Excavate unsuitable foundation material below the invert of the culvert to an approximate depth of 24 inches and a width of at least the culvert diameter plus 4 feet. Remove rock, hardpan, or other unyielding material below the foundation grade for a depth of at least 12 inches and a width of at least 24 inches greater than the outside width of the culvert.

Excavate to foundation grade without unduly disturbing the trench or foundation surface. Foundation grade is the elevation at the bottom of any bedding for the installation of the structure.

206A.05 Channel Preservation.

206A.06 Foundation Seal.

206A.07 Dewatering.

206A.08 Foundation Preparation. Excavate any unsuitable material present at foundation grade, and replace it with foundation fill.

206A.09 Utilization of Excavated Materials. Utilize all suitable excavated material as backfill or embankment. Do not place excavated material in live streams.

Dispose of all surplus material as SHOWN ON THE DRAWINGS or DIRECTED BY THE ENGINEER. Do not deposit excavated material in a manner that will endanger the partly finished structure.

206A.10 Backfill & Embankments for Minor Structures. Backfill excavated areas around minor structures to the level of the original ground surface. Backfill with selected material placed in horizontal layers not over 6 inches (loose measure) in depth. Use compactible material free of frozen lumps, chunks of highly plastic clay, or other objectionable material. Do not use rocks larger than 3 inches in diameter within 12 inches of the structure. Compact each layer in accordance with Subsection 203.16(b), method 3, using a mechanical tamper.

206A.11 Bedding, Backfill, & Embankment for Pipe Culverts. Install bedding, backfill, and embankment for pipe culverts in accordance with Sections 603, 603A, and 603B, unless otherwise SHOWN ON THE DRAWINGS or described in the PROJECT SPECIFICATIONS.

Measurement

206A.12 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Measure bedding material by the cubic meter in place. Measure foundation fill under Section 206.

Payment

206A.13 Basis. Payment will be considered incidental to other pay items in this contract.

Section 251—Riprap

Description

251.01 Work. Furnish and place riprap/drain rock for bank protection, slope protection, drainage structures, and erosion control.

Materials

251.02 Requirements. Riprap/drain rock materials shall be obtained from sources SHOWN ON THE DRAWINGS and DESIGNATED BY THE ENGINEER.

Construction

251.03 General. Minimize ground disturbance where practicable in preparing for placement of riprap. Prepare surfaces by removing logs, cutting brush and stumps flush with the ground, or as SHOWN ON THE DRAWINGS. Remove all soft or spongy material to the depths SHOWN ON THE DRAWINGS and replace it with approved material. Perform structural excavation and backfill as specified in Section 206A. Control gradation by visual inspection.

251.04 Placed Riprap. Placed riprap is rock placed on a prepared surface to form a well-graded mass. Place riprap to its full thickness in one operation to avoid displacing the underlying material. Do not place riprap material by methods that cause segregation or damage to the prepared surface. Place or rearrange individual rocks by mechanical or manual methods to obtain a compact uniform blanket with a reasonably smooth surface.

251.05 Keyed Riprap.

251.06 Mortared Riprap.

251.07 Sacked Concrete Riprap.

251.08 Sacked Soil Cement Riprap.

251.09 Hand-Placed Riprap.

251.10 Granular Filter Blanket.

251.11 Geotextile.

Measurement

251.12 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

251.13 Basis. Payment will be considered incidental to other pay items in this contract.

Section 252—Mechanically Placed Rock Retaining Wall

Description

253.01 Work. For special rock embankment, load, haul, and place rock as SHOWN ON THE DRAWINGS.

Materials

253.02 Requirements. Furnish material that conforms to specifications in the following subsections:

Rock for Mechanically Placed Embankments 705.04

Rock shall be roughly rectangular, tabular, or cubic in shape. Rounded rocks shall not be used. Rocks shall be intact, massive, with no open planes of weakness.

Construction

252.3 Placing Rock. Perform the work specified in section 203 or 206A, as required

Place the rock in a stable orientation with minimum rock size to chock the larger rock solidly in position and to fill voids between the large rocks

Measurement

253.10 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

253.11 Basis.

The accepted quantities will be paid for at the contract unit price for each PAY ITEM IN THE SCHEDULE OF ITEMS. Payment will be made under:

Pay Item		Pay Unit
252 (01)	Mechanically Placed Rock Retaining Wall	Lump Sum

Section 304—Aggregate Base or Surface Course

Description

304.01 Work. Furnish, haul, and place aggregate base or surface course on the subgrade or base or stockpile site approved by the CO.

