

**SECTION 1
GENERAL REQUIREMENTS**

- 1.01 Location: The work described in these Specifications is located in the City of McRae-Helena, Georgia.
- 1.02 Work to be Done: Project consists of the furnishing of all materials, labor and equipment for the complete construction of Water System Improvements, Iron and Manganese Filters for the City of McRae-Helena, Georgia consisting of:
- Installing four (4) packaged pressure filters for iron and manganese removal, concrete slabs, above ground HDLPE equalization tanks and steel buildings, complete with piping and other appurtenances.
- 1.03 Schedule of Work: The Contractor shall schedule the work to minimize interruptions or shutdowns during the work without prior concurrence by both the Owner and Engineer.
- The Contractor shall notify the Engineer and the Owner before starting any new phase of construction to verify that no interruption of service will be encountered.
- 1.04 Drawings: The Drawings entitled “Water System Improvements, Iron and Manganese Filters, for the City of McRae-Helena Georgia, August 2023” form a part of the Construction Agreement.
- 1.05 Specifications: The Specifications form a part of the Construction Agreement, and include this Section and Sections 2 through 9 as identified below:

Section Number	Title of Section
2	Control of Materials
3	Soil Erosion and Sediment Control
4	Concrete
5	Reinforcing Steel, Structural Steel and Miscellaneous Metal
6	Building and Building Service Equipment
7	Mechanical Equipment
8	Electrical - Basic Materials and Methods
9	Painting

- 1.06 Protecting Existing Utilities and Structures: Prior to any excavation, the Contractor shall call the Utilities Protection Inc. “Call Before You Dig” number (811). Any damage done to existing utility lines, drains, power and telephone cable, poles, and structures of every nature, not indicated to be replaced and/or abandoned shall be repaired or replaced by the Contractor at his own expense. The approximate position of certain known underground lines and structures are shown on the Drawings according to the best available information. Existing small lines are not shown. The Contractor shall locate, excavate and expose all existing underground lines in advance of trenching and other construction operations. Where connections are to be made at underground structures and pipe lines, elevations and locations shall be verified prior to construction of the pertinent work.

Where underground utilities or obstructions are encountered which conflict with the new work, the location and/or alignment of the new or existing lines may be changed to avoid interference upon written concurrence by the Engineer.

- 1.07 Easements: The Owner has obtained easements for all work on private property. The Contractor will be provided copies of all easement agreements to the Owner. The Contractor shall review any special conditions of any easement agreement and notify the Engineer of any condition which cannot be met under the Plans and Specifications without an increase in contract price.
- 1.08 Working Drawings: The Contractor's attention is directed to the requirements of the "Instructions to Bidders and Special Provisions" with reference to working drawings. The Contractor shall submit a digital copy of the drawings and details, covering Reinforcing Steel, Structural Steel, Miscellaneous Metals, Piping and such other items of work as may be necessary for successful completion of the work of the Project, to the Engineer for review. After review, the Engineer will return the digital copy to the Contractor. The Contractor will forward three printed copies, exactly as marked in the returned digital copy, to the Engineer.
- A. The Contractor shall check all working drawings for accuracy of dimensions and details and for conformity with the Drawings and Specifications before submitting working drawings to the Engineer. The Contractor shall indicate that working drawings have been checked by him by affixing an appropriate stamp or notation on the face of each of the working drawings.
 - B. Responsibility for Accuracy: The Engineer's review stamp shall not relieve the Contractor of the responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of working drawings with the Drawings and Specifications.
 - C. Working drawings for any structure shall consist of such detailed plans as may be required for the prosecution of the work but not included in the plans. All necessary-working drawings shall be furnished by the Contractor. They shall include shop details, erection plans, masonry layout diagrams, and bending diagrams for reinforcing steel, review by the Engineer must be obtained before any work involving these plans may be performed. Plans for false work, centering, and form work may also be required and such cases shall be likewise subject to review by the Engineer.
 - D. It is expressly understood, however, the Engineer's review of the Contractor's working drawings does not relieve the Contractor of any responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of his working drawings with the Drawings and Specifications.
 - E. The contract price shall include the cost of furnishing all working drawings and the Contractor will be allowed no extra compensation for such drawings.
- 1.09 Shop Drawings: The Contractor shall submit shop drawings and details covering the required items of work and such other items which may be necessary for the successful

completion of this Contract to the Engineer for checking and review before any fabrication, erection or installation shall commence. A reviewed set of shop drawings with Engineer's review stamp shall be kept on the job at all times.

