	3610601.019	2012.99823			02°56'	Right
				S 74°40' E	1.10'		
28+29.61	1852165.765	3610600.727	2012.95796			02°56'	Right

28+30.71	1852166.814	3610600.38	2012.91776	S 71°44' E	1.11'	03°48'	Right
				S 67°57' E	1.11'		
28+31.82	1852167.839	3610599.965	2012.87763			00°39'	Right
				S 67°17' E	12.76'		
28+44.58	1852179.607	3610595.039	2012.42107			04°52'	Left
				S 72°09' E	13.28'		
28+50.00	1852184.768	3610593.378	2012.23207				
28+57.86	1852192.251	3610590.969	2011.95804			00°50'	Left
				S 73°00' E	1.17'		
28+59.03	1852193.366	3610590.628	2011.91798			03°37'	Left
				S 76°37' E	1.17'		
28+60.19	1852194.5	3610590.359	2011.87802			02°56'	Left
				S 79°33' E	1.17'		
28+61.36	1852195.646	3610590.147	2011.83817			02°56'	Left
				S 82°30' E	1.17'		
28+62.52	1852196.801	3610589.995	2011.79842			02°56'	Left
				S 85°26' E	1.16'		
28+63.69	1852197.963	3610589.902	2011.75876			02°56'	Left
				S 88°23' E	1.16'		
28+64.85	1852199.127	3610589.869	2011.7192			02°56'	Left
				N 88°41' E	1.16'		
28+66.02	1852200.292	3610589.896	2011.67973			02°56'	Left
				N 85°45' E	1.16'		
28+67.18	1852201.453	3610589.983	2011.64035			02°56'	Left
				N 82°48' E	1.16'		
28+68.35	1852202.609	3610590.129	2011.60108			02°56'	Left
				N 79°52' E	1.16'		
28+69.51	1852203.755	3610590.333	2011.56189			02°56'	Left
				N 76°55' E	1.16'		
28+70.68	1852204.889	3610590.597	2011.5228			02°56'	Left
				N 73°59' E	1.16'		
28+71.84	1852206.009	3610590.918	2011.48379			02°56'	Left
				N 71°03' E	1.16'		
28+73.01	1852207.11	3610591.296	2011.44488			02°56'	Left
				N 68°06' E	1.16'		
28+74.17	1852208.191	3610591.731	2011.40606			02°56'	Left
				N 65°10' E	1.16'		
28+75.33	1852209.248	3610592.22	2011.36732			02°56'	Left
				N 62°14' E	1.16'		
28+76.50	1852210.278	3610592.762	2011.32867			02°56'	Left
				N 59°17' E	1.16'		
28+77.66	1852211.279	3610593.357	2011.29012			02°56'	Left
				N 56°21' E	1.16'		
28+78.83	1852212.249	3610594.002	2011.25165			02°56'	Left
				N 53°25' E	1.16'		
28+79.99	1852213.184	3610594.697	2011.21327			02°56'	Left

28+81.16	1852214.082	3610595.438	2011.17497	N 50°28' E	1.16'	02°56'	Left
28+82.32	1852214.941	3610596.224	2011.13677	N 47°32' E	1.16'	02°56'	Left
28+83.49	1852215.758	3610597.053	2011.09865	N 44°36' E	1.16'	02°56'	Left
28+84.65	1852216.532	3610597.923	2011.06061	N 41°39' E	1.16'	02°56'	Left
28+85.82	1852217.261	3610598.832	2011.02267	N 38°43' E	1.16'	02°56'	Left
28+86.98	1852217.942	3610599.777	2010.9848	N 35°46' E	1.16'	02°56'	Left
28+88.15	1852218.573	3610600.756	2010.94701	N 32°50' E	1.16'	02°56'	Left
28+89.31	1852219.154	3610601.766	2010.90931	N 29°54' E	1.16'	02°56'	Left
28+90.48	1852219.682	3610602.804	2010.8717	N 26°57' E	1.16'	02°56'	Left
28+91.64	1852220.156	3610603.869	2010.83415	N 24°01' E	1.17'	02°56'	Left
28+92.81	1852220.575	3610604.956	2010.7967	N 21°04' E	1.17'	02°56'	Left
28+93.97	1852220.938	3610606.064	2010.75932	N 18°08' E	1.17'	03°37'	Left
28+95.14	1852221.23	3610607.193	2010.722	N 14°31' E	1.17'	00°50'	Left
29+00.00	1852222.379	3610611.917	2010.56856	N 13°40' E	13.28'		
29+08.42	1852224.37	3610620.099	2010.30286			06°57'	Left
29+21.77	1852225.932	3610633.352	2009.89231	N 06°43' E	13.34'	00°58'	Right
29+22.92	1852226.087	3610634.5	2009.85717	N 07°42' E	1.16'	03°28'	Right
29+24.08	1852226.311	3610635.636	2009.82211	N 11°09' E	1.16'	02°56'	Right
29+25.24	1852226.593	3610636.758	2009.78714	N 14°05' E	1.16'	02°56'	Right
29+26.40	1852226.932	3610637.865	2009.75224	N 17°01' E	1.16'	02°56'	Right
29+27.55	1852227.326	3610638.953	2009.71743	N 19°57' E	1.16'	02°56'	Right
29+28.71	1852227.776	3610640.019	2009.68269	N 22°53' E	1.16'	02°56'	Right
29+29.87	1852228.28	3610641.061	2009.64802	N 25°48' E	1.16'	02°56'	Right
29+31.02	1852228.836	3610642.076	2009.61343	N 28°44' E	1.16'	02°56'	Right

29+32.18	1852229.444	3610643.06	2009.57893	N 31°40' E	1.16'	02°56'	Right
29+33.34	1852230.101	3610644.013	2009.54449	N 34°36' E	1.16'	02°56'	Right
29+34.50	1852230.805	3610644.93	2009.51014	N 37°31' E	1.16'	02°56'	Right
29+35.65	1852231.556	3610645.811	2009.47585	N 40°27' E	1.16'	02°56'	Right
29+36.81	1852232.351	3610646.652	2009.44164	N 43°23' E	1.16'	02°56'	Right
29+37.97	1852233.187	3610647.451	2009.4075	N 46°19' E	1.16'	02°56'	Right
29+39.12	1852234.064	3610648.206	2009.37343	N 49°15' E	1.16'	02°56'	Right
29+40.28	1852234.977	3610648.915	2009.33943	N 52°10' E	1.16'	02°56'	Right
29+41.44	1852235.926	3610649.577	2009.30551	N 55°06' E	1.16'	02°56'	Right
29+42.59	1852236.908	3610650.19	2009.27165	N 58°02' E	1.16'	02°56'	Right
29+43.75	1852237.919	3610650.752	2009.23787	N 60°58' E	1.16'	02°56'	Right
29+44.91	1852238.958	3610651.261	2009.20416	N 63°53' E	1.16'	02°56'	Right
29+46.06	1852240.022	3610651.716	2009.17052	N 66°49' E	1.16'	02°56'	Right
29+47.22	1852241.107	3610652.117	2009.13695	N 69°45' E	1.16'	02°56'	Right
29+48.38	1852242.211	3610652.461	2009.10345	N 72°41' E	1.16'	02°56'	Right
29+49.54	1852243.332	3610652.749	2009.07002	N 75°36' E	1.16'	02°56'	Right
29+50.00	1852243.787	3610652.841	2009.05663	N 78°32' E	1.16'	02°56'	Right
29+50.69	1852244.466	3610652.979	2009.03665			02°56'	Right
29+51.85	1852245.611	3610653.151	2009.00335	N 81°28' E	1.16'	02°56'	Right
29+53.01	1852246.762	3610653.264	2008.97012	N 84°24' E	1.16'	02°56'	Right
29+54.16	1852247.918	3610653.318	2008.93696	N 87°20' E	1.16'	02°56'	Right
29+55.32	1852249.076	3610653.312	2008.90386	S 89°45' E	1.16'	02°56'	Right
29+56.48	1852250.231	3610653.248	2008.87083	S 86°49' E	1.16'	02°56'	Right
29+57.64	1852251.383	3610653.125	2008.83785	S 83°53' E	1.16'	03°28'	Right

29+58.80	1852252.525	3610652.932	2008.80494	S 80°25' E	1.16'	00°58'	Right
29+72.14	1852265.644	3610650.489	2008.43045	S 79°27' E	13.34'	00°45'	Right
29+84.49	1852277.751	3610648.069	2008.09155	S 78°42' E	12.35'	01°04'	Left
29+85.57	1852278.817	3610647.876	2008.06218	S 79°46' E	1.08'	03°22'	Left
29+86.65	1852279.891	3610647.747	2008.03286	S 83°08' E	1.08'	02°56'	Left
29+87.73	1852280.971	3610647.673	2008.0036	S 86°05' E	1.08'	02°56'	Left
29+88.82	1852282.053	3610647.654	2007.97439	S 89°01' E	1.08'	02°56'	Left
29+89.90	1852283.134	3610647.691	2007.94524	N 88°03' E	1.08'	02°56'	Left
29+90.98	1852284.212	3610647.784	2007.91614	N 85°06' E	1.08'	02°56'	Left
29+92.06	1852285.284	3610647.931	2007.8871	N 82°10' E	1.08'	02°56'	Left
29+93.14	1852286.347	3610648.134	2007.85811	N 79°13' E	1.08'	02°56'	Left
29+94.23	1852287.398	3610648.39	2007.82917	N 76°17' E	1.08'	02°56'	Left
29+95.31	1852288.434	3610648.7	2007.80029	N 73°21' E	1.08'	02°56'	Left
29+96.39	1852289.453	3610649.063	2007.77145	N 70°24' E	1.08'	02°56'	Left
29+97.47	1852290.452	3610649.477	2007.74267	N 67°28' E	1.08'	02°56'	Left
29+98.55	1852291.429	3610649.943	2007.71394	N 64°32' E	1.08'	02°56'	Left
29+99.63	1852292.38	3610650.457	2007.68525	N 61°35' E	1.08'	02°56'	Left
30+00.00	1852292.692	3610650.648	2007.67557	N 58°39' E	1.08'		
30+00.72	1852293.304	3610651.02	2007.65662			02°56'	Left
30+01.80	1852294.197	3610651.63	2007.62804	N 55°42' E	1.08'	02°56'	Left
30+02.88	1852295.059	3610652.284	2007.59951	N 52°46' E	1.08'	02°56'	Left
30+03.96	1852295.885	3610652.982	2007.57102	N 49°50' E	1.08'	02°56'	Left
30+05.04	1852296.675	3610653.721	2007.54259	N 46°53' E	1.08'	02°56'	Left
30+06.12	1852297.425	3610654.5	2007.5142	N 43°57' E	1.08'	02°56'	Left

				N 41°01' E	1.08'		
30+07.21	1852298.135	3610655.316	2007.48586			02°56'	Left
				N 38°04' E	1.08'		
30+08.29	1852298.802	3610656.167	2007.45758			02°56'	Left
				N 35°08' E	1.08'		
30+09.37	1852299.425	3610657.052	2007.42933			02°56'	Left
				N 32°12' E	1.08'		
30+10.45	1852300.001	3610657.967	2007.40114			02°56'	Left
				N 29°15' E	1.08'		
30+11.53	1852300.53	3610658.911	2007.37299			02°56'	Left
				N 26°19' E	1.08'		
30+12.61	1852301.009	3610659.881	2007.34489			02°56'	Left
				N 23°22' E	1.08'		
30+13.70	1852301.438	3610660.874	2007.31683			02°56'	Left
				N 20°26' E	1.08'		
30+14.78	1852301.816	3610661.888	2007.28882			02°56'	Left
				N 17°30' E	1.08'		
30+15.86	1852302.141	3610662.92	2007.26085			02°56'	Left
				N 14°33' E	1.08'		
30+16.94	1852302.413	3610663.968	2007.23293			02°56'	Left
				N 11°37' E	1.08'		
30+18.03	1852302.631	3610665.028	2007.20505			03°22'	Left
				N 08°15' E	1.08'		
30+19.11	1852302.786	3610666.099	2007.17721			01°04'	Left
				N 07°10' E	12.35'		
30+31.45	1852304.328	3610678.35	2006.86287			02°45'	Right
				N 09°56' E	15.16'		
30+46.62	1852306.942	3610693.286	2006.48448			01°08'	Right
				N 11°04' E	1.32'		
30+47.94	1852307.195	3610694.582	2006.45191			03°17'	Right
				N 14°21' E	1.32'		
30+49.26	1852307.523	3610695.861	2006.41941			02°56'	Right
				N 17°17' E	1.32'		
30+50.00	1852307.743	3610696.569	2006.4012				
30+50.58	1852307.915	3610697.122	2006.38696			02°56'	Right
				N 20°13' E	1.32'		
30+51.90	1852308.371	3610698.36	2006.35458			02°56'	Right
				N 23°09' E	1.32'		
30+53.22	1852308.89	3610699.574	2006.32226			02°56'	Right
				N 26°05' E	1.32'		
30+54.54	1852309.471	3610700.759	2006.28999			02°56'	Right
				N 29°01' E	1.32'		
30+55.86	1852310.111	3610701.914	2006.25779			02°56'	Right
				N 31°57' E	1.32'		
30+57.18	1852310.809	3610703.033	2006.22564			02°56'	Right
				N 34°53' E	1.32'		
30+58.50	1852311.564	3610704.116	2006.19355			02°56'	Right

