TECHNICAL SPECIFICATIONS

FOR

HORSESHOE LAKE SLOPE FAILURE REPAIR

OXFORD, MS

OWNER:
THE LAKES HOME OWNER'S ASSOCIATION
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FOR REVIEW
NOT FOR CONSTRUCTION

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SECTION 02230 SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Includes (as applicable):

1. Removal of improvements.
2. Topsoil stripping.
3. Removal of trees and other vegetation.
4. Clearing and grubbing.
5. Disconnecting or abandonment of existing utilities.

B. Protect remaining site improvements from damage. Restore damaged work to condition existing before start of site clearing.

C. Determine location of existing utility services before site clearing. Comply with local utility service requirements.

D. Clearing limits shall be staked in the field by the Engineer.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SITE CLEARING

A. Install erosion and sedimentation control measures before site clearing.

B. Remove trees, shrubs, grass, and other vegetation, site improvements, or obstructions to permit installation of new construction. Removal includes digging out and off-site disposal of stumps and roots.

C. Strip topsoil to depth indicated in geotechnical report. Stockpile topsoil that will be reused in the Work.

D. In areas not to be further excavated, fill depressions resulting from site clearing. Place and compact satisfactory soil materials in 6- to 8-inch thick layers to density of surrounding soil.

E. Dispose of waste materials, including trash, debris, and excess topsoil, off Owner's property. Burning or burial of waste materials on-site is not permitted.

END OF SECTION

SECTION 02300 EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Excavating and placing fill for slope repair.

B. Shoring and bracing.

C. Do not interrupt existing utilities serving facilities occupied by Owner or to adjacent facilities. Provide temporary utility services.

1.2 RELATED WORK

A. Section 02230: SITE CLEARING
B. Section 02374: EROSION-SEDIMENT CONTROL
C. Section 02384 SEEDING

1.3 QUALITY ASSURANCE

A. The Owner shall provide Quality control services. All testing shall comply with the geotechnical report. In the absence of said report all testing shall be in accordance with 1.3b.

B. Areas in fill shall be tested for compaction in accordance with ASTM D1556, ASTM D2922, or ASTM D3017. The results of these compaction tests shall be compared to compaction curves as determined by testing uncompacted material in accordance with ASTM D698 (“Standard Proctor”). During all compacting operations, the water content of the material shall be constantly adjusted, if necessary, by sprinkling or loosening and subsequent evaporation to within 2% by weight of the optimum moisture content determined by tests indicated above. If tests indicate work does not meet specified requirements, process materials, recompact and retest. A minimum of one (1) field density test shall be made for each 5,000 square feet of structural fill area per lift of structural fill placed, or as prescribed in the geotechnical report.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil: Unless otherwise prescribed in the geotechnical report, fill material shall have a liquid limit between 5 and 20, a maximum 40 percent passing a 200 sieve, and be free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.

B. Backfill and Fill: Satisfactory soil materials.

C. Undercut Soils: Soils removed from slope failure to be moisture conditioned and placed in washes along the downstream slope of the dam as directed by the Engineer.

D. Clean Sand: Clean sand for use in underdrain shall have a maximum of 10% passing a 200 sieve and no particles greater than 1/2 inch.

E. Washed Gravel: Provide washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 8 sieve.

F. Geosynthetic: Place geosynthetic as outlined in the plans. Material to meet or exceed requirements shown on the plans.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation shall be carried to the grades shown on the plans.

B. The area shall be cleared and grubbed prior to the start of excavation.

C. All suitable materials excavated shall be used in the formation of embankments and backfill as directed.

D. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times, and temporary ditches shall be cut to divert surface water which may affect the prosecution of the work. Prior to the acceptance, the entire area shall be machined and bladed for proper drainage.

E. The rough excavation shall be carried to such depth that sufficient material will be left above the designated sub-grade to allow for compaction of this grade. Likewise, on embankments, sufficient material shall be placed above the designated sub-grade to allow for both compaction and settlement.

