

203-R-806 EXCAVATION AND EMBANKMENT

(Revised 10-16-25)

The Standard Specifications are revised as follows:

SECTION 203, BEGIN LINE 353, DELETE AND INSERT AS FOLLOWS:

~~Soils containing organic material greater than 6% by dry weight, or soils with a maximum dry density of less than 90pcf shall not be incorporated in the embankment. Organic content will be determined in accordance with AASHTO T 267, and maximum dry density will be determined in accordance with AASHTO T 99. Soils meeting the following criteria will be allowed to be used in embankment:~~

Soil Property	Test Method	Requirements
Dry Weight Organic Material	AASHTO T 267	$\leq 6\%$
Maximum Dry Density	AASHTO T 99	$\geq 90\text{pcf}$
Soluble Sulfate	ITM 510	$\leq 1,000\text{ppm}$

~~Frozen materials, stumps, roots, all or parts of trees, brush, weeds, sod, all spongy, yielding, soft, and unstable materials, or other perishable materials shall not be incorporated in the embankment. Rocks greater than 3 in. in any dimension shall not be left within 18 in. of the finished subgrade. Removed materials may only be used in embankment construction if they are constructed in accordance with 203.23.~~ The original ground surface, or the surface of any lift in place shall not be frozen and shall be free of snow, ice, or mud.

~~All vegetation, all spongy, yielding, soft, and unstable materials, which are encountered, shall be removed as shown on the plans or as directed. Removed materials may only be used in embankment construction if they are constructed in accordance with 203.23.~~

After clearing of the embankment area and prior to embankment placement, all pronounced depressions left in the original ground shall be filled with suitable material and compacted in accordance with 203. Proofrolling of the natural ground surface shall be performed in accordance with 203.26 within all areas where new fill shall be placed.

If the original ground cannot be compacted to the required strength because of soft or unstable soils, the use of stabilizing materials consisting of coarse aggregate No. 52 encapsulated in geotextile, in accordance with 214.03(a), or soil ~~dry~~stabilizing with a chemical modifier in accordance with 217.215 shall be used as directed. The coarse aggregate materials used for stabilization shall be 1 to 2 ft thick and shall allow the encapsulated material in the embankment to drain.

When free water is encountered, backfilling shall be accomplished using ~~B~~ ~~borrowsand or other approved material~~, in accordance with ~~904.06~~~~903.02~~~~with the exception that~~ ACBF or GBF shall not be used in backfilling. Backfilling using ~~B~~ ~~borrowsand or other approved material~~ shall occur to an elevation at least 2 ft above the free water level. ~~Compaction of the B borrow placed above the free water level shall be accomplished using heavy vibratory equipment.~~

The use of hydraulic methods to construct embankments will be allowed only when authorized in writing. Only ~~B~~ *borrowsand or other approved material* without ACBF or GBF shall be placed below the free water level. Backfill at structures shall be in accordance with 211.04.

The embankment shall be kept drained at all times by keeping the center higher than the sides and uniformly graded. *Side ditches shall be constructed as directed prior to the construction of the embankment.*

Each embankment lift shall extend transversely over the entire area and shall be kept smooth. When fill materials are deposited in large masses onto the embankment, the materials shall be spread out in uniform lifts. *Rocks greater than 3 in. in any dimension shall not be left within 18 in. of the finished embankment.* Rock or shale used for embankment construction shall be in accordance with 203.20.

When grading operations are performed in non-daylight hours, artificial lighting shall be provided and maintained, to enable the construction and inspection of the operations.

When the embankment soils are granular, silty loam, sandy loam, *or* silts, ~~or when the plasticity index of the material is less than 8~~, the embankment shall be encased with materials consisting of silty clay loam, clay loam, sandy clay loam, or silty clay of 12 in. minimum depth measured perpendicular to the face of the slope. ~~The plasticity index for these materials shall be equal to or greater than 8 and the organic content shall not exceed 6%.~~ The surface of any necessary encasement shall meet the finished slope limits shown on the plans or as directed.

