11.0 EARTHWORK

This Section 11 includes the requirements for the earthwork Work for the US 550/160 Connection South Design Build Project (Project). This Work shall be completed in accordance with the Contract Documents.

11.1 Administrative Requirements

CDOT may issue a Notice to Proceed (NTP) for Earthwork in advance of the NTP2 for the Project. The Earthwork NTP (ENTP) will allow the Contractor to proceed with removals, clearing and grubbing, excavation, construction of temporary access, and detour construction.

11.1.1. Standards

The Contractor shall design and construct the Project in accordance with the Contract, including the Project Special Provisions in this Section 11, Standard Special Provisions in Book 2, Section 20, requirements of the standards in the documents listed in Table 11-1 and those referenced in Book 3. The Contractor shall use the latest adopted edition at the time of the Proposal Due Date.

Table 11-1. Standards

Author or Agency	Title
Colorado Department of Transportation (CDOT)	*Standard Specifications for Road and Bridge Construction (Standard Specifications)*
American Association of State Highway and Transportation Officials (AASHTO)	*Standard Specifications for Transportation Materials and Methods of Sampling and Testing*
CDOT	*MS4 Construction Program Manual*
CDOT	*Field Materials Manual (FMM)*
CDOT	*Geotechnical Design Manual (GDM)*
CDOT	*Mechanistic-Empirical (M-E) Pavement Design Manual*
Federal Highway Administration (FHWA)	*Design of Mechanically Stabilized Earth Walls and Reinforced Slopes, Geotechnical Engineering Circular No. 11, Report No. FHWA-NHI-10-024, 2009 (GEC 11)*

11.2 Design Requirements

11.2.1. Submittals

All submittals shall be prepared, Reviewed, and submitted in accordance with the requirements set forth in Book 2, Section 3.

11.2.2. ENTP Submittals

1. Pre-Construction Video/Photographs
    - Per Book 2, Section 2
2. Quality Management Plan
    - Per Book 2, Section 3
3. Traffic Control Plan
    - Per Book 2, Section 16
4. Preliminary Design Plans (Proposal level plans)

- Per Book 2, Section 3

5. Public Information
    - Per Book 2, Section 4
6. Environmental Requirements
    - Per Book 2, Section 5
7. Landscape Requirements
    - Per Book 2, Section 17

11.2.3. Cut and Fill Slope Design

Cut and fill slopes shall be designed with the minimum factors of safety for global stability shown in the *GDM*. Designs that include permanent reinforcing to improve stability shall follow the guidelines in *GEC 11*. Evaluation of global stability for slopes shall be performed using limit-equilibrium analysis methods. Slope grades shall be designed to mitigate potential surface erosion, sloughing and rockfall; and to promote revegetation in accordance with Book 2, Section 17.

The Contractor is responsible for stability of temporary cut and fill slopes, and excavations. Global stability of temporary access roads shall be evaluated and the results included in the temporary access plans and method statements. The restorations of temporary roads shall be designed with appropriate global stability per the *GDM* and the restoration plans shall be included in the temporary access plans and method statements submittal.

11.3 Construction Requirements

11.3.1. Clearing and Grubbing

Trees, logs, limbs, stumps, brush, trash, unsuitable materials, and any other items identified under clearing and grubbing shall become the property of the Contractor and shall be disposed of off Site. Clearing and grubbing shall conform to Section 201 of the CDOT *Standard Specifications*. The Contractor shall provide a tree removal plan in accordance with Book 2, Section 17 prior to clearing and grubbing.

The Contractor shall conduct a landscape walkthrough, in accordance with requirements of Book 2, Section 17 prior to the start of any construction Activities.

11.3.2. Archaeological Discoveries

Archaeological materials may be encountered within the Project limits. Refer to Project Special Provision, Revision of Section 107, Archaeological Discoveries.