Materials

304.02 Source. Obtain materials from sources or stockpiles SHOWN ON THE DRAWINGS, or from other approved sources.

304.03 Gradation. Ensure that grading requirements for Contractor-furnished materials meet the requirements specified in Subsection 703.06.

304.04 Quality.
304.05 Additives.
304.06 Water.
304.07 Mineral Filler.

Construction

304.08 Preparation of Roadbed. Complete the roadbed in accordance with Section 203, 306, or 309, and have it approved in writing by the CO before placing base or surface course.

304.09 Mixing & Placing. Spread the aggregate in a uniform layer, with no segregation of size, and to a loose depth that has the required thickness when compacted.

304.10 Compaction. Compact the aggregate using one of the following methods, as specified in the SCHEDULE OF ITEMS:

(a) Compaction A. Compact the aggregate by operating spreading and hauling equipment over the full width of each layer of the aggregate.

(b) Compaction B. Moisten or dry the aggregate to a uniform moisture content suitable for compaction. Operate rollers that meet the requirements specified in Subsection 203.15(b), (c), or (d)

over the full width of each layer until visual displacement ceases, making no fewer than three complete passes.

(c) Compaction C. Compact each layer of aggregate to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.

(d) Compaction D. Compact each layer of aggregate to a density of at least 95 percent of the maximum density, as determined by AASHTO T 180, method C or D.

(e) Compaction E. Ensure that materials produced by pit-run and grid-rolling are visually moist and compacted using operating compaction equipment defined in Subsection 203.15(b), (c), and (d) over the full width of each layer until visual displacement ceases.

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the density of each layer in accordance with AASHTO T 191, T 205, T 238, T 217, T 239, T 255, or T 224.

304.11 Stockpiling.

304.12 Thickness & Width Requirements. Ensure that the thickness and width of the compacted aggregate conform to the dimensions SHOWN ON THE DRAWINGS, and that measurements on the compacted aggregate meet the following criteria:
(a) The maximum variation from the specified thickness is 1 inch.
(b) The compacted thickness is not consistently above or below the specified thickness, and the average thickness of 4 or more measurements for any 0.5 miles of road segment is within ± 0.5 inch of the specified thickness.
(c) The compacted width has a (+) 1 foot tolerance.

Measurement

304.13 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

304.14 Basis. The accepted quantities will be paid for at the contract unit price for each PAY ITEM DESIGNATED IN THE SCHEDULE OF ITEMS. Payment will be made under:

Pay Item		Pay Unit
304 (13)	Crushed Aggregate Surfacing, Compaction B.....	Cubic Yard

Section 306—Reconditioning Existing Road

Description

306.01 Work. Recondition existing road; clean ditches, cattleguards, and culverts, including inlets and outlets; remove slide material; scarify where SHOWN ON THE DRAWINGS; and shape and compact the traveled way and shoulders, including parking areas, turnouts, and approach road intersections.

Construction

306.02 Blading & Shaping. Unless otherwise SHOWN ON THE DRAWINGS, blade and shape the existing traveled way and shoulders, including turnouts, to remove minor surface irregularities. Maintain the existing cross slope or crown, unless otherwise SHOWN ON THE DRAWINGS. Establish a blading pattern that will retain the surfacing on the roadbed and provide a thorough mixing of the materials within the completed surface width.

Scarify and shape the existing traveled way and shoulders at locations and to the depth and width SHOWN ON THE DRAWINGS. Remove any rock larger than 4 inches in its greatest dimension that is brought to the surface during scarification, except as provided below.

306.03 Rock Reduction.

306.04 Drainage. Grade the ditches to the typical sections and at the locations SHOWN ON THE DRAWINGS. Clean culverts to drain.

Remove excess materials from the roadbed, culverts, and ditches, and place material as SHOWN ON THE DRAWINGS.

306.05 Cattleguards.

306.06 Compaction. Shape and compact the traveled way and shoulders using one of the methods described below and DESIGNATED IN THE SCHEDULE OF ITEMS.

(a) Compaction A. Compact the aggregate by operating spreading and hauling equipment over the full width of each layer of the aggregate.