				N 37°49' E	1.32'		
30+59.82	1852312.373	3610705.158	2006.16152			02°56'	Right
				N 40°45' E	1.32'		
30+61.14	1852313.235	3610706.158	2006.12954			02°56'	Right
				N 43°41' E	1.32'		
30+62.46	1852314.147	3610707.112	2006.09761			02°56'	Right
				N 46°37' E	1.32'		
30+63.78	1852315.106	3610708.018	2006.06575			02°56'	Right
				N 49°33' E	1.32'		
30+65.10	1852316.11	3610708.874	2006.03393			02°56'	Right
				N 52°29' E	1.32'		
30+66.42	1852317.157	3610709.678	2006.00217			02°56'	Right
				N 55°25' E	1.32'		
30+67.74	1852318.243	3610710.427	2005.97046			02°56'	Right
				N 58°21' E	1.32'		
30+69.06	1852319.367	3610711.119	2005.93881			02°56'	Right
				N 61°17' E	1.32'		
30+70.38	1852320.524	3610711.753	2005.9072			02°56'	Right
				N 64°13' E	1.32'		
30+71.69	1852321.713	3610712.327	2005.87565			02°56'	Right
				N 67°09' E	1.32'		
30+73.01	1852322.929	3610712.839	2005.84415			02°56'	Right
				N 70°05' E	1.32'		
30+74.33	1852324.169	3610713.289	2005.8127			02°56'	Right
				N 73°01' E	1.32'		
30+75.65	1852325.432	3610713.674	2005.7813			02°56'	Right
				N 75°57' E	1.32'		
30+76.97	1852326.712	3610713.994	2005.74995			02°56'	Right
				N 78°53' E	1.32'		
30+78.29	1852328.007	3610714.248	2005.71865			02°56'	Right
				N 81°49' E	1.32'		
30+79.61	1852329.313	3610714.436	2005.6874			02°56'	Right
				N 84°46' E	1.32'		
30+80.93	1852330.627	3610714.557	2005.65619			02°56'	Right
				N 87°42' E	1.32'		
30+82.25	1852331.946	3610714.61	2005.62504			02°56'	Right
				S 89°22' E	1.32'		
30+83.57	1852333.266	3610714.595	2005.59393			02°56'	Right
				S 86°26' E	1.32'		
30+84.89	1852334.583	3610714.513	2005.56286			02°56'	Right
				S 83°30' E	1.32'		
30+86.21	1852335.895	3610714.364	2005.53184			02°56'	Right
				S 80°34' E	1.32'		
30+87.53	1852337.198	3610714.148	2005.50086			03°17'	Right
				S 77°17' E	1.32'		
30+88.85	1852338.486	3610713.857	2005.46992			01°08'	Right
				S 76°09' E	15.16'		

31+00.00	1852349.308	3610711.188	2005.21112				
31+04.02	1852353.208	3610710.226	2005.11786			06°40'	Left
				S 82°49' E	15.13'		
31+19.15	1852368.221	3610708.334	2004.77194			01°11'	Left
				S 84°00' E	1.32'		
31+20.47	1852369.538	3610708.196	2004.7419			03°15'	Left
				S 87°15' E	1.32'		
31+21.80	1852370.861	3610708.132	2004.71191			02°56'	Left
				N 89°49' E	1.32'		
31+23.12	1852372.185	3610708.137	2004.68195			02°56'	Left
				N 86°52' E	1.32'		
31+24.44	1852373.506	3610708.209	2004.65203			02°56'	Left
				N 83°56' E	1.32'		
31+25.77	1852374.823	3610708.349	2004.62215			02°56'	Left
				N 81°00' E	1.32'		
31+27.09	1852376.13	3610708.556	2004.59231			02°56'	Left
				N 78°04' E	1.32'		
31+28.42	1852377.425	3610708.83	2004.56249			02°56'	Left
				N 75°07' E	1.32'		
31+29.74	1852378.704	3610709.169	2004.53272			02°56'	Left
				N 72°11' E	1.32'		
31+31.06	1852379.964	3610709.574	2004.50297			02°56'	Left
				N 69°15' E	1.32'		
31+32.39	1852381.202	3610710.043	2004.47326			02°56'	Left
				N 66°18' E	1.32'		
31+33.71	1852382.413	3610710.575	2004.44359			02°56'	Left
				N 63°22' E	1.32'		
31+35.03	1852383.596	3610711.169	2004.41394			02°56'	Left
				N 60°26' E	1.32'		
31+36.36	1852384.747	3610711.822	2004.38433			02°56'	Left
				N 57°29' E	1.32'		
31+37.68	1852385.863	3610712.533	2004.35475			02°56'	Left
				N 54°33' E	1.32'		
31+39.00	1852386.942	3610713.3	2004.32519			02°56'	Left
				N 51°37' E	1.32'		
31+40.33	1852387.979	3610714.122	2004.29567			02°56'	Left
				N 48°41' E	1.32'		
31+41.65	1852388.973	3610714.996	2004.26618			02°56'	Left
				N 45°44' E	1.32'		
31+42.97	1852389.921	3610715.92	2004.23672			02°56'	Left
				N 42°48' E	1.32'		
31+44.30	1852390.82	3610716.891	2004.20728			02°56'	Left
				N 39°52' E	1.32'		
31+45.62	1852391.668	3610717.907	2004.17788			02°56'	Left
				N 36°55' E	1.32'		
31+46.94	1852392.463	3610718.965	2004.1485			02°56'	Left
				N 33°59' E	1.32'		

31+48.27	1852393.203	3610720.062	2004.11915			02°56'	Left
				N 31°03' E	1.32'		
31+49.59	1852393.885	3610721.196	2004.08982			02°56'	Left
				N 28°07' E	1.32'		
31+50.00	1852394.078	3610721.557	2004.08075				
31+50.91	1852394.509	3610722.363	2004.06053			02°56'	Left
				N 25°10' E	1.32'		
31+52.24	1852395.072	3610723.561	2004.03125			02°56'	Left
				N 22°14' E	1.32'		
31+53.56	1852395.573	3610724.786	2004.002			02°56'	Left
				N 19°18' E	1.32'		
31+54.88	1852396.01	3610726.035	2003.97278			02°56'	Left
				N 16°21' E	1.32'		
31+56.21	1852396.383	3610727.306	2003.94358			02°56'	Left
				N 13°25' E	1.32'		
31+57.53	1852396.69	3610728.593	2003.9144			02°56'	Left
				N 10°29' E	1.32'		
31+58.86	1852396.93	3610729.895	2003.88524			02°56'	Left
				N 07°32' E	1.32'		
31+60.18	1852397.104	3610731.207	2003.85611			03°15'	Left
				N 04°18' E	1.32'		
31+61.50	1852397.203	3610732.528	2003.82699			01°11'	Left
				N 03°07' E	15.13'		
31+76.64	1852398.024	3610747.638	2003.49579			02°21'	Left
				N 00°46' E	12.86'		
31+89.49	1852398.194	3610760.493	2003.21627			01°12'	Right
				N 01°58' E	1.12'		
31+90.61	1852398.232	3610761.613	2003.19197			03°13'	Right
				N 05°11' E	1.12'		
31+91.73	1852398.334	3610762.729	2003.16768			02°56'	Right
				N 08°07' E	1.12'		
31+92.85	1852398.492	3610763.838	2003.1434			02°56'	Right
				N 11°03' E	1.12'		
31+93.97	1852398.707	3610764.938	2003.11914			02°56'	Right
				N 13°59' E	1.12'		
31+95.09	1852398.977	3610766.025	2003.09488			02°56'	Right
				N 16°55' E	1.12'		
31+96.21	1852399.303	3610767.097	2003.07064			02°56'	Right
				N 19°51' E	1.12'		
31+97.34	1852399.684	3610768.15	2003.0464			02°56'	Right
				N 22°48' E	1.12'		
31+98.46	1852400.118	3610769.183	2003.02217			02°56'	Right
				N 25°44' E	1.12'		
31+99.58	1852400.604	3610770.192	2002.99796			02°56'	Right
				N 28°40' E	1.12'		
32+00.00	1852400.808	3610770.565	2002.98879				
32+00.70	1852401.142	3610771.175	2002.97375			02°56'	Right

32+01.82	1852401.728	3610772.129	2002.94954	N 31°36' E	1.12'	02°56'	Right
32+02.94	1852402.363	3610773.052	2002.92535	N 34°32' E	1.12'	02°56'	Right
32+04.06	1852403.045	3610773.941	2002.90116	N 37°28' E	1.12'	02°56'	Right
32+05.18	1852403.771	3610774.794	2002.87698	N 40°24' E	1.12'	02°56'	Right
32+06.30	1852404.54	3610775.609	2002.8528	N 43°20' E	1.12'	02°56'	Right
32+07.42	1852405.349	3610776.383	2002.82863	N 46°16' E	1.12'	02°56'	Right
32+08.54	1852406.197	3610777.115	2002.80447	N 49°12' E	1.12'	02°56'	Right
32+09.66	1852407.082	3610777.803	2002.78031	N 52°08' E	1.12'	02°56'	Right
32+10.78	1852408	3610778.444	2002.75615	N 55°05' E	1.12'	02°56'	Right
32+11.90	1852408.95	3610779.037	2002.73201	N 58°01' E	1.12'	02°56'	Right
32+13.02	1852409.929	3610779.581	2002.70786	N 60°57' E	1.12'	02°56'	Right
32+14.14	1852410.935	3610780.075	2002.68372	N 63°53' E	1.12'	02°56'	Right
32+15.26	1852411.965	3610780.516	2002.65959	N 66°49' E	1.12'	02°56'	Right
32+16.38	1852413.016	3610780.903	2002.63546	N 69°45' E	1.12'	02°56'	Right
32+17.50	1852414.085	3610781.237	2002.61133	N 72°41' E	1.12'	02°56'	Right
32+18.62	1852415.17	3610781.515	2002.5872	N 75°37' E	1.12'	02°56'	Right
32+19.74	1852416.268	3610781.737	2002.56308	N 78°33' E	1.12'	02°56'	Right
32+20.86	1852417.376	3610781.903	2002.53895	N 81°29' E	1.12'	02°56'	Right
32+21.98	1852418.492	3610782.012	2002.51483	N 84°26' E	1.12'	02°56'	Right
32+23.10	1852419.611	3610782.064	2002.49071	N 87°22' E	1.12'	02°56'	Right
32+24.22	1852420.731	3610782.058	2002.46659	S 89°42' E	1.12'	03°13'	Right
32+25.34	1852421.85	3610781.989	2002.44247	S 86°29' E	1.12'	01°12'	Right
32+38.20	1852434.663	3610780.932	2002.16583	S 85°17' E	12.86'	05°47'	Right
				S 79°30' E	13.96'		

32+50.00	1852446.267	3610778.781	2001.9117				
32+52.16	1852448.388	3610778.388	2001.86526			01°12'	Left
				S 80°42' E	1.22'		
32+53.38	1852449.59	3610778.191	2001.839			03°14'	Left
				S 83°55' E	1.22'		
32+54.59	1852450.801	3610778.062	2001.81274			02°56'	Left
				S 86°52' E	1.22'		
32+55.81	1852452.017	3610777.996	2001.78648			02°56'	Left
				S 89°48' E	1.22'		
32+57.03	1852453.235	3610777.991	2001.76021			02°56'	Left
				N 87°16' E	1.22'		
32+58.25	1852454.452	3610778.049	2001.73394			02°56'	Left
				N 84°20' E	1.22'		
32+59.46	1852455.663	3610778.17	2001.70766			02°56'	Left
				N 81°24' E	1.22'		
32+60.68	1852456.867	3610778.352	2001.68138			02°56'	Left
				N 78°27' E	1.22'		
32+61.90	1852458.06	3610778.596	2001.65508			02°56'	Left
				N 75°31' E	1.22'		
32+63.12	1852459.239	3610778.9	2001.62878			02°56'	Left
				N 72°35' E	1.22'		
32+64.33	1852460.401	3610779.264	2001.60248			02°56'	Left
				N 69°39' E	1.22'		
32+65.55	1852461.543	3610779.688	2001.57616			02°56'	Left
				N 66°43' E	1.22'		
32+66.77	1852462.661	3610780.169	2001.54984			02°56'	Left
				N 63°47' E	1.22'		
32+67.99	1852463.753	3610780.707	2001.5235			02°56'	Left
				N 60°51' E	1.22'		
32+69.21	1852464.817	3610781.3	2001.49716			02°56'	Left
				N 57°54' E	1.22'		
32+70.42	1852465.848	3610781.947	2001.47081			02°56'	Left
				N 54°58' E	1.22'		
32+71.64	1852466.845	3610782.646	2001.44444			02°56'	Left
				N 52°02' E	1.22'		
32+72.86	1852467.805	3610783.395	2001.41807			02°56'	Left
				N 49°06' E	1.22'		
32+74.08	1852468.725	3610784.192	2001.39169			02°56'	Left
				N 46°10' E	1.22'		
32+75.29	1852469.603	3610785.035	2001.36529			02°56'	Left
				N 43°14' E	1.22'		
32+76.51	1852470.437	3610785.923	2001.33888			02°56'	Left
				N 40°18' E	1.22'		
32+77.73	1852471.225	3610786.851	2001.31246			02°56'	Left
				N 37°21' E	1.22'		
32+78.95	1852471.963	3610787.819	2001.28603			02°56'	Left
				N 34°25' E	1.22'		