The Contractor shall notify the Engineer in writing about any information in the shop drawings which deviates from the Contract Documents.

Shop drawings, product data and engineering calculations covering all equipment, material, fabrications and similar items shall be submitted to the Engineer for review. Submittals shall verify compliance with the contract documents with any deviations noted by the Contractor.

The Contractor shall submit a digital copy of drawings and details to adequately describe the function, performance characteristics, dimensions, arrangement, support, anchorage and other similar information to allow for installation, operation and maintenance. After review, the Engineer will return the digital copy to the Contractor. The Contractor will forward three printed copies, exactly as marked in the returned digital copy, to the Engineer within seven calendar days.

A. Submittal Identification: Each submittal shall cover items from one Specification Section unless multiple sections are required for clarity. Each submittal shall be accompanied with a cover sheet that bears the Project Name, Engineer's project number, and the Contractor's name along with the following information:

1. Submittal Date
2. Submittal Number: Submittal numbers shall be sequentially numbered without division by trades. Resubmittals shall be given the number of the original submittal followed by the letter A for the first resubmittal, the letter B for the second resubmittal, etc. (Example: 10A, 10B, etc.)
3. Item Name
4. Location: Identify the location(s) where the material or equipment is to be placed. (Example: RAS pump station, yard piping, construction joints greater than 12" thick.) The noted location shall be as specific as possible.
5. Subcontractor or Supplier: Identify the equipment or material provider.
6. Manufacturer: Identify the manufacturer of the material or equipment being submitted.
7. Drawing or Identification Number: When available, list the shop drawing or identification number given by the contractor, supplier or manufacturer. Such numbers are typically found shop drawings for piping details, reinforcing steel, miscellaneous metals, etc.
8. Specification Section: Identify the Specification Section(s) applicable to the equipment or material being submitted.

B. Contractor Review: The Contractor shall check all working drawings for accuracy of dimensions and details and for conformation with the Drawings and Specifications before submitting working drawings to the Engineer for review. The Contractor shall indicate that working drawings have been checked by him by

affixing an appropriate stamp on the face of each of the working drawings and the submittal cover sheet. All notes by the contractor shall be in GREEN.

1. Pertinent Information: Where catalogs or data sheets include multiple listings, the Contractor shall highlight all entries that are pertinent to the submittal. Information that is not pertinent to the review shall be crossed out.
 2. Deviations: The Contractor must clearly identify any deviations from the contract Specifications or Drawings and provide additional data that may be required for the Engineer's review. When applicable, the Contractor must identify any required modifications to other components resulting from the deviation and may include but not limited to structural components, piping systems, electrical systems, etc.
- C. Engineer's Review: The Engineer shall review all shop drawings for general compliance with the contract documents. All corrections required by the Engineer will be noted in RED. The Engineer's review stamp shall be placed on the submittal cover sheet and/or the working drawing indicating the status of the returned submittal and date of review.
- D. Responsibility for Accuracy: Verification of all dimensions, quantities, material, identification numbers and other similar details shall be the sole responsibility of the Contractor. The Contractor shall be responsible for agreement and conformity of working drawings with the Contract Drawings and Specifications. The Engineer's review stamp shall not relieve the Contractor of these responsibilities, including errors and omissions.
- E. Resubmittals: The Contractor shall verify that all corrections and additional information requested by the Engineer have been provided on the resubmittal. The Contractor shall clearly identify any additional revisions to the submittal that were not specifically called out or requested in the initial review. Resubmittals shall be numbered as noted in these Specifications.
- F. Colors and Samples: Provide colors and samples as required by individual specification sections or when required for a complete and accurate review of the equipment or material. The samples should be submitted in the quantity required to be returned, plus one to be retained by the Engineer / Owner.
1. The Contractor shall provide samples that are identical to the proposed item. Where indicated in the Specifications or when requested by the Engineer, full size samples shall be provided.
 2. Owner's Color Selection: All products requiring color selection shall be submitted as early as possible. The Engineer will coordinate selection with the Owner after all samples, colors and finishes for the accepted products have been received. The Engineer will provide the Contractor with a schedule of the Owner selected colors and finishes.
 3. Sample Identification: Samples, color charts or similar data shall be identified as a decimal of the related submittal number. (Example: If the

flooring submittal is Number 10, all samples related to the flooring submittal shall be numbered 10.1, 10.2, 10.3, etc.)