F. Should the Contractor, through negligence, excavate below the designated lines, he shall replace at his own expense such excavation with approved materials.

G. Stability of Excavations

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Carry down shoring and bracing as excavation progresses.
2. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.2 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIALS

A. Any materials encountered, which, in the opinion of the Engineer, are unsuitable for use in the work, shall be removed and disposed of as directed.

B. No excavation shall be wasted without permission of the Engineer. Surplus excavation shall be disposed of as directed.

C. Waste excavation shall be left presenting a neat appearance well drained and smoothed suitable for mowing.

D. Excavation material in excess of on-the-site requirements shall be hauled and deposited at a site provided by the Contractor.

E. Spoils from the ditch excavation shall be spread and leveled to blend with the ground contours and so as to present a well-drained, pleasing appearance.

3.3 COMPACTION OF FILLS AND BACKFILLS

A. Unless otherwise prescribed in the geotechnical report, remove all trash and debris from excavations. Place backfill and fill in layers not more than 8 inches in loose depth at optimum moisture content. Compact each layer to 95 percent of maximum dry density according to ASTM D698.

B. The Contractor shall route his equipment at all times over the layers so as to distribute evenly the travel over the entire width.

C. When sub-grade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact.

D. All sloped surfaces to receive fill shall be benched as shown on Sheet 5.0. Any other slopes shall have a minimum bench height of 36 inches.

3.4 DISPOSAL OF UNSUITABLE SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 02374 EROSION - SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by the Contractor.

1.02 RELATED REQUIREMENTS

A. Section 02230 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.

B. Section 02300 - Earthwork: Temporary and permanent grade changes for erosion control.

1.03 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP).

B. Comply with requirements of State of Mississippi, Mississippi Department of Environmental Quality.

C. Comply with all requirements of construction plans for erosion and sedimentation control.

D. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

E. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
   1. Obtain and pay for permits and provide security required by authority having jurisdiction.
   2. Owner will withhold payment to equivalent to all fines resulting from non-compliance with applicable regulations.

F. Timing: Put preventive measures in place prior to disturbance of surface cover and before precipitation occurs.

G. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 5 years.

H. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.

3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

J. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

K. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

L. Open Water: Prevent standing water that could become stagnant.

M. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.04 SUBMITTALS

A. Erosion and Sedimentation Control Plan:
1. Submit within 2 weeks after Notice to Proceed.
2. Obtain the approval of the Plan by authorities having jurisdiction.
3. Obtain the approval of the Plan by the Owner
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B. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.01 MATERIALS

A. As detailed on the drawings.

B. Mulch: Use one of the following:
1. Straw or hay.
2. Wood waste, chips, or bark.
3. Erosion control matting or netting.
4. Cutback asphalt.

C. Bales: Air dry, rectangular straw bales.
1. Cross Section: 14 by 18 inches, minimum.
2. Bindings: Wire or string, around long dimension.

D. Bale Stakes: One of the following, minimum 3 feet long:
1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
2. Wood, 2 by 2 inches in cross section.

E. Silt Fence:
1. Type II material per current edition of the Mississippi Standard Specifications for State Aid Road and Bridge Construction

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers:
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
      b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
      c. Along the toe of cut slopes and fill slopes.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
   1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet. *As an option, #57 stone can be submitted for the concrete blocks*

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

G. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.

H. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:
   1. Excavate minimum of as detailed on the drawings inches.

B. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D 4873.
   2. Install with top of fabric at nominal height and embedment indicated on drawings.
   3. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
   4. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Straw Bale Rows:
   1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
   2. Install bales so that bindings are not in contact with the ground.
   3. Embed bales at least 4 inches in the ground.
   4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
   5. Fill gaps between ends of bales with loose straw wedged tightly.
   6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

D. Mulching:
   1. Apply two (2) tons per acre hay mulch.
   .

E. Temporary Seeding:
   1. When hydraulic seeder is used, seedbed preparation is not required.
   2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
   3. Use seed mixture appropriate to the time of year seeding is performed. Seed mixture shall be per Section S-214.03 of the current edition of the Mississippi Standard Specifications for State Aid Road and Bridge Construction
   4. Apply agricultural lime at a rate of two (2) tons per acre.
   5. Apply Ammonium Nitrate at a rate of 0.15 tons per acre
   6. Apply commercial fertilizer (13-13-13) at a rate of half (0.5) ton per acre.
   7. Incorporate fertilizer into soil before seeding.
   8. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep deep.
   9. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
   10. Repeat irrigation as required until grass is established.

3.05 MAINTENANCE

A. Inspect preventive measures as required by permits, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Straw Bale Rows:
   1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
   2. Remove silt deposits that exceed one-half of the height of the bales.
   3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

E. Clean out temporary sediment control structures as required by permits and relocate soil on site.

F. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Precision Engineering Corporation.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 02384 PERMANENT SEEDING

PART 1 GENERAL

1.1 This item shall consist of soil preparation and seeding the areas shown on the plans or as directed by the Engineer in accordance with these specifications.

PART 2 MATERIALS

2.1 SEED The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein.

Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Seeds shall be used for seeding as follows:

Bermuda	80 pounds per acre	March 1 to September 1
	20 pounds per acre	September 1 to March 1
Bahiagrass	80 pounds per acre	March 1 to September 1
	25 pounds per acre	September 1 to March 1
Tall Fescue	25 pounds per acre	March 1 to September 1
	100 pounds per acre	September 1 to March 1
Sericea Lespedeza	25 pounds per acre	March 1 to September 1
	25 pounds per acre	September 1 to March 1
Crimson Clover	20 pounds per acre	August 1 to April 1

2.2 MULCH: Use one of the following at 2 tons per acre:

1. Straw or hay.

2.3 LIME. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 mesh sieve and 50% will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate of 1000 lbs/acre. All liming materials shall conform to the requirements of ASTM C 602.

2.4 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified herein, and shall meet the r applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or c. A

granular or pellet form suitable for application by blower equipment.

Fertilizers shall be 13-13-13 commercial fertilizer and shall be spread at the rate of 300 lbs/acre.

2.5 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas is outlined in Section 02300 EARTHWORK. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the Engineer before being placed.

PART 3 CONSTRUCTION

3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches in any diameter, sticks, stumps, and other debris which might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches as a result of grading operations and, if immediately prior to seeding, the top 3 inches of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

However, when the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches. Clods shall be broken and the top 3 inches of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

3.2 DRY APPLICATION METHOD.

a. Liming. Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds which have previously been prepared as described above. The lime shall then be worked into the top 3 inches of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate which will provide not less than the minimum quantity stated in paragraph 2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 2.1 immediately after fertilizing, and the fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawnroller, weighing 40 to 65 pounds per foot of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot of width for sandy or light soils.

3.3 WET APPLICATION METHOD.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying Equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons per minute at a pressure of 100 pounds per square inch. The pump shall be mounted in a line which will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet. One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds of lime shall be added to and mixed with each 100 gallons of water.

Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds of these combined solids shall be added to and mixed with each 100 gallons of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the Engineer all sources of water at least 2 weeks prior to use. The Engineer may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source which is disapproved by the Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 2 hours from the time they were mixed or they shall be wasted and disposed of at locations acceptable to the Engineer.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches, after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray which shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces which are to be mulched as indicated by the plans or designated by the Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

Mulching:

1. Apply two (2) tons per acre hay mulch.

3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

PART 4 PAYMENT

4.1 The quantity of seeding to be paid for shall be the number of acres measured on the ground surface along a horizontal plane, completed and accepted. Final payment will not be made until grass has been established.

4.2 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Seeding & Mulching -- per acre

END OF SECTION