32+80.16	1852472.652	3610788.823	2001.25958			02°56'	Left
				N 31°29' E	1.22'		
32+81.38	1852473.288	3610789.862	2001.23313			02°56'	Left
				N 28°33' E	1.22'		
32+82.60	1852473.87	3610790.931	2001.20665			02°56'	Left
				N 25°37' E	1.22'		
32+83.82	1852474.396	3610792.03	2001.18016			02°56'	Left
				N 22°41' E	1.22'		
32+85.03	1852474.865	3610793.153	2001.15366			02°56'	Left
				N 19°44' E	1.22'		
32+86.25	1852475.277	3610794.299	2001.12714			02°56'	Left
				N 16°48' E	1.22'		
32+87.47	1852475.629	3610795.465	2001.10061			02°56'	Left
				N 13°52' E	1.22'		
32+88.69	1852475.921	3610796.648	2001.07406			02°56'	Left
				N 10°56' E	1.22'		
32+89.91	1852476.152	3610797.843	2001.04749			03°14'	Left
				N 07°42' E	1.22'		
32+91.12	1852476.315	3610799.051	2001.0209			01°12'	Left
				N 06°30' E	13.96'		
33+00.00	1852477.321	3610807.87	2000.82639				
33+05.08	1852477.897	3610812.92	2000.71502				

Natural Regrade Design Summary Report on Channel 'main L1'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.50
add'l watershed area (ac.)	0.00
valley length (ft.)	211.42
drainage density (ft./ac.)	140.76
head elevation (ft.)	2178.00
base elevation (ft.)	2142.65
relief (ft.)	35.56
head slope	-0.24
base slope	-0.08
slope range	-0.236 to -0.084
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.62 to 1.22
bankfull depth range (ft.)	0.06 to 0.12
flood prone width range (ft.)	1.45 to 2.84
flood prone depth range (ft.)	0.17 to 0.32
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.72 to 0.88
Tractive force, flood prone width (lbs/sq.ft.)	1.04 to 1.27
manual Qpk?	no
bankfull Qpk (cfs)	0.81
flood prone Qpk (cfs)	2.72

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 235.10(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.24
flood prone width (ft.)	0.30
flood prone depth (ft.)	0.03
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.19
Tractive force, flood prone width (lbs/sq.ft.) 0.27
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.19
flood prone width (ft.) 1.45
flood prone depth (ft.) 0.17
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.62
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.12
Tractive force, bankfull width (lbs/sq.ft.) 0.72
Tractive force, flood prone width (lbs/sq.ft.) 1.04
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.17
flood prone width (ft.) 2.02
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.25
bankfull width (ft.) 0.87
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.04
bottom width (ft.) 0.17
Tractive force, bankfull width (lbs/sq.ft.) 0.88
Tractive force, flood prone width (lbs/sq.ft.) 1.27
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.13
flood prone width (ft.) 2.46
flood prone depth (ft.) 0.28
flood prone area (sq.ft.) 0.38
bankfull width (ft.) 1.06
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.83
Tractive force, flood prone width (lbs/sq.ft.) 1.19
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.10
flood prone width (ft.) 2.84
flood prone depth (ft.) 0.32
flood prone area (sq.ft.) 0.50
bankfull width (ft.) 1.22
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.24
Tractive force, bankfull width (lbs/sq.ft.) 0.72
Tractive force, flood prone width (lbs/sq.ft.) 1.04
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 235.10
slope at station (%) -0.08
flood prone width (ft.) 3.08
flood prone depth (ft.) 0.35
flood prone area (sq.ft.) 0.59
bankfull width (ft.) 1.32
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.11
bottom width (ft.) 0.26
Tractive force, bankfull width (lbs/sq.ft.) 0.68
Tractive force, flood prone width (lbs/sq.ft.) 0.98
right side slope (%) 25.00
left side slope (%) 25.00

Channel L1

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,338.06	3,609,714.96	2,178.00				
				S 58°17' E	13.58'		
0+13.58	1,850,349.62	3,609,707.81	2,174.70			27°48'	Left
				S 86°05' E	28.51'		
0+42.09	1,850,378.06	3,609,705.87	2,168.40			62°57'	Right
				S 23°09' E	27.49'		
0+50.00	1,850,381.17	3,609,698.60	2,166.87				
0+69.58	1,850,388.87	3,609,680.59	2,163.06			06°57'	Left
				S 30°05' E	27.88'		
0+97.46	1,850,402.84	3,609,656.47	2,158.33			60°45'	Left
				N 89°10' E	27.50'		
1+00.00	1,850,405.38	3,609,656.51	2,157.95				
1+24.96	1,850,430.34	3,609,656.87	2,154.25			00°29'	Right
				N 89°39' E	27.72'		
1+50.00	1,850,455.38	3,609,657.02	2,151.03				
1+52.68	1,850,458.06	3,609,657.04	2,150.69			59°59'	Right
				S 30°22' E	27.50'		
1+80.17	1,850,471.95	3,609,633.31	2,147.62			01°19'	Right
				S 29°03' E	27.43'		
2+00.00	1,850,481.58	3,609,615.98	2,145.71				
2+07.60	1,850,485.27	3,609,609.33	2,144.97			58°55'	Left
				S 87°58' E	27.50'		
2+35.10	1,850,512.76	3,609,608.36	2,142.65				

Natural Regrade Design Summary Report on Channel 'main L2'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.47
add'l watershed area (ac.)	0.00
valley length (ft.)	203.03
drainage density (ft./ac.)	137.76
head elevation (ft.)	2146.00
base elevation (ft.)	2115.48
relief (ft.)	30.62
head slope	-0.24
base slope	-0.10
slope range	-0.239 to -0.096
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.62 to 1.23
bankfull depth range (ft.)	0.06 to 0.12
flood prone width range (ft.)	1.45 to 2.87
flood prone depth range (ft.)	0.17 to 0.33
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.69 to 0.75
Tractive force, flood prone width (lbs/sq.ft.)	1.00 to 1.07
manual Qpk?	no
bankfull Qpk (cfs)	0.79
flood prone Qpk (cfs)	2.67

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 205.57(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.24
flood prone width (ft.)	0.31
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.19
Tractive force, flood prone width (lbs/sq.ft.) 0.28
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.18
flood prone width (ft.) 1.45
flood prone depth (ft.) 0.17
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.62
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.12
Tractive force, bankfull width (lbs/sq.ft.) 0.69
Tractive force, flood prone width (lbs/sq.ft.) 1.00
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.13
flood prone width (ft.) 2.03
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.25
bankfull width (ft.) 0.87
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.17
Tractive force, bankfull width (lbs/sq.ft.) 0.71
Tractive force, flood prone width (lbs/sq.ft.) 1.02
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.11
flood prone width (ft.) 2.49
flood prone depth (ft.) 0.28
flood prone area (sq.ft.) 0.38
bankfull width (ft.) 1.07
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.75
Tractive force, flood prone width (lbs/sq.ft.) 1.07
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.10
flood prone width (ft.) 2.87
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.51
bankfull width (ft.) 1.23
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.72
Tractive force, flood prone width (lbs/sq.ft.) 1.03
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 205.57
slope at station (%) -0.10
flood prone width (ft.) 2.88
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.52
bankfull width (ft.) 1.24
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.72
Tractive force, flood prone width (lbs/sq.ft.) 1.04
right side slope (%) 25.00
left side slope (%) 25.00

Channel L2

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,639.26	3,609,857.03	2,146.00				
				S 60°30' E	15.18'		
0+15.18	1,850,652.47	3,609,849.56	2,142.22			26°20'	Left
				S 86°50' E	28.46'		
0+43.65	1,850,680.89	3,609,847.99	2,135.99			62°48'	Right
				S 24°02' E	27.50'		
0+50.00	1,850,683.48	3,609,842.18	2,134.82				
0+71.15	1,850,692.09	3,609,822.87	2,130.93			03°37'	Left
				S 27°39' E	27.30'		
0+98.45	1,850,704.77	3,609,798.69	2,126.71			58°33'	Left
				S 86°12' E	27.50'		
1+00.00	1,850,706.32	3,609,798.59	2,126.51				
1+25.94	1,850,732.20	3,609,796.87	2,123.15			06°58'	Left
				N 86°50' E	27.00'		
1+50.00	1,850,756.22	3,609,798.19	2,120.53				
1+52.94	1,850,759.16	3,609,798.35	2,120.21			57°30'	Right
				S 35°40' E	27.50'		
1+80.44	1,850,775.19	3,609,776.01	2,117.66			01°40'	Right
				S 34°00' E	25.13'		
2+00.00	1,850,786.13	3,609,759.80	2,115.96				
2+05.57	1,850,789.24	3,609,755.18	2,115.48				

Natural Regrade Design Summary Report on Channel 'main L3'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.56
add'l watershed area (ac.)	0.00
valley length (ft.)	223.85
drainage density (ft./ac.)	143.47
head elevation (ft.)	2132.00
base elevation (ft.)	2093.86
relief (ft.)	38.62
head slope	-0.25
base slope	-0.08
slope range	-0.252 to -0.083
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.62 to 1.23
bankfull depth range (ft.)	0.06 to 0.12
flood prone width range (ft.)	1.44 to 2.86
flood prone depth range (ft.)	0.16 to 0.33
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.75 to 1.00
Tractive force, flood prone width (lbs/sq.ft.)	1.08 to 1.45
manual Qpk?	no
bankfull Qpk (cfs)	0.84
flood prone Qpk (cfs)	2.83

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 228.36(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.25
flood prone width (ft.)	0.30
flood prone depth (ft.)	0.03
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.20
Tractive force, flood prone width (lbs/sq.ft.) 0.28
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.21
flood prone width (ft.) 1.44
flood prone depth (ft.) 0.16
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.62
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.12
Tractive force, bankfull width (lbs/sq.ft.) 0.79
Tractive force, flood prone width (lbs/sq.ft.) 1.14
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.19
flood prone width (ft.) 2.02
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.25
bankfull width (ft.) 0.87
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.17
Tractive force, bankfull width (lbs/sq.ft.) 1.00
Tractive force, flood prone width (lbs/sq.ft.) 1.45
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.15
flood prone width (ft.) 2.47
flood prone depth (ft.) 0.28
flood prone area (sq.ft.) 0.38
bankfull width (ft.) 1.06
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.94
Tractive force, flood prone width (lbs/sq.ft.) 1.36
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.10
flood prone width (ft.) 2.86
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.51
bankfull width (ft.) 1.23
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.75
Tractive force, flood prone width (lbs/sq.ft.) 1.08
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 228.36
slope at station (%) -0.08
flood prone width (ft.) 3.05
flood prone depth (ft.) 0.35
flood prone area (sq.ft.) 0.58
bankfull width (ft.) 1.31
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.10
bottom width (ft.) 0.26
Tractive force, bankfull width (lbs/sq.ft.) 0.66
Tractive force, flood prone width (lbs/sq.ft.) 0.95
right side slope (%) 25.00
left side slope (%) 25.00

Channel L3

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,867.10	3,610,005.07	2,132.00				
				S 13°49' W	4.84'		
0+04.84	1,850,865.94	3,610,000.37	2,130.71			102°19'	Left
				S 88°30' E	27.50'		
0+32.34	1,850,893.43	3,609,999.65	2,123.80			04°01'	Right
				S 84°29' E	27.17'		
0+50.00	1,850,911.01	3,609,997.95	2,119.84				
0+59.50	1,850,920.47	3,609,997.04	2,117.71			58°06'	Right
				S 26°23' E	27.48'		
0+86.99	1,850,932.69	3,609,972.42	2,112.25			05°13'	Right
				S 21°10' E	26.10'		
1+00.00	1,850,937.39	3,609,960.29	2,109.97				
1+13.09	1,850,942.11	3,609,948.09	2,107.68			54°21'	Left
				S 75°31' E	27.48'		
1+40.57	1,850,968.72	3,609,941.21	2,103.49			04°28'	Left
				S 79°59' E	25.37'		
1+50.00	1,850,978.01	3,609,939.57	2,102.26				
1+65.94	1,850,993.70	3,609,936.80	2,100.17			51°38'	Right
				S 28°21' E	27.50'		
1+93.44	1,851,006.76	3,609,912.60	2,097.10			00°46'	Right
				S 27°35' E	27.22'		
2+00.00	1,851,009.80	3,609,906.78	2,096.50				
2+20.66	1,851,019.37	3,609,888.48	2,094.60			58°10'	Left
				S 85°46' E	7.71'		
2+28.36	1,851,027.06	3,609,887.91	2,093.86				

Natural Regrade Design Summary Report on Channel 'main L4'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	3.24
add'l watershed area (ac.)	0.00
valley length (ft.)	294.70
drainage density (ft./ac.)	139.10
head elevation (ft.)	2096.00
base elevation (ft.)	2066.96
relief (ft.)	29.16
head slope	-0.13
base slope	-0.06
slope range	-0.132 to -0.059
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.49 to 1.92
bankfull depth range (ft.)	0.05 to 0.19
flood prone width range (ft.)	1.15 to 4.47
flood prone depth range (ft.)	0.13 to 0.51
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.37 to 0.84
Tractive force, flood prone width (lbs/sq.ft.)	0.53 to 1.21
manual Qpk?	no
bankfull Qpk (cfs)	1.74
flood prone Qpk (cfs)	5.87

