



**TENNESSEE DEPARTMENT OF
ENVIRONMENT AND CONSERVATION**

**DIVISION OF MINERAL AND
GEOLOGIC RESOURCES**

LAND RECLAMATION SECTION

SPECIFICATIONS

FOR THE

CLOUSE HILL

RECLAMATION PROJECT

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Clouse Hill Reclamation Project

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SPECIFICATIONS FOR THE CLOUSE HILL RECLAMATION PROJECT

Section 100.0 - Introduction

The following specifications are for reclamation services on the abandoned mine areas at the location shown on the contract drawings.

Definitions:

State: The State, as used in these specifications, shall mean the Tennessee Department of Environment and Conservation, Division of Mineral and Geologic Resources, Land Reclamation Section, and its representatives.

Project Officer: The Project Officer, as used in these specifications, shall mean the employee of the Land Reclamation Section of the Tennessee Division of Mineral and Geologic Resources who is currently assigned to this project.

Division Engineer: The Engineer, as used in these specifications, shall mean the Environmental Protection Specialist of the Land Reclamation Section.

Contractor: The Contractor, as referred to in these specifications, shall mean the general earthmoving contractor selected to perform the proposed reclamation that has a proven performance history.

Section 101.0 - Delivery Time

All work specified in this contract is to be completed within approximately 330 days after receipt of order.

This agency term contract will remain active for a period of 24 months from the issue date to allow for determination of final quantities, delivery of weight tickets and certifications, final inspections and acceptance of work and processing of the invoice.

Work is to commence within approximately 30 days after receipt of order.

Once work begins, the Contractor shall use the necessary labor, equipment, and materials to actively pursue the work.

Section 102.0 - Summary of Work

This project is located in Grundy County, Tennessee. The project involves the reclamation of 84.5 acres of abandoned strip mines across three different sites. These areas are characterized by dangerous highwalls, water-filled pits, and barren spoils. The scope of work includes clearing and grubbing, area grading, pit dewatering and treatment, the construction of rock-lined channels and anoxic limestone drains, road restoration, and site revegetation.

Section 103.0 – License Requirements

The Respondent and all applicable subcontractors must hold an active Tennessee Contractors License with a Heavy Construction (HC), Heavy Construction "E" (HC-E), a full Building Construction (BC), a Building Construction "Commercial" (BC-B), a Building Construction "Industrial" (BC-C), or a Highway, Railroad and Airport Construction "Grading & Drainage" (HRA-A) classification.

Section 104.0 - Applicant Violator System

This project is funded through a grant with the U.S. Department of Interior's Office of Surface Mining. Therefore, the Contractor must not have outstanding violations with the Office of Surface Mining or be listed for any reason on the OSM Applicant Violator System (AVS).

A construction contract cannot be issued for this project to any contractor who has unfavorable status on the AVS. The successful bidder is required to submit company ownership and control information to the Land Reclamation office for certification. The Land Reclamation Section will provide the necessary forms for submittal.

Section 105.0 - Operator Qualifications

All equipment operators shall be competent and experienced with the type of equipment for which they are assigned, and they shall also be experienced in working to the lines and grade established on cut and fill stakes in the field.

Section 106.0 - Increase or Decrease in Quantities

All quantities set forth in these specifications and on the bid sheet are estimates. The State reserves the right to increase or decrease the actual quantities as site conditions warrant. The unit price bid shall remain unchanged. Any increase in contract quantities will be made in writing prior to performing any work.

Partial payments will be made based on the amount of work accomplished at the time of the payment request. Payment requests should be: 1) accompanied by supporting measurement and calculation documents and 2) mutually developed by the contractor and project officer. Any payment requests without the concurrence of these requirements will not be processed.

Final payment shall be calculated using the total number of units utilized and measured in the project at the unit price bid for each item.

Section 107.0 - Preparation of Erosion Control Measures

Best Management Practices found in Chapter 7 of the Tennessee Erosion and Sediment Control Handbook (August 2012, Fourth Edition) shall be utilized, except as modified herein. Special care shall be taken during all phases of construction to prevent pollution of streams with harmful or polluting materials such as but not limited to fuels, oils, bitumen, and calcium chloride. Payment will be a subsidiary of Section 204.0, Area Grading. Mulch berms, silt fence, and straws utilized for erosion control shall be paid under Section 211.0, Silt Retention Barrier.

Section 108.0 - Care of Public and Private Property

The contractor shall take all necessary precautions to prevent damage to all overhead, underground, and above ground structures and to protect and preserve property within or adjacent to the project and shall be responsible for all damage thereto. The contractor shall exercise special care in the execution of the work to avoid interference or damage to all operating facilities or structures. The contractor shall be responsible for any damage or injury to public or private property and shall otherwise restore or replace such damage or injury to property as may be deemed necessary by the engineer.

The contractor shall cooperate with utilities during any relocation work, adjustment, removal, or reconstruction of any such utility or facility within the work areas.

Section 109.0 - Site Access

The Contractor shall be responsible for maintaining the access roads in a passable condition during the life of the contract. All roads not designated as permanent shall be closed and water barred upon the completion of the project to prevent public access to the affected area. No other access points will be used unless approved by the Engineer.

Passable condition means roadways shall be graded as often as necessary to remove ruts that will trap water or erode. Access roads will be ditched, water barred, graded, have culverts installed, or have whatever other measures are necessary to protect the road from erosion and to maintain a relatively smooth surface.

Section 111.0 - Working Hours

All work on this project, except for dewatering, will be restricted to daylight hours unless specifically approved in writing by the Program Manager of the Land Reclamation Section. The contractor may be required at the project officer's discretion to perform the necessary dewatering on a 24-hour basis.

Section 112.0 - Site Clean Up

All work areas and/or areas disturbed during the course of the work shall be thoroughly cleaned of all rubbish, debris, construction waste, or other unsightly materials. Sanitary facilities shall be removed and/or backfilled in a manner acceptable to the project officer.

Section 114.0 - Maintenance during Construction

The contractor shall maintain completed work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work carried out day by day, with adequate equipment and forces to the end, that ensures the area is kept in a satisfactory condition at all times. No separate payment will be made for this item.

All costs of maintenance work during construction and before the project is accepted shall be a subsidiary to the lump sum bid price for mobilization.

Section 115.0 - Unacceptable Material and Workmanship

All material not conforming to the requirements of the specifications will be considered as unacceptable. All unacceptable materials and workmanship, whether in place or not, will be rejected and shall be removed immediately from the site of the work unless otherwise directed by the engineer. In case of failure by the contractor to comply promptly with any order by the engineer to remove rejected material and workmanship, the engineer shall have authority to have such rejected work and materials removed by other means and to deduct the expense of such removal from any monies due, or to become due, to the contractor. Corrective actions to repair unacceptable work and materials will be completed at no cost to the State.

Section 116.0 - Final Inspection and Acceptance

(a) All work (which term includes but is not limited to materials, workmanship, and manufacture and fabrication of components) shall be subject to inspection and tests by the State at all reasonable times and at all places prior to acceptance. Any such inspections and tests are for the sole benefit of the State and shall not relieve the contractor of responsibility for providing quality control measures to ensure that the work strictly complies with the contract requirements. No inspection or tests by the State shall be construed as constituting or implying acceptance. Inspection or

test shall not relieve the contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the State after acceptance of the completed work under the terms of paragraph (f) of this clause, except as hereinabove provided.

(b) The contractor shall, without charge, replace any material or correct any workmanship found by the State not to conform to the contract requirements. The contractor shall promptly segregate and remove rejected material from the premises.

(c) If the contractor does not promptly replace rejected material or correct rejected workmanship, the State (1) may, by contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the contractor, or (2) may terminate the contractor's right to proceed in accordance with the clause of this contract entitled "Cancellation".

(d) The contractor shall furnish promptly, without additional charge, all facilities, labor, and materials reasonably needed for performing such inspection and tests as may be required by the engineer. All inspections and tests by the State shall be performed in such manner as not to unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in this contract.

(e) If the State decides to inspect completed work before final acceptance, which may involve removing or tearing it out, the contractor must promptly provide all necessary facilities, labor, and materials upon request. If such work is found to be defective or nonconforming in any material respect, due to the fault of the contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction.

(f) Unless otherwise provided in this contract, acceptance by the State shall be made as promptly as practicable after completion and inspection of all work required by this contract, or that portion of the work that the engineer determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the State's rights under any warranty or guarantee.

(g) Upon due notice from the contractor of presumptive completion of the entire project work, the engineer will make an inspection. If all construction provided for and contemplated by the contract is found completed to his satisfaction, a final inspection will be scheduled within five (5) days. The final inspection shall be conducted by the Program Manager of the Land Reclamation Section or his designee, the Division Engineer, and the Project Officer. The contractor shall be present along with his superintendent and all subcontractors, if any, that have worked on the project.

The contractor shall not remove any equipment from the site until after he receives written notice of final acceptance of the work. Written notice of the final inspection and acceptance will be issued to the Contractor stating final acceptance and the date of release.