11.3.3. Removal of Structures and Obstructions

The Contractor shall raze, remove, and dispose of all Structures and obstructions that are identified in the Basic Configuration for removal, except Utilities, Structures, and obstructions removed under other contractual agreements. Removal of Structures and obstructions shall conform to Section 202 of the CDOT *Standard Specifications.*

Substructures of existing Structures, regardless of location, shall be removed a minimum of 2 feet below the existing natural ground surface or the proposed ground surface, whichever is at a lower elevation, and a minimum of 5 feet horizontally from proposed underground Structures.

The existing ground nail wall (structure P-05-AW) located at approximate reference design station 1040+00, 35 feet right of centerline, shall be partially removed for the Work. Existing ground nail lengths behind the face of the wall range from 10 to 40 feet. The Contractor shall provide a method statement describing proposed procedures for partial removal of the wall and stabilization of the remaining portions of the wall to CDOT for Review at least two weeks prior to the start of wall removal.

Existing pavements shall be removed for the Work. Removals, at a minimum, shall include Surface course, Base and Subbase courses, and unsuitable embankment Materials. Millings produced from removal of asphalt by planing shall become the property of the Contractor. Removal of asphalt mat shall conform to Project Special Provisions Revision of Section 202 - Removal of Asphalt Mat and Revision of Section 202 - Removal of Asphalt Mat (Planing).

11.3.4. Excavations and Embankments

The Contractor shall provide an Earthwork Management Plan (EMP) and method statement that shows the volumes of excavated Materials to be reused as embankment, Subbase course, stockpiles, and/or wasted Materials to CDOT for Approval prior to ENTP. The EMP, at a minimum, shall show haul routes, temporary stockpile locations and volumes, and final locations for reused or wasted Materials. The method statement shall include proposed Equipment types for excavation, haul, and embankment compaction; and a narrative discussing the sequence and schedule for the Work.

Cut slopes and embankment fill slopes shall be constructed in accordance with Section 203 of the CDOT *Standard Specifications* and the technical requirements of the Contract. Embankment construction shall comply with the requirements of Project Special Provisions Revision of Sections 105, 106, and 203, Conformity to the Contract of Embankment; and Revision of Section 203, Embankment Material. The Contractor shall perform erosion control and stormwater management in accordance with the Contract and all applicable permits. A stormwater management plan prepared in accordance with Section 208 of the CDOT *Standard Specifications* and Book 2, Section 5.

Where the top of a cut slope meets existing grade, the slope shall be rounded and shaped to blend with the adjacent existing contours to create a pleasing appearance and to reduce erosion.

New embankment shall be benched into the existing slopes, where required, in accordance with Section 203.06 of the CDOT *Standard Specifications*.

Where Roadway embankment is retained by structurally designed walls (retaining walls), the retained embankment and reinforced fill Material properties shall be compatible with the soil parameters used in design of the walls. This shall apply to both externally stabilized and internally stabilized wall systems.

Flexible and rigid Pavement Structure alternatives defined in Book 2, Section 10, shall be underlain by at least 2 feet of Aggregate Base Course (ABC) Class 3 Subbase course. The ABC Class 3 Subbase course may consist of suitable Material derived from excavation of the terrace alluvium deposit within the Project limits. See Section 11.3.9 for additional guidance and requirements for the use of Materials. The upper 12 inches of soil or bedrock beneath the Subbase shall be scarified or pulverized such that the maximum particle size is less than 6 inches, moisture-conditioned to between 1% and 3% above optimum moisture, and compacted per Section 203 of the CDOT *Standard Specifications*. Terrace alluvium may be encountered at Subgrade in excavations in the general vicinity of reference design station 998+00 to station 1022+00. Excavations in the general vicinity of reference design station 1022+00 to station 1040+00 may encounter bedrock of the Animas Formation at Subgrade. Properties of the terrace alluvium and bedrock are described in the *Geotechnical Data Report* (GDR) in Book 4. The Contractor shall not use excavated Animas Formation bedrock materials for embankment, Structure backfill, landscape fill, or fill within the roadway prism. Excavated Animas Formation bedrock Materials shall become the property of the Contractor, and disposal shall be the responsibility of the Contractor.