1.10 As-Built Drawings: As the work progresses, the Contractor shall regularly record on one set of Drawings all changes and deviations from the Contract Drawings and record the exact final locations of any deviation and original work. Upon completion, the Contractor shall have these drawings and records certified as to their completeness and correctness by the Resident Inspector and deliver them to the Engineer for incorporation in the tracings. Final as-built alignment, invert elevations and locations are to be supplied by the Contractor.

A. Monthly Submittal: As-built information for each item completed shall be provided monthly to the Engineer and submitted with partial pay request. Pay requests WILL NOT be processed without as-built records.

On stand-alone projects such as treatment plants, buildings or other similar projects, the Engineer may perform a monthly review of as-built drawings by the Resident Inspector in lieu of the monthly submittal requirement if discussed at the preconstruction conference.

B. As-Built Requirements: All submitted as-builts must meet the following requirements:

1. Contractor must present as-builts on a clean set of Drawings. All as-builts must be neat and legible. Revision or detail drawings, if required, may be included as additional sheets to plan set.

2. Items to be included on the as-built drawings include, but are not limited to the following:

- a. Any deviations to the contract drawings
- b. Additional details not originally shown on the Drawings
- c. Changes made by change orders, field orders, work directives or submittals
- d. Detail of all piping and pavement replacement
- e. Finish elevations and invert elevations of all structures
- f. Location and depth / elevation of utilities buried underground or concealed in concrete

3. Requirements for Utilities:

- a. All new buried utilities and other similar items will be located with a minimum of two distances from permanent points or to all intersections, changes in direction and appurtenance locations. Any statement such as "Installed Per Plans" shall not relieve Contractor of these requirements.
- b. Utilities to be located include, but are not limited to, pipes, conduits, duct banks, wires, cables, fiber optic and other similar items.

- c. Appurtenances requiring location include, but are not limited to, manholes, fire hydrants, fittings, water taps, sewer taps, meters, valves, clean-outs, junction boxes, pull boxes, hand holes, and other similar items.
 - d. A distance from centerline of road is required for all new water and sewer lines every 100'.
 - e. The location of utilities installed below slabs or encased in concrete must be accurately dimensioned on the structure plans and sections.
 - f. Provide ground elevation, top elevation and all invert elevations for each manhole, drop inlet, junction box, and other similar structures.
 - g. For force mains or other pipes shown in a profile view, provide ground elevation and invert elevation at all high points, low points and change of slope. Additional elevations may be required to verify positive slope.
- C. GPS Data Collection: Unless otherwise instructed by the Engineer, the Contractor shall provide GPS data on all new utilities and appurtenances as defined in the previous section. GPS / GIS data shall meet the following minimum requirements:
- 1. GPS field work must be performed by personnel that are trained in the use of GPS equipment. If needed, Contractor may subcontract with a surveyor to provide the required data.
 - 2. The GPS receiver must be mapping grade or better. Survey or high accuracy grade receivers may be required to achieve tolerances noted in the following section of these Specifications. Recreational grade units, including smart phones and tablets, are not acceptable.
 - 3. Spatial Reference:
 - a. Units: US Survey Feet
 - b. Horizontal Datum: State Plan Coordinates
(Geographic zone where project is located)
 - c. Vertical Datum: North American Vertical Datum (NAVD) 1988
 - 4. Collected GPS data must be submitted to the Engineer in a raw data format file, including an export of data to a .txt or .csv file in the format of northing, easting, elevation, and description coordinates.
- D. Dimension Tolerances for As-Built Drawings: Dimensions provided on as-built drawings, whether measured by GPS or conventional methods, shall meet the following requirements:

<i>Project Type or Structure</i>	<i>Horizontal (X,Y)</i>	<i>Vertical (Z)</i>
1. Water Lines and Appurtenances	<1 meter	Not required
2. Force Mains and Appurtenances	<1 meter	Not required
3. Sewer Lines and Appurtenances (See manholes below)	<1'	<0.10'*
4. Force Mains and Appurtenances	<1'	<0.10'*
5. Storm Drains and Appurtenances	<1'	<0.10'*
6. Roadways, Sidewalks and Similar	<1'	<0.10'*
7. Location of Building and Structures	<1'	<0.05'
8. Actual Dimensions of Buildings and Structures and Finished Floor Elevations	<1/4"	<0.01'*
9. Temporary Benchworks		<0.01'
10. Manhole and Wetwell Inverts and Rim Elevations	<1'	<0.01'*
11. Weirs and Other Critical Elevations	<1'	<0.01'*

1.11 Operation and Maintenance Manuals: If applicable and before the work is 50% complete, the Contractor shall submit three printed copies and one digital pdf file of operation and maintenance manuals for equipment as specified. The digital file shall be provided on a single drive or disk. Each component shall be labeled per the specification section referenced, for example:

“8.22 Aluminum Gates.pdf” or “11.13 Mechanical Bar Screen.pdf”

1.12 Clean-Up: Upon completion of the work, all excess material and rubbish shall be removed from the job site and disposed of as directed by the Engineer. The surrounding construction area shall be left in essentially as good a condition as existed prior to construction.