If, however, the inspection discloses any work in whole or in part, as being unsatisfactory, the engineer will give the contractor the necessary instructions for the correction of the deficiencies and the contractor shall immediately comply with and execute such instructions. Upon completion of the corrective work, another inspection shall be made which shall constitute the final inspection provided all work has been satisfactorily completed.

Section 117.0 - Accidents

The contractor shall provide, at the site and at his own expense, such equipment and medical facilities as are necessary to supply first-aid service to anyone who may be injured in connection with the work.

The contractor must promptly report in writing to the project officer all accidents whatsoever arising out of, or in connection with, the performance of the work, whether on, or adjacent to the site which caused death, personal injury, or property damages, giving full details and statements of witnesses. In addition, if death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the project officer and the contracting officer.

If any claim is made against the contractor or any subcontractor on account of any accident, the contractor shall promptly report the facts in writing to the project officer, giving full details of the claim.

Section 118.0 - Completion Time

The completion time is 330 calendar days, with no allowances for weekends, holidays, or normal weather disruptions. The Contractor shall take this time frame for completion into consideration when bidding on this project. Time extensions will not be granted except for unforeseeable, uncontrollable events (e.g., acts of God). Poor planning, inefficiency, equipment failure, or other factors within the Contractor's control will not justify a time extension.

Performance milestones will be enforced on the project. If 25% of the acreage is not completed by Day 82 of the contract, the Contractor will be given a warning. If 50% of the acreage is not completed by Day 165 or 75% of the acreage is not completed by Day 247 of the contract, the contract will be terminated in accordance with Section 7 of the contract terms and conditions.

Section 119.0 - Safety

The contractor shall conduct his operations in such a manner that all applicable laws and regulations are adhered to during performance of this contract.

119.01 - The contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public.

119.02 - No direct payment will be made for work required in this section, but the cost thereof will be considered to be included in bid price under Section 200.0, Mobilization.

Section 120.0 - Dust Control

The contractor shall take all available precautions to control dust. Dust shall be controlled by sprinkling, by applying calcium chloride, or by other methods as approved. If sprinkling is the selected method for controlling dust, the contractor shall water as often as necessary to control dust that is produced as a result of the movement of construction equipment and vehicles. Oils shall not be used. The use of other methods in preventing dust formation shall require prior approval from the Project Officer.

Section 121.0 - Superintendence by Contractor

The contractor, at all times during performance and until all the work is completed and accepted, shall give their personal superintendence to the work, or have on the project a competent superintendent, satisfactory to the division Program Manager and with authority to act for the contractor.

Section 123.0 – Tennessee One-Call Center

In the state of Tennessee, state law requires anyone about to engage in either digging, excavation, moving of earth, demolition, or any type of activity that disturbs the earth and therefore possibly involving a danger to damaging underground utility lines, to notify the Tennessee One-Call Center of their intent to dig.

Tennessee One-Call will then notify the member utilities of your proposed work. The utility company locator will then have 72 hours, excluding holidays and weekends, to locate those underground facilities.

While not required by law, in addition to calling Tennessee One-Call, you may also want to contact any non-member utilities that you know are in the area of your proposed work.

The locate ticket you receive is only valid for 15 calendar days from the start date indicated on the ticket, after which time, it expires. If you wish to continue working, you must call in at least three working days before the expiration date to renew your locate ticket, at which time you would be given a new ticket number.

The contractor must call the Tennessee One-Call Center at 811 or 1-800-351-1111 at least three days prior to starting work. Tennessee 811 accepts locate requests 24 hours a day, seven days a week.

Section 200.0 - Mobilization

Description

200.01 – The project consists of three separate Sites. Access to the Sites will require mobilization of equipment to the three different locations.

A paved county road must be crossed at Site 2 to traverse between areas. Precautions will be taken not to damage the road. Any damage to the road will be repaired at the Contractor's expense.

The work in this Section consists of furnishing all plant, equipment, labor, materials, and supervision necessary for performing all work required under this contract. This includes all operations performed in connection with mobilization of the Contractor's equipment and personnel.

Mobilization shall include the purchase of contract bonds; transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities at the site; and other preparatory work at the site. The specification covers mobilization for work required by the contract at the time of award.

Demobilization is also included under this Section. All equipment will be removed from the site before final payment is made under this Section.

A land surveyor licensed in the State of Tennessee shall be required for this project. Any property corners located within the final work limits will be replaced after construction has been completed. Several points along property lines that run through the project work limits will also be marked for the convenience of the landowner. The surveyor will be responsible for any research (locating deeds, locating surveys, etc.) necessary to accurately locate the property corners and lines. There are 16 known property corners shown on State Property Viewer maps within or very close to the work limits. Additional corners may be present depending on the maps and surveys obtained by the surveyor. The cost for furnishing the licensed surveyor and all work required to place the property pins shall be included under in the lump sum price bid under this Section. The general locations of the property pins shown on the drawings are only approximations and should be taken as such.

Payment for the licensed surveyor and all work necessary to locate and replace all property corners within the project work limits shall be included in the lump sum payment for Mobilization under this Section.

Measurement and Payment

200.02 - Measurement will be one (1) job, lump sum for all work completed under Mobilization.

Payment will be made at the contract lump sum price. This price shall be full compensation for furnishing all materials, labor, equipment, and incidentals necessary to complete the work.

Section 201.0 - Clearing and Grubbing

Special Project Specifications

201.00 – Clearing and grubbing limits will be flagged by the Project Officer. The Contractor shall confine all work within the flagged area. Care shall be taken to not damage any trees outside the flagged limits. All clearing debris shall be treated according to Section 201.05 Methods 1 (Windrowing), 4 (Burying), 5 (Chipping), or 6 (Piling and Burning). The primary method of disposal will be Method 5, Chipping. Disposal of clearing debris by other methods will require approval of the Project Officer.

Most of the clearing debris will be chipped and utilized for sediment control. Clearing debris twenty-inch (20") diameter or smaller shall be treated according to Method 5 (Chipping) of Section 201.05. Chipped debris larger than twenty-inch (20") diameter will be piled and burned. Chipped debris will be utilized as mulch filter berms for sediment control and onsite soil stabilization measures where appropriate. The Project Officer will determine where the chipped debris is to be placed. Excess chipped debris will be placed in the bottom of the pits. Remaining stumps will be buried in the bottom of the pits. Acceptable mulch filter berms will be paid to the nearest one linear foot under Section 211.0, Silt Retention Barrier.

If burning is required, the Contractor shall follow all applicable laws and ordinances. The Contractor shall ensure burning operations proceed under the constant care of competent watchmen at all times and in a manner that will not harm the surrounding vegetation or adjacent property.

The Project Officer will designate locations for stacking windrowed brush. Windrows will be constructed with densely packed treetops and saplings to filter sediment. Cleared debris may only be windrowed when directed by the Project Officer.

After grade work has been completed, the State will survey the work areas to determine the acreage of the work completed. Horizontal measurement shall be used in the data collection.

Description

201.01 - This work shall consist of clearing, grubbing, trimming, removing, and disposing of timber, construction slash, and debris. This work shall also include preservation of vegetation and objects designated to remain from injury or defacement.

Construction Requirements

201.02 – Clearing and Grubbing: All debris, trees, stumps, roots, and other protruding obstructions within the clearing limits, not designated to remain, shall be cleared, grubbed, removed, and disposed of, except for the following:

- (a) Undisturbed stumps outside the embankment areas, provided they do not extend more than 12 inches above the original ground nor closer than two (2) feet to the finished sub grade or one (1) foot to any slope surface and do not interfere with the placement or compaction of embankments.
- (b) Stable trees up to six (6) inches in diameter within the clearing limits but beyond the embankment and uncut vegetation less than three (3) feet in height and less than three (3) inches in diameter.
- (c) Grubbing of pits, channel changes, rock sections, and channels below the depth of the proposed excavation.

All roots over three (3) inches in diameter within the embankment area shall be grubbed to a minimum depth of six (6) inches below sub grade. Roots protruding from the excavated slope shall be cut flush with the excavated slope surface.

Trees shall be felled into the area being cleared when ground conditions, tree lean, and shape of clearing permit. Controlled felling shall be used that will ensure the direction of fall when necessary to prevent damage to property, structures, trees designated to remain, or traffic.

Snags and trees outside the clearing limits that are designated for individual removal shall be cut off not more than 12 inches above the ground and treated in accordance with Subsections 201.03 and 201.05.

Limits of work are flagged on the ground by means of paint or colored ribbon. All work shall be confined within the flagged boundary. Any clearing done outside the flagged boundary will not be paid for.

201.03 – Disposal of Merchantable Timber (Timber Meeting Utilization Standards): Timber meeting utilization standards shall be disposed of in accordance with the Special Project Specifications.

201.04 - Pioneer Roads: The construction of pioneer roads shall be approved by the engineer.