Subbase course Material with a Hveem R-value of at least 70 (R-70) may be an acceptable substitute for the ABC Class 3. R-70 Subbase course shall consist of soil placed on Subgrade under the pavement section and shall be at least 2 feet in depth, as stated in the previous paragraph and in Book 2, Section 10. Approval of the R-70 Subbase course Material will be contingent on the Material having a resistance value of at least 70 when tested by the Hveem Stabilometer. The Material must be stable when tested in accordance with in accordance with AASHTO T-190. In order to meet a primary Project goal of maximizing use of on Site Materials, the R-70 Subbase course Material, if used, may be derived from suitable on Site terrace alluvium excavated for the Roadway construction. Prior to transport or placement of the Material, a representative sample shall be submitted to CDOT for Testing and Acceptance. Additional samples shall be submitted during construction in accordance with the Contractor's Approved Quality Management Plan (QMP).

The amount of water to be used in compacting R-70 Subbase course shall be in the moisture content range of 2% below optimum to 2% above optimum, in accordance with AASHTO test method T-180.

R-70 Subbase course shall be compacted to at least 95% of maximum modified Proctor dry density in accordance with AASHTO T-180. ABC Class 3 Subbase course derived from the on Site source shall be placed as rock embankment in accordance with Section 203.07 (b) of the CDOT *Standard Specifications* if the requirements of Section 203.03 of the CDOT *Standard Specifications* are met.

11.3.4.1 Temporary Access and Detours

Detour submittals shall be as stated in Book 2, Section 10. Temporary access routes and construction shall conform to the requirements of this Section 11, Book 2, Section 5, and Project Special Provision, Revision of Section 107.

Temporary roads to provide construction access shall be designed and constructed to minimize disturbance to existing vegetation and shall be restored to the original contours or to new contours as shown on the restoration plans. Detours shall be obliterated and the alignments restored when they will no longer be used. Restoration of access road and detour sites shall include stabilization, seeding and planting as required by Book 2, Section 5, and Book 2, Section 17.

11.3.4.2 Embankment in Drainage Gulches A and B

Permanent embankments shall not be constructed within existing Gulches A and B. Embankments on the sides of the drainages may reactivate existing landslide deposits, trap subsurface water, and reduce the stability of the slopes. Gulches A and B are to be spanned by bridge Structures, as shown on the Basic Configuration. Temporary excavations and embankments, constructed within the drainages for access, shall be removed during final grading and the ground surface shall be restored to approximate the existing contours. Restoration shall include stabilization, seeding and planting as required by Book 2, Section 17.

11.3.4.3 Protection of Processed Soil

A large amount of existing soil and bedrock will be processed in place. The Contractor shall include in the Quality Management Plan (QMP) a method to protect soil and bedrock that has been processed so that it does not become overwetted and unworkable. If treated soil or bedrock becomes overwetted (i.e., exposure to surface runoff or a temporary drainage condition), the Contractor shall be responsible for returning the soil to an acceptable condition prior to placement of the Pavement Structure section, at the sole expense of the Contractor.

11.3.5. US 550 Mainline Subgrade Treatment

11.3.5.1 Treatment of Swelling Soils

It is the Contractor's responsibility to mitigate swelling soils, if found in pavement areas. Treatment of expansive or swelling soils is addressed in Section 4.9 of the CDOT *M-E Pavement Design Manual*. CDOT requires treatment of expansive soils under pavement. Surficial soils and Animas Formation Bedrock, as identified in the GDR, are assumed to be expansive or have sufficiently high plasticity index to require treatment. The required treatment shall consist of subexcavation and placement of Subbase course Materials in accordance with Book 2, Section 10.

11.3.5.2 Chemical Stabilization

Chemical stabilization, such as lime treatment, cement stabilization, or other methods, shall not be used and are not eligible for an ATC.