All unsuitable excavated material must be properly disposed of in a manner acceptable to the Engineer and in a manner that will not adversely impact the environment.

1.13 Payment: No separate payment will be made for the work of this Section. The cost of the work and all cost incidentals thereto shall be included in the price bid for the item to which the work pertains.

SECTION 2 CONTROL OF MATERIALS

- 2.01 Source of Supply and Quality of Materials: The source of supply for all materials and equipment shall be submitted to the Engineer for review before orders are placed. Suppliers of reinforcing steel, fabricated metal work, and metal castings may be required to submit guarantees of conformity with Drawings and Specifications. Representative preliminary samples of the character and quantity prescribed shall be submitted by the Contractor or producer for examination and tested in accord with the methods referred to under the samples and testing materials section of these Specifications. Only materials conforming to the requirements of the Specifications and reviewed by the Engineer shall be used in the work. All materials proposed to be used may be inspected or tested at any time during their preparation and use. If, after trial, it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish materials from other approved sources. No material, which after approval has in any way become unfit for use, shall be used in the work.
- 2.02 Samples and Testing of Materials: Unless otherwise specified, standard tests of materials shall be made in accord with the Specifications and tests of the American Society for Testing Materials, by a commercial testing laboratory accepted by the Engineer. Reports of the tests shall promptly be furnished to the Engineer. Tests shall be arranged by the Contractor. The cost of all tests will be paid for by the Contractor unless otherwise specified.
- 2.03 Schedule of Materials and Standard Tests: The following schedule of materials and the standard test to which each is to be subjected is given for the Contractor's guidance.
- A. Cement (any quantity): Certificate of mill test to be furnished by producers of laboratory tests made as per ASTM C-1
 - B. Fly Ash: Independent laboratory test as per ASTM C 618
 - C. Sand (any quantity for use in cement concrete): Tests to indicate conformity with ASTM C-33
 - D. Stone and Gravel (any quantity for use in cement): Coarse Aggregate, similar to sand
 - E. Concrete: Cylinder compression tests of concrete placed in the work from 4 cylinders made for each day's placing of each class of concrete of each 50 cubic yards or fraction thereof. One cylinder shall be broken at 7 days, 2 cylinders shall be broken at 28 days, and one cylinder shall be held in reserve.
 - F. Brick (1 to 5,000): Visual inspection for shape, color soundness, freedom from cracks, balls of clay, and particles of lime
 - G. Concrete Masonry Units: Visual inspection for shape, soundness and freedom from cracks and fractures. Laboratory tests are required on at least 5 units as per ASTM C-140.

- H. Structural Tile: Visual inspection for shape, soundness, color, texture and crazing. Laboratory tests are required on at least 5 units as per ASTM C-126.
- I. Building Stone:
1. 1 to 5 Tons: Visual inspection for shape and color
 2. For Each Additional 5 Tons or Part Thereof: Visual inspection for shape and color and test for compression as per ASTM C-97 and C-170
- J. Cast Iron Pipe and Ductile Cast Iron Pipe:
1. Field Inspection: Visual inspection for dimensions, coating, cement lining, holes, hammer test, weights
 2. Laboratory Tests: Certified test reports by foundry
- K. Steel Pipe: ASTM A-134 and A-139
- L. Polyvinyl Chloride Pipe:
1. Visual Inspection: To ensure that pipe is homogenous throughout, free from cracks, nicks, gouges, severe scratches, voids, inclusions and other defects, reasonably uniform in color density and other physical properties. Quality Control Certification Seal and markings to include manufacturer's name or trademark, nominal pipe size and size base, PVC Cell Classification or Material Code, Dimension Ratio or Standard Dimension Ratio Number, product type, pressure class or pressure rating standard specification designation, production records code.
 2. Laboratory Tests: In amounts and character as per ASTM D-3034 for sewer pipe and AWWA C 900 for water pipe
- M. Structural Steel:
1. Any Quantity: Field inspection for rust, shape, and dimensions
 2. 25 to 200 Tons: Independent shop inspection and certified copies of mill tests
 3. For Structures and Buildings: See ASTM A-36
- N. Concrete Reinforcement Steel:
1. Up to 50,000 Pounds: Field inspection for rust, shape and dimensions
 2. 50,000 Pounds and Up: Independent laboratory inspection as follows:
 - a. Billet Steel: ASTM A-615
 - b. Roll Steel: ASTM A-616
 - c. Cold-Drawn Steel Wire: ASTM A-82
 - d. Wire Fabric: ASTM A-185
- O. Cast Iron Castings:
1. Field Inspection: For dimensions, coatings, holes, hammer test