201.05 - Slash Treatment: Treatment of construction slash shall be accomplished by one or more of the following methods:

(1) Windrowing Construction Slash: Areas used for windrow construction slash shall be cleared to accommodate the windrow. Construction slash shall be placed outside the embankment in neat, compacted windrows laid approximately parallel with the toe-line of embankment slopes. The top of windrows shall not extend higher than ten (10) feet. All material in the windrow shall be matted down with construction equipment to form a compact and uniform pile. Windrows shall have 16-foot minimum length breaks at least every 200 feet. Windrows shall not be placed against trees. A pioneer road may be constructed to provide an area for placement of windrows provided the excavated material is kept within the clearing limits and does not adversely affect the embankment construction.

(2) Windrowing of Large Material: Construction slash ten (10) inches or more in diameter at the small end and six (6) feet or more in length shall be windrowed as in subsection (1) above. Small materials shall be treated by one or more of the other included options for slash treatment.

(3) Windrowing and Covering: Construction slash shall be placed and compacted as in subsection (1) above and shall be covered with at least six (6) inches of rock and soil to form a smooth and uniform windrow.

(4) Burying: Construction slash shall be buried at the locations shown on the drawings and designated on the ground. Construction slash shall be matted down in layers and covered with at least two (2) feet of rock and soil. The final surface shall be smooth and sloped to drain.

(5) Chipping: Construction slash up to at least twenty (20) inches in diameter shall be processed through a chipping machine. Chips shall be deposited on embankment slopes to a loose depth not exceeding six (6) inches. Minor amounts of chips may be permitted within the embankment if they are thoroughly mixed with soil and do not form a layer.

(6) Piling and Burning: Construction slash shall be burned in areas shown on the drawings and designated on the ground. Piles shall be constructed so that burning does not damage standing trees. If burning is incomplete, the remaining slash shall be piled and burned until the pieces are reduced to less than three (3) inches in diameter and three (3) feet in length. These pieces shall then be scattered.

The contractor shall conduct burning operations in compliance with all local, state, and federal laws, ordinances, and regulations. It is the contractor's responsibility to obtain all licenses, permits, payment of fees, etc., to comply.

(7) Decking Unmerchantable Material: Logs not meeting utilization standards that are six (6) inches or more in diameter shall be bucked into lengths not to exceed 32 feet and piled at the locations shown on the drawings.

Pieces of wood that are less than three (3) inches in diameter and three (3) feet in length may be scattered within the clearing limits.

No material shall be deposited in lakes, meadows, streams, or streambeds. Construction slash that interferes with drainage structures shall be removed immediately.

Trees adjacent to the clearing limits scorched or damaged beyond recovery shall be felled and disposed of in accordance with Subsection 201.02 or treated as construction slash.

Measurement and Payment

201.06 - The method of measurement will be to the nearest 0.1 acre for all work completed and accepted. Horizontal measurement shall be used in the data collection.

Payment will be paid at the contract unit price bid per acre and shall be full compensation for furnishing and applying all materials, labor, equipment, and other incidentals necessary to complete the work.

Section 204.0 - Area Grading

Special Project Specifications

204.00 - Work in this section includes backfilling and grading of spoil to eliminate highwalls and pits. After grade work is completed, drainage control will be established through the construction of rock channels, grass waterways, and terraces. Anoxic limestone drains will be constructed to control subsurface drainage.

Site 1 is located on Clouse Hill Road. It consists of 59.8 acres. The Site consists of strip mining around Clouse Hill ridge and three other small ridges to the east of the Clouse Hill. Clouse Hill has many short sections of strip mining separated by leave areas. Clouse Hill is divided into 10 different work areas, and the three other small ridges include an additional 5 areas.

The highwalls around the Clouse Hill site range from 15 to 25 feet in height. The grade of the backfilled highwalls will have final slopes that range from a 3:1 slope to flatter than 10:1 slope in places. See sheets 4 and 5 of the drawings for details of backfilled slopes at locations along the site. The site has one water-filled pit that is very shallow. The water should be able to be absorbed during backfilling operations. If the water is unable to be absorbed, the water quality will be checked before discharging operations can begin. If the water does not meet water quality standards, treatment shall be required. Requirements for treatment and discharging water are in Section 214.0, Pond Treatment and Dewatering, of the specifications. The approximate cut/fill yardage for the Clouse Hill Ridge site is 184,000/186,000 cubic yards.

The 5 areas east of Clouse Hill have highwalls between 15 feet to 20 feet in height. There are no water-filled pits. The final grades for the small ridge to the north will have 10:1 or flatter slopes. The backfilled highwalls for the small ridge to the south will have 4:1 or flatter slopes. See sheet 6 of the drawings for typical sections for the backfilled slopes at locations along the site.

Site 2 is situated near Short 7th Avenue in Coalmont, TN. It consists of 9.6 acres of contour mines divided into 3 areas. The site features shallow, water-filled pits and highwalls averaging 15 feet or less. The water pits may be able to be absorbed during backfilling operations depending on site conditions at the time. The backfilled highwalls will have final slopes ranging from 5:1 to 10:1. The approximate cut/fill yardage for the areas is 27,000/27,000 cubic yards. See sheet 9 of the drawings for typical sections for the backfilled slopes at locations along the site.

Site 3 is located adjacent to Bonnie Oak Road. It is a 15.1-acre area mine. The site has one water-filled pit surrounded by spoil piles. There are no highwalls present. The final backfilled slopes will have 10:1 or flatter slopes. There will be a grass lined waterway constructed through the site with a short rock-lined channel at the end to control drainage. The final backfilled slopes are shown on sheet 11 of the drawings. The approximate cut/fill yardage for the area is 82,000/84,000 cubic yards.

Before backfilling operations can begin, all water in pits shall be tested to ensure they meet water quality standards. All water-filled pits shall be pumped or drained down prior to backfilling to not create mud or sludge. See Section 214.0, Pond Treatment and Dewatering for details on individual pits.

Method 1 of Section 204.03, Side Casting, will be used for placing fill in pits and backfilling highwalls. The backfilling and grading of the pits and depressions where water is still pooled after pumping and draining shall be in a slow, consistent operation that allows the soil to absorb the remaining water. Backfilling must cease when the ground within the water-filled pits becomes unstable to the point the backfill will not support the weight of a dozer.

The material at the base of the highwall must be walked-in every ten (10) vertical feet in order to reduce settling of backfill material. Compaction by rolling with the earthmoving equipment used for grading operations will be acceptable.

All slopes will be tracked in perpendicular to the slope when grading is complete or when active grading operations of the slope will cease for more than 72 hours or before an anticipated rain event.

Grade work will provide positive grade for drainage on all graded areas and will eliminate all depressions that can hold water. After all rough grading is complete, surface drainage shall be provided by construction of rip-rap channels, grass-lined waterways, and terraces. The Project Officer will determine where drainage channels are required, both those specified and any additional channels, if needed. Where the grade on grassed waterways exceeds two (2) percent, rip-rap channels lined with filter fabric and rip-rap will be constructed. Typical sections for terraces, grassed waterways, and rock-lined channels are shown on sheet 12 of the drawings.

Terraces are required to intercept sheet flow runoff on backfilled slopes. The Project Officer will stake all terrace locations. Terrace grades shall not exceed 2%, verified with a transit, level, or equivalent method.

Terrace construction, grass-lined waterway construction, rock-lined channel construction, and anoxic limestone drain construction are included in the unit price bid under Section 204.0, Area Grading.

After grade work has been completed, the State will survey the sites to determine the area of the work completed. Horizontal measurement shall be used in the data collection.

Description

204.01 - The work in this section consists of the excavation, filling, and grading of all materials of whatever nature. It includes all hauling, formation of fills and embankments, ditch excavation, berm construction, disposal of unsuitable or surplus material, and finishing and final dressing.

Materials

204.02 – a. The materials required for this work shall be the in-situ materials on site unless stated otherwise in this contract special provisions.

b. Fencing- The barbed wire shall be 12.5-gauge wire with 4-point barbs at maximum 5-inch intervals. The top wire will be at least 42-inches from the ground, and the bottom wire will be at least 14-inches from the ground. Posts will be spaced 8-feet apart. The fencing will consist of five evenly spaced strands.

Construction

204.03 - Construction of Fills: Final grade shall approximate the lines and grade configuration shown on the plans. Regardless of the method of fill placement, the fill shall be so constructed that positive surface drainage shall be provided at all times. Ponding of water will not be allowed on the surface of the fill. Fill material may be placed in one of several different methods. These options are listed, and any required option or options shall be shown on the drawings.

Method of placing fill:

- (1) Side Casting: This method allows the dumping or pushing of material over the side of previously placed material. The material pushed or dumped must not exceed four (4) feet in thickness on the face of previously placed material. This method may be used in areas where finished grade is not critical to establishing final drainage patterns and in areas where settlement is not considered a problem. Small amounts of herbaceous and vegetative material (trees and brush) will be permitted in the base of the fill, provided it is not bunched up to form a loose pile of brush that will rot and leave a void that results in subsidence. When trees and brush are placed in the fill, the trees and brush shall be placed on the bottom of the pit and compacted to form a dense mass not to exceed four (4) feet in thickness. This method of brush disposal will only be allowed where future subsidence will not cause pits to be formed, and disposal areas will be shown on the drawings. Scattered individual trees may be allowed in the fill provided they are on the bottom of the pit area and fill material completely surrounds the trees. Compaction is not required. This method is particularly applicable for pushing off spoil ridges into open

pits to form a uniform finished grade that approximates original contour or contour shown on the drawings.

