Amend **Section 203 - Excavation and Embankment** to read as follows:

"SECTION 203 - EXCAVATION AND EMBANKMENT

203.01 Description. This section describes excavating, hauling, and disposing of surplus excavated material and placing and compacting specified materials necessary to construct project.

Roadway excavation includes excavating and compacting, or disposing of, all materials of whatever character encountered in the work.

For terminology used in this section, refer to Section 101 – Definitions and Terms and ASTM D 653 – Standard Terminology Relating to Soil, Rock, and Contained Fluids.

203.02 Materials.

(A) Unsuitable Material. Soils that cannot be properly compacted, or soils that have roots or other organic matter, garbage. Debris, junk, or any deleterious matter on the surface of buried.

(B) Excavated Material. All material excavated from project site for roadway contraction.

(C) Selected Material. Suitable excavated material for specific use from areas within the highway right-of-way.

(D) Borrow Excavated Material. Accepted materials from designated borrow sources outside right-of-way or excavation limits, conforming to the requirements of Subsection 106.02 – Material Sources. Borrow excavated material shall conform to the size and quality specified in the contract documents. When the contract documents do not specify size of quality, borrow excavated material shall be of a quality source suitable for the purpose intended. Borrow excavated material shall be free of any roots or other organic, garbage, trash, junk, or other deleterious material.

203.03 Construction Requirements. Clear and grub in accordance with Section 201 - Clearing and Grubbing before excavating. Excavate and embank road, road intersections and road entrances to a smooth and uniform surface. Excavate so as not to disturb material outside limits of slopes or limits of grading.

(A) Excavation.

(1) General. Obliterate old roadways according to Section 202 - Removal of Structures and Obstructions. Blasting will not be allowed.

When encountering possible archaeological, historical, or burial site findings, comply with the requirements of Subsection 107.13(B) - Archaeological, Historic, and Burial Sites.

(2) Widening or Flattening Cut Slopes. Submit proposed locations for widening or flattening planned cut slopes to obtain material required:

(a) For embankment construction;

(b) To preclude the opening of unsightly borrow pits; or

(c) To increase the stability of cut slopes.

Do not proceed with proposed slope widening or flattening until the Engineer accepts proposed locations.

(3) Cut Slopes. Round the tops and ends of cut slopes according to the contract documents.

Finish soil cut slopes that are flatter than one-half horizontal to one vertical true and straight in accordance with slope lines and grades shown in the contract documents.

Finish cut slopes that are one-half horizontal to one vertical or steeper in rock excavation in a rough condition, with debris and loose material removed. When completed, the average plane of excavated slopes shall conform to the slopes shown in the contract documents. No points shall vary from planned slopes by more than 6 inches when measured at right angle to the slope.

(4) Potential Slide Areas. Excavate and remove unstable material by:

(a) Benching to lines and grades designated by the Engineer; or

(b) Excavating material to a slope designated by the Engineer, from an elevation at or near roadway grade;

Use this material in roadway construction or dispose of when ordered by the Engineer.

(5) **Subexcavation.** When excavation to the finish grade results in a subgrade or slopes of unsuitable material as defined in Subsection 203.02 – Materials, the Engineer will require:

(a) Removing unsuitable material and

(b) Backfilling to finished grade with acceptable material in accordance with Subsection 203.03(C) – Embankment Construction.

Notify the Engineer two weeks prior to the start of subexcavation operations. The Engineer will perform necessary cross-sectional measurements before authorizing backfill placement.

(B) Excavated Material.

(1) **Selected Material.** Use selected material for:

(a) Embankment fill;

(b) Finishing the top portion of the roadbed;

(c) Constructing roadbed shoulders;

(d) Structure backfill;

(e) Constructing berms,

(f) Erosion control;

(g) Landscaping; and

(h) Other purposes in accordance with the contract documents.

Place selected material on the roadbed in accordance with Subsection 203.03(C) - Embankment Construction and selected topsoil for erosion control in accordance with Section 209 – Temporary Water Pollution, Dust, and Erosion Control.

Keep selected material in place until it can be hauled, and compacted in its final position. If allowed by the Engineer, selected material may be stockpiled at locations accepted by the Engineer, for later placement in final position.

The Engineer will not include for payment as stockpiled material, selected material placed in windrows along tops of roadway slopes for erosion control work.

Unsuitable material; will become the property of the Contractor and be hauled away at no increase in contract price or contract time.