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 322.24(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.13
flood prone width (ft.)	0.21
flood prone depth (ft.)	0.02
flood prone area (sq.ft.)	0.00
bankfull width (ft.)	0.09
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.02
Tractive force, bankfull width (lbs/sq.ft.)	0.07

Tractive force, flood prone width (lbs/sq.ft.) 0.11
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.12
flood prone width (ft.) 1.15
flood prone depth (ft.) 0.13
flood prone area (sq.ft.) 0.08
bankfull width (ft.) 0.49
bankfull depth (ft.) 0.05
bankfull area (sq.ft.) 0.01
bottom width (ft.) 0.10
Tractive force, bankfull width (lbs/sq.ft.) 0.37
Tractive force, flood prone width (lbs/sq.ft.) 0.53
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.11
flood prone width (ft.) 1.63
flood prone depth (ft.) 0.19
flood prone area (sq.ft.) 0.16
bankfull width (ft.) 0.70
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.14
Tractive force, bankfull width (lbs/sq.ft.) 0.45
Tractive force, flood prone width (lbs/sq.ft.) 0.64
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.09
flood prone width (ft.) 1.99
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.25
bankfull width (ft.) 0.85
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.04
bottom width (ft.) 0.17
Tractive force, bankfull width (lbs/sq.ft.) 0.47
Tractive force, flood prone width (lbs/sq.ft.) 0.67
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.08
flood prone width (ft.) 4.16
flood prone depth (ft.) 0.48
flood prone area (sq.ft.) 1.08
bankfull width (ft.) 1.79
bankfull depth (ft.) 0.18
bankfull area (sq.ft.) 0.19
bottom width (ft.) 0.36
Tractive force, bankfull width (lbs/sq.ft.) 0.84
Tractive force, flood prone width (lbs/sq.ft.) 1.21
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.07
flood prone width (ft.) 4.32
flood prone depth (ft.) 0.49
flood prone area (sq.ft.) 1.16
bankfull width (ft.) 1.85
bankfull depth (ft.) 0.19
bankfull area (sq.ft.) 0.21
bottom width (ft.) 0.37
Tractive force, bankfull width (lbs/sq.ft.) 0.76
Tractive force, flood prone width (lbs/sq.ft.) 1.09
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 300.00
slope at station (%) -0.06
flood prone width (ft.) 4.47
flood prone depth (ft.) 0.51
flood prone area (sq.ft.) 1.24
bankfull width (ft.) 1.92
bankfull depth (ft.) 0.19
bankfull area (sq.ft.) 0.22
bottom width (ft.) 0.38
Tractive force, bankfull width (lbs/sq.ft.) 0.69
Tractive force, flood prone width (lbs/sq.ft.) 1.00
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 322.24
slope at station (%) -0.06
flood prone width (ft.) 4.54
flood prone depth (ft.) 0.52
flood prone area (sq.ft.) 1.28

bankfull width (ft.)	1.95		
bankfull depth (ft.)	0.19		
bankfull area (sq.ft.)	0.23		
bottom width (ft.)	0.39		
Tractive force, bankfull width		(lbs/sq.ft.)	0.70
Tractive force, flood prone width		(lbs/sq.ft.)	1.01
right side slope (%)	25.00		
left side slope (%)	25.00		

Channel L4

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,138.18	3,610,200.95	2,096.00				
				S 87°59' E	20.42'		
0+20.42	1,851,158.59	3,610,200.23	2,093.23			62°58'	Right
				S 25°01' E	27.50'		
0+47.92	1,851,170.22	3,610,175.32	2,089.75			00°54'	Left
				S 25°55' E	27.50'		
0+50.00	1,851,171.13	3,610,173.45	2,089.51				
0+75.42	1,851,182.24	3,610,150.58	2,086.55			59°11'	Left
				S 85°06' E	27.50'		
1+00.00	1,851,206.73	3,610,148.48	2,083.92				
1+02.92	1,851,209.64	3,610,148.23	2,083.61			01°10'	Right
				S 83°56' E	27.89'		
1+30.81	1,851,237.37	3,610,145.29	2,080.87			60°37'	Right
				S 23°19' E	27.50'		
1+50.00	1,851,244.96	3,610,127.66	2,079.14				
1+58.31	1,851,248.25	3,610,120.03	2,078.39			00°41'	Left
				S 24°00' E	27.76'		
1+86.07	1,851,259.54	3,610,094.67	2,076.08			60°09'	Left
				S 84°09' E	27.49'		
2+00.00	1,851,273.40	3,610,093.25	2,075.01				
2+13.56	1,851,286.89	3,610,091.87	2,073.97			03°37'	Left
				S 87°46' E	26.25'		
2+39.81	1,851,313.12	3,610,090.84	2,072.10			54°37'	Right
				S 33°09' E	27.50'		
2+50.00	1,851,318.69	3,610,082.31	2,071.43				
2+67.31	1,851,328.15	3,610,067.82	2,070.28			00°17'	Right
				S 32°52' E	27.43'		
2+94.74	1,851,343.04	3,610,044.78	2,068.58			58°56'	Left
				N 88°12' E	27.50'		
3+00.00	1,851,348.30	3,610,044.94	2,068.27				
3+22.24	1,851,370.53	3,610,045.64	2,066.96				

Natural Regrade Design Summary Report on Channel 'main L4L1'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.86
add'l watershed area (ac.)	0.00
valley length (ft.)	155.67
drainage density (ft./ac.)	83.88
head elevation (ft.)	2094.00
base elevation (ft.)	2074.93
relief (ft.)	18.94
head slope	-0.15
base slope	-0.08
slope range	-0.149 to -0.077
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.81 to 1.38
bankfull depth range (ft.)	0.08 to 0.14
flood prone width range (ft.)	1.89 to 3.22
flood prone depth range (ft.)	0.22 to 0.37
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.63 to 0.66
Tractive force, flood prone width (lbs/sq.ft.)	0.91 to 0.95
manual Qpk?	no
bankfull Qpk (cfs)	1.00
flood prone Qpk (cfs)	3.36

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 184.94(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.15
flood prone width (ft.)	0.39
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.17
bankfull depth (ft.)	0.02
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03
Tractive force, bankfull width (lbs/sq.ft.)	0.15

Tractive force, flood prone width (lbs/sq.ft.) 0.22
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.13
flood prone width (ft.) 1.89
flood prone depth (ft.) 0.22
flood prone area (sq.ft.) 0.22
bankfull width (ft.) 0.81
bankfull depth (ft.) 0.08
bankfull area (sq.ft.) 0.04
bottom width (ft.) 0.16
Tractive force, bankfull width (lbs/sq.ft.) 0.63
Tractive force, flood prone width (lbs/sq.ft.) 0.91
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.09
flood prone width (ft.) 2.64
flood prone depth (ft.) 0.30
flood prone area (sq.ft.) 0.43
bankfull width (ft.) 1.13
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.23
Tractive force, bankfull width (lbs/sq.ft.) 0.65
Tractive force, flood prone width (lbs/sq.ft.) 0.94
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.08
flood prone width (ft.) 3.22
flood prone depth (ft.) 0.37
flood prone area (sq.ft.) 0.64
bankfull width (ft.) 1.38
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.11
bottom width (ft.) 0.28
Tractive force, bankfull width (lbs/sq.ft.) 0.66
Tractive force, flood prone width (lbs/sq.ft.) 0.95
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.)	184.94		
slope at station (%)	-0.08		
flood prone width (ft.)	3.46		
flood prone depth (ft.)	0.40		
flood prone area (sq.ft.)	0.74		
bankfull width (ft.)	1.49		
bankfull depth (ft.)	0.15		
bankfull area (sq.ft.)	0.13		
bottom width (ft.)	0.30		
Tractive force, bankfull width	(lbs/sq.ft.)	0.69	
Tractive force, flood prone width	(lbs/sq.ft.)	1.00	
right side slope (%)	25.00		
left side slope (%)	25.00		

Channel L4L1

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,264.85	3,610,256.44	2,094.00				
				S 04°59' W	20.71'		
0+20.71	1,851,263.06	3,610,235.81	2,090.72			24°55'	Right
				S 29°54' W	28.19'		
0+48.90	1,851,249.01	3,610,211.37	2,086.94			61°49'	Left
				S 31°55' E	27.48'		
0+50.00	1,851,249.59	3,610,210.44	2,086.81				
0+76.38	1,851,263.54	3,610,188.04	2,083.87			04°15'	Left
				S 36°11' E	26.51'		
1+00.00	1,851,277.48	3,610,168.98	2,081.64				
1+02.89	1,851,279.18	3,610,166.65	2,081.36			55°37'	Right
				S 19°27' W	27.50'		
1+30.39	1,851,270.03	3,610,140.72	2,079.08			04°15'	Right
				S 23°42' W	27.05'		
1+50.00	1,851,262.15	3,610,122.76	2,077.57				
1+57.44	1,851,259.16	3,610,115.95	2,077.00			57°38'	Left
				S 33°56' E	27.50'		
1+84.94	1,851,274.51	3,610,093.13	2,074.93				

Natural Regrade Design Summary Report on Channel 'main L5'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	2.73
add'l watershed area (ac.)	0.00
valley length (ft.)	272.24
drainage density (ft./ac.)	99.68
head elevation (ft.)	2076.00
base elevation (ft.)	2038.71
relief (ft.)	37.37
head slope	-0.21
base slope	-0.05
slope range	-0.206 to -0.053
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.20 to 1.77
bankfull depth range (ft.)	0.02 to 0.18
flood prone width range (ft.)	0.47 to 4.12
flood prone depth range (ft.)	0.05 to 0.47
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.25 to 0.89
Tractive force, flood prone width (lbs/sq.ft.)	0.36 to 1.28
manual Qpk?	no
bankfull Qpk (cfs)	1.47
flood prone Qpk (cfs)	4.95

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 308.37(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.21
flood prone width (ft.)	0.47
flood prone depth (ft.)	0.05
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.20
bankfull depth (ft.)	0.02
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.04
Tractive force, bankfull width (lbs/sq.ft.)	0.25

Tractive force, flood prone width (lbs/sq.ft.) 0.36
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.18
flood prone width (ft.) 1.68
flood prone depth (ft.) 0.19
flood prone area (sq.ft.) 0.18
bankfull width (ft.) 0.72
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.14
Tractive force, bankfull width (lbs/sq.ft.) 0.77
Tractive force, flood prone width (lbs/sq.ft.) 1.11
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.14
flood prone width (ft.) 2.37
flood prone depth (ft.) 0.27
flood prone area (sq.ft.) 0.35
bankfull width (ft.) 1.02
bankfull depth (ft.) 0.10
bankfull area (sq.ft.) 0.06
bottom width (ft.) 0.20
Tractive force, bankfull width (lbs/sq.ft.) 0.89
Tractive force, flood prone width (lbs/sq.ft.) 1.28
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.11
flood prone width (ft.) 2.91
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.52
bankfull width (ft.) 1.25
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.86
Tractive force, flood prone width (lbs/sq.ft.) 1.24
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.)	200.00	
slope at station (%)	-0.10	
flood prone width (ft.)	3.36	
flood prone depth (ft.)	0.38	
flood prone area (sq.ft.)	0.70	
bankfull width (ft.)	1.44	
bankfull depth (ft.)	0.14	
bankfull area (sq.ft.)	0.13	
bottom width (ft.)	0.29	
Tractive force, bankfull width	(lbs/sq.ft.)	0.88
Tractive force, flood prone width	(lbs/sq.ft.)	1.26
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	250.00	
slope at station (%)	-0.08	
flood prone width (ft.)	3.77	
flood prone depth (ft.)	0.43	
flood prone area (sq.ft.)	0.88	
bankfull width (ft.)	1.62	
bankfull depth (ft.)	0.16	
bankfull area (sq.ft.)	0.16	
bottom width (ft.)	0.32	
Tractive force, bankfull width	(lbs/sq.ft.)	0.74
Tractive force, flood prone width	(lbs/sq.ft.)	1.06
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	300.00	
slope at station (%)	-0.05	
flood prone width (ft.)	4.12	
flood prone depth (ft.)	0.47	
flood prone area (sq.ft.)	1.05	
bankfull width (ft.)	1.77	
bankfull depth (ft.)	0.18	
bankfull area (sq.ft.)	0.19	
bottom width (ft.)	0.35	
Tractive force, bankfull width	(lbs/sq.ft.)	0.57
Tractive force, flood prone width	(lbs/sq.ft.)	0.83
right side slope (%)	25.00	
left side slope (%)	25.00	

station (ft.)	308.37	
slope at station (%)	-0.05	
flood prone width (ft.)	4.19	
flood prone depth (ft.)	0.48	
flood prone area (sq.ft.)	1.09	
bankfull width (ft.)	1.80	

bankfull depth (ft.)	0.18		
bankfull area (sq.ft.)	0.19		
bottom width (ft.)	0.36		
Tractive force, bankfull width	(lbs/sq.ft.)	0.58	
Tractive force, flood prone width	(lbs/sq.ft.)	0.84	
right side slope (%)	25.00		
left side slope (%)	25.00		