(b) Compaction B. Moisten or dry the aggregate to a uniform moisture content suitable for compaction. Operate rollers that meet the requirements specified in Subsection 203.15(b), (c), or (d) over the full width of each layer until visual displacement ceases, making no fewer than three complete passes.

(c) Compaction C. Compact each layer of aggregate to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.

(1) Compaction C-1. Compact each layer of aggregate to a density of at least 96 percent of the maximum density, as determined by the Modified Marshall Hammer Compaction Method (available upon request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

(d) Compaction D. Compact each layer of aggregate to a density of at least 95 percent of the maximum density, as determined by AASHTO T 180, method C or D.

(1) Compaction D-1. Compact each layer of aggregate to a density of at least 100 percent of the

maximum density as determined by the Modified Marshall Hammer Compaction Method (available upon request from USDA Forest Service, Regional Materials Engineering Center, P.O. Box 7669, Missoula, MT 59807).

(e) Compaction E. Ensure that materials produced by pit-run and grid-rolling are visually moist and compacted using operating compaction equipment defined in Subsection 203.15(b), (c), and (d) over the full width of each layer until visual displacement ceases.

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the density of each layer in accordance with AASHTO T 191, T 205, T 238, T 217, T 239, T 255, or T 224.

Measurement

306.07 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

306.08 Basis. The accepted quantities will be paid for at the contract unit price for each PAY ITEM DESIGNATED IN THE SCHEDULE OF ITEMS. Payment will be made under:

Pay Item		Pay Unit
306 (01)	Reconditioning of roadbed, compaction A	Lineal Mile

Section 601—Mobilization

Description

601.01 Work. Move personnel, equipment, material, and incidentals to the project, and perform all activities necessary to accomplish work at the project site. Obtain permits, insurance, and bonds.

Measurement

601.02 Method. Measure mobilization by the lump sum.

Payment

601.03 Basis. The accepted quantity, measured as provided above, will be paid at the contract price per unit of measurement for the PAY ITEM listed below that is DESIGNATED IN THE SCHEDULE OF ITEMS.

The mobilization lump sum will be paid as follows:

(a) If applicable, bond premiums will be reimbursed according to FAR clause 52.232–5, Payment Under Fixed-Price Construction Contracts, after receipt of evidence of payment.

(b) Fifty percent of the lump sum, not to exceed 5 percent of the original contract amount, will be paid following completion of 5 percent of the original contract amount, not including mobilization.

(c) Payment of the remaining portion of the lump sum, up to 10 percent of the original contract amount, will be paid following completion of 10 percent of the original contract amount, not including mobilization.

(d) Any portion of the lump sum in excess of 10 percent of the original contract amount will be paid after final acceptance. Payment will be made under:

Pay Item		Pay Unit
601 (01)	Mobilization	Lump Sum

Section 603—Metal Pipe

Description

603.01 Work. Furnish and install, or install only, metal pipe and pipe appurtenances, including all bedding and backfilling required to complete the work. The term "metal" refers to aluminum and steel.

Materials

603.02 Requirements. Furnish materials that meet the requirements specified in the following subsections:

Metallic-Coated Corrugated Steel Pipe 707.02
Metallic-Coated Spiral Rib Pipe 707.11

Furnish bedding material that meets the requirements specified in Subsection 603.04.

Furnish backfill materials that meet the requirements specified in Subsection 603.08.

Clean and paint damaged spelter coating caused by welding, field cutting, or mishandling, as specified in Subsection 707.15.

To prevent electrolysis or physical failure, use materials in each pipe installation that are compatible with each other.

Either annular or helical pipe corrugations will be acceptable. Helical corrugated pipe containing annular rerolled ends may be used in conjunction with annular pipe of like or compatible materials.

Provide fabricator's certification that the sheet and pipe fabrication are in accordance with AASHTO M 36, M 196, and M 245, as applicable. Submit the certification before installing the pipe.

The lengths and locations of individual pipe SHOWN ON THE DRAWINGS are approximate. Do not order pipe until culvert locations are DESIGNATED ON THE GROUND.

Construction

603.03 Excavation. Excavate in accordance with the requirements specified in Section 206A.

Specific pipe installation time restrictions and installation plan requirements are SHOWN ON THE DRAWINGS.