(2) Borrow Material. Arrange to obtain borrow material and pay the costs involved. Notify the Engineer 20 working days before opening borrow areas. Allow sufficient time for testing the borrow material by the Engineer.

Control of borrow material shall be according to Section 106 - Control of Materials.

Excavate to dimensions and elevations established for borrow pit. Remove borrow material after the Engineer completes staking out and cross sectioning of the borrow excavated and in-place sites for measurement and payment purposes. Establish and specify the finished borrow areas approximately true to line and grade. Complete the finished borrow areas so no water may collect or stand therein.

Do not place borrow material until after placing the selected material in fill.

When it is necessary to remove an existing fence, replace it with a comparable fence after work that required fence removal has been completed. If necessary, confine livestock during fence removal. When required for security purposes, provide and maintain temporary fencing. Furnish and install permanent fencing after temporary fencing is no longer needed.

(3) Surplus Selected Material. Unless otherwise shown in the contract documents, and not over soft ground, use surplus selected material when and in locations accepted by the Engineer to: widen embankments uniformly or flatten slopes; dispose of along roadway or other designated locations. Dispose of surplus selected material below adjacent roadbed grade. Complete embankments before disposing of surplus selected material.

When indicated in the contract documents, the quantity of surplus selected material is approximate only. Replace shortage of material caused by premature disposal of surplus selected material at no increase in contract price or contract time.

Upon completion of disposal operations, grade disposal areas to provide a level surface. Unusual surplus selected material shall become the Contractor's property. Supply topographic map of disposal area.

(4) Highly Sensitive Soil. When soil having high moisture content, loses its stability and becomes plastic or muddy, excavate with the least manipulation or churning of soil.

(C) Embankment Construction.

(1) General. Use suitable excavated or borrow material in the construction of embankments. Do not place rocks, broken concrete, or other solid materials in embankment areas where deep foundations such as driven piles or drilled shafts are to be placed.

When placing and compacting material for embankment on hillsides and existing embankments, or building embankment half width at a time continuously bench slopes that are steeper than four horizontal to one vertical while bringing the work up in layers.

Benching shall be of sufficient width to permit construction equipment to operate. Begin each horizontal cut at the intersection of original ground and the vertical sides of the previous cuts. Recompact the material cut along with the new embankment material.

When embankments across swampy ground cannot support the weight of trucks or other hauling equipment, the lower part of the fill may be constructed by dumping successive loads of gravel, cobbles, and boulders in a uniformly distributed layer of a thickness not greater than necessary or use permeable separator with granular material of adequate thickness to support vehicle placing the layers. Construct remainder of embankment according to the contract documents.

When depositing embankment material on only one side of abutments, wingwalls, piers, or culvert headwalls, do not overcompact the area next to the structure. Do not place fill next to the end bent of a bridge higher than the bottom of the backwall of the bent until after the superstructure is in place. Conduct operations so that the embankment is constructed at approximately the same elevation on both sides of the structure at the same time.

Finish embankment slopes as shown in the contract documents, to approximate lines and grades established and such that slopes contain no unsightly or undue irregularities.

Place embankment material in horizontal layers not exceeding 8 inches in loose thickness. Compact as specified before placing the next layer. Spread each lift to get uniform thickness before compacting. Level and manipulate continuously to ensure uniform density as compaction of each layer progresses. Add or remove water to obtain required density. Route construction equipment uniformly over entire surface of each layer.

When embankment material consists predominantly of rock fragments, hardpan or cemented gravel that cannot be broken readily, and includes 25 percent or more of materials larger than 6 inches in greatest dimension but less than 30 inches in greatest dimension, place such material in the embankment in layers not exceeding 3 feet. Uniformly distribute such material throughout the embankment. Construct lifts below an elevation 3 feet below pavement structure. Construct balance of embankment of suitable material, smooth and place in layers not exceeding 8 inches in loose thickness. Compact as specified for embankments.

While depositing embankment material place sufficient earth or other fine material around large material to fill interstices and to produce a dense compact embankment. Furnish earth or other fine material to fill the interstices when not available in excavated material.

Processing embankment material to reduce maximum size of particles so that material can be placed in specified lifts.