2. Laboratory Tests: Certified test reports by foundry

2.04 Payment: No separate payment will be made for work under this Section of the Specifications. The cost of such work and all cost incidentals thereto shall be included in the price bid for the item to which the work pertains.

SECTION 3 SOIL EROSION AND SEDIMENT CONTROL

- 3.01 Soil Erosion and Sediment Control Program: Siltation and soil erosion shall be prevented by the installation of erosion control measures and practices prior to or concurrent with land-disturbing activities. The Contractor shall utilize silt fence, hay bales, mulch, grass, slope drains and other erosion control devices or machines as necessary. All soil erosion and sedimentation control measures must be installed prior to initiation of construction activity. Siltation and erosion control shall be in compliance with the "Georgia Erosion and Sedimentation Act of 1975" as amended to date and these Specifications. Erosion, sedimentation and pollution control may include temporary construction work outside the right of way where necessary as a result of construction operations, such as haul roads and equipment storage sites. Any violations of the Act shall be subject to those penalties and fines as defined by the Act.
- 3.02 Erosion Control Program: Vegetation and mulch will be applied to applicable areas **immediately** after grading is completed. Best Management Practices (BMPs) will be employed to prevent erosion in areas of bare soils and concentrated water flows. Diversions and dikes will be installed to divert sediment-laden runoff into the sediment barriers and to protect cut and fill slopes from erosive water flows.
- 3.03 Standards and Specifications: All designs will conform to and all work will be performed in accordance with the standards and specifications of the publication entitled "Manual For Erosion and Sediment Control in Georgia" and in compliance with the "Georgia Erosion and Sedimentation Act of 1975" as amended to date. All materials shall be first-class quality to withstand a 25-year storm event.
- 3.04 Limit of Progress: The Engineer will limit the area of excavation commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding and other such pollution control measures current in accordance with an accepted schedule. Should seasonal limitations make such coordination unrealistic, special erosion control measures shall be taken immediately to the extent feasible and justified. Excavation shall not exceed 100' in advance of pipe laying.
- 3.05 Construction in Rivers, Streams and Impoundments: Construction operations in rivers, streams and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures without prior discussion with Engineer. As soon as conditions permit, rivers, streams and impoundments shall be promptly cleared of all false work, piling which are to be removed, debris, and other obstructions placed therein or caused by the construction operations. Frequent fording of live streams with construction equipment will not be permitted; therefore, temporary bridges or other structures shall be used wherever an appreciable number of stream crossings are necessary. Mechanized equipment shall not be operated in live streams except as may be required to construct channel changes and temporary or permanent structures, and to remove temporary structures without prior discussion with Engineer.
- 3.06 Temporary Erosion Control: Temporary erosion control shall consist of planting temporary grass of a quick growing species such as millet, rye grass or cereal grasses suitable to the area. The Contractor shall use all means necessary to control dust on and

near the work site and all offsite barrow areas. The Contractor should thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of work on the site. Where the location of temporary erosion control structures is not indicated on the Drawings, the following guidelines shall be used: Install sedimentation structures at the toe of all disturbed earth slopes, around all drainage structure inlets, across constructed drainage ways at approximately 150' centers and at the tops of slopes and terraced slopes as indicated on the details. Siltation fences or hay bales only shall be used across constructed drainage ways. Hay bales only shall be used at drainage structure inlets. Perimeter barriers may be any of the types detailed. All areas left disturbed for a period greater than 14 days shall be stabilized with temporary seeding or straw mulch.

3.07 Silt Fence: Where shown on the Drawings and as directed by the Engineer, the Contractor shall furnish, install, maintain and remove water permeable self-supporting silt fencing to remove sediment laden runoff.

- A. Fabric: Silt fencing shall be composed of strong rot-proof synthetic fibers formed into a fabric of either the woven or non-woven type. Either type of fabric shall be free of defects or flaws, coatings which may change its properties after installation, resist exposure to sunlight or heat and have finished edges to prevent fraying. Type fences shall be woven type.