All slopes to be graded and not immediately stabilized with stormwater management control measures shall be roughened, as described herein, until stormwater management control measures are placed. The soil slopes shall be roughened to create a series of ridges and depressions parallel to the contour by making grooves at least 1 in. deep and not more than 15 in. apart. Slopes shall be stabilized in accordance with 205. Roughening shall take place each day after work is performed on the slopes, or as directed to re-establish the roughening.

Sufficient quantities of excavated materials suitable for the growth of vegetation shall be preserved from within the planned excavation area and used on constructed cut, fill, and shoulder slopes to help develop the growth of vegetation. Materials suitable for vegetative growth shall be at least 6 in. deep or as indicated within the contract documents and shall be measured perpendicular to the face of the slope. *This material shall have a pH value in accordance with 914.01 prior to placement.* Unless otherwise provided, no additional compensation will be allowed for this work, except payment will be made for the class of excavation involved for authorized undercutting of back slopes. Encasement of rock embankment and cut slopes will not be required unless otherwise directed. *The material placed on backslopes of cut sections shall be placed in accordance with 203.21.*

~~Material suitable for the growth of vegetation shall be in accordance with 914.01 prior to placement. The material placed on backslopes of cut sections shall be placed in~~

accordance with 203.21.

SECTION 203, BEGIN LINE 761, DELETE AND INSERT AS FOLLOWS:

203.18 Embankment Construction

Embankment construction shall consist of constructing roadway embankments, including preparation of the areas upon which they are to be placed, the construction of dikes within or outside the right-of-way, the placing and compacting of approved material within roadway areas where unsuitable material has been removed, and the placing and compacting of embankment material in holes, pits, and other depressions within the roadway area. Only approved materials shall be used in the construction of embankment backfill. Recycled concrete pavement processed into coarse aggregate shall be from past documented Department projects. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. Rocks, broken concrete, RAP, or other solid materials shall not be placed in embankment areas where piling, ~~and mechanically stabilized earth walls, soil nail walls, or~~ other foundations are to be placed or driven.

Recycled concrete pavement measuring 12 in. or less in all directions may be incorporated into the embankment. Reinforcement shall not protrude from the recycled concrete pavement aggregate. Construction of embankment shall be in accordance with 203.20(a). Each layer shall be choked with broken concrete aggregates and be compacted to the required stiffness or as directed. The final 3024 in. of the embankment ~~just below and~~ the subgrade shall be composed of material meeting the gradation requirements of coarse aggregate No. 53 in accordance with 904.01, ~~or B borrow in accordance with 904.06.~~ Construction requirements shall be in accordance with 211.03. *Recycled concrete pavement shall not be used within 2 ft of the water table.*

~~Only RAP particles measuring 2 in. or less in all directions shall be incorporated into the top 30 in. of the embankment. When an underdrain is specified, the RAP embankment shall be terminated below the bottom of the underdrain and the rest of the embankment shall be constructed with the coarse aggregate. RAP particles incorporated anywhere in the embankment shall be 5 in. or less. RAP shall be constructed in accordance with 203.24.~~

~~When two sizes are used for one embankment, materials shall be separated with a layer of geotextile in accordance with 918.02(c), Type 2A. Geotextile used between recycled material lifts shall be included in the cost of the embankment pay item.~~

RAP particles measuring 2 in. or less in all directions may be incorporated in embankments. Compacted lift thickness for RAP shall not be greater than 6 in. when the embankment is 5 ft or less. Where the depth of the embankment exceeds 5 ft, the compacted lift thickness for RAP shall not be greater than 12 in. RAP shall only be used below the elevation of the pavement underdrains. RAP shall be constructed in accordance with 203.24.

Recycled concrete pavement processed into coarse aggregate and RAP shall not be mixed together or *mixed* with other materials. When two or more approved materials are allowed for one embankment, materials shall be separated with a layer of geotextile in accordance with 918.02(c), Type 2A. Geotextile used between recycled material lifts shall be included in the cost of the embankment pay item.