Deposit embankment material having an SE value equal to or greater than 15 within the top 3 feet of the embankment excluding pavement structure. Place embankment material below the top 3 feet of embankment grade with material having sand equivalent value equal to or greater than area being filled. Break up clods or hard lumps of earth over 6 inches in greatest dimension before compacting material in embankment, except as provided above.

Construct the center of embankment layers slightly higher than the sides. Construct sidehill embankments with the intersection if original ground and the embankment being the high point of the layer. Uniformly slope embankment to the outer side. For embankment layers, do not exceed a cross fall of one foot in 20 feet.

Caves are often present in lava formations. The Engineer will determine if caves are too close to the road surface. Excavate to open their tops when ordered by the Engineer. Fill and compact caves with accepted materials.

Maintain stability of constructed embankments until final acceptance of the contract documents. Maintain embankments to grade and cross section shown in the contract documents. Replace portions that become displaced or damaged prior to acceptance at no increase in contract price or time.

(2) Relative Compaction Test. The relative compaction test is a procedure for determining the ratio of the dry unit weight (density) of in-place soil to the maximum dry unit weight of the same soil, as determined by the following methods:

(a) Maximum Dry Unit Weight. Test for maximum dry unit weight according to AASHTO T 180 for soil aggregate mixtures with less than 35 percent passing the No. 200 sieve, and for soils with 35 percent or more passing the No. 200 sieve, having sand equivalent of 15 or more. Test for maximum unit weight in accordance with AASHTO T 99 for soils with 35 percent or more passing the No. 200 sieve, having sand equivalent of less than 15. Perform percent passing No. 200 sieve and sand equivalent tests in accordance with AASHTO T 11 and AASHTO T 176, respectively. For both maximum dry unit weight tests, use Method "A" if the particles are under No. 4 mesh in size, and Method "D" if the particles are over No. 4 mesh in size, and apply the correction for fraction over 3/4-inch. Use Hawaii Test Method HDOT TM 5 for sample preparation of sensitive soils when so designated by the Engineer.

(b) Density of Soil In-Place. Test for soil in-place density in accordance with Hawaii Test Method HDOT TM 1, HDOT TM 2, and HDOT TM 3.

(3) Compaction of Embankment With Moisture And Density Control. When original ground surface in embankment sections is within 3 feet of finished profile grade, the original ground contained in the prism within 3 feet of the finished grade and within the width of the traveled way plus 3 feet on each side, shall have a relative compaction of 95 percent or more.

When original ground within 3 feet of the finished grade does not conform to the specified relative compaction, excavate

material until specified relative compaction is achieved or to 3 feet below finished grade.

When material 3 feet 6 inches below finished grade does not have a relative compaction of at least 90 percent, compact material until 90 percent or more relative compaction is attained. After compacting lower 6 inches to a relative compaction of 90 percent, backfill excavated material or other material designated in the excavated area. Place backfill material in layers not exceeding 8 inches in loose thickness before compaction. Compact each layer to a relative compaction of 95 percent or more.

Construct embankments in layers not to exceed 8 inches in loose thickness except as specified in Subsection 203.03(C)(4) - Compaction of Embankment Without Moisture and Density Control. Compact each layer within 3 feet of finished grade to 95 percent or more relative compaction. Compact material below a plane 3 feet below finished grade to 90 percent or more relative compaction.

(4) Compaction Of Embankment Without Moisture And Density Control. Compact rock embankments to the maximum compaction obtainable by routing loaded hauling equipment over the entire width of the layer and supplemented by using rollers accepted by the Engineer. At the start of construction, conduct a test program to determine the number of passes of a compactor needed to achieve the required compaction. The number of passes will then be used as the field criterion for compaction.

Keep dumping and rolling areas separately. Do not cover lift by another until achieving compaction in accordance with this subsection.

(D) Subgrade Preparation. Prepare subgrade to the required density, cross section, and grade.

(1) General. Prepare subgrade after completing and backfilling drainage facilities and structures and compacting earthwork.

Remove rocks or lumps and fill voids with suitable materials. Material used to fill voids shall conform to specified material to be placed on the subgrade.

(2) Density Requirement. Compact finished subgrade to a relative compaction of 95 percent for a depth of 6 inches immediately before placing subsequent material thereon.

(3) **Surface Tolerances of Subgrade.** Finish subgrade upon which pavement structure is placed shall not vary more than 0.04-foot above or below theoretical grade.