In lieu of silt fence described above, the Contractor may use haybales. Haybales shall be placed as shown on the Drawings and secured with 2" x 4" wood post or No. 4 steel rebar.

1. Type "NS" Fence: Posts shall be a minimum of 4' long and either hardwood or steel may be used. If hardwood is used, the size may be 1.5" x 1.5" with a cross-section of 2.25-square inch. Steel posts shall be "U", "T" or "C" shaped with a minimum weight of 1.15-pounds per foot with props for fastening the fence. Maximum post spacing shall be 6'. Type "NS" sediment barriers shall have a P-factor no greater than 0.045.
 2. Type "S" Fence: Posts shall be a minimum of 4' long and either hardwood or steel may be used. If hardwood is used, the size may be 1.5" x 1.5" with a cross-section of 2.25-square inch. Steel posts shall be "U", "T", or "C" shaped with a minimum weight of 1.15-pounds per foot with props for fastening the fence. Maximum post spacing shall be 4'. Type "S" sediment barriers shall have a P-factor no greater than 0.030.
- B. Posts and Woven Wire Supports: Post installation shall start at the center of the low point (if applicable) with remaining posts spaced a maximum of 6' apart from Type "NS" fence and 4' apart for Type "S" fence. Post shall be driven in a minimum of 18". Fabric shall be secured to post with nails, staples, wire or string. Toe of fabric shall be buried 6" in the soil with 2" turned back upstream. If fence is erected in sections, a minimum of 18" overlap will be required.
- C. Payment: Payment for silt fence will be in accordance with the unit price bid in the proposal as installed and/or other locations as directed by the Engineer. In the event

repairing fence or removing silt deposit is required, the work shall be performed at no additional cost.

- 3.08 Check Dam: Stone or Haybale check dams may be installed as shown. For stone check dams, the drainage area shall not exceed 2 acres. For hay bales, the drainage area shall not exceed 1 acre. The center of the check dam must be at least 9" lower than the ends and 2' tall maximum with 2:1 side slopes. A geotextile should be used as a separator between the stone and the soil base. Stone check dams should be graded sizes 2" to 10". Hay bales should be staked with 2 × 2 wood post or No. 4 steel rebar and embedded a minimum of 4".

Payment for check dams will be in accordance with the unit price bid in the proposal as installed and / or other locations as directed by the Engineer. In the event repairing of the check dam or removing silt deposit is required, the work shall be performed at no additional cost.

- 3.09 Riprap: The Contractor shall furnish and place riprap as required and where shown. Riprap shall consist of stone or bagged sand-cement to a thickness of approximately 12". Stone shall be hard quarry or fieldstone of such quality that it will not disintegrate on exposure to water or weathering. Stone shall range in weight from a minimum of 25-pounds to a maximum of 150-pounds with at least 75% of the pieces weighing more than 50-pounds. Bagged sand-cement riprap shall consist of one part cement and five parts of sand in clean cloth bags approximately one cubic foot in size. Sand and cement shall be as specified for concrete work herein.

Riprap will be paid for based on the number of square yards measured in place to the thickness specified in the proposal at locations shown on the Drawings or other locations as directed by the Engineer.

- 3.10 Grassing of Disturbed Areas: The Contractor shall furnish and install all materials and provide all labor for grassing and sedimentation control as indicated on the Drawings and/or Specifications.

A. Preparation: The Contractor shall grass all areas that were disturbed by clearing or construction operations. Grassing shall be by conventional seeding or hydroseeding. Before seeding commences, the Contractor shall spread the stored stock piled top soil over the entire area, working the better top soil into the more rocky areas. The entire area shall be smoothed with a drag and all clods broken up. All deleterious material, large stones, roots, limbs and other debris shall be removed to leave a smooth area that would be suitable for mowing. Grassing (by seeding) shall be completed as soon as practical after finish grading is completed in order to minimize erosion from rainfall and runoff. Any erosion occurring in grassed areas shall be immediately repaired.

B. Grass Seed: Grass seed selection shall be in accordance with the "Manual for Erosion and Sediment Control in Georgia" as amended to date. Otherwise, the type of grass seed applied shall be determined by site and soil compatibility and Owner discretion.