~~Recycled concrete pavement processed into coarse aggregate or RAP shall only be used below the elevation of the pavement underdrains. Compacted lift thickness for RAP shall not be greater than 6 in. within the top 30 in. of the embankment. Where the depth of the embankment exceeds 5 ft, the compacted lift thickness for RAP shall not be greater than 12 in. Recycled concrete pavement and RAP shall not be used within 2 ft of the water table.~~

Proofrolling in accordance with 203.26 shall be performed over the entire grade at a maximum thickness of 5 ft of recycled concrete ~~or RAP~~ prior to the placement of the next lift.

~~A geotextile in accordance with 918.02(c), Type 2B shall be placed in accordance with 214 prior to the placement of sSubgrade treatment Type IC or Type II in accordance with 207 when shall be constructed on recycled concrete pavement processed into coarse aggregate or RAP is used for embankment construction. Recycled concrete pavement processed into coarse aggregate or RAP shall not be used for embankment construction when subgrade Type I, Type IBC, or Type IBL is specified. Geotextile shall be placed completely covering the top of the embankment. A minimum 24 in. soil encasement shall be constructed concurrently with the recycled concrete pavement processed into coarse aggregate or RAP lift. The soil encasement shall be suitable for vegetation growth and shall be constructed in accordance with 203.09.~~

SECTION 203, BEGIN LINE 853, DELETE AND INSERT AS FOLLOWS:

203.20 Rock and Shale Embankment

Utilization of these materials in embankment construction shall be in accordance with the following.

(a) Rock Embankment

~~Where~~When rock is used for embankment, no large stones shall be allowed to nest but shall be distributed over the area to avoid pockets. Voids shall be filled carefully with small stones. The final 2 ft ~~6 in.~~ of the embankment just below the subgrade elevation shall be composed of suitable material placed in layers not exceeding 8 in. loose measurement and compacted to the required density. Shale or shale like materials shall not be incorporated in the upper 2 ft of the embankment shall be constructed with No. 53 aggregate in accordance with 301. A geotextile in accordance with 918.02(a), Type 2A shall be placed between the rock and No. 53 aggregate in the embankments described below. The geotextile shall be placed in accordance with 214.03. The rock embankment lift thickness shall not exceed 2 ft.

~~Where~~When the depth of an embankment exceeds 510 ft, and is to consist entirely of rock, the rock size used in the top 10 ft of the embankment shall not exceed 1 ft in any dimension. For any portion of the embankment below the top 10 ft, the rock size shall be deposited in lifts not to exceed the top size of the material being placed, but in no event exceeding 42 ft in any dimension. The rock for any particular lift shall be deposited on and pushed over the end of the lift being constructed by means of bulldozer

~~directed with a vibratory roller. The material shall be spread with a track mounted dozer or other equipment having a minimum effective weight of 40 t. This sequence of steps shall be repeated for the remaining sections of the embankment. The final 6 in. of the embankment shall be constructed using coarse aggregate No. 53 in accordance with 301. A geotextile in accordance with 918.02(a), Type 2A shall be placed between the rock and the soil.~~

~~Where the depth of embankment is 5 ft or less, or where the material being placed does not consist entirely of rock, the material shall be placed in lifts not to exceed the top size of the rock being placed but not exceeding 2 ft. Each layer shall be choked thoroughly with broken stone or other suitable material and be compacted to the required density or as directed. A geotextile in accordance with 918.02(a), Type 2A shall be placed between the rock and the soil. When the depth of an embankment is less than or equal to 10 ft, the rock size shall not exceed 1 ft in any dimension. The material shall be spread with a track mounted dozer or other equipment having a minimum effective weight of 40 t. The material shall be choked with small broken stone and compacted with a vibratory roller. This sequence of steps shall be repeated for the remaining sections of the embankment. The top 6 in. of the embankment shall be constructed using coarse aggregate No. 53 in accordance with 301.~~

Where a rock fill is to be placed over a structure, the structure shall first be covered with 2 to 4 ft of ~~earth~~ structure backfill or other approved material as directed, and properly compacted before the rock is placed. This covering shall be placed in accordance with 203.19. Structure backfill shall be constructed in accordance with 211.