603.04 Bedding. Bed the pipe to a depth of not less than 10 percent of its total height. After excavating in accordance with Subsection 206A.04(b), compact the foundation surface in accordance with Subsection 603.08 and shape it to fit the pipe.

As bedding material, provide selected mineral soil that meets the requirements for backfill specified in Subsection 603.08. Ensure that completed bedding has a longitudinal, vertical camber approximating 2% of the culvert length.

603.05 Laying Pipe. Lay the lower segment of the pipe so that it is in contact with the bedding for the required depth throughout its length. Place outside circumferential laps facing upstream.

Ensure that the final installed alignment allows no reverse grades, and does not permit any point to vary from a straight line drawn from inlet to outlet by more than 2 percent horizontally and vertically of the culvert length, or 12 inches, whichever is less.

Do not place any pipe in service until a suitable outlet is provided.

Install helically corrugated lock-seam pipe with the seam at the inlet end placed below the horizontal centerline. This requirement applies to the outlet end when the outlet is less than 60 inches below subgrade.

Position longitudinal laps on riveted or spot-welded pipe at any location between 45° above or below horizontal.

603.06 Joining Pipes. Firmly join pipe using form-fitting coupling bands. Attach end sections to the pipe using connecting bands or other means, as recommended by the manufacturer. Install gaskets at each joint to form a watertight connection when SHOWN ON THE DRAWINGS. Do not use dimpled bands when the slope of the pipe is greater than 15 percent.

Ensure that coupling bands meet the strength requirements of field joints for Nonerodible Soil Condition—Special Joint Type, according to division II, section 26, of the "Standard Specifications for Highway Bridges" by AASHTO.

When aluminum alloys come in contact with other metals, coat the contacting surfaces with an asphalt mastic or other impregnated caulking compound approved by the CO.

603.07 Shop Elongation.

603.08 Backfilling. Do not place or backfill pipe that meets any of the following conditions until the excavation and foundation have been approved by the ENGINEER:

- Embankment height greater than 10 feet at subgrade centerline.
- Installation in a live stream.
- Round pipe with a diameter of 48 inches or greater.
- Pipe arches with a span of 50 inches or greater.

After the bedding is prepared and the pipe is placed, place selected material in layers not exceeding 6 inches loose thickness, and compact the material under the haunches and alongside the pipe using a mechanical tamper. Use material that is readily compactible and free of frozen lumps, chunks of highly plastic clay (with a plasticity index greater than 10), or other objectionable material. Do not use rocks larger than 3 inches in greatest dimension within 12 inches of the pipe. On each side of the pipe, place an area of compacted material at least as wide as the diameter of the pipe. Compact the backfill without damaging or displacing the pipe. Ensure that backfill density exceeds the density of the surrounding embankment.

Continue backfilling and compacting until the backfill is a minimum of 12 inches above the top of the culvert.

After bedding and backfilling the pipe, protect it with an adequate cover of embankment before heavy equipment is permitted to cross during roadway construction.

Replace any pipe that is distorted by more than 5 percent of nominal dimensions, or that is ruptured or broken.

Measurement

603.09 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

603.10 Basis. The accepted quantities will be paid for at the contract unit price for each PAY ITEM DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment will made under:

Pay Item		Pay Unit
603 (01)18	18-inch Corrugated Steel Pipe, 0.064-inch thickness	Lineal Feet
603 (01)24	24-inch Corrugated Steel Pipe, 0.064-inch thickness	Lineal Feet
603 (01)36	36-inch Corrugated Steel Pipe, 0.064-inch thickness	Lineal Feet
603 (01)48	48-inch Corrugated Steel Pipe, 0.064-inch thickness	Lineal Feet

Section 611—Development of Pits & Quarries

Description

611.01 Work. Clear, grub, strip topsoil, remove overburden, construct access roads, conduct restoration activities, and perform other incidental work required for pit or quarry development.

Construction

611.02 General. Perform all work in accordance with Sections 201, 203, and 625; landscape preservation requirements; and the pit and quarry development and/or restoration plan, as SHOWN ON THE DRAWINGS.

611.03 Source. Develop designated sources in accordance with requirements SHOWN ON THE DRAWINGS or in the PROJECT SPECIFICATIONS.