C. Temporary and Permanent Seeding: Temporary seeding is required on any areas exposed longer than 14 days. Permanent seeding shall be done only if it can be

completed between March 1st and April 15th or August 15th and November 15th. Use temporary seeding during remaining periods. The Contractor shall provide for later permanent seeding by obtaining a signed proposal to the Owner from an approved local landscaper for the work specified. The Owner shall deduct the amount of the proposal from the final payment. The work of spreading and compacting topsoil shall be performed by the Contractor, as specified, prior to planting rye grass. Replacing or repairing of eroded topsoil shall be done as necessary by the local landscaper at time of later grassing, and this work shall be included in his proposal.

- D. Hydro-seeding: Mix the seed (inoculated if needed), fertilizer and wood cellulose or wood pulp fiber mulch with water and apply in slurry uniformly over the area to be treated. Apply within one hour after the mixture is made.
 - E. Grassing Along Highway Right of Way: Grassing along highway right of way shall be in accordance with Department of Transportation, State of Georgia, Standard Specifications, Construction of Roads and Bridges, 1993 Edition, Section 700.
 - F. Grassing through Established Pastures and Lawns: Grassing through established pastures and lawns shall be by seeding with the same type of grass as was disturbed or, if acceptable to the Owner, seeding may be as recommended by the local Soil Conservation Agent.
 - G. Grassing of Other Areas: Grassing of other areas shall be by planting grass of a quick growing species that will also give a permanent cover. Permanent seeding shall be a mixture of Bermuda and centipede.
 - H. Planting: Preparation of soil along highway right of way shall be as set out in highway specifications. The Contractor shall use recognized equipment and materials in preparation of the soils. Before planting, a fertilizer of 6-12-12 composition or approved equal shall be evenly applied at the rate of 1,500-pounds per acre and disced or harrowed into the dampened soil.
 - I. Maintenance: Temporary grass may be intermixed with permanent grass. However, the Contractor shall cut and maintain the temporary grass such that the permanent grass will become established and not be choked out. The Contractor will be required to maintain the grass on the site until the job is accepted.
 - J. Payment: Grassing will be paid for on a lump sum basis and shall include all areas where the existing grass has been disturbed or destroyed by the Contractor's operation. Areas to be grassed shall be designated by the Engineer. Final acceptance and payment of grassing is defined as a full cover, over the seeded area of live and growing grass, when at least 98% of the total area has no bare spots exceeding 1-square foot, and the ground surface is fully stabilized against erosion. The cost of such work and all cost incidentals thereto shall be included in the unit prices bid for the item to which the work pertains.
- 3.11 Seed, Fertilizer, Mulch: Seed, fertilizer, mulch and periodic watering shall be applied in adequate quantities to assure a satisfactory ground cover over the entire disturbed area of construction operations. Water thoroughly as soon as completed and at least twice daily,

or more often if necessary to provide continuous growth without setback until all growth from seed is thoroughly established.

The mulching material will consist of dry straw or hay of good quality, free of seeds of competing plants, and at the rate of two or two and a half tons per acre, respectively. Straw or hay mulch will be applied uniformly over the disturbed areas to achieve 75% coverage. It must be spread within 24-hours after seeding is done. The spreading must be done by blower-type or other mulch-spreading equipment or by hand and anchored by pressing the mulch into the soil. Anchoring must be done immediately after the mulch is spread. A disk harrow with the disk set straight or a special "packer disk" may be used. The disk may be smooth or aerated and should be 20" or more in diameter and 8" to 12" apart. The edges of the disk should be dull enough not to cut the mulch but sharp enough to press into the soil leaving much of it in an erect position.

No separate payment will be made for the above work. The cost of such work, and all cost incidentals thereto, shall be included in the unit prices bid for the item to which the work pertains.

3.12 Slope Stabilization: Sedimentation shall be controlled by the use of hay mulch on all slopes. On slopes greater than 3:1, the Contractor shall install blankets. Prior to placing the blanket, the grassing shall have been completed and the area left in a smooth, uniform condition, free from stones, lumps, roots, and other material which would prevent from making snug contact with the underlying soil.

A. Fiberglass Blanket: The fiberglass blanket shall be machine produced consisting of uniform layer of continuous, randomly-oriented glass fiber strands. The blanket shall be at least 48" wide and weighing a minimum of 0.2-pounds per square yard when used on slopes and 0.4 pounds per square yard when in waterways.

1. Securing and Stapling: All staples shall be driven flush with the ground. Staples for securing the blanket shall be made from cold drawn wire no less than 6" lengths of 14-gauge, to form a "U" of 1" in width. Longer staples may be required for loose soil.