Channel L5

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,567.78	3,610,488.20	2,076.00				
				N 76°57' E	6.05'		
0+06.05	1,851,573.67	3,610,489.57	2,074.74			98°12'	Right
				S 04°51' E	27.50'		
0+33.55	1,851,576.00	3,610,462.17	2,069.33			06°57'	Left
				S 11°48' E	28.22'		
0+50.00	1,851,579.36	3,610,446.06	2,066.40				
0+61.76	1,851,581.77	3,610,434.55	2,064.29			62°05'	Left
				S 73°53' E	27.49'		
0+89.26	1,851,608.18	3,610,426.92	2,059.86			03°07'	Left
				S 77°00' E	27.40'		
1+00.00	1,851,618.65	3,610,424.50	2,058.30				
1+16.66	1,851,634.89	3,610,420.76	2,055.89			58°50'	Right
				S 18°10' E	27.50'		
1+44.16	1,851,643.46	3,610,394.63	2,052.32			08°05'	Right
				S 10°06' E	27.17'		
1+50.00	1,851,644.49	3,610,388.88	2,051.65				
1+71.33	1,851,648.22	3,610,367.88	2,049.20			58°08'	Left
				S 68°13' E	27.46'		
1+98.79	1,851,673.73	3,610,357.69	2,046.42			08°57'	Left
				S 77°10' E	26.64'		
2+00.00	1,851,674.91	3,610,357.42	2,046.31				
2+25.43	1,851,699.70	3,610,351.78	2,044.07			56°04'	Right
				S 21°06' E	27.49'		
2+50.00	1,851,708.55	3,610,328.86	2,042.20				
2+52.92	1,851,709.60	3,610,326.13	2,041.98			09°58'	Left
				S 31°04' E	27.94'		
2+80.87	1,851,724.02	3,610,302.20	2,040.18			60°50'	Left
				N 88°06' E	27.50'		
3+00.00	1,851,743.15	3,610,302.83	2,039.16				
3+08.37	1,851,751.51	3,610,303.11	2,038.71				

Natural Regrade Design Summary Report on Channel 'main L6'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.72
add'l watershed area (ac.)	0.00
valley length (ft.)	211.09
drainage density (ft./ac.)	122.81
head elevation (ft.)	2030.00
base elevation (ft.)	2018.01
relief (ft.)	12.25
head slope	-0.09
base slope	-0.04
slope range	-0.086 to -0.040
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.66 to 1.30
bankfull depth range (ft.)	0.07 to 0.13
flood prone width range (ft.)	1.54 to 3.02
flood prone depth range (ft.)	0.18 to 0.35
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.28 to 0.32
Tractive force, flood prone width (lbs/sq.ft.)	0.40 to 0.46
manual Qpk?	no
bankfull Qpk (cfs)	0.93
flood prone Qpk (cfs)	3.12

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 221.43(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.09
flood prone width (ft.)	0.32
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.14
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03
Tractive force, bankfull width (lbs/sq.ft.)	0.07

Tractive force, flood prone width (lbs/sq.ft.) 0.10
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.07
flood prone width (ft.) 1.54
flood prone depth (ft.) 0.18
flood prone area (sq.ft.) 0.15
bankfull width (ft.) 0.66
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.13
Tractive force, bankfull width (lbs/sq.ft.) 0.28
Tractive force, flood prone width (lbs/sq.ft.) 0.40
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.05
flood prone width (ft.) 2.15
flood prone depth (ft.) 0.25
flood prone area (sq.ft.) 0.29
bankfull width (ft.) 0.92
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.18
Tractive force, bankfull width (lbs/sq.ft.) 0.29
Tractive force, flood prone width (lbs/sq.ft.) 0.42
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.04
flood prone width (ft.) 2.61
flood prone depth (ft.) 0.30
flood prone area (sq.ft.) 0.42
bankfull width (ft.) 1.12
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.22
Tractive force, bankfull width (lbs/sq.ft.) 0.29
Tractive force, flood prone width (lbs/sq.ft.) 0.42
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.)	200.00		
slope at station (%)	-0.04		
flood prone width (ft.)	3.02		
flood prone depth (ft.)	0.35		
flood prone area (sq.ft.)	0.57		
bankfull width (ft.)	1.30		
bankfull depth (ft.)	0.13		
bankfull area (sq.ft.)	0.10		
bottom width (ft.)	0.26		
Tractive force, bankfull width	(lbs/sq.ft.)	0.32	
Tractive force, flood prone width	(lbs/sq.ft.)	0.46	
right side slope (%)	25.00		
left side slope (%)	25.00		

station (ft.)	221.43		
slope at station (%)	-0.04		
flood prone width (ft.)	3.18		
flood prone depth (ft.)	0.36		
flood prone area (sq.ft.)	0.63		
bankfull width (ft.)	1.37		
bankfull depth (ft.)	0.14		
bankfull area (sq.ft.)	0.11		
bottom width (ft.)	0.27		
Tractive force, bankfull width	(lbs/sq.ft.)	0.34	
Tractive force, flood prone width	(lbs/sq.ft.)	0.48	
right side slope (%)	25.00		
left side slope (%)	25.00		

Channel L6

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,902.58	3,610,652.65	2,030.00				
				S 44°05' E	10.32'		
0+10.32	1,851,909.75	3,610,645.23	2,029.19			39°03'	Left
				S 83°07' E	26.58'		
0+36.90	1,851,936.14	3,610,642.05	2,027.27			55°52'	Right
				S 27°15' E	27.50'		
0+50.00	1,851,942.14	3,610,630.40	2,026.43				
0+64.40	1,851,948.74	3,610,617.60	2,025.50			04°53'	Left
				S 32°09' E	28.80'		
0+93.20	1,851,964.06	3,610,593.22	2,023.85			64°07'	Left
				N 83°45' E	27.44'		
1+00.00	1,851,970.82	3,610,593.96	2,023.50				
1+20.63	1,851,991.33	3,610,596.21	2,022.43			02°47'	Right
				N 86°32' E	28.52'		
1+49.15	1,852,019.80	3,610,597.94	2,021.08			63°25'	Right
				S 30°03' E	27.50'		
1+50.00	1,852,020.22	3,610,597.20	2,021.05				
1+76.65	1,852,033.57	3,610,574.13	2,019.88			02°08'	Left
				S 32°11' E	27.80'		
2+00.00	1,852,046.00	3,610,554.37	2,018.90				
2+04.45	1,852,048.38	3,610,550.60	2,018.71			60°19'	Left
				N 87°30' E	16.98'		
2+21.43	1,852,065.34	3,610,551.34	2,018.01				

Natural Regrade Design Summary Report on Channel 'main L7'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.27
add'l watershed area (ac.)	0.00
valley length (ft.)	172.22
drainage density (ft./ac.)	135.20
head elevation (ft.)	2024.00
base elevation (ft.)	2006.20
relief (ft.)	17.91
head slope	-0.13
base slope	-0.02
slope range	-0.135 to -0.023
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.62 to 1.36
bankfull depth range (ft.)	0.06 to 0.11
flood prone width range (ft.)	1.45 to 2.90
flood prone depth range (ft.)	0.17 to 0.30
entrenchment ratio	2.14 to 2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.11 to 0.50
Tractive force, flood prone width (lbs/sq.ft.)	0.26 to 0.71
manual Qpk?	no
bankfull Qpk (cfs)	0.69
flood prone Qpk (cfs)	2.31

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 178.53(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.13
flood prone width (ft.)	0.31
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03
Tractive force, bankfull width (lbs/sq.ft.)	0.11

Tractive force, flood prone width (lbs/sq.ft.) 0.16
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.12
flood prone width (ft.) 1.45
flood prone depth (ft.) 0.17
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.62
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.12
Tractive force, bankfull width (lbs/sq.ft.) 0.46
Tractive force, flood prone width (lbs/sq.ft.) 0.67
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.09
flood prone width (ft.) 2.05
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.26
bankfull width (ft.) 0.88
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.18
Tractive force, bankfull width (lbs/sq.ft.) 0.50
Tractive force, flood prone width (lbs/sq.ft.) 0.71
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.06
flood prone width (ft.) 2.49
flood prone depth (ft.) 0.28
flood prone area (sq.ft.) 0.38
bankfull width (ft.) 1.07
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.41
Tractive force, flood prone width (lbs/sq.ft.) 0.59
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.)	178.53		
slope at station (%)	-0.02		
flood prone width (ft.)	2.68		
flood prone depth (ft.)	0.31		
flood prone area (sq.ft.)	0.45		
bankfull width (ft.)	1.15		
bankfull depth (ft.)	0.12		
bankfull area (sq.ft.)	0.08		
bottom width (ft.)	0.23		
Tractive force, bankfull width	(lbs/sq.ft.)	0.33	
Tractive force, flood prone width	(lbs/sq.ft.)	0.48	
right side slope (%)	25.00		
left side slope (%)	25.00		

Channel L7

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,852,188.89	3,610,785.20	2,024.00				
				S 08°55' E	25.69'		
0+25.69	1,852,192.88	3,610,759.83	2,020.44			72°41'	Left
				S 81°36' E	27.35'		
0+50.00	1,852,216.93	3,610,756.27	2,017.22				
0+53.04	1,852,219.94	3,610,755.83	2,016.82			15°58'	Left
				N 82°26' E	28.40'		
0+81.44	1,852,248.09	3,610,759.57	2,013.38			62°40'	Right
				S 34°54' E	27.45'		
1+00.00	1,852,258.71	3,610,744.35	2,011.44				
1+08.89	1,852,263.80	3,610,737.06	2,010.51			13°07'	Right
				S 21°48' E	29.18'		
1+38.07	1,852,274.63	3,610,709.96	2,008.10			65°36'	Left
				S 87°24' E	27.42'		
1+50.00	1,852,286.55	3,610,709.42	2,007.45				
1+65.49	1,852,302.02	3,610,708.72	2,006.60			21°18'	Left
				N 71°18' E	2.74'		
1+68.23	1,852,304.62	3,610,709.60	2,006.49			11°41'	Right
				N 82°59' E	1.89'		
1+70.12	1,852,306.50	3,610,709.83	2,006.43			23°30'	Right
				S 73°31' E	1.89'		
1+72.01	1,852,308.31	3,610,709.29	2,006.37			23°26'	Right
				S 50°05' E	1.89'		
1+73.90	1,852,309.75	3,610,708.08	2,006.32			23°30'	Right
				S 26°35' E	1.89'		
1+75.79	1,852,310.60	3,610,706.39	2,006.27			11°41'	Right
				S 14°54' E	2.74'		
1+78.53	1,852,311.30	3,610,703.74	2,006.20				

Natural Regrade Design Summary Report on Channel 'main R1'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	3.05
add'l watershed area (ac.)	0.00
valley length (ft.)	342.34
drainage density (ft./ac.)	112.06
head elevation (ft.)	2222.00
base elevation (ft.)	2164.46
relief (ft.)	57.79
head slope	-0.22
base slope	-0.088
slope range	-0.219 to -0.089
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.68 to 1.80
bankfull depth range (ft.)	0.07 to 0.18
flood prone width range (ft.)	1.59 to 4.19
flood prone depth range (ft.)	0.18 to 0.48
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.86 to 1.20
Tractive force, flood prone width (lbs/sq.ft.)	1.24 to 1.72
manual Qpk?	no
bankfull Qpk (cfs)	1.64
flood prone Qpk (cfs)	5.54

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 379.83(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.22
flood prone width (ft.)	0.27
flood prone depth (ft.)	0.03
flood prone area (sq.ft.)	0.00
bankfull width (ft.)	0.12
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.02

Tractive force, bankfull width (lbs/sq.ft.) 0.16
Tractive force, flood prone width (lbs/sq.ft.) 0.23
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.21
flood prone width (ft.) 1.59
flood prone depth (ft.) 0.18
flood prone area (sq.ft.) 0.16
bankfull width (ft.) 0.68
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.14
Tractive force, bankfull width (lbs/sq.ft.) 0.86
Tractive force, flood prone width (lbs/sq.ft.) 1.24
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.19
flood prone width (ft.) 2.24
flood prone depth (ft.) 0.26
flood prone area (sq.ft.) 0.31
bankfull width (ft.) 0.96
bankfull depth (ft.) 0.10
bankfull area (sq.ft.) 0.06
bottom width (ft.) 0.19
Tractive force, bankfull width (lbs/sq.ft.) 1.09
Tractive force, flood prone width (lbs/sq.ft.) 1.57
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.16
flood prone width (ft.) 2.75
flood prone depth (ft.) 0.31
flood prone area (sq.ft.) 0.47
bankfull width (ft.) 1.18
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.24
Tractive force, bankfull width (lbs/sq.ft.) 1.18
Tractive force, flood prone width (lbs/sq.ft.) 1.70
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.14
flood prone width (ft.) 3.17
flood prone depth (ft.) 0.36
flood prone area (sq.ft.) 0.62
bankfull width (ft.) 1.36
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.11
bottom width (ft.) 0.27
Tractive force, bankfull width (lbs/sq.ft.) 1.20
Tractive force, flood prone width (lbs/sq.ft.) 1.72
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.12
flood prone width (ft.) 3.55
flood prone depth (ft.) 0.41
flood prone area (sq.ft.) 0.78
bankfull width (ft.) 1.52
bankfull depth (ft.) 0.15
bankfull area (sq.ft.) 0.14
bottom width (ft.) 0.30
Tractive force, bankfull width (lbs/sq.ft.) 1.15
Tractive force, flood prone width (lbs/sq.ft.) 1.66
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 300.00
slope at station (%) -0.12
flood prone width (ft.) 3.88
flood prone depth (ft.) 0.44
flood prone area (sq.ft.) 0.93
bankfull width (ft.) 1.67
bankfull depth (ft.) 0.17
bankfull area (sq.ft.) 0.17
bottom width (ft.) 0.33
Tractive force, bankfull width (lbs/sq.ft.) 1.17
Tractive force, flood prone width (lbs/sq.ft.) 1.68
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 350.00
slope at station (%) -0.10
flood prone width (ft.) 4.19
flood prone depth (ft.) 0.48

flood prone area (sq.ft.) 1.09
bankfull width (ft.) 1.80
bankfull depth (ft.) 0.18
bankfull area (sq.ft.) 0.19
bottom width (ft.) 0.36
Tractive force, bankfull width (lbs/sq.ft.) 1.07
Tractive force, flood prone width (lbs/sq.ft.) 1.53
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 379.83
slope at station (%) -0.09
flood prone width (ft.) 4.38
flood prone depth (ft.) 0.50
flood prone area (sq.ft.) 1.19
bankfull width (ft.) 1.88
bankfull depth (ft.) 0.19
bankfull area (sq.ft.) 0.21
bottom width (ft.) 0.38
Tractive force, bankfull width (lbs/sq.ft.) 1.02
Tractive force, flood prone width (lbs/sq.ft.) 1.46
right side slope (%) 25.00
left side slope (%) 25.00