Pits that are holding water and designated to be backfilled shall be dewatered before backfilling. See Section 214.0, Pond Treatment and Dewatering.

In some instances, pits with shallow water may be backfilled with the pushing of earth material into the pit from the end and absorbing the water with the soil material. In the event absorption is allowed, the contractor shall push backfill material slowly to allow the soil particles to absorb the water and remain stable to the point of supporting the equipment used to move the backfill material.

Any mud or very soft backfill shall be covered with dry material to a depth that will support a dozer. If the mud cannot be made stable, then the contractor shall provide a guard to make sure no one enters the area until it has been stabilized.

If absorption of the water is permitted, then specifications will be included in Section 204.00, Special Project Specifications. Otherwise, absorption will not be permitted.

- (2) Layer Placement of Fill: Fill material shall be placed in layers not to exceed one (1) foot in thickness and compacted by rolling with the earthmoving equipment used for transporting or hauling the fill material.
- (a) Movement of materials will not be permitted when material is frozen or completely saturated. Material must be in a condition that allows placement without bogging equipment down.
 - (b) Placement of fill or embankment will not be permitted in areas of bogs or swampy areas until those areas are drained and the sub grade of the fill is prepared to receive fill materials.
 - (c) Preparation of surfaces to receive embankment shall be prepared by clearing all vegetative and organic materials from the site where fill materials are to be placed.
 - (d) When rock is used as a foundation, the foundation shall be stripped and cleaned of all overlying materials. All loose, disintegrated, or light slab portions of the rock shall be removed. In rock foundations where the rock is shattered below the foundation elevation, the shattered material shall be removed, and the foundation shall be rebuilt to meet the proposed overlying construction specifications.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the normal 8–12-inch thickness without crushing, pulverizing, or further breaking down the pieces resulting from excavation methods, such material may be placed in the embankment in layers not exceeding four (4) feet in depth. All rock to be placed in the embankment shall be broken into sizes not exceeding three (3) feet in maximum dimension. Larger pieces may be placed on the embankment face when permitted by the engineer. Each layer shall be leveled and smoothed with suitable leveling equipment and by the distribution of finer fragments of rock or other satisfactory material.

204.03.1 - Channels, Berms, and Dikes:

- (a) Diversion channels, berms, check dams, and other minor erosion control measures shall be a part of this work and shall be constructed in accordance with the details shown on the drawings.
- (b) Ditch and Berm Construction: The construction of diversion channels and berms, that are necessary for the control of drainage on the sites, shall be constructed to the template cross-section shown on the drawings. All channels or berms not designated as permanent structures shall be removed prior to final acceptance.

Minimum side slopes for channels and berms shall be two (2) feet horizontal to one (1) foot vertical or flatter. Maximum grade of the ditch bottom shall not exceed two (2) percent unless otherwise designated or directed by the engineer.

The channels shall be seeded and mulched immediately after construction of the ditch or berm is complete. Channels or berms shall be maintained throughout the life of the contract to function as constructed.

204.03.2 - Drainage Excavation:

Drainage excavation shall include construction of terraces, minor channel changes, channels, water bars, diversion channels, and other minor earth drainage structures as shown on the drawings.

204.04 - Temporary Dozer Access Road: The temporary dozer access road shall be built on the flagged grade. Maximum grade shall not exceed 12 percent unless approved in writing by the engineer. The road will have a maximum disturbance width of twenty feet. Upon abandonment, the road will be water barred to direct water to the outside and revegetated. Water bar locations will be flagged on the ground by the engineer.

Measurement and Payment

204.05 – The method of measurement will be to the nearest 0.1 acre for all work completed and accepted. Horizontal measurement shall be used in the data collection.

Payment will be paid at the contract unit price bid per acre and shall be full compensation for furnishing and applying all materials, labor, equipment, and other incidentals necessary to complete the work.

Section 208.0 - Ditches, Terraces, and Channels

Special Project Specifications

208.00 – Rock-lined channels, grass-lined channels, and terraces shall be constructed to carry surface drainage after grade work has been completed. The State will be present and help locate the channels and any terraces. General locations for anticipated channels are shown on the final views of the drawings. Design details for the channels are shown on sheet 12 of the drawings.

There are ten anticipated rock-lined channels required for the project. The rock-lined channels will be 10 feet wide and three (3) feet deep. The channels will be lined with five (5) ounce non-woven filter fabric. The rip-rap will be clean 6"-12" stone with larger stone over 12" (Class B) mixed in to anchor the rock in place on steep sections of the channel. Smaller stones will be rejected. The rock-lined channels total 1,690 feet in length. Soil removed from the excavation of the channels shall be deposited where it will not interfere with surface runoff into the watercourse.

Terraces shall be constructed as needed to control drainage. All terraces shall have an outfall grade of no more than two-percent. In no case shall the grade exceed two-percent unless the bottom is on bedrock. The grade of the terrace shall be checked with a level or transit by the Contractor to ensure proper construction. Rock checks shall be constructed to slow the flow of surface water at the discretion of the Project Officer.

There are three grass-lined waterways to be constructed. The waterways will be 10-feet wide. Details for grassed waterways are on sheet 12 of the drawings. The Project Officer may determine that additional drainage control channels (terraces, grassed waterways, rock-lined channels) are needed after grade work has been completed.

Payment for constructing all terraces, rock-lined channels, rock checks, and grass-lined waterways (those specified in the plans and any additional ones) shall be included in the unit price bid under Section 204.0, Area Grading. Rip-rap and filter fabric used in constructing the channels shall be paid for under Section 209.0, Rip-rap.

Description

208.01 - This work shall consist of the layout and construction of diversion channels, terraces, and channels necessary to prevent or minimize erosion and control water flow and direction on the project site.

Equipment

208.02 – The equipment size and quantity shall be suited for the size drainage structure shown on the drawings and it shall be available to perform the work. Large equipment shall not be permitted when cutting small diversion channels if an excessive area of disturbance is the result of the use of large equipment.

Construction Requirements

208.03 - All diversion channels, terraces, and waterway channels shall be constructed to the grades and dimensions shown on the drawings, but in no case shall the bottom grade of any ditch be greater than three (3) percent unless approved in writing by the Engineer.

Measurement and Payment

208.04 - Separate payment will not be made for construction of rock-lined channels, grass-lined waterways, or terraces, but will be a subsidiary item of work under Section 204.0, Area Grading.

Payment for filter fabric and rip-rap used in construction of rock-lined channels will be made under Section 209.0, Rip-Rap.

Section 209.0 - Rip-Rap

Special Project Specifications

209.00 – Ten rock-lined channels shall be constructed at the locations shown on final views of the drawings. The rock-lined channels shall require 1,690 tons of limestone. The limestone will be a combination of 6"-12" limestone and larger Class-B limestone. Larger Class B limestone will be mixed in to deter the limestone from washing down slope during rain events. The Project Officer will verify the acceptability of the limestone size and the channel location before channel construction can begin.

There are three anoxic limestone drains specified in Section 302.0, Limestone Subsurface Drain Construction. The ALD's will require 460 tons of rip-rap. The limestone for the ALD's will be #2 limestone or 4"-9" limestone. The rip-rap will be high calcium limestone, at least 90% CaCO₃.

The approximate lengths and rock requirements of rock channels and ALD's are as follows:

Site	Location	Length	Quantity
Rock-lined Channel #1	Area 2	270'	270 tons
Rock-lined Channel #2	Area 3	270'	270 tons
Rock-lined Channel #3	Area 3	270'	270 tons
Rock-lined Channel #4	Area 4	310'	310 tons
Rock-lined Channel #5	Area 4	180'	180 tons
Rock-lined Channel #6	Area 8	90'	90 tons
Rock-lined Channel #7	Area 10	90'	90 tons
Rock-lined Channel #8	Area 18	60'	60 tons
Rock-lined Channel #9	Area 18	100'	100 tons
Rock-lined Channel #10	Area 19	50'	50 tons
TOTAL			1,690 tons
Anoxic Limestone Drain #1	Area 14	280'	150 tons
Anoxic Limestone Drain #2	Area 15	250'	130 tons
Anoxic Limestone Drain #3	Area 18	360'	180 tons
TOTAL			460 tons

A total of 2,150 tons of rip-rap and limestone will be required for the project. A total of 4,300 yd² of five (5) ounce, non-woven filter fabric shall be placed under the rip-rap channels, and around all sides of the subsurface drains.

Payment for stone and filter fabric shall be paid under this Section. Payment for constructing the rock-lined channels, rock checks, and anoxic limestone drains shall be included in the price bid per acre under Section 204.0 (a), Area Grading.

Description

209.01 - This work shall consist of furnishing and placing hard durable limestone rock on the slopes of embankments, dikes, stream banks, on bottom and sides of channels and ditches, gullies, culvert outlets, wing walls, structure outlets and at other locations shown on the drawings.