611.04 Clearing, Grubbing, & Slash Cleanup. Meet clearing, grubbing, and slash cleanup requirements as specified in Section 201. Merchantable logs shall be bucked and decked at locations DESIGNATED BY THE ENGINEER. Tops, limbs, and stumps shall be piled and as part of site restoration be spread evenly over the disturbed areas.

611.05 Access Roads. Construct or recondition access roads to the pit or quarry as specified in Section 203 or 306, and as SHOWN ON THE DRAWINGS.

611.06 Topsoil. Strip, stockpile, and place topsoil obtained from the site over the disturbed area after material removal.

611.07 Overburden.

611.08 Ground Control & Haulways. Perform the work in accordance with MSHA 30 CFR, part 56, as related to ground control and haulways. Immediately correct any deterioration of overburden slopes, safety benches, or protective berms, or any encroachment on clearing limits.

611.09 Oversize Material. Use all suitable material for aggregate, regardless of size, that is developed in stripping, overburden removal, and excavation of rock material, unless other disposition is SHOWN ON THE DRAWINGS or DESIGNATED BY THE ENGINEER.

611.10 Restoration. After excavation has been completed in part or all of the area, slope and grade the sides, and smooth the general pit area. Cut slopes shall be shaped to 1½:1. Pit floor shall be shaped to drain AS DESINGATED BY THE ENGINEER. All disturbed areas shall be seeded and mulched in accordance with Section 625.

Measurement

611.11 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

611.12 Basis. Payment will be considered incidental to other pay items in this contract.

Section 618—Cleaning & Reconditioning Existing Drainage Structures

Description

618.01 Work. Clean and recondition existing pipe and appurtenant structures.

Materials

618.02 Requirements. Ensure that the materials used for repair or replacement meet the applicable requirements of sections SHOWN ON THE DRAWINGS or specified in the SPECIAL PROJECT SPECIFICATIONS.

Construction

618.04 Pipe Cleaned in Place. Remove all foreign material inside the barrel by methods that do not damage the pipe. Take adequate measures to protect the drainage and prevent stream siltation or increased turbidity when hydraulically cleaning pipe in place.

If approved by the CO, all or part of the pipe designated to be cleaned in place may be removed, cleaned, and relaid in accordance with Sections 603, 603A, and 603B. In these cases, furnish all materials required to replace damaged pipe and joints, perform all excavation and backfill, and relay the pipe.

618.05 Relaying or Stockpiling Salvaged Pipe.

618.06 Reconditioning Drainage Structure. Remove all debris, repair leaks, and replace broken or missing metalwork on all structures, such as manholes and inlets, that are SHOWN ON THE DRAWINGS as needing reconditioning. Leave these structures in operating condition.

Measurement

618.07 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Payment

618.08 Basis. Payment will be considered incidental to other pay items in this contract.

Section 625—Seeding & Mulching

Description

625.01 Work. Prepare seedbeds, and furnish and place required seed, fertilizer, limestone, mulch, net, and blanket material.

Materials

625.02 Requirements. Ensure that materials meet the requirements specified in the following subsections:

Fertilizer 713.03
Mulch 713.05
Seed 713.04

Construction

625.03 Seeding Seasons. The normal season dates for seeding shall be from April 1 to November 30. Seeding materials shall not be applied during windy weather or when the ground is excessively wet or frozen, or when snow depth is greater than 2 inches.

625.04 Soil Preparation. Finish the areas to be seeded, as required by other applicable sections, to the lines and grades SHOWN ON THE DRAWINGS. Restore areas that are damaged by erosion or other causes. Ensure that the surface soil is in a roughened condition favorable for germination and growth.

625.05 Application Methods for Seed, Fertilizer, & Limestone. To control erosion, apply seed to disturbed soil and slopes within 30 days of disturbance. If the slopes have not been finished, apply the seed by the dry method as an interim erosion control measure. Apply fertilizer with the seed when specified in the PROJECT SPECIFICATIONS.

The following methods may be used to place material AS DESIGNATED IN THE SCHEDULE OF ITEMS:

(a) Hydraulic Method.

(b) Dry Method. Use hand-operated devices, mechanical, landscape, or cultipacker seeders, seed drills, fertilizer spreaders, or other approved mechanical seeding equipment to apply the seed or seed and fertilizer.