Channel R1

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,261.04	3,609,191.81	2,222.00				
				N 29°40' E	22.73'		
0+22.73	1,850,272.29	3,609,211.56	2,216.89			61°20'	Left
				N 31°40' W	27.50'		
0+50.00	1,850,257.97	3,609,234.77	2,211.08				
0+50.23	1,850,257.85	3,609,234.97	2,211.03			04°56'	Right
				N 26°44' W	27.58'		
0+77.81	1,850,245.44	3,609,259.60	2,205.50			59°30'	Right
				N 32°46' E	27.50'		
1+00.00	1,850,257.46	3,609,278.26	2,201.31				
1+05.31	1,850,260.33	3,609,282.72	2,200.30			01°44'	Right
				N 34°30' E	27.35'		
1+32.66	1,850,275.82	3,609,305.26	2,195.46			58°40'	Left
				N 24°09' W	27.50'		
1+50.00	1,850,268.73	3,609,321.08	2,192.58				
1+60.16	1,850,264.57	3,609,330.35	2,190.89			01°40'	Right
				N 22°29' W	27.71'		
1+87.87	1,850,253.97	3,609,355.95	2,186.60			59°57'	Right
				N 37°27' E	27.50'		
2+00.00	1,850,261.35	3,609,365.59	2,184.85				
2+15.36	1,850,270.69	3,609,377.78	2,182.63			02°43'	Left
				N 34°44' E	27.80'		
2+43.16	1,850,286.53	3,609,400.63	2,178.91			60°22'	Left
				N 25°38' W	27.50'		
2+50.00	1,850,283.57	3,609,406.79	2,178.06				
2+70.66	1,850,274.63	3,609,425.42	2,175.50			08°11'	Right
				N 17°28' W	27.80'		
2+98.47	1,850,266.29	3,609,451.94	2,172.32			60°28'	Right
				N 43°01' E	27.50'		
3+00.00	1,850,267.34	3,609,453.07	2,172.16				
3+25.97	1,850,285.05	3,609,472.05	2,169.43			02°40'	Right
				N 45°41' E	26.37'		
3+50.00	1,850,302.25	3,609,488.84	2,167.11				
3+52.33	1,850,303.91	3,609,490.47	2,166.88			55°10'	Left
				N 09°29' W	27.50'		
3+79.83	1,850,299.38	3,609,517.60	2,164.46				

Natural Regrade Design Summary Report on Channel 'main R2'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	2.78
add'l watershed area (ac.)	0.00
valley length (ft.)	301.40
drainage density (ft./ac.)	108.29
head elevation (ft.)	2198.50
base elevation (ft.)	2135.09
relief (ft.)	63.08
head slope	-0.30
base slope	-0.09
slope range	-0.302 to -0.086
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.69 to 1.70
bankfull depth range (ft.)	0.07 to 0.17
flood prone width range (ft.)	1.62 to 3.97
flood prone depth range (ft.)	0.18 to 0.45
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	1.08 to 1.44
Tractive force, flood prone width (lbs/sq.ft.)	1.56 to 2.07
manual Qpk?	no
bankfull Qpk (cfs)	1.50
flood prone Qpk (cfs)	5.05

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 340.12(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.304
flood prone width (ft.)	0.34
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.15
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.27
Tractive force, flood prone width (lbs/sq.ft.) 0.39
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.27
flood prone width (ft.) 1.62
flood prone depth (ft.) 0.18
flood prone area (sq.ft.) 0.16
bankfull width (ft.) 0.69
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.14
Tractive force, bankfull width (lbs/sq.ft.) 1.15
Tractive force, flood prone width (lbs/sq.ft.) 1.65
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.23
flood prone width (ft.) 2.29
flood prone depth (ft.) 0.26
flood prone area (sq.ft.) 0.32
bankfull width (ft.) 0.98
bankfull depth (ft.) 0.10
bankfull area (sq.ft.) 0.06
bottom width (ft.) 0.20
Tractive force, bankfull width (lbs/sq.ft.) 1.39
Tractive force, flood prone width (lbs/sq.ft.) 2.00
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.20
flood prone width (ft.) 2.80
flood prone depth (ft.) 0.32
flood prone area (sq.ft.) 0.49
bankfull width (ft.) 1.20
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.24
Tractive force, bankfull width (lbs/sq.ft.) 1.44
Tractive force, flood prone width (lbs/sq.ft.) 2.07
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.16
flood prone width (ft.) 3.25
flood prone depth (ft.) 0.37
flood prone area (sq.ft.) 0.66
bankfull width (ft.) 1.40
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.12
bottom width (ft.) 0.28
Tractive force, bankfull width (lbs/sq.ft.) 1.36
Tractive force, flood prone width (lbs/sq.ft.) 1.96
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.14
flood prone width (ft.) 3.63
flood prone depth (ft.) 0.42
flood prone area (sq.ft.) 0.82
bankfull width (ft.) 1.56
bankfull depth (ft.) 0.16
bankfull area (sq.ft.) 0.15
bottom width (ft.) 0.31
Tractive force, bankfull width (lbs/sq.ft.) 1.34
Tractive force, flood prone width (lbs/sq.ft.) 1.93
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 300.00
slope at station (%) -0.10
flood prone width (ft.) 3.97
flood prone depth (ft.) 0.45
flood prone area (sq.ft.) 0.98
bankfull width (ft.) 1.70
bankfull depth (ft.) 0.17
bankfull area (sq.ft.) 0.17
bottom width (ft.) 0.34
Tractive force, bankfull width (lbs/sq.ft.) 1.08
Tractive force, flood prone width (lbs/sq.ft.) 1.56
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 340.12
slope at station (%) -0.09
flood prone width (ft.) 4.18
flood prone depth (ft.) 0.48

flood prone area (sq.ft.)	1.09	
bankfull width (ft.)	1.80	
bankfull depth (ft.)	0.18	
bankfull area (sq.ft.)	0.19	
bottom width (ft.)	0.36	
Tractive force, bankfull width	(lbs/sq.ft.)	0.94
Tractive force, flood prone width	(lbs/sq.ft.)	1.36
right side slope (%)	25.00	
left side slope (%)	25.00	

Channel R2

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,559.70	3,609,336.46	2,198.50				
				N 04°48' E	12.88'		
0+12.88	1,850,560.78	3,609,349.29	2,194.58			28°52'	Left
				N 24°04' W	28.09'		
0+40.96	1,850,549.32	3,609,374.94	2,186.47			61°22'	Right
				N 37°17' E	27.49'		
0+50.00	1,850,554.79	3,609,382.12	2,184.06				
0+68.46	1,850,565.98	3,609,396.81	2,179.14			00°27'	Right
				N 37°44' E	27.60'		
0+96.06	1,850,582.87	3,609,418.64	2,172.35			59°34'	Left
				N 21°50' W	27.50'		
1+00.00	1,850,581.41	3,609,422.29	2,171.46				
1+23.56	1,850,572.65	3,609,444.17	2,166.15			03°13'	Left
				N 25°03' W	25.94'		
1+49.51	1,850,561.66	3,609,467.67	2,160.80			53°31'	Right
				N 28°29' E	27.50'		
1+50.00	1,850,561.90	3,609,468.11	2,160.70				
1+77.01	1,850,574.77	3,609,491.84	2,155.64			03°29'	Right
				N 31°58' E	26.22'		
2+00.00	1,850,586.95	3,609,511.35	2,151.74				
2+03.23	1,850,588.65	3,609,514.09	2,151.20			54°42'	Left
				N 22°45' W	27.50'		
2+30.73	1,850,578.02	3,609,539.45	2,147.03			00°27'	Right
				N 22°18' W	27.73'		
2+50.00	1,850,570.71	3,609,557.28	2,144.45				
2+58.46	1,850,567.50	3,609,565.11	2,143.31			60°03'	Right
				N 37°45' E	27.50'		
2+85.96	1,850,584.33	3,609,586.86	2,140.10			01°49'	Right
				N 39°34' E	26.66'		
3+00.00	1,850,593.28	3,609,597.68	2,138.69				
3+12.62	1,850,601.32	3,609,607.41	2,137.42			56°10'	Left
				N 16°36' W	27.50'		
3+40.12	1,850,593.46	3,609,633.76	2,135.09				

Natural Regrade Design Summary Report on Channel 'main R3'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	2.53
add'l watershed area (ac.)	0.00
valley length (ft.)	310.12
drainage density (ft./ac.)	122.69
head elevation (ft.)	2165.00
base elevation (ft.)	2105.16
relief (ft.)	60.05
head slope	-0.27
base slope	-0.08
slope range	-0.275 to -0.078
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.66 to 1.61
bankfull depth range (ft.)	0.07 to 0.16
flood prone width range (ft.)	1.54 to 3.74
flood prone depth range (ft.)	0.18 to 0.43
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.94 to 1.33
Tractive force, flood prone width (lbs/sq.ft.)	1.36 to 1.92
manual Qpk?	no
bankfull Qpk (cfs)	1.36
flood prone Qpk (cfs)	4.58

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 336.47(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.27
flood prone width (ft.)	0.32
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.14
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.23
Tractive force, flood prone width (lbs/sq.ft.) 0.34
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.25
flood prone width (ft.) 1.54
flood prone depth (ft.) 0.18
flood prone area (sq.ft.) 0.15
bankfull width (ft.) 0.66
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.13
Tractive force, bankfull width (lbs/sq.ft.) 1.00
Tractive force, flood prone width (lbs/sq.ft.) 1.45
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.22
flood prone width (ft.) 2.17
flood prone depth (ft.) 0.25
flood prone area (sq.ft.) 0.29
bankfull width (ft.) 0.93
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.19
Tractive force, bankfull width (lbs/sq.ft.) 1.23
Tractive force, flood prone width (lbs/sq.ft.) 1.78
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.18
flood prone width (ft.) 2.65
flood prone depth (ft.) 0.30
flood prone area (sq.ft.) 0.44
bankfull width (ft.) 1.14
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.23
Tractive force, bankfull width (lbs/sq.ft.) 1.27
Tractive force, flood prone width (lbs/sq.ft.) 1.83
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.17
flood prone width (ft.) 3.05
flood prone depth (ft.) 0.35
flood prone area (sq.ft.) 0.58
bankfull width (ft.) 1.31
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.10
bottom width (ft.) 0.26
Tractive force, bankfull width (lbs/sq.ft.) 1.33
Tractive force, flood prone width (lbs/sq.ft.) 1.92
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.13
flood prone width (ft.) 3.42
flood prone depth (ft.) 0.39
flood prone area (sq.ft.) 0.72
bankfull width (ft.) 1.47
bankfull depth (ft.) 0.15
bankfull area (sq.ft.) 0.13
bottom width (ft.) 0.29
Tractive force, bankfull width (lbs/sq.ft.) 1.19
Tractive force, flood prone width (lbs/sq.ft.) 1.71
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 300.00
slope at station (%) -0.10
flood prone width (ft.) 3.74
flood prone depth (ft.) 0.43
flood prone area (sq.ft.) 0.87
bankfull width (ft.) 1.61
bankfull depth (ft.) 0.16
bankfull area (sq.ft.) 0.15
bottom width (ft.) 0.32
Tractive force, bankfull width (lbs/sq.ft.) 0.94
Tractive force, flood prone width (lbs/sq.ft.) 1.36
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 336.47
slope at station (%) -0.08
flood prone width (ft.) 3.95
flood prone depth (ft.) 0.45

flood prone area (sq.ft.)	0.97	
bankfull width (ft.)	1.70	
bankfull depth (ft.)	0.17	
bankfull area (sq.ft.)	0.17	
bottom width (ft.)	0.34	
Tractive force, bankfull width	(lbs/sq.ft.)	0.81
Tractive force, flood prone width	(lbs/sq.ft.)	1.16
right side slope (%)	25.00	
left side slope (%)	25.00	