11.3.5.3 Soil Survey

The Contractor shall utilize the soils information included in the GDR and conduct a supplemental soil survey to confirm or ascertain whether Subgrade Materials and embankment beneath the existing Roadway pavement are suitable for reuse as embankment and if treatment by subexcavation is required. This supplemental soil survey, when combined with the information in the GDR, shall conform to the requirements stated in the *CDOT Field Materials Manual* (*FMM*). In addition to the soil survey requirements of the *FMM*, the Contractor shall investigate Subgrade conditions at locations where Subgrade exposed at the profile elevation transitions from bedrock to terrace alluvium and from terrace alluvium to surficial soil. The additional investigation shall verify Subgrade conditions extending at least 100 feet either side of the location where terrace alluvium Subgrade thickness meets the requirements of Book 2, Section 10.

The Contractor shall submit a report with the results of the supplemental soil survey and any proposed additional mitigation measures to CDOT for Approval before any embankment, Aggregate Base or Subbase course, pavement, and pavement-related Work commences. The report shall clearly and concisely describe the existing soil conditions, delineate areas needing additional mitigation, and define the required mitigation measures. The report shall include a soil profile and the test results per the *FMM*.

If the existing Materials beneath existing pavements are suitable for reuse, the Material shall be tested during construction as stated in *FMM*.

11.3.6. Trails

Intentionally left Blank

11.3.7. Compaction Requirements

The type of compaction for the Project shall be per the CDOT *Standard Specifications* unless superseded by Project or *Standard Special Provisions* with depth of moisture-density control, as follows:

1. Full depth of all embankments.
2. 12 inches for bases of cuts and fills unless otherwise specified.
3. Compaction shall comply with (AASHTO) T-180 or T-99 testing procedures per Sections 203, 206, 304 and 603.

4. The amount of water to be used in compacting the embankment shall be in the moisture content range of 2% below optimum to 2% above optimum in accordance with AASHTO T-99 or T-180, as appropriate per Section 203 of the CDOT *Standard Specifications*.
5. Embankment below Subbase course shall be compacted to at least 95% of maximum modified Proctor dry density in accordance with AASHTO T-99 or T-180, as appropriate per Section 203 of the CDOT *Standard Specifications*.
6. Subbase course Materials consisting of ABC Class 3 may be compacted as rock embankment per Section 203.07 (b) of the CDOT *Standard Specifications*.

11.3.8. Settlement

Fills greater than 5 feet in height shall be evaluated for potential primary and long-term settlement. The evaluation should consider potential settlement of both the Materials below the base of the fill and the embankment Materials. The evaluations may need to include geotechnical investigations consisting of subsurface exploration and testing of existing conditions below the embankment. Primary settlement must be complete prior to construction of any Pavement Structure or Structure. The Contractor shall be responsible for development of methods to measure fill settlement and to mitigate excessive or long-term settlement. Proposed measurement and mitigation methods are to be included in the QMP. Any impacts to the Baseline Schedule due to delays caused by settlement shall be the responsibility of the Contractor.

11.3.9. Use of Materials

Earthwork volumes calculated from the reference design includes an excess excavation consisting of surficial soil and alluvium as defined in the GDR. CDOT considers these excess Materials to be valuable for use on this Project and future projects in the US 160 and US 550 corridors. The excess surficial soil is expected to be suitable for use as embankment fill. The excess alluvium Material will be useful as embankment fill meeting the requirements of Section 203 of the Standard Specifications or base course meeting the requirements of Section 703 of the Standard Specifications. Other by-products from processing the alluvium may also be useful for construction within the corridors. The Contractor shall not use excavated Animas Formation bedrock materials for embankment, Structure backfill, landscape fill, or fill within the roadway prism. All the excavated Materials shall become the property of the Contractor. Although CDOT values the excess excavation as noted below, the Animas Formation bedrock Materials are not considered of value and shall be disposed of off Site. Final disposal or placement of all the Material shall be included in the Work and shall be the responsibility of the Contractor

The value to CDOT of the excess excavation from the Project for use on future projects is dependent on the degree of processing (screening and/or crushing), the quality of the finished product(s), the location of delivery, and whether it be complete in place (CIP) or stockpiled. The Contractor's Earthwork Management Plan shall state the proposed disposition of all excess excavation and, for any quantities of Materials that shall be delivered for CDOT's future use; the quantity of each product, the degree of processing, the method for controlling quality, and the location and condition of delivery (CIP or stockpile).