Materials

209.02 - Stones used for rip-rap shall be hard angular limestone rock meeting the following requirements for durability absorption ratio as defined below:

If the Durability Absorption Ratio (DAR) is 23 or greater, the rock is acceptable. If DAR is between 10 and 23, it is acceptable if the Durability Index is 52 or greater. If DAR is less than 10, the rock is unacceptable.

The Durability Index and percent absorption shall be determined by AASHTO T-210 and AASHTO T-85, respectively. The minimum specific gravity of the rock shall be 2.5 as determined by AASHTO T-85. The Contractor shall furnish a certified test report.

<u>Class</u>	<u>Allowable Size Range</u>	<u>Weight Restriction</u>
A	2 inches to 1.25 feet	≤ 20 percent by weight < 4 inches
B	3 inches to 2.25 feet	≤ 20 percent by weight < 6 inches
C	5 inches to 3 feet	≤ 20 percent by weight < 9 inches

All rock shall be clean shot rock containing no sand, dust, or organic materials. The stone shall be uniformly distributed throughout the size ranges.

209.021 - Nonwoven Filter Fabric: The filter fabric shall be a nonwoven geotextile composed of polypropylene fibers and shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

The filter fabric shall as a minimum exhibit the following properties:

<u>Property</u>	<u>Test Method</u>	<u>Unit</u>	<u>Results</u>
Grab Tensile	ASTM D 4632	lbf	115
Elongation	ASTM D 4632	%	50
Puncture	ASTM D 4833	lbf	65
Trapezoid Tear	ASTM D 4533	lbf	50
Permittivity	ASTM D 4491	sec ⁻¹	1.10-2.00
Flow Rate	ASTM D 4491	gal/min/ft ²	120-140
AOS	ASTM D 4751	US Sieve	70
Mullen Burst	ASTM D 3786	psi	175

Delivery, Storage, and Handling: During shipment and storage, the filter fabric shall be wrapped in a heavy-duty protective covering. The storage area shall be such that the fabric is protected from mud, soil, dust, and debris. Fabric that is not installed immediately shall not be stored in direct sunlight.

209.022 - Securing Pins: Securing pins shall be of steel, a minimum of 3/16 inch in diameter and at least 15 inches long. Other equivalent securing devices may be substituted if recommended by the fabric manufacturer.

Rock Rip-Rap Flume

209.03 - This work shall consist of limestone rip-rap for channel protection furnished and constructed in accordance with these specifications and in reasonably close conformity with the lines, grades, and dimensions specified. Construction shall be at the locations shown on the plans or established by the Engineer.

1. Excavation and Foundation Preparation: Foundation and other necessary excavations shall be approved by the Engineer before the placing of rip-rap is begun. Where filling of depressions is required, the backfill material shall be compacted with hand or mechanical tampers. Unless otherwise shown, rip-rap shall begin in a toe trench constructed in original ground around the toe of the rock fill or the top of the cut slope. Where rip-rap is to commence under water, the two trenches shall be omitted, and an apron of rip-rap shall be substituted.

2. Placement of Stone Rip-Rap: Rip-rap shall be dumped into place to form a dense compact layer to the design thickness. The tolerance shall be +12 inches with no under tolerance.

209.031 - Filter Fabric: The plastic filter fabric shall be placed in the manner and at the location indicated on the plans. The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions, and debris.

The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within three (3) inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip will overlap the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three (3) feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals, or other contaminants. Any contaminated fabric shall be removed and replaced with uncontaminated fabric at no expense to the State. Any fabric damaged during its installation or during placement of rip-rap shall be replaced by the Contractor at no additional cost to the State. Filter fabric shall conform to Section 209.021 of this section.

209.032 - Grouted Rip-Rap: Grouted rip-rap shall be placed as specified above for stone rip-raps, except care shall be taken to prevent earth from filling the spaces between stones. After the stone has been acceptably placed, the spaces between them shall be filled with a 1:3 grout composed of Portland cement and sand mixed thoroughly with sufficient water to give a thick, creamy consistency. The grout shall be placed beginning at the toe and finished by sweeping with a stiff bristle broom. After the grouting is completed, the rip-rap shall be covered and kept wet for five (5) days or covered and kept wet for 24 hours and then coated with a white pigmented membrane curing compound. Grout shall not be placed when air temperature is below 40° F or when there is frost on the rip-rap. Grout shall be protected from freezing.

209.033 - The Contractor shall exercise care in placing and in preparation of the rip-rap subgrade to ensure that the design template is maintained. When deemed necessary by the Division Engineer, the rip-rap shall be rolled with tracked equipment or tamped in place with a backhoe bucket to provide a denser mass. Upon completion of the work, visual inspection shall reveal that approximately 50 percent of the surface area consists of stones no smaller than one-half of the maximum size specified.

Measurement and Payment

209.04 - (a) Rip-Rap: Measurement of the rip-rap shall be to the nearest 0.01 ton of rip-rap placed and accepted. Weight tickets will be accepted for dumped in place material.

Payment of rip-rap will be made at the contract unit price bid per ton.

(b) Filter Fabric: Measurement of the filter fabric shall be to the nearest square yard installed and accepted.

Payment of filter fabric will be made at the contract unit price bid per square yard.

Section 211.0 - Silt Retention Barrier

Special Project Specifications

211.00 - Approximately 21,100 linear feet of silt retention barrier shall be installed for sediment control. Barriers must be installed at the toe of spoil areas during the initial stages of construction, immediately following the completion of grading for each section.

Wood-chip filter berms utilizing on-site clearing debris are the preferred method of silt retention barrier. The berms shall be a minimum of three (3) feet wide and a minimum 1½-feet in height. The berms shall be trapezoidal in shape with a flattened top. The Project Officer will direct the Contractor as to where to place the berms. The wood chip berm will be measured to the nearest linear foot, and payment will be made at the unit price bid under this Section. Details for the wood-chip berms are shown on sheet 12 of the drawing.

If the Project Officer determines that the mulch filter berms are not adequate, straw wattles or silt fence will be installed. The Project Officer will determine which type of silt retention barrier is appropriate at a given site.

Silt fence shall be a minimum of two (2) feet in height. The posts supporting the fence shall be spaced at a maximum of six (6) feet to eliminate fiber sagging as much as possible. Tie backs shall be utilized where needed to support posts. See sheet 12 of the project drawings for details of silt fence construction.

Straw wattles will be constructed along contours as to not channel drainage to one point. The straw wattles shall be constructed and maintained for the duration of the project. The ends and any long stretches will be turned up slope forming a J-hook to filter any concentrated flow behind the wattles. Twelve-inch diameter wattles shall be placed in a 3"-5" trench. Stakes shall be used to anchor the wattles to the ground. The stakes shall be a minimum of 1" by 1" in width and four (4) feet in length. The stakes shall be placed at a maximum of four (4) feet apart. One half of the stake must be under ground level. See sheet 12 of project drawings for details of straw wattle construction.

The silt retention barrier will be maintained for the duration of the project. Sediment buildup will be removed from the barriers as needed.

Payment for installing the wattles, silt fence, and chipped berms will be paid at the contract unit price bid per linear foot and shall be full compensation for furnishing and applying all materials, labor, equipment, and other incidentals necessary to complete the work.

Description

211.01 - The work in this section consists of furnishing all materials, equipment, labor, and other incidentals necessary for the construction of silt checks and temporary silt fences designated on the drawings and other silt control devices described in these specifications.

Materials

211.021 – Silt Fence: Filter fabric shall be woven polypropylene filaments needle punched network such that yarns retain their relative positions to each other.

Minimum properties for the filter shall be:

Grab strength ASTM D-1682-64	30 lb.
Bursting strength ASTM D-3786-80a	210 psi
Permeability co-efficient CFMC-GET	20.01 cm/sec
Water flow rate	40 gal/min/sq ft

Material for the fence posts shall be 2" X 2" X 4 1/4' oak minimum as furnished by the manufacturer or as approved by the Engineer.

211.022 - Straw Wattles. Wattles will consist of 100% weed seed free agricultural straw inside flexible and durable tubular polyester netting.

Stakes to anchor wattles shall be one (1) inch diameter stakes, four (4) foot in length approved by the Project Officer.

Construction

211.03 - Silt fences and straw wattles shall be constructed at the general location shown in the drawings. The exact location will be staked on the ground.

Temporary Silt Fences: Using a woven filter cloth as a filter medium, silt fences shall be constructed at the locations staked and shall be erected before beginning any earth work. Exceptions shall be approved by the Project Officer.

Maintenance

211.04 - During the life of the contract, the Contractor shall maintain the silt retention barriers in an effective condition. Sediment buildup will be removed in a timely manner.

Measurement and Payment

211.05 – Measurement for the silt retention barriers shall be made to the nearest one (1) foot for completed and accepted work. Measurement will be linear measurement.

Payment for the silt retention barriers shall be made at the contract unit price bid which shall be full payment for completed and accepted work.

Section 214.0 - Pond Treatment and Dewatering

Special Project Specifications

214.00 – All of the water in the pits was found to be close to compliance with water quality standards when checked by Division personnel. The water quality may have changed depending on site conditions at the time of the project. The water-filled pits must be checked to ensure compliance with water quality standards before discharging operations can commence.