Channel R3

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,850,901.98	3,609,515.75	2,165.00				
				N 05°53' W	8.54'		
0+08.54	1,850,901.11	3,609,524.25	2,162.63			24°43'	Left
				N 30°36' W	26.96'		
0+35.50	1,850,887.39	3,609,547.45	2,155.42			57°15'	Right
				N 26°39' E	27.46'		
0+50.00	1,850,893.89	3,609,560.41	2,151.77				
0+62.97	1,850,899.71	3,609,572.00	2,148.50			03°26'	Left
				N 23°13' E	27.30'		
0+90.27	1,850,910.47	3,609,597.09	2,142.07			58°27'	Left
				N 35°14' W	27.50'		
1+00.00	1,850,904.85	3,609,605.04	2,139.93				
1+17.77	1,850,894.60	3,609,619.55	2,136.04			00°22'	Right
				N 34°51' W	27.79'		
1+45.56	1,850,878.72	3,609,642.35	2,130.41			60°15'	Right
				N 25°24' E	27.49'		
1+50.00	1,850,880.63	3,609,646.37	2,129.59				
1+73.05	1,850,890.51	3,609,667.19	2,125.32			02°44'	Right
				N 28°07' E	25.97'		
1+99.02	1,850,902.75	3,609,690.09	2,120.95			53°38'	Left
				N 25°31' W	27.46'		
2+00.00	1,850,902.33	3,609,690.98	2,120.80				
2+26.48	1,850,890.92	3,609,714.88	2,116.79			01°37'	Right
				N 23°54' W	27.50'		
2+50.00	1,850,881.40	3,609,736.38	2,113.65				
2+53.98	1,850,879.78	3,609,740.02	2,113.12			59°11'	Right
				N 35°17' E	27.50'		
2+81.48	1,850,895.67	3,609,762.47	2,109.96			02°14'	Right
				N 37°30' E	27.49'		
3+00.00	1,850,906.94	3,609,777.16	2,108.16				
3+08.97	1,850,912.41	3,609,784.28	2,107.30			59°10'	Left
				N 21°39' W	27.50'		
3+36.47	1850902.259	3609809.837	2105.1554				

Natural Regrade Design Summary Report on Channel 'main R4'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	2.50
add'l watershed area (ac.)	0.00
valley length (ft.)	314.34
drainage density (ft./ac.)	125.92
head elevation (ft.)	2153.00
base elevation (ft.)	2082.20
relief (ft.)	70.65
head slope	-0.32
base slope	-0.07
slope range	-0.325 to -0.074
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.66 to 1.58
bankfull depth range (ft.)	0.07 to 0.16
flood prone width range (ft.)	1.53 to 3.68
flood prone depth range (ft.)	0.18 to 0.42
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.95 to 1.60
Tractive force, flood prone width (lbs/sq.ft.)	1.37 to 2.30
manual Qpk?	no
bankfull Qpk (cfs)	1.34
flood prone Qpk (cfs)	4.53

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 351.46(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.32
flood prone width (ft.)	0.32
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.14
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.27
Tractive force, flood prone width (lbs/sq.ft.) 0.39
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.29
flood prone width (ft.) 1.53
flood prone depth (ft.) 0.18
flood prone area (sq.ft.) 0.15
bankfull width (ft.) 0.66
bankfull depth (ft.) 0.07
bankfull area (sq.ft.) 0.03
bottom width (ft.) 0.13
Tractive force, bankfull width (lbs/sq.ft.) 1.17
Tractive force, flood prone width (lbs/sq.ft.) 1.68
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.25
flood prone width (ft.) 2.14
flood prone depth (ft.) 0.24
flood prone area (sq.ft.) 0.29
bankfull width (ft.) 0.92
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.18
Tractive force, bankfull width (lbs/sq.ft.) 1.42
Tractive force, flood prone width (lbs/sq.ft.) 2.05
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.23
flood prone width (ft.) 2.62
flood prone depth (ft.) 0.30
flood prone area (sq.ft.) 0.43
bankfull width (ft.) 1.12
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.22
Tractive force, bankfull width (lbs/sq.ft.) 1.60
Tractive force, flood prone width (lbs/sq.ft.) 2.30
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.19
flood prone width (ft.) 3.02
flood prone depth (ft.) 0.35
flood prone area (sq.ft.) 0.57
bankfull width (ft.) 1.30
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.10
bottom width (ft.) 0.26
Tractive force, bankfull width (lbs/sq.ft.) 1.51
Tractive force, flood prone width (lbs/sq.ft.) 2.18
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.15
flood prone width (ft.) 3.38
flood prone depth (ft.) 0.39
flood prone area (sq.ft.) 0.71
bankfull width (ft.) 1.45
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.13
bottom width (ft.) 0.29
Tractive force, bankfull width (lbs/sq.ft.) 1.29
Tractive force, flood prone width (lbs/sq.ft.) 1.86
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 300.00
slope at station (%) -0.10
flood prone width (ft.) 3.68
flood prone depth (ft.) 0.42
flood prone area (sq.ft.) 0.84
bankfull width (ft.) 1.58
bankfull depth (ft.) 0.16
bankfull area (sq.ft.) 0.15
bottom width (ft.) 0.32
Tractive force, bankfull width (lbs/sq.ft.) 0.95
Tractive force, flood prone width (lbs/sq.ft.) 1.37
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 350.00
slope at station (%) -0.07
flood prone width (ft.) 3.95
flood prone depth (ft.) 0.45

flood prone area (sq.ft.) 0.97
bankfull width (ft.) 1.70
bankfull depth (ft.) 0.17
bankfull area (sq.ft.) 0.17
bottom width (ft.) 0.34
Tractive force, bankfull width (lbs/sq.ft.) 0.77
Tractive force, flood prone width (lbs/sq.ft.) 1.11
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 351.46
slope at station (%) -0.07
flood prone width (ft.) 3.95
flood prone depth (ft.) 0.45
flood prone area (sq.ft.) 0.97
bankfull width (ft.) 1.70
bankfull depth (ft.) 0.17
bankfull area (sq.ft.) 0.17
bottom width (ft.) 0.34
Tractive force, bankfull width (lbs/sq.ft.) 0.77
Tractive force, flood prone width (lbs/sq.ft.) 1.11
right side slope (%) 25.00
left side slope (%) 25.00

Channel R4

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,208.68	3,609,627.80	2,153.00				
				N 13°21' W	21.95'		
0+21.95	1,851,203.62	3,609,649.16	2,145.92			28°58'	Left
				N 42°19' W	27.47'		
0+49.41	1,851,185.12	3,609,669.46	2,137.52			59°04'	Right
				N 16°45' E	27.50'		
0+50.00	1,851,185.29	3,609,670.03	2,137.35				
0+76.91	1,851,193.05	3,609,695.80	2,129.64			01°05'	Right
				N 17°50' E	26.56'		
1+00.00	1,851,200.11	3,609,717.78	2,123.47				
1+03.47	1,851,201.18	3,609,721.08	2,122.54			55°46'	Left
				N 37°56' W	27.48'		
1+30.95	1,851,184.28	3,609,742.75	2,115.73			01°21'	Right
				N 36°36' W	27.27'		
1+50.00	1,851,172.92	3,609,758.05	2,111.39				
1+58.22	1,851,168.02	3,609,764.65	2,109.52			58°21'	Right
				N 21°45' E	27.50'		
1+85.72	1,851,178.21	3,609,790.19	2,103.83			00°33'	Right
				N 22°18' E	26.52'		
2+00.00	1,851,183.63	3,609,803.40	2,101.17				
2+12.24	1,851,188.28	3,609,814.72	2,098.89			55°38'	Left
				N 33°20' W	27.48'		
2+39.72	1,851,173.18	3,609,837.68	2,094.35			03°40'	Right
				N 29°40' W	29.22'		
2+50.00	1,851,168.09	3,609,846.62	2,092.89				
2+68.94	1,851,158.71	3,609,863.07	2,090.19			65°37'	Right
				N 35°57' E	27.47'		
2+96.41	1,851,174.84	3,609,885.31	2,086.90			00°40'	Right
				N 36°37' E	27.55'		
3+00.00	1,851,176.98	3,609,888.19	2,086.55				
3+23.96	1,851,191.27	3,609,907.42	2,084.23			59°21'	Left
				N 22°45' W	27.50'		
3+50.00	1,851,181.20	3,609,931.44	2,082.31				
3+51.46	1,851,180.63	3,609,932.79	2,082.20				

Natural Regrade Design Summary Report on Channel 'main R5'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.81
add'l watershed area (ac.)	0.00
valley length (ft.)	238.51
drainage density (ft./ac.)	132.12
head elevation (ft.)	2120.00
base elevation (ft.)	2064.58
relief (ft.)	55.56
head slope	-0.31
base slope	-0.08
slope range	-0.309 to -0.075
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.10 to 1.40
bankfull depth range (ft.)	0.01 to 0.14
flood prone width range (ft.)	0.23 to 3.27
flood prone depth range (ft.)	0.03 to 0.37
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.19 to 1.36
Tractive force, flood prone width (lbs/sq.ft.)	0.27 to 1.96
manual Qpk?	no
bankfull Qpk (cfs)	0.97
flood prone Qpk (cfs)	3.27

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 267.70(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.31
flood prone width (ft.)	0.23
flood prone depth (ft.)	0.03
flood prone area (sq.ft.)	0.00
bankfull width (ft.)	0.10
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.02

Tractive force, bankfull width (lbs/sq.ft.) 0.19
Tractive force, flood prone width (lbs/sq.ft.) 0.27
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.29
flood prone width (ft.) 1.46
flood prone depth (ft.) 0.17
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.63
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.13
Tractive force, bankfull width (lbs/sq.ft.) 1.12
Tractive force, flood prone width (lbs/sq.ft.) 1.62
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.25
flood prone width (ft.) 2.06
flood prone depth (ft.) 0.24
flood prone area (sq.ft.) 0.26
bankfull width (ft.) 0.88
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.18
Tractive force, bankfull width (lbs/sq.ft.) 1.36
Tractive force, flood prone width (lbs/sq.ft.) 1.96
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.20
flood prone width (ft.) 2.53
flood prone depth (ft.) 0.29
flood prone area (sq.ft.) 0.40
bankfull width (ft.) 1.09
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.22
Tractive force, bankfull width (lbs/sq.ft.) 1.35
Tractive force, flood prone width (lbs/sq.ft.) 1.95
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.14
flood prone width (ft.) 2.92
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.53
bankfull width (ft.) 1.25
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 1.10
Tractive force, flood prone width (lbs/sq.ft.) 1.58
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 250.00
slope at station (%) -0.08
flood prone width (ft.) 3.27
flood prone depth (ft.) 0.37
flood prone area (sq.ft.) 0.66
bankfull width (ft.) 1.40
bankfull depth (ft.) 0.14
bankfull area (sq.ft.) 0.12
bottom width (ft.) 0.28
Tractive force, bankfull width (lbs/sq.ft.) 0.64
Tractive force, flood prone width (lbs/sq.ft.) 0.92
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 267.70
slope at station (%) -0.08
flood prone width (ft.) 3.38
flood prone depth (ft.) 0.39
flood prone area (sq.ft.) 0.71
bankfull width (ft.) 1.45
bankfull depth (ft.) 0.15
bankfull area (sq.ft.) 0.13
bottom width (ft.) 0.29
Tractive force, bankfull width (lbs/sq.ft.) 0.66
Tractive force, flood prone width (lbs/sq.ft.) 0.96
right side slope (%) 25.00
left side slope (%) 25.00

Channel R5

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,458.49	3,609,827.39	2,120.00				
				N 15°20' E	19.85'		
0+19.85	1,851,463.74	3,609,846.53	2,113.76			65°56'	Left
				N 50°36' W	27.49'		
0+47.34	1,851,442.49	3,609,863.98	2,105.54			00°08'	Right
				N 50°28' W	28.20'		
0+50.00	1,851,440.44	3,609,865.67	2,104.80				
0+75.54	1,851,420.74	3,609,881.94	2,097.66			61°50'	Right
				N 11°22' E	27.49'		
1+00.00	1,851,425.56	3,609,905.91	2,091.38				
1+03.04	1,851,426.16	3,609,908.89	2,090.60			04°31'	Right
				N 15°53' E	26.63'		
1+29.67	1,851,433.45	3,609,934.50	2,084.39			56°01'	Left
				N 40°07' W	27.49'		
1+50.00	1,851,420.35	3,609,950.05	2,080.19				
1+57.16	1,851,415.73	3,609,955.52	2,078.71			03°46'	Right
				N 36°22' W	28.21'		
1+85.36	1,851,399.01	3,609,978.23	2,073.71			61°54'	Right
				N 25°32' E	27.50'		
2+00.00	1,851,405.32	3,609,991.44	2,071.58				
2+12.86	1,851,410.86	3,610,003.05	2,069.71			03°47'	Right
				N 29°19' E	27.33'		
2+40.20	1,851,424.25	3,610,026.88	2,066.65			58°37'	Left
				N 29°18' W	27.50'		
2+50.00	1,851,419.45	3,610,035.43	2,065.91				
2+67.70	1,851,410.79	3,610,050.86	2,064.58				