CDOT has identified locations of future need for the suitable Materials generated from the Project as excess excavation. The future need locations and estimated volumes of each material type needed for each location are shown on Table 11-1. The estimated volumes that are needed at these locations are based on the reference design for this project and preliminary plans by CDOT for future projects. The Contractor's design may result in differing volumes of excess excavation. The Contractor's Earthwork Management Plan shall show how it accommodates the needs at the locations shown in Table 11-1, unless it is shown that this is counter to the first priority to maximize Scope. Complete in place to the top of the Subbase is preferable within the limits of the Ultimate Configuration. Other locations not shown on the table that are in close proximity and accessible to the US 550 and US 160 corridors and within 10 miles of the location of future need may be acceptable for stockpiling.

The Contractor shall complete all necessary clearances and obtain all necessary permits, property rights and permissions for each placement/stockpile site presented in the Earthwork Management Plan. Design of stockpiles and CIP embankments shall conform to the corridor Aesthetics and Landscaping requirements in Book 2, Section 17; and the Standard Specifications.

Table 11-1 Locations for Placement of Excess Excavation

Future Project Locations	Description	Anticipated Project Need		
		Embankment	Subbase Course (tons)	Class 6 (tons)
US 550				
Current Project Ultimate 4 lane Build-out	The portion of the Ultimate Configuration not incorporated into the Work. Limits to be defined by Contractor.	XX	XX	XX
Gap	4 Lane build-out from approximate mile post 9.0 - 11.7	390,500	76,000	28,000
Sunnyside	4 Lane build-out from approximate mile post 7.0 - 9.0	19,000	70,600	24,000
Sunnyside South	4 Lane build-out from approximate mile post 2.7 - 7.0	0	121,000	43,000
US 550 Subtotals		409,500	267,600	95,000
US 160				
US 160: Elmores East Project	4 Lane build-out from approximate mile post 91.5 – 94.5	230,000	68,300	20,400
US 160: Dry Creek Project	4 Lane build-out from approximate mile post 97.0 – 99.0	50,000	49,100	15,800
US 160 Subtotals		280,000	117,400	36,200
	TOTAL	**689,500**	**385,000**	**131,200**

*Placement of material at any location other than those described in Book 2, Section 1 shall be Approved by CDOT.

11.4 Deliverables

The Contractor shall submit the following to CDOT for Review, Acceptance, or Approval:

Table 11-2 Deliverables

Deliverable	Review, Acceptance, or Approval	Schedule
Wall Removal Method Statement	Review	Two weeks prior to beginning wall removal
Earthwork Management Plan and Methods Statement	Approval	Prior to ENTP
Supplemental Soil Survey Report and Subgrade Improvement Plan	Approval	Before any embankment, Aggregate Base Course (ABC), pavement, and pavement-related Work at existing pavement locations commences
Embankment Process Control Plan Per Revision of Sections 105, 106, and 203	Approval	Include in QMP per Book 2, Section 3

*If the Contractor elects to utilize Earthwork NTP (ENTP), the deliverables identified for ENTP shall be submitted to CDOT for Review, Acceptance, or Approval prior to CDOT issuing ENTP. If the Contractor elects not to use ENTP, those deliverables identified shall be submitted to CDOT for Review, Acceptance, or Approval prior to CDOT issuing Second Notice to Proceed (NTP2).

11.5 Special Provisions

The following Project Special Provisions supplement or modify the CDOT *Standard Specifications* and take precedence over the CDOT *Standard Specifications* and plans. The Contractor is responsible to have a copy of the CDOT *Standard Specifications* at all times on the Project Site.