It will be possible to absorb the water in some of the pits. If the water in a pit cannot be safely absorbed, it shall be pumped or drained down to an acceptable depth for backfilling to begin. Any water to be discharged must be tested and recorded before discharge operations can begin to ensure compliance with water quality standards.

Extreme care will be taken by the Contractor so as not to allow sludge or sediment from the bottom of the pits to be discharged and to not allow offsite damage to occur as a result of increased quantity and velocity of water.

The Contractor is to submit the analytical results from the composite samples along with his plan of treatment, mixing, and dewatering to the Project Officer for approval prior to starting this phase of the work.

The estimated volumes and water quality of pits when field checked:

Pit Identification	Volume (Gallons)	pH Level
Water-filled Pit #1	470,000	6.0
Water-filled Pit #2	330,000	6.5
Water-filled Pit #3	390,000	6.8
Water-filled Pit #4	9,000,000	6.6

Section 214.03 will be followed **strictly** during the dewatering process.

No dewatering shall take place until a treatment and discharge plan is approved by the State. Refer to Section 214.02 for approval steps to be followed **strictly**. Effluent limits must be verified by the Contractor and Project Officer.

Description

214.01 - The work in this section consists of treating and draining the ponded water in several locations at the site.

Treatment

214.02 - Ponds will be treated and drained as follows: The Contractor shall be required to collect a composite sample from each impoundment for analysis. All necessary precautions such as prompt analysis, cooling of samples, etc., are to be taken to maintain the integrity of the samples. The Contractor shall perform titration tests to determine neutralization requirements and, at a minimum, the pH, acidity, alkalinity, total iron, manganese, and suspended solids as well as the conditions under which the samples were collected (weather, number, and location of sampling point, etc.). The Contractor is to submit the analytical results from the composite samples along with his plan of treatment, mixing, and dewatering to the Project Officer for approval prior to starting this phase of the work. The neutralizing agent must be approved prior to treatment by the Project Officer.

Contractor's treatment plans along with test results are to be submitted ten days prior to treatment and discharge.

The Contractor shall have all the necessary equipment set up, ready for use, and materials available on site prior to beginning treatment. The Contractor shall uniformly apply one-half the estimated volume of neutralizing agent to the impoundment and mix by pumping. High volume pumps (3,000 gpm minimum) will be required per impoundment in order to ensure thorough mixing in a timely manner. The mixing pumps shall have their intake located near but not on the bottom of the impoundment. The Contractor must have the capability of directing the discharge from the mixing pumps to the extremities of the impoundment in order to assure thorough mixing. After the initial mixing, the State will spot check the Contractor's analysis of pH, Fe, TSS, and Mn content for water quality. The Contractor shall add additional neutralizing agent in order to meet NPDES standards.

<u>Effluent Characteristic</u>	<u>Daily Maximum Limitation</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
pH	6.0 - 9.0	5 per day	Grab
Iron, TpHotal	6.0 mg/l	5 per day	Grab
Manganese, Total	4.0 mg/l	5 per day	Grab
Total Suspended Solids	70.0 mg/l	5 per day	Grab
Flow (GPM)	N/A	5 per day	Estimated

Compliance with the above effluent limits must be verified by the Contractor and the Project Officer before discharge of the treated water to the receiving stream. The Contractor must periodically monitor water quality during dewatering operations as specified in the monitoring requirements. The Contractor shall furnish the results of the monitoring samples to the Project Officer immediately.

Dewatering

214.03 - Upon approval of test results by the Project Officer, the Contractor may begin discharge according to a prior approved discharge plan.

The discharged water must follow NPDES standards when it leaves the project boundaries. In order to comply with total suspended solids, all discharge must be directed onto an approved splash pad. It may be necessary for the Contractor to construct temporary flumes.

Extreme care must be taken by the Contractor so as not to allow sludge or sediment from the bottom of the pond to be discharged and to not allow offsite damage to occur as a result of increased quantity and velocity of water.

The Project Officer may at any time during discharge issue a cease order for noncompliance with these requirements. In such case the Contractor shall immediately terminate discharge operations until the problem is corrected and approval to discharge has been reissued.

The Project Officer will determine when each impoundment has been sufficiently drained and will approve backfilling operations which shall be in accordance with Section 203.0, Excavation and Embankment, and Section 204.0, Area Grading.

Measurement and Payment

214.04 - Measurement will be lump sum for the work completed and accepted.

Payment will be made at the lump sum price bid which shall be full compensation for furnishing all materials, labor, supervision, equipment, and all other incidentals necessary to complete the work.

Section 302.0 - Limestone Subsurface Drain Construction

Special Project Specifications

302.00 – There are three anticipated anoxic limestone drains for this project. The subsurface drains will be 5' wide and 2' deep. Clean, #2 limestone or 4" – 9" limestone will be required for any subdrains. The Project Officer will determine the appropriate rock size depending on site conditions. The limestone must be at least 90% calcium carbonate. The subsurface drains shall be wrapped with 5-ounce non-woven filter fabric.

The approximate lengths and rock requirements of ALD's are as follows:

Anoxic Limestone Drain (ALD) Summary		
Site	Length	Quantity
ALD #1	280'	150 tons
ALD #2	250'	130 tons
ALD #3	360'	180 tons
Total		460 tons

Any water-filled pits that require an added anoxic limestone drain shall be pumped down and graded such that the ALD is installed next to the highwall and near the bottom of the pit. The ALD is not only to control the subsurface water, but to also provide treatment of the water. A small dam shall be constructed at the outlet to back water up into the ALD before discharging for better treatment.

Payment for all work associated with the construction and installation of the limestone under drains shall be paid for under Section 204.0 (a), Area Grading. Payment for the limestone and filter fabric used in the construction of the under drain will be under Section 209.0 Rip-Rap.

Description

302.01 - This work shall consist of the layout and construction of subsurface drains and placement of limestone for the treatment of acid drainage.

Equipment

302.02 - Equipment size and quantity suited for the size drainage shown on the drawings shall be available to perform the work. Large equipment shall not be permitted when cutting small drains if an excessive area of disturbance is the result of the use of large equipment.

Materials

302.03 - Nonwoven Filter Fabric: The filter fabric shall be a nonwoven geotextile composed of polypropylene fibers and shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids. The filter fabric shall as a minimum exhibit the following properties:

<u>Property</u>	<u>Test Method</u>	<u>Unit</u>	<u>Results</u>
Grab Tensile	ASTM D 4632	lbf	115
Elongation	ASTM D 4632	%	50
Puncture	ASTM D 4833	lbf	65
Trapezoid Tear	ASTM D 4533	lbf	50
Permittivity	ASTM D 4491	sec-1	1.10-2.00
Flow Rate	ASTM D 4491	gal/min/ft ²	120-140
AOS	ASTM D 4751	US Sieve	70
Mullen Burst	ASTM D 3786	psi	175

Delivery, Handling, and Storage: During shipment and storage, the filter fabric shall be wrapped in a heavy-duty protective covering. The storage area shall be such that the fabric is protected from sun, mud, soil, dust, and debris. Fabric that is not installed immediately shall not be stored in direct sunlight. Fabric storage on the ground will not be permitted for longer than 12 hours.

Filter and Buffering Stone: The stone in the subsurface drain shall be limestone meeting the following requirements. Limestone from the Monteagle formation is acceptable and possibly limestone from the Holston formation. A certificate of analysis will be required wherever the rock is sourced. A 90 percent CaCO₃ or better will be required. Dolomite limestone will not be acceptable; only rock composed principally of mineral calcite will be acceptable. The rock gradation size will be as shown below. The rock shall be clean rock free of detrimental substances. Percent wear shall not exceed 40 percent as determined by AASHTO T-96. Rock shall have a specific gravity of at least 2.65 as determined by AASHTO T-85. The Contractor shall furnish a certified test report that the rock meets these requirements.

<u>Sieve Size</u>	<u>Percentage Passage (%)</u>
3"	100
2½"	90-100
2"	35-70
1½"	0-15
¾"	0-5

Placement of Filter Stone: Rock may be dumped into place to form a dense mass to the dimensions shown on the drawings.

Plastic Film Wrap: Plastic film shall be 6-mil polyethylene film at least 10 feet wide. Plastic film shall be stored in a dark room or in the closed shipping container away from sunlight.

302.04 - Plastic film shall be installed as follows:

After the trench has been excavated as approved, the plastic liner shall be placed in the trench. A minimum of an 18-inch overlap shall be provided at each lap.

Care shall be taken to assure a tight seal around the crushed stone after it is in place.

Extreme care shall be exercised to prevent damage to the plastic. It is imperative that the drain remains completely encased in the plastic sheet to seal out the air from the interior of the trench. Any damaged plastic shall be replaced by the Contractor at no additional cost to the State.

Construction Requirements

302.05 - All drains shall be constructed to the grades and dimensions shown on the drawings but in no case shall the bottom grade of any ditch be greater than one (1) percent or less than 1/4 percent unless approved in writing by the Engineer.

Soil removed from the excavation of the ditch shall be deposited where it will not interfere with surface flow into a watercourse.