Natural Regrade Design Summary Report on Channel 'main R6'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.39
add'l watershed area (ac.)	0.00
valley length (ft.)	192.67
drainage density (ft./ac.)	138.37
head elevation (ft.)	2082.00
base elevation (ft.)	2043.53
relief (ft.)	38.59
head slope	-0.31
base slope	-0.06
slope range	-0.307 to -0.062
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.61 to 1.23
bankfull depth range (ft.)	0.06 to 0.12
flood prone width range (ft.)	1.43 to 2.86
flood prone depth range (ft.)	0.16 to 0.33
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.47 to 0.93
Tractive force, flood prone width (lbs/sq.ft.)	0.67 to 1.35
manual Qpk?	no
bankfull Qpk (cfs)	0.75
flood prone Qpk (cfs)	2.52

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 228.64 (ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.31
flood prone width (ft.)	0.31
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.25
Tractive force, flood prone width (lbs/sq.ft.) 0.35
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.25
flood prone width (ft.) 1.43
flood prone depth (ft.) 0.16
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.61
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.12
Tractive force, bankfull width (lbs/sq.ft.) 0.92
Tractive force, flood prone width (lbs/sq.ft.) 1.32
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.18
flood prone width (ft.) 2.02
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.25
bankfull width (ft.) 0.87
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.17
Tractive force, bankfull width (lbs/sq.ft.) 0.93
Tractive force, flood prone width (lbs/sq.ft.) 1.35
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.12
flood prone width (ft.) 2.47
flood prone depth (ft.) 0.28
flood prone area (sq.ft.) 0.38
bankfull width (ft.) 1.06
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.74
Tractive force, flood prone width (lbs/sq.ft.) 1.07
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.06
flood prone width (ft.) 2.86
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.51
bankfull width (ft.) 1.23
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.47
Tractive force, flood prone width (lbs/sq.ft.) 0.67
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 228.64
slope at station (%) -0.06
flood prone width (ft.) 3.00
flood prone depth (ft.) 0.34
flood prone area (sq.ft.) 0.56
bankfull width (ft.) 1.29
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.10
bottom width (ft.) 0.26
Tractive force, bankfull width (lbs/sq.ft.) 0.49
Tractive force, flood prone width (lbs/sq.ft.) 0.71
right side slope (%) 25.00
left side slope (%) 25.00

Channel R6

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,851,694.73	3,610,065.84	2,082.00				
				N 14°15' W	7.78'		
0+07.78	1,851,692.82	3,610,073.37	2,079.56			21°36'	Left
				N 35°51' W	28.21'		
0+35.99	1,851,676.30	3,610,096.24	2,071.50			61°54'	Right
				N 26°03' E	27.49'		
0+50.00	1,851,682.45	3,610,108.83	2,068.08				
0+63.48	1,851,688.37	3,610,120.94	2,064.79			03°57'	Left
				N 22°06' E	27.64'		
0+91.12	1,851,698.77	3,610,146.55	2,059.09			59°55'	Left
				N 37°49' W	27.48'		
1+00.00	1,851,693.32	3,610,153.57	2,057.56				
1+18.60	1,851,681.92	3,610,168.26	2,054.38			02°57'	Right
				N 34°52' W	27.97'		
1+46.57	1,851,665.93	3,610,191.21	2,050.49			60°56'	Right
				N 26°04' E	27.49'		
1+50.00	1,851,667.44	3,610,194.29	2,050.11				
1+74.05	1,851,678.01	3,610,215.90	2,047.47			03°05'	Right
				N 29°09' E	27.09'		
2+00.00	1,851,690.64	3,610,238.56	2,045.29				
2+01.15	1,851,691.20	3,610,239.56	2,045.20			57°44'	Left
				N 28°35' W	27.50'		
2+28.64	1,851,678.04	3,610,263.71	2,043.52				

Natural Regrade Design Summary Report on Channel 'main R7'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.55
add'l watershed area (ac.)	0.00
valley length (ft.)	211.95
drainage density (ft./ac.)	137.13
head elevation (ft.)	2058.00
base elevation (ft.)	2025.68
relief (ft.)	32.41
head slope	-0.20
base slope	-0.06
slope range	-0.205 to -0.057
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.63 to 1.23
bankfull depth range (ft.)	0.06 to 0.12
flood prone width range (ft.)	1.46 to 2.87
flood prone depth range (ft.)	0.17 to 0.33
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.61 to 0.83
Tractive force, flood prone width (lbs/sq.ft.)	0.88 to 1.19
manual Qpk?	no
bankfull Qpk (cfs)	0.83
flood prone Qpk (cfs)	2.80

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 234.94(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	0.00
slope at station (%)	-0.20
flood prone width (ft.)	0.31
flood prone depth (ft.)	0.04
flood prone area (sq.ft.)	0.01
bankfull width (ft.)	0.13
bankfull depth (ft.)	0.01
bankfull area (sq.ft.)	0.00
bottom width (ft.)	0.03

Tractive force, bankfull width (lbs/sq.ft.) 0.16
Tractive force, flood prone width (lbs/sq.ft.) 0.24
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 50.00
slope at station (%) -0.18
flood prone width (ft.) 1.46
flood prone depth (ft.) 0.17
flood prone area (sq.ft.) 0.13
bankfull width (ft.) 0.63
bankfull depth (ft.) 0.06
bankfull area (sq.ft.) 0.02
bottom width (ft.) 0.13
Tractive force, bankfull width (lbs/sq.ft.) 0.69
Tractive force, flood prone width (lbs/sq.ft.) 0.99
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.15
flood prone width (ft.) 2.05
flood prone depth (ft.) 0.23
flood prone area (sq.ft.) 0.26
bankfull width (ft.) 0.88
bankfull depth (ft.) 0.09
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.18
Tractive force, bankfull width (lbs/sq.ft.) 0.78
Tractive force, flood prone width (lbs/sq.ft.) 1.13
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.13
flood prone width (ft.) 2.50
flood prone depth (ft.) 0.29
flood prone area (sq.ft.) 0.39
bankfull width (ft.) 1.07
bankfull depth (ft.) 0.11
bankfull area (sq.ft.) 0.07
bottom width (ft.) 0.21
Tractive force, bankfull width (lbs/sq.ft.) 0.83
Tractive force, flood prone width (lbs/sq.ft.) 1.19
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 200.00
slope at station (%) -0.08
flood prone width (ft.) 2.87
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.51
bankfull width (ft.) 1.23
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.61
Tractive force, flood prone width (lbs/sq.ft.) 0.88
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 234.94
slope at station (%) -0.06
flood prone width (ft.) 3.12
flood prone depth (ft.) 0.36
flood prone area (sq.ft.) 0.60
bankfull width (ft.) 1.34
bankfull depth (ft.) 0.13
bankfull area (sq.ft.) 0.11
bottom width (ft.) 0.27
Tractive force, bankfull width (lbs/sq.ft.) 0.46
Tractive force, flood prone width (lbs/sq.ft.) 0.67
right side slope (%) 25.00
left side slope (%) 25.00

Channel R7

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,852,023.54	3,610,242.42	2,058.00				
				N 41°04' W	13.25'		
0+13.25	1,852,014.83	3,610,252.41	2,055.26			16°52'	Left
				N 57°56' W	27.85'		
0+41.11	1,851,991.23	3,610,267.20	2,049.76			60°34'	Right
				N 02°38' E	27.48'		
0+50.00	1,851,991.64	3,610,276.08	2,048.14				
0+68.59	1,851,992.49	3,610,294.65	2,044.75			09°42'	Right
				N 12°20' E	27.71'		
0+96.30	1,851,998.41	3,610,321.72	2,040.14			59°57'	Left
				N 47°38' W	27.50'		
1+00.00	1,851,995.67	3,610,324.22	2,039.60				
1+23.79	1,851,978.09	3,610,340.25	2,036.08			02°50'	Right
				N 44°48' W	28.88'		
1+50.00	1,851,959.62	3,610,358.85	2,032.73				
1+52.67	1,851,957.74	3,610,360.74	2,032.39			64°28'	Right
				N 19°40' E	27.50'		
1+80.17	1,851,966.99	3,610,386.64	2,029.49			01°18'	Right
				N 20°58' E	27.27'		
2+00.00	1,851,974.09	3,610,405.15	2,027.86				
2+07.44	1,851,976.75	3,610,412.10	2,027.25			58°20'	Left
				N 37°22' W	27.50'		
2+34.94	1,851,960.06	3,610,433.96	2,025.68				

Natural Regrade Design Summary Report on Channel 'main R8'

Report is based on GeoFluv settings, not on built channels in the drawing.

*GeoFluv(TM) approach is used for channels steeper than -0.04 in lieu of Williams (1986) approach.

watershed area (ac.)	1.40
add'l watershed area (ac.)	0.00
valley length (ft.)	161.65
drainage density (ft./ac.)	115.76
head elevation (ft.)	2024.00
base elevation (ft.)	2011.22
relief (ft.)	13.01
head slope	-0.12
base slope	-0.05
slope range	-0.117 to -0.049
width to depth ratio, when slope < -0.04	12.50
width to depth ratio, when slope > -0.04	10.00
maximum design velocity (ft./s.)	4.50
runoff coefficient	0.89
bankfull width range (ft.)	0.68 to 1.17
bankfull depth range (ft.)	0.07 to 0.12
flood prone width range (ft.)	1.58 to 2.72
flood prone depth range (ft.)	0.18 to 0.31
entrenchment ratio	2.33
Tractive force, bankfull width (lbs/sq.ft.)	0.35 to 0.38
Tractive force, flood prone width (lbs/sq.ft.)	0.50 to 0.55
manual Qpk?	no
bankfull Qpk (cfs)	0.75
flood prone Qpk (cfs)	2.53

 Cross-section reports are done every 50.00(ft.).
 Stations are measured along the centerline, starting from the headwaters.
 The length of the centerline is 165.19(ft.).
 Left and right are from the point of view of looking downstream.

station (ft.)	50.00
slope at station (%)	-0.09
flood prone width (ft.)	1.58
flood prone depth (ft.)	0.18
flood prone area (sq.ft.)	0.15
bankfull width (ft.)	0.68
bankfull depth (ft.)	0.07
bankfull area (sq.ft.)	0.03
bottom width (ft.)	0.14
Tractive force, bankfull width (lbs/sq.ft.)	0.38

Tractive force, flood prone width (lbs/sq.ft.) 0.55
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 100.00
slope at station (%) -0.07
flood prone width (ft.) 2.22
flood prone depth (ft.) 0.25
flood prone area (sq.ft.) 0.31
bankfull width (ft.) 0.95
bankfull depth (ft.) 0.10
bankfull area (sq.ft.) 0.05
bottom width (ft.) 0.19
Tractive force, bankfull width (lbs/sq.ft.) 0.38
Tractive force, flood prone width (lbs/sq.ft.) 0.55
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 150.00
slope at station (%) -0.05
flood prone width (ft.) 2.72
flood prone depth (ft.) 0.31
flood prone area (sq.ft.) 0.46
bankfull width (ft.) 1.17
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.08
bottom width (ft.) 0.23
Tractive force, bankfull width (lbs/sq.ft.) 0.35
Tractive force, flood prone width (lbs/sq.ft.) 0.50
right side slope (%) 25.00
left side slope (%) 25.00

station (ft.) 165.19
slope at station (%) -0.05
flood prone width (ft.) 2.86
flood prone depth (ft.) 0.33
flood prone area (sq.ft.) 0.51
bankfull width (ft.) 1.23
bankfull depth (ft.) 0.12
bankfull area (sq.ft.) 0.09
bottom width (ft.) 0.25
Tractive force, bankfull width (lbs/sq.ft.) 0.36
Tractive force, flood prone width (lbs/sq.ft.) 0.52
right side slope (%) 25.00
left side slope (%) 25.00

Channel R8

Stationing at Intervals, and Geometric Points with Bearings, Distances, and Deflection Angles

Station	Easting (X)	Northing (Y)	Elevation (Z)	Bearing	Distance	Deflection	Direction
0+00.00	1,852,241.20	3,610,452.46	2,024.00				
				N 49°43' W	0.69'		
0+00.69	1,852,240.68	3,610,452.90	2,023.92			63°17'	Right
				N 13°34' E	26.96'		
0+27.65	1,852,247.00	3,610,479.12	2,020.90			58°01'	Left
				N 44°27' W	27.50'		
0+50.00	1,852,231.35	3,610,495.07	2,018.74				
0+55.15	1,852,227.74	3,610,498.74	2,018.24			05°25'	Right
				N 39°02' W	27.55'		
0+82.71	1,852,210.38	3,610,520.15	2,015.96			59°24'	Right
				N 20°22' E	27.50'		
1+00.00	1,852,216.40	3,610,536.36	2,014.76				
1+10.20	1,852,219.95	3,610,545.92	2,014.06			01°43'	Right
				N 22°04' E	27.39'		
1+37.59	1,852,230.24	3,610,571.31	2,012.50			58°51'	Left
				N 36°46' W	27.50'		
1+50.00	1,852,222.82	3,610,581.25	2,011.93				
1+65.09	1,852,213.78	3,610,593.34	2,011.25			29°36'	Right
				N 07°11' W	0.10'		
1+65.19	1,852,213.77	3,610,593.43	2,011.22				