Each strip of the blanket shall be held firmly in place by means of 3 rows of staples; 1 row along each edge and 1 row along the middle. The staples shall be spaced no more than 3' apart in each row with the staples in the middle row spaced alternately with those at the edges. The edge staples shall be placed in the 2" overlap. At the end of each blanket, staples shall be placed in a row with spacing of approximately 12".

An anchor slot or trench, 9" in depth, shall be dug across the upgrade end of the site. The first 12" of the blanket shall be placed in the trench and the backfill tamped solidly in place. Adjacent strip ends shall overlap 2" and adjoining ends shall overlap 6" with the upstream section on top.

B. Organic Fiber Blanket:

1. Straw Blanket: The straw blanket shall be a machine-produced blanket of clean, weed-free straw from agricultural crops with consistent thickness and the straw evenly distributed over the entire area of the blanket.

- a. Slopes: The top of each blanket shall be covered with a photodegradable plastic mesh having a maximum mesh size of 5/16" × 5/16" which is sewn to the straw using biodegradable thread. The blanket shall be at least 48" wide with a minimum thickness of 3/8" and a minimum dry weight of 0.5-pounds per square yard.
 - b. Waterways: The blanket shall be the same as for slopes except having the photodegradable plastic mesh on the top and bottom.
2. Excelsior Blanket: A machine produced mat of curled wood excelsior of which 80% has 6" or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The blanket shall be smolder resistant. The top of the blanket shall be clearly labeled.
- a. Slopes: The top of each blanket shall be covered with a photodegradable plastic mesh having a maximum mesh size of 1½" × 3". The blanket shall be at least 48" wide with a minimum thickness of ¼" and a minimum dry weight of 0.8-pounds per square yard.
 - b. Waterways: The blanket shall be the same as for slopes except having the photodegradable plastic mesh on the top and bottom.
3. Securing and Stapling: Staples shall be driven vertically into the ground to anchor the plastic mesh. Staples shall be spaced approximately 2-yards apart on each side of the blanket and one row in the center alternately spaced between each side staple. Where blankets are laid side to side, the staples shall be placed with half of the staple anchoring mesh from each blanket. At the beginning of a blanket, staples shall be placed in a row with spacing of approximately 12".

In waterways, there shall be no longitudinal seams unless overlapped at least 6" with the upgrade section on top. The first 12" of the first row of blankets shall be placed in a 6" deep anchor slot stapled in the bottom, and the slot shall be backfilled and solidly tamped.

- C. Payment: The cost of such work, and all cost incidentals thereto, shall be included in the lump sum bid for the item to which the work pertains

3.13 Final Stabilization: When monitoring is required, stabilized means at least 70% of the soil surface is uniformly covered in permanent vegetation unlike the NPDES Storm Water Discharges Associated with Construction Activities, General Permit (GAR 100001, 100002, 100003), which includes installation of equivalent permanent stabilization measures (such as the use of riprap, gabions, permanent mulches or geotextiles). Permanent vegetation consists of planted trees, shrubs, perennial vines; a crop of perennial vegetation appropriate for the season and region; or a crop of annual vegetation and a seeding of target crop perennials appropriate for the region such that within the growing season a 70% coverage by the perennial crop is achieved. For linear construction projects on agricultural or silvicultural lands, stabilized means stabilizing it for its agricultural or silvicultural use.

Final acceptance of grassing for payment is defined as a full cover, over the seeded area of live and growing grass, when at least 98% of the total areas has no bare spots exceeding 1-square foot, and the ground surface is fully stabilized against erosion.

- 3.14 Maintenance Program: Best management practices will be inspected daily. Any damages will be repaired by the end of the day. Cleanout of sediment control structures will be accomplished in accordance with the publication entitled "*Manual for Erosion and Sediment Control in Georgia*," latest edition and sediment disposal accomplished by spreading on the site. Sediment basins and barriers will remain in place until disturbed areas are stabilized. The sediment control barriers will then be removed and the areas by these structures grassed.

No separate payment will be paid for the above work, except silt fence, unless the work performed was in accordance with "Grassing of Disturbed Areas" paragraph, then payment would be made on a linear foot basis as specified. Otherwise, the cost of the above work and all cost incidental thereto shall be included in the unit prices bid for the item to which the work pertains. In case of failure on the part of the Contractor to adequately control erosion, pollution, and / or siltation, the Owner reserves the right to employ outside assistance or to use his own forces to provide the necessary corrective measures. Such incurred direct costs plus Project Engineering costs will be charged to the Contractor and appropriate deductions made from the Contractor's monthly progress estimate.