Index of Project Special Provisions

REVISION OF SECTION 107
ARCHAEOLOGICAL DISCOVERIES

Section 107 of the CDOT *Standard Specifications* is hereby revised as follows:

Subsection 107.23 shall include the following:

The project corridor is known to contain Ancestral Puebloan archaeological materials that are eligible for nomination to the National Register of Historic Places, including human remains. Consequently, a qualified Archaeological Monitor provided and funded by CDOT (an in-house or contracted specialist) shall monitor the initial phase(s) of ground disturbance during construction within the US 550/US 160 Connection project area. The Archaeological Monitor and CDOT Senior Staff Archaeologist are authorized representatives of CDOT as it pertains to archaeological materials and, as such, are authorized to direct the Contractor to avoid significant cultural remains.

Controlled excavations at known sites within the project area were completed in 2018 and 2019. That work resulted in the resolution of all archaeological issues known to CDOT specific to those sites. However, it is possible that significant cultural materials remain in a buried context and therefore undiscovered within the project area. A map showing the environmentally sensitive areas will be provided by CDOT upon request. The Archaeological Monitor will request the Contractor to alter means of excavation within certain areas of the project. Although there is a high likelihood the project will encounter archaeological artifacts within the top five (5) feet of excavation, there is a low probability those materials will be significant enough to require temporary avoidance. If surface or subsurface archaeological materials—limited primarily to architectural features and human remains—are exposed in the presence (or absence) of an Archaeological Monitor, all work in the vicinity of the find shall stop and the Engineer shall be notified. The Archaeological Monitor will work with the Contractor to avoid unnecessary work interruptions. Significance will be determined by the Archaeological Monitor in consultation with the CDOT Senior Archaeologist.

In the event potentially significant archaeological materials are encountered, the Contractor will immediately notify the CDOT Senior Archaeologist of the discovery. In consultation with the Archaeological Monitor (if present) and CDOT Archaeologist will ensure that the area of the find is surrounded with temporary fencing until the appropriate analysis and excavation, if required, is complete. The Contractor shall provide, install and remove the temporary fence at the direction of CDOT. The area to be avoided will generally measure no more than 20x20 meters, and the issue will typically be resolved in less than 14 calendar days. No work will be allowed in proximity to the discovered materials. However, construction may proceed outside the area(s) of avoidance. The contractor should anticipate minor impacts to the earthwork and clearing schedule as a result of “no work area” avoidance; however, the discovery of archaeological artifacts will not result in a stop work order.

The contractor will not be required to provide additional equipment and/or assistance related to an archaeological discovery. The Senior Archaeologist will provide the Contractor with clearance to proceed when all necessary evaluation and mitigation actions have been completed. The final disposition of all archaeological materials will be determined and facilitated by CDOT.

As a result of the controlled excavations there is an exposed pit, estimated to be 7.5 feet deep with a radius of 30 feet at approximate reference station 977+50 which shall be filled in accordance with specifications.

REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work includes removal and disposal of existing asphalt mat.

In subsection 202.02 delete the seventh paragraph and replace with the following:

The existing asphalt shall be removed in a manner that minimizes contamination of the removed mat with underlying material. The removed mat shall become the property of the Contractor and shall be either disposed of outside the project site, or used in one one or more of the following ways:

1. Used in embankment construction in accordance with section 203.

2. Placed in bottom of fills as approved by CDOT.
3. Recycled into the hot mix asphalt.

REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT (PLANING)

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 202.09, and replace it with the following:

202.09 Removal of Asphalt Mat (Planing). Prior to beginning planing operations, the Contractor shall submit a planing plan as part of the QMP. The planing plan shall include at a minimum:

(1) The number, types and sizes of planers to be used.
(2) The width and location of each planing pass.
(3) The number and types of brooms to be used and their locations with respect to the planers.
(4) The proposed method for planing and wedging around existing structures such as manholes, valve boxes, and inlets.
(5) The longitudinal and transverse typical sections for tie-ins at the end of the day.
(6) If requested by CDOT, a plan sheet showing the milling passes.