Unless otherwise specified, excavation shall begin at the outlet end and progress upstream.

The trench or excavation shall be constructed to the depths and cross sections shown in the drawings. The trench width may be increased above the top of the tile, at the option of the Contractor.

Trench shields, shoring and bracing, or other methods necessary to safeguard the workmen and work, and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the Contractor.

Filter fabric lining is required and shall conform to the requirements stated herein. Minimum overlap shall be one (1) foot. Care shall be taken in placing fabric to avoid punching holes in the fabric. Fabric with holes shall be removed and replaced at the Contractor's expense.

The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within three (3) inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip will overlap the downstream strip. The fabric shall be placed loosely to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three (3) feet during construction. The fabric shall always be protected during construction from clogging due to clay, silts, chemicals, or other contaminants. Any contaminated fabric shall be removed and replaced with uncontaminated fabric at no expense to the Department. Any fabric damaged during its installation or during placement of rip-rap shall be replaced by the Contractor at no additional cost to the State. Filter fabric shall conform to Section 209.021 of this section.

Measurement and Payment

302.06 – No separate measurement or payment shall be made for anoxic limestone drain construction, but will be a subsidiary item of Section 204.0, Area Grading.

Limestone and filter fabric used in construction of the anoxic limestone drain shall be paid for under Section 209.0, Rip-Rap.

Section 701.0 - Road Restoration

Special Project Specifications

701.00 – Road restoration shall include upgrading, constructing, and maintaining existing access roads. Any roads impacted during construction shall be re-established after work is complete. Existing roads will be left in as good or better conditions as they were before the project. Care will be taken not to track excess dirt and mud onto the county roads.

Site 1 will be accessed from two gated roads on Clouse Hill Road. Either or both gated roads can be utilized to access the areas. One road is in serviceable condition and will only require light work and maintenance. The second road will require minor clearing and shaping.

Access to Site 2 will be from 7th Avenue off Highway 56 in Coalmont, TN. The access road will be upgraded to widen and shape the road. The Site is split by a paved county road, Short Street. Equipment will not be trammed across the road without adequate protection for the asphalt. Any damage to the road will be the Contractor's responsibility.

Site 3 lies directly on Bonnie Oak Road. A very short access road will be required, less than 100 feet. Road rock will be placed as needed to keep the road serviceable.

Road rock shall be placed as needed on any soft spots that may develop. Limestone shall be used when necessary to stabilize the road. No. 2, No. 57, and crusher-run limestone will be utilized as needed for the roads as needed. Five hundred (500) tons of road limestone are available for the project.

All work required to construct, upgrade, and maintain access roads shall be paid lump sum under this Section 701.0 (a), Road Restoration. All road rock needed to construct, maintain, and upgrade the access road shall be paid per 0.01 ton under this Section 701.0(b), Road Limestone.

Description

701.01 - The work in this section consists of maintenance of roads for safe traffic flow during work on this project. Upon completion of the reclamation work, the road will be revegetated, water barred and blocked.

Materials

701.02 - Materials for shaping the roadbed shall be the in-place materials within the roadway. Crushed limestone with a maximum 1 ½ inch size shall meet the requirements of Section 903 of the Tennessee Highway Department of Standard Specifications, 2026 Edition.

Construction and Maintenance

701.03 - The roadway shall be maintained for traffic at all times. The road shall be graded to maintain a smooth riding surface that will permit automobile traffic to safely travel through the project.

Soft areas within the roadway will have to be ripped out and reworked to the density specified. The roadbed shall be graded to a smooth surface before application of the surfacing.

Safety

701.04 - It will be the Contractor's responsibility to take whatever measures necessary to maintain traffic on the county road during the course of the work. Flagman, lights, and warning signs will be in accordance with the current edition of the "Manual for Uniform Traffic Control Devices for Streets and Highways" Federal Highway Administration including all addenda.

Construction of signs, lights, and barricades shall conform to Section 712.04 of the Tennessee Highway Department Standard Specifications for Road and Bridges, 1981 edition.

Measurement and Payment

701.05 – (a) Road Restoration:

Measurement shall be one job for all work completed and accepted.

Payment shall be lump sum for complete and accepted work and shall constitute full and complete payment for all work in this section.

(b) Road Limestone:

Measurement of stone placed on roads shall be to the 0.01 ton of rip-rap placed and accepted. Weight tickets will be accepted for dumped in place material.

Payment of all stone will be made at the contract unit price bid per ton.

Section 801.0 - Vegetation Establishment

Special Project Specifications

801.00 – One thousand pounds per acre of 19-19-19 fertilizer and twelve (12) tons per acre of lime will be worked into the soil.

The entire disturbed area shall have lime and fertilizer spread and the soil shall be pulverized to a depth of four to six inches.

Seeding on this project will be done with a hydroseeder, cultipacker seeder, or tractor-mounted cyclone seeder. If a hydroseeder is used, four to five pounds per 1,000 square feet of wood mulch will be used to identify the area covered.

Seed requirements and rates are as follows:

Virginia Wildrye (<i>Elymus Virginicus</i>)	10 Pounds per Acre
Winter Wheat (<i>Triticum Aestivum</i>)	30 Pounds per Acre
Foxtail Millet (<i>Setaria Italica</i>)	4 Pounds per Acre
Buckwheat (<i>Fagopyrum Esculentum</i>)	20 Pounds per Acre
Orchard Grass (<i>Dactylis Glomerata</i>)	10 Pounds per Acre
Perennial Ryegrass (<i>Lolium Perenne</i>)	15 Pounds per Acre
Deertongue (<i>Panicum Clandestinum</i>)	7 Pounds per Acre
Partridge Pea (<i>Chamaecrista Fasciculata</i>)	8 Pounds per Acre
Ladino Clover (<i>Trifolium Repens</i>)	7 Pounds per Acre
Alsike Clover (<i>Trifolium Hybridum</i>)	8 Pounds per Acre
<u>Black Eyed Susan (<i>Rudbeckia Hirta</i>)</u>	<u>1 Pound per Acre</u>
Total - 120 Pounds Per Acre	

Three (3) tons of straw or hay mulch per acre is required and mulch shall be held in place by using a crimper or other compatible method to anchor the mulch into the soil. The crimper shall be capable of pushing the mulch into the soil to a depth of two inches.

All areas that are seeded must be mulched on the same day that they are seeded. If an area is seeded, but not mulched and crimped, and it rains, the area must be re-disked and re-seeded. Additional seed required by poor planning of the Contractor shall be at the expense of the Contractor.

The Project Officer shall be on site during the vegetation process. The cost for furnishing all materials, equipment, labor, and other incidentals necessary for the revegetation shall be included in the unit price bid per acre under this Section.

Description

801.01 – Grasses: Seeding shall consist of furnishing and placing seed, commercial fertilizer, agricultural limestone, and mulch material when specified, all in accordance with these specifications, on all newly graded earthen areas or other areas shown on the drawings.

Seedbed will be prepared in accordance with Section 801.05.

Seed certification will be required before seeding is started. (See Section 801.021)

Seedlings: The Contractor will be required to purchase, then store, transport, and plant the seedling species that are specified in Section 801.00. If some seedlings are not available at the time of planting, after getting approval from the Project Officer, substitute species of tree seedlings may be used.

The Tennessee Department of Agriculture, Division of Forestry at the East Tennessee Nursery at Delano, Tennessee, should have sufficient amounts of seedling species for this project.

The Contractor shall take only a two-day supply of trees from a cooler or storage facility when planting begins. Contractor shall submit the location of the storage facility for approval by the State before use.

ROOT PRUNING WILL NOT BE PERMITTED.

Planting stock shall be picked up at a cooler or storage facility as needed for planting within two days and protected from exposure to sun and drying during shipment, delivery to planting site and handling at project site. Planting stock shall be dormant when planted and shall be planted immediately following delivery to the project site. The seedlings shall be moistened, and the bundles remain unopened until they are ready to plant. All seedlings shall be planted within two days after being picked up at a storage facility. Seedlings to be planted the second day shall be placed in a cool shady area.

Seedling pickup should be scheduled to minimize the amount of time between pickup at the storage facility and field planting.

Care should be taken to prevent seedling bags/bales from being crushed. Heavy objects, such as planter's tools, should not be stacked on the seedlings.

Seedlings should not be transported in the same cargo space with, or any cargo space contaminated with, diesel fuel, gasoline, any petroleum product, pesticides, or any substance toxic to plants.

Seedlings should not be allowed to freeze or overheat. Internal bag temperature should be kept between 35° and 45° Fahrenheit.

Materials

801.02 – Grasses: Materials used in this construction shall meet the requirements of the following specifications:

801.021 - Grass Seed: The seed shall meet the requirements of the Tennessee Department of Agriculture and no "Below Standard" seed will be accepted.

Grass seed furnished under these specifications shall be packed in new bags or bags that are sound and not mended.

The vendor shall notify the Department before shipments are made so that arrangements can be made for inspection and testing of stock.