The kinds of seed to be furnished and the amounts to be applied in terms of pure live seed shall be:

Kind of Seed	Quantity of Pure Live Seed (Lbs/Acre)
1. Slender Wheatgrass (elymus trachycaulus)	6.0
2. Mountain Brome (bromus marginatus)	9.0
3. Bluebunch Wheatgrass (pseudoroegneria spicata)	4.0
4. Blue Wild Rye (elymus glaucus)	5.0

Pounds of seed to be furnished per acre shall be obtained by dividing the pounds of pure live seed required per acre by the product of the percent purity and percent germination.

Example: $\frac{5\,lbs.PPLS}{0.90 \times 0.85}$ = 6.55 lbs commercial seed per acre applied

Where: 5 lbs. PPLS = pounds pure live seed per acre required; Purity = 90%: Germination = 85%

Certified, blue-tagged seed shall be used where a name variety or cultivar is specified. Blue tags which are removed to mix the seed shall be provided to the Engineer. All seed purchased will be certified to be free of noxious weed seeds listed on the current "All States Noxious Weeds List." Test results from a certified seed analyst and seed analysis labels attached to the bags will be provided to the Forest Service.

Lab testing for noxious weeds will be conducted prior to seed mixing. Only after a finding and documentation in writing of no seeds on the current "All States Noxious Weeds List" will the seed be accepted and used.

Fertilizer shall be applied at a rate of 100 pounds per acre in one application by the dry method and have a chemical analysis as listed below:

Nutrient	Percent
Nitrogen, N	16
Phosphorus, P_2O_5	16
Potassium, K	16

625.06 Application of Mulch. The following methods may be used to apply mulch:

(a) Hydraulic Method.

(b) Dry Method. After completion of seeding and fertilizing apply mulch uniformly at the rate of 2,000 pounds per acre, so that 60% of the seeded area is covered by a thin layer of straw. Coverage shall be measured by visual means.

Mulch material shall be clean, Montana certified weed free, clean straw.

625.07 Installation of Netting & Erosion Control Blankets.

625.08 Care During Construction. Protect and care for seeded areas until the work is finally accepted. Repair all damage to seeded areas caused by construction, without additional compensation.

Measurement

625.09 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Base area computations on surface measurements.

Payment

625.10 Basis. The accepted quantities will be paid for at the contract unit price for each PAY ITEM DESIGNATED IN THE SCHEDULE OF ITEMS. Payment will be made under:

Pay Item		Pay Unit
625 (02)	Seeding, fertilizing, and mulching, dry method	Lump Sum

Section 637—Equipment Rental

Description

637.01 Work. Furnish and operate equipment for construction work ordered by the CO and not otherwise provided for under the contract.

Equipment

637.02 Requirements. Submit the model number and serial number for each piece of equipment before use. Make equipment available for inspection and approval before use.

Furnish and operate equipment with such auxiliary attachments, oilers, and so forth, as are usually needed for efficient operation of the equipment. Keep the equipment in good repair and capable of operating 90 percent of the working time.

Obtain approval for the length of workday and workweek before beginning work. Keep daily records of the number of unit-hours of operation. Submit the records to the Engineer.

Measurement

637.03 Method. Use the method of measurement that is DESIGNATED IN THE SCHEDULE OF ITEMS.

Measure rental equipment by the hour. When the equipment is operated part-time in any half shift and is operative and not used on other work during the half shift, measure the full half shift. Measure time in excess of 40 hours per week at the same rate as the first 40 hours.

Do not make deductions for nonoperating time for reasonable interruptions for minor repairs if the nonoperating time does not exceed one-half hour per workday. Do not measure nonoperating time in excess of the one-half hour per workday. Do not measure equipment dependent upon another piece of nonoperable equipment.

Do not measure standby time, or time for moving equipment to or from the project or between project worksites.

Measure quantities to include the actual hours, to the nearest half hour, that the equipment is in operation performing the required work. Each day, record the actual hours that the equipment is in operation on the required work.

Payment

637.04 Basis. The accepted quantities will be paid for at the contract unit price for each PAY ITEM DESIGNATED IN THE SCHEDULE OF ITEMS. Payment will be made under:

Pay Item		Pay Unit
637 (01)	Hydraulic excavator, crawler mounted, ¾ C.Y.	Hour

Section 705—Rock

705.01 Gabion Rock

705.02 Riprap Rock

Furnish hard, durable, angular rock free of organic and spoil material and resistant to weathering and water action. Do not use rounded rock, boulders, shale, or rock with shale seams. Furnish rock from Government supplied stockpiles.