The QMP shall include as a minimum:

(1) The schedule for replacing the cutting teeth.
(2) The daily preventive maintenance schedule and checklist.
(3) Proposed use of automatic grade controls.
(4) The surface testing schedule for smoothness.
(5) The process for filling distressed areas.
(6) Corrective procedures if the milled surface does not meet the minimum transverse or longitudinal surface finish when measured with a 10 foot straightedge.

The Contractor shall not start the planing operation until the hot mix asphalt (HMA) mix design has been Approved.

The existing pavement shall be milled to the cross-slope as shown on the plans, and shall have a surface finish that does not vary longitudinally or transversely more than 3/8 inch from a 10 foot straightedge. A 10 foot straightedge shall be supplied by the Contractor.

All milled surfaces shall be broomed with a pick-up broom, unless otherwise specified, before being opened to traffic. A sufficient number of brooms shall be used immediately after planing to remove all milled material remaining in the roadway.

If the Contractor fails to adequately clean the roadway, work shall cease until CDOT has approved the Contractor's revised written proposal to adequately clean the roadway.

At the completion of each day's work, longitudinal vertical edges greater than 1 inch shall be tapered. No transverse vertical edges will be allowed. Longitudinal milled surface tie-ins to existing pavement shall be tapered to not less than a 3:1 slope, transverse milled surface tie-ins to existing pavement shall be tapered to not less than a 50:1 slope. Transverse tapered joints may be tapered with the planing machine, a temporary asphalt ramp, or other methods approved by CDOT. No longitudinal joint between the milled and existing surfaces shall fall between 1 to 5 feet of any lane line.

If the transverse joint is tapered with a temporary asphalt ramp, the milled surface at the joint shall be constructed as a butt joint the full depth of the lift of asphalt to be placed on the milled surface. The Contractor shall be responsible for maintaining this asphalt ramp until all corresponding HMA is placed.

If the transverse joint is tapered with a planing machine, a butt joint shall be cut into the taper the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing

Other approved transverse joint tapers shall be maintained at the expense of the Contractor, and at a minimum shall incorporate a butt joint the full depth of the lift of asphalt to be placed on the milled surface prior to commencement of resurfacing.

Distressed or irregular areas identified in the planed surface by CDOT shall be patched.

The roadway shall be left in a safe and usable condition at the end of each work day. The Contractor shall take appropriate measures to ensure that the milled surface does not trap or hold water. All required pavement markings removed by the planing shall be restored before the roadway is opened to traffic.

All milled surfaces to be overlaid with HMA shall be covered with new asphalt within 5 working days.

All planing shall be completed full width and parallel to the travel lanes before resurfacing commences unless otherwise directed by CDOT.

All material generated by the planing operation shall remain the property of the Contractor.

Add subsection 202.091 immediately following subsection 202.09 as follows:

202.091 Equipment

Each planer shall conform to the following:

The planer shall have sufficient power, traction and stability to maintain an accurate depth of cut. The propulsion and guidance system of the planer shall be maintained in such condition that the planer may be operated to straight and true lines.

The planer shall be capable of operating with automatic grade controls (contact or non-contact) on both sides of the machine using a 30 foot averaging system or other approved grade control systems. The use of such controls shall be described in the QMP.

The planer shall be capable of picking up the removed material in a single operation. A self-loading conveyor shall be an integral part of the planer. Windrows will not be allowed.