The vendor shall furnish the Department a certified laboratory report from an accredited commercial seed laboratory or from a State seed laboratory showing the analysis of the seed to be furnished. The report from an accredited commercial seed laboratory shall be signed by a Registered Member of the Society of Commercial Seed Technologists. At the discretion of the Department, samples of the seed may be taken for check against the certified laboratory report. Sampling and testing will be in accordance with the requirements of the Tennessee Department of Agriculture.

The seed mixture shall be uniformly mixed using a mechanical mixer and bagged in 50-pound bags. Group seed shall not be mixed until after each type of seed that is used to form the "Group" has been tested and inspected separately and approved for purity and germination by the Department. Seed mixed before tests and inspection are made will not be accepted.

Inoculants for Legumes: Inoculants for treating legume seeds shall be standard cultures of nitrogen-fixing bacteria that are adapted to the kind of seed to be treated. The inoculant shall be supplied in convenient containers of a size sufficient to treat the number of seeds to be planted. The label on the container shall indicate the specified legume seed to be inoculated and the date period to be used. Twice the amount recommended by the manufacturer shall be used.

801.022 - Commercial Fertilizer: Manufactured fertilizer shall be a standard commercial fertilizer containing the specified percentages of nitrogen, phosphoric acid, and potash.

If bagged fertilizer is used, fertilizer shall be furnished in standard containers with the name, weight, and guaranteed analysis of the contents clearly marked. The containers shall ensure proper protection in handling and transporting the fertilizer.

All commercial fertilizers shall comply with local, state, and federal fertilizer laws. The Contractor shall furnish a supplier's certification of analysis and weight when bulk fertilizer is supplied. Fertilizers shall be commercial grade 19-19-19 or equivalent.

801.023 - Agricultural Limestone: Agricultural limestone shall contain not less than 85 percent of calcium carbonate and magnesium carbonate combined and shall be crushed so that at least 90 percent will pass the No. 10 mesh sieve and 30 percent through a No. 50 sieve.

801.024 - Mulch Material: All hay and straw mulch material shall be air dried and reasonably free from noxious weeds and weed seeds or other materials detrimental to plant growth on the project or on adjacent agricultural lands.

Hay shall be stalks of approved grasses, sedges, or legumes seasoned before baling or loading. Straw shall be stalks of rye, oats, wheat, or other approved grain crops. The mulch shall be reasonably free from weeds, seeds, and foreign materials and shall contain no Johnson grass or wild onions. Weight tickets shall be furnished to verify the quantity of mulch furnished.

Both hay and straw shall be suitable for spreading with standard mulch blower equipment. When wood fiber mulch is used, it shall meet the following specifications:

Moisture Content	10% $\pm$ 2.0%
Organic Matter	99.4% $\pm$ 0.2%
Ash Content	0.6% $\pm$ 0.2%
Water Holding Capacity	(per hundred grams of oven dry fiber .1050 grams minimum)

801.025 - Mulch Binder: This tack is a free-flowing silicate powder to which hydrophilic polymers sequestering agents are added. Application rate shall be 100 pounds of silicate powder, four (4) bags of fiber mulch and 800 gallons of water per acre when sprayed in hydroseeder. If used in a mulching machine, use one dry pound of material per two gallons of water and three bags of fiber mulch. On all slopes steeper than 3:1, a mulch binder may be used.

Equipment

801.03 - All equipment used in this operation shall be adequate to produce the desired results. Blower equipment used to supply treated mulch in a single operation shall have two (2) or more jets or spray nozzles and shall be located at the near end of the discharge spot to coat mulch material uniformly with glue as it is ejected. If a crimper is used, discs shall have corrugated or notched surfaces and shall be at least 12 inches in diameter. Crimpers shall be capable of pushing mulch into the ground at least two inches with mulch remaining "planted" after crimper moves on without kicking out soil and mulch.

Hydroseeders shall be designed for the purpose of mixing and applying a slurry mixture of seed, fertilizer, and wood fiber mulch. It shall be capable of applying a uniform mixture over the entire area to be seeded. The slurry mixture shall be agitated during application to keep the ingredients thoroughly mixed.

All equipment necessary for the satisfactory performance of this work shall be on the project and approved before work will be permitted to begin.

801.04 - Care during Construction and Acceptable Stand: All seeded areas shall be properly cared for until acceptance of the work.

Areas which have been previously seeded and mulched in accordance with this section, but which have been damaged or failed to successfully establish an acceptable stand of grass and legumes shall be repaired as directed by the Project Officer.

Construction Requirements

801.05 – Grasses: The Contractor shall notify the Project Officer at least 48 hours in advance of the time he intends to begin seeding operations and shall not do so until permission has been granted by the Project Officer. Before starting revegetation operations, sloping, shaping, and dressing shall have been completed in accordance with these specifications. If the Contractor fails to notify the Project Officer within the specified time, then the seeding operation will not be accepted.

It shall be imperative that the Contractor have on site all equipment, materials, labor, and any other incidentals necessary for performing the work to satisfactory completion.

The Contractor shall proceed, with vigor, the vegetation process once the process has begun.

(a) Preparing the Seedbed:

The seedbed shall be prepared in the following manner and sequence. Each area to be seeded shall be scarified, disked, harrowed, raked, or otherwise worked until it has been loosened and pulverized to a depth of four (4) to six (6) inches or as approved by the Project Officer. The tilling operation shall be performed only when the soil is in a tillable and workable condition. Fertilizer, 1,000 pounds per acre, of grade 19-19-19 or equivalent and agricultural limestone, twelve (12) tons per acre, shall be applied and shall be uniformly incorporated into the soil to a depth of approximately four (4) to six (6) inches.

(b) Seeding:

Seed of the specified groups shall be sown as soon as preparation of the seedbed has been completed. It shall be sown uniformly by an approved means. Seeds of legumes shall be inoculated before sowing in accordance with the manufacturer's recommendations and as approved by the Project Officer.

(c) Mulching:

Mulch material may be hay or small grain straw and shall be spread evenly over the seedbed area using a mulching machine at an approximate rate of three (3) tons per acre immediately following seeding operations. Sage grass straw or wild grass will not be accepted. Hay or straw mulch shall be held in place by use of an approved mulch binder. Glue tack shall be applied to all seeded and mulched areas. The rate of four (4) to five (5) pounds per 1,000 square feet of wood fiber mulch shall be applied to help identify area covered and help stick the seed to the ground. (Hydroseeding shall not be performed when winds prevent an even and thorough distribution of the mixture.)

On extremely rocky finished grades where crimping will not be practical; crimping will not be permitted, and mulch binder shall be required. Also, crimping will not be permitted except on flat slopes (5:1 or flatter).

A mulch binder shall be required on all slopes steeper than 3:1.

All mulch shall be applied with a mulching machine.

When crimpers are used to anchor the mulch into the soil, crimpers shall be capable of pushing the mulch into the soil to a depth of two inches.

Seedlings: The planting methods for the seedlings are as follows:

1. Hand planting will be done by using a planting bar (dibble) or planting hoe (hoedads). The hole must be large enough for the seedling roots to be spread out and not bent or doubled under. The seedlings must be planted at the same depth that they were growing at the nursery.

After the hole is made and the seedling placed in the ground, the soil shall be pressed firmly around the seedling to assure complete soil-plant contact thus eliminating air pockets that will dry out the roots. The planting hole should be deep enough for roots to fall straight down. Seedlings should be planted so that the root collar is at least one inch below the packed soil surface but keep the lowest living branch junction above the soil surface. During the planting operation, the roots of the seedlings shall be maintained in a moistened state at all times. Under no circumstances will roots be allowed to dry out.

2. Only one bag of seedlings should be opened at a time. The remaining bags shall be closed tightly to prevent moisture loss from the remaining seedlings. Once removed from the bag/bale, seedlings must be placed in a planting bag or container immediately. Partially empty bags should be kept in a covered, cool location. Seedlings from opened bags must be planted the same day the bags are opened.

3. The Contractor shall inspect and assure that the correct procedures are being followed. Any deviation or violation of these specifications will be reason for the Project Officer to require that the seedlings planted not be paid for and that new seedlings be furnished and planted at the Contractor's expense.

Measurement and Payment

801.06 – The method of measurement will be the number of acres seeded to the nearest 0.1 acre. Horizontal measurement shall be used in the data collection.

Payment will be paid at the contract unit price bid per acre and shall be full compensation for furnishing and applying all materials, labor, equipment, and other incidentals necessary to revegetate the site.

CLOUSE HILL RECLAMATION PROJECT

QUOTATION SHEET

(For Field Use Only)

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY.</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
200	Mobilization	1	Job	\$ _____	\$ _____
201	Clearing and Grubbing	84.5	Acre	_____	_____
204	Area Grading	84.5	Acre	_____	_____
209	(a) Riprap	2,150	Ton	_____	_____
	(b) Filter Fabric	4,300	Yd ²	_____	_____
211	Silt Retention Barrier	21,100	Linear Feet	_____	_____
214	Pond Treatment And Dewatering	1	Job	_____	_____
701	(a) Road Restoration	1	Job	_____	_____
	(b) Road Limestone	500	Ton	_____	_____
801	Vegetation Establishment	84.5	Acre	_____	_____
					TOTAL \$ _____