Gradation shall be:

Table 705.1. - Gradation requirements for riprap

Class	% of Rock by Mass	Mass (pounds)	Approximate Cubic Dimension[b,c] (Inches)
3	20	220-330	14-16
	30	110-220	10-14
	40	11-110	5-10
	10[a]	0-11	0-5

a. Furnish spalls and rock fragments graded to provide a stable compact mass.
b. The volume of a rock with these cubic dimensions will have a mass approximately equal to the specified rock mass.
c. Furnish stone with breadth and thickness at least one-third its length.

705.03 Rock for Masonry Structures

705.04 Rock for Mechanically Placed Embankments

705.05 Rock for Hand-Placed Embankments

705.06 Stone Curbing

Section 707—Metal Pipe

707.01 Ductile Iron Culvert Pipe

707.02 Metallic-Coated Corrugated Steel Pipe

Furnish pipe, special sections (such as elbows, branch connections, and prefabricated flared end sections), and coupling bands that conform to AASHTO M 36M and AASHTO M 218, M 274, or M 289 for the dimensions and thicknesses specified.

Fabricate underdrain pipe from a minimum of 1.32-mm steel sheets. Use any class of perforation specified in AASHTO M 36M.

707.03 Aluminum-Alloy Corrugated Pipe

707.04 Asphalt-Coated Pipe

707.05 Steel Structural-Plate Structures

707.06 Aluminum-Alloy Structural-Plate Structures

707.07 Asphalt-Coated Structural-Plate Structures

707.08 Polymer-Coated Steel Pipe

707.09 Fiber-Bonded Bituminous-Coated Steel Pipe

707.10 Slotted Drain Pipe

707.11 Metallic-Coated Spiral Rib Pipe

Furnish pipe, special sections (such as elbows and branch connections), and coupling bands that conform to AASHTO M 36M, type IR and IIR, and AASHTO M 218, M 274, or M 289 for the dimensions and thicknesses specified.

707.12 Aluminum-Alloy Spiral Rib Pipe

707.13 Concrete-Lined Corrugated Steel Pipe

707.14 Invert-Paved Corrugated Steel Pipe

707.15 Repair of Damaged Coatings

Repair damaged coatings in accordance with AASHTO M 36M and ASTM A 849.

Section 713—Roadside Improvement Material

713.01 Topsoil

713.02 Agricultural Limestone

713.03 Fertilizer

Furnish standard commercial-grade dry formulated fertilizer conforming to the standards of the Association of Official Analytical Chemists International, applicable State and Federal regulations, and required minimum percentages of available nutrients.

Supply the fertilizer in new, clean, sealed, and properly labeled containers with name, weight, and guaranteed analysis of contents clearly marked.

A liquid form of fertilizer containing the minimum percentage of available nutrients may be used.

713.04 Seed

Furnish seed that conforms to FSS JJJ–S–181 for seed testing and quality, and is in conformance with the State Seed Acts. If seed species in the specified seed mix are not listed in FSS JJJ–S–181, furnish certified weed-free seed. Do not use wet, moldy, or otherwise contaminated or damaged seed.

Provide seeds as follows:

(a) Furnish each seed type in a separate standard sealed container. Clearly label each container with the following:

(1) Name and type of seed.
(2) Lot number.
(3) Net weight.
(4) Percent of purity, germination, and hard seed.
(5) Percent of maximum weed seed content.

Inoculate legume seed with approved cultures, in accordance with the manufacturer's instructions.

(b) Furnish a product certification for each kind or type of seed, certifying that the seed was tested by a recognized laboratory within 6 months of the date of delivery. Include the following:

(1) Name and address of testing laboratory.
(2) Date of test.
(3) Seed identification.
(4) Test results showing the percentages of purity, germination, and weed content.
(5) Certified weed-free seed.

713.05 Mulch

(a) Straw. Obtain straw for mulching from oats, wheat, rye, or other grain crops that are free from weeds, mold, and other objectionable material. Furnish straw mulch in an air-dry condition suitable for placing with mulch blower equipment.