203.04 Method of Measurement. The Engineer will measure:

(A) Roadway excavation per cubic yard. The Engineer will compute the quantities of roadway excavation by average end area method and centerline distances. Curvature correction will not be applied to quantities within roadway prism, as shown in the contract documents. In computing excavation quantities from outside the roadway prism, where roadway centerline is used as a base, curvature correction will be applied when the centerline radius is 1,000 feet or less.

When roadway excavation quantities by average end area method cannot be computed due to the nature of a particular operation or changed conditions, the Engineer will determine and use computation method that will produce an accurate quantity estimate.

(B) Borrow excavated material per cubic yard. The Engineer will compute quantities of borrow material incorporated into the work on a volume basis using average end area method in place at the work site.

The Engineer will include binder material entering and becoming a part of borrow excavated material placed on roadbed in volume of borrow excavated material when the average end area method is used to calculate the in-place volume.

(C) Selected material for planting soil and selected material for decorative boulder is paid on a lump sum basis. Measurement does not apply.

203.05 Basis of Payment. The Engineer will pay for the accepted pay items listed below at the contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for the work prescribed in this section and the contract documents.

The Engineer will pay for each of the following pay items when included in the proposal schedule:

Pay Item	**Pay Unit**
Roadway Excavation	Cubic Yard

The Engineer will pay for:

(1) 15% of the contract bid price upon completion of obliterating old roadways and hauling;

(2) 30% of the contract bid price upon completion of preparing the subgrade;

(3) 40% of the contract bid price upon completion of placing selected material in final position, rounding of slopes; and using water for compaction;

(4) 15% of the contract bid price upon completion of disposing surplus excavation material;

Borrow Excavated Material — Cubic Yard

The Engineer will pay for:

(1) 10% of the contract bid price upon completion of staking out and cross sectioning the existing condition at the borrow excavated and in-place sites and establishing the borrow area;

(2) 5% of the contract bid price upon completion of providing, replacing, and maintaining temporary and permanent fencing and confining livestock

(3) 15% of the contract bid price upon completion of all necessary storing and processing of the borrow material;

(4) 15% of the contract bid price upon completion of watering; hauling the material to the work site;

(5) 20% of the contract bid price upon completion of placing, grading, compacting the material in accordance with contract requirements at the work site

(6) 15% of the contract bid price upon completion of restoring and regrading the borrow area;

(7) 10% of the contract bid price upon completion of staking out and cross sectioning the final condition at the borrow excavated and in-place sites;

(8) 10% of the contract bid price upon completion of removing and disposing of excess and unsuitable material from the work site

Selected Material for Planting Soil — Lump Sum

Selected Material for Decorative Boulder Lump Sum

The Engineer will pay for accepted quantities of slide material excavated and removed from the following areas, as roadway excavation at the contract unit price per cubic yard: within planned roadway prism for slide material from outside planned roadway slopes that has slid onto the roadway; and potential slide areas outside planned roadway slopes, as ordered by the Engineer. Only quantities of slide material that are either reused in roadway construction or disposed of, as ordered by the Engineer, will be accepted for payment. Payment will be full compensation for work prescribed in this subsection, Subsection 203.03(A)(4) – Potential Slide Areas, and the contract documents.

The Engineer will pay for accepted quantities of subexcavation, as roadway excavation at the contract unit price per cubic yard, when ordered by the Engineer, for work prescribed in Subsection 203.03(A)(5) – Subexcavation. Payment will be full compensation for the work prescribed therein and in the contract documents.

The Engineer will pay for accepted quantities of unlined gutter excavation as roadway excavation at the contract unit price per cubic yard, when gutter is located as follows: within the median area of a divided highway; and between roadbed shoulder and adjacent cut slope. Payment will be full compensation for removing and disposing of excavated material; backfilling and compacting; and for the work prescribed in the contract documents.

The Engineer will not pay for stockpiling selected material or placing selected material in final position separately and will consider the cost as included in the unit prices for the various excavation contract pay items. The cost is for work prescribed in this section and the contract documents.

The Engineer will not pay for selected material from ditch, channel, or structure excavation, when used instead of borrow excavation.

The Engineer will not pay for overhaul separately and will consider the cost as included in the unit prices for the various excavation contract pay items. The cost is for work prescribed in this section and the contract documents.

The Engineer will not pay for embankment separately and will consider the cost as included in the unit price for roadway excavation. The cost is for work prescribed in this section and the contract documents."

END OF SECTION 203