REVISION OF SECTIONS 105, 106, AND 203
CONFORMITY TO THE CONTRACT OF EMBANKMENT

Sections 105, 106 and 203 of the Standard Specifications are hereby revised for this project as follows:

Subsection 105.03 shall include the following:

(c) Conformity to the contract of embankment construction shall be determined in accordance with the following:

1. *Process Control Plan.* The Contractor shall be responsible for Process Control (PC) for all embankment material on this project. The Contractor shall submit a written Process Control Plan (PCP) to be included in the Quality Management Plan (QMP), including a methods statement, to CDOT for Approval. The Embankment PCP shall include but not be limited to the following:

   (1) Maximum lift thickness of eight inches in accordance with subsection 203.06 or as directed.
   (2) Compaction equipment capable of obtaining the specified compaction.
   (3) Water trucks with an adequate distribution system that will apply water evenly.
   (4) List of all inspection and materials testing forms and procedures utilized by the Contractor.
   (5) Adherence to Table 106-4 requiring minimum testing frequency.
   (6) Monitoring of changes in Material types or classification and procedures for modifying compaction methods to accommodate the changes.

2. *Documentation.* The contractor shall maintain current records of process control operation activities, and tests performed. These records shall be in the form shown in the QMP, and shall include as a minimum, the contractor or subcontractor, the number of personnel working, weather conditions, type of equipment being used, delays and their cause, and deficiencies along with corrective action taken. Such records shall cover both conforming and defective or deficient features. Additional documentation to CDOT shall include all daily test results, daily inspection reports, daily non-compliance reports, and monthly certification reports. Copies of these records and a statement that work incorporated in the project complies with the contract shall be submitted to CDOT prior to payment for the work or upon request. Monthly certification reports shall be stamped with the seal of a professional engineer registered in Colorado. Failure to provide CDOT with the necessary documentation will result in the suspension of payments on embankment until the documentation has been completed and accepted by CDOT. CDOT Owner Assurance documentation shall not be used as supporting documentation for the contractor's certification.

CDOT or CDOT's certified representative will be responsible for Owner Assurance (OA) and Independent Assurance Testing (IAT).

Subsection 106.03 shall include the following:

Testing of embankment construction shall conform to the following:

The supervisor responsible for the direct supervision for the process control sampling and testing shall be identified in the QMP and be qualified according to the requirements of CP-10 (Note: this will require a PE or a NICET Level III certification). The technicians taking samples and performing tests must be qualified according to requirements of CP-10 (Note: this will require WAQTC qualification).

The project verification sampling and testing procedures shown in the CDOT Field Materials Manual under the frequency guide schedule for minimum materials sampling, testing and inspection shall be used for the elements shown in Table 106-4.

Table 106-4
EXCAVATION AND EMBANKMENT TESTING SCHEDULE

Minimum Testing Frequency Contractor's Process Control	Element	Minimum Testing Frequency CDOT verification Testing
None Required	Soil Survey (Classification)	See CDOT Field Materials Manual for Frequency
1 per soil type	Moisture – Density Curve	1 per soil type
1 per 1,000 cubic yards or fraction thereof.	In-Place Density	1 per 2,000 cubic yards or fraction thereof.
1 per 300 cubic yards or fraction thereof.	In-Place Density when within 100 ft. of Bridge Approach(s).	1 per 500 cubic yards or fraction thereof.
1 per 5,000 cubic yards or fraction thereof.	1 Point Check	1 per 10,000 cubic yards or fraction thereof.

Qualifications for testing and personnel are contained in Section 203, Chapter 200 of the CDOT Field Materials Manual, CP-10, CP-13, CP-15, and CP-80, and the CDOT Inspectors Checklist.

Subsection 203.02 (a) shall include the following:

Unclassified Excavation shall include removal of unstable or unsuitable material within the roadway as determined and directed by CDOT.

Subsection 203.02 (c) shall include the following:

Embankment material containing significantly more than optimum moisture that would become stable if dried shall not be unsuitable material.

Subsection 203.11 (b) shall include the following:

Section 203 of the Standard Specifications is hereby revised for this project as follows:

In subsection 203.03, delete the first paragraph and replace with the following:

Embankment material shall consist of approved material acquired from excavations or borrow pits and hauled and placed in embankments.

Materials derived from bedrock of the Animas Formation shall not be placed as embankment fill.