(b) Hay. Obtain hay from herbaceous mowing. Ensure that it is free from weeds, mold, and other objectionable material. Furnish hay in an air-dry condition suitable for placing with mulch-blower equipment.

713.06 Plant Material

713.07 Erosion Control Mats, Roving, & Geocell

713.08 Miscellaneous Planting Material

713.09 Sprigs

713.10 Sod

713.11 Pegs for Sod

713.12 Stabilizing Emulsion Tackifiers

713.13 Bales

713.14 Sandbags

713.15 Erosion Control Culvert Pipe

713.16 Silt Fence

If approved, variations from the above may be permitted to accommodate premanufactured fences.

Section 716—Material for Timber Structures

716.01 Untreated Structural Timber and Lumber

Furnish structural timber and lumber that conform to AASHTO M 168 and the applicable standards of the West Coast Lumber Inspection Bureau, Southern Pine Inspection Bureau, or another nationally recognized timber association. Ensure that all structural timber and lumber are seasoned and dried at the time of fabrication. Material that has become twisted, curved, or otherwise distorted prior to assembly into final structure may be cause for rejection.

Do not used boxed-heart pieces of Douglas Fir or Redwood in stringer, floor beams, caps posts, sills, curbs, rails, rail posts, and rail post blocks. Boxed-heart pieces are to be defined as timber so sawed that at any point in length of a sawed pieced the pith lies entirely inside the four faces.

Legibly mark, stamp, or brand all pieces, identifying the inspection service, grade designation species, and identity of inspector. Furnish timber and lumber that conform to the species, design values, and nominal dimensions SHOWN ON THE DRAWINGS. Furnish an inspection certification as to the species and grade from and agency accredited by ALSC.

716.02 Hardware & Structural Steel

Furnish machine and carriage bolts that meet the requirements of ASTM A 307, drift pins and dowels that meet the requirements of ASTM A 575, and Galvanized hardware that meets the requirements of AASHTO M 111.

Ensure that all structural steel shapes, rods, glued laminated deck panel dowels, and plates are structural steel that meets the requirements of AASHTO M 183. Ensure that galvanizing meets the requirements of AASHTO M 111.

Furnish bolts with square or hexagonal heads, nuts or dome-heated bolts as SHOWN ON THE DRAWINGS, and nails that are cut or round nails of standard form U se cut, round, or boat spikes, as specified. Use washers that are American Standard Plain Washers.

Use ring or shear plate timber connectors conforming to AASHTO's "Standard Specifications for Highway Bridges," division II, article 16.2.6, Timber Connectors.

716.03 Treated Structural Timber and Lumber

Furnish wood in accordance with Subsection 716.01 Treat the wood and mark each piece of treated timber in accordance with AASHTO M 133. Use the type of treatment and minimum net retention of preservative that are SHOWN ON THE DRAWINGS. Completely and accurately fabricate all treated timber before it is treated. Except for Southern Pine, incise all surfaces greater than 2 inch in width, including glued laminated members, before treatment. Treat glued laminated timers in accordance with AWPA C28. Furnish inspection certification of treatment from and agency accredited by ALSC.

Use the assay method to determine retention of preservatives in all lumber and timbers.

Ensure that treatment meets the requirements in the current edition of the WWPI's "Best Management Practices for the Use of Treated Wood in Aquatic Environments."

716.04 Structural Glued Laminated Timber

Furnish structural glued laminated timber that meets the requirements specified in the current edition of AITC 117. Use the combination symbol, protection, quality marks, certificates, and preservation treatment that are SHOWN ON THE DRAWINGS. Ensure that manufacture, marking, and quality control of structural glued laminated timber are in conformance with ANSI/AITC A190.1, Structural Glued Laminated Timber.

Ensure that members are manufactured as industrial-appearance grade for wet use conditions, using a phenol-resorcinol resin type of adhesive throughout. Use only single- or multiple-piece laminations with bonded edge joints.

Ensure that caulking compound used to seal deck panel joints meets the requirements of FSS TT – S – 001543 (com.) and is bronze in color.

716.05 Substitution for Solid Sawn Structural Timber and Lumber

Comparable glued laminated material may be substituted for solid sawn material. Ensure that all substitutions have approximately equal dimension and will provide equal or greater bonding and shear strength per member. Before fabrication, submit drawings that show revised details, including and changes in dimensions, elevation, and bolt length.