~~Shale shall not be incorporated as rock embankment unless written permission is obtained. Proofrolling shall be performed on the final lift of the embankment in accordance with 203.26.~~

Payment for rock embankment construction will be in accordance with 203.28.

SECTION 203, BEGIN LINE 955, DELETE AND INSERT AS FOLLOWS:

203.21 Embankment on Hillsides or Slopes

~~The side ditches and drainage blankets shall be constructed prior to the embankment construction. Drainage blankets shall be in accordance with 214. Before an embankment is placed on natural soil slopes or a drainage blanket when existing fill slopes are 4:1 or flatter, the existing ground surfaces shall be plowed or deeply scarified or, if the nature of the ground indicates greater precautions should be taken for integrating the proposed fill materials with the existing slopes, benches shall be cut into the existing slopes before fill placement is started. All such precautionary work shall be done as directed. No direct payment will be made for plowing or scarifying, the cost thereof shall be included in the various pay items of the contract. Before an embankment is placed on natural soil slopes or existing fill slopes steeper than 4:1, b~~Benches a minimum of 10 ft wide, unless otherwise specified, shall be cut into the slopes prior to the placement of embankment fill when the existing fill slopes or natural soil slopes are steeper than 4:1. If benches are cut, the excavation involved will be paid for at the contract unit price per cubic yard for the class or classes of excavation encountered.

SECTION 203, BEGIN LINE 1028, DELETE AND INSERT AS FOLLOWS:

203.23 Embankment other than Rock, with Strength or Density Control

The compaction will be determined by DCP testing in accordance with ITM 509 and the moisture content in accordance with ITM 506. Soil classification will be performed in accordance with the ITM 512 by the Department. The following DCP blow counts will be used for compaction control:

COHESIVE SOILS: A-4, A-5, A-6, and A-7					
Textural Classification	Maximum Dry Density (pcf)	Optimum Moisture Content Range (%)	Acceptable Minimum DCP value for 6 in. for 95% compaction	Acceptable Minimum DCP value for 12 in. for 95% compaction	Acceptable Minimum DCP value for 6 or 12 in. for 100% compaction
CLAY SOILS					
Clay	< 105	19 - 24	6	*	*
Clay	105 - 110	16 - 18	7		*
Clay	111 - 114	14 - 15	8		*
SILTY SOILS					
Silty	115 - 116	13 - 14	9	*	*
Silty	117 - 120				*
SANDY SOILS					
Sandy	121 - 125	8 - 12	12	*	*
Sandy	> 125				*
GRANULAR SOILS - STRUCTURE BACKFILL and A-1, A-2, A-3 SOILS					
No. 30	6	9	9	10	14
No. 4					
1/2 in.					
1 in.					
* Test section required in accordance with ITM 513.					

GRANULAR SOILS - STRUCTURE BACKFILL		
Textural Classification	Acceptable Minimum DCP value for 12 in. for 95% compaction	Acceptable Minimum DCP value for 12 in. for 100% compaction
No. 30	6	9
No. 4	7	10
1/2 in.	11	14
1 in.	16	19

GRANULAR SOILS: A-1, A-2, and A-3
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<i>AASHTO Classification</i>	<i>Maximum Dry Density (pcf)</i>	<i>Coefficient of Uniformity</i>	<i>Acceptable Minimum DCP value for 12 in. for 95% compaction</i>	<i>Acceptable Minimum DCP value for 12 in. for 100% compaction</i>
<i>A-1 Soils</i>	≤ 120		13	*
<i>A-2 Soils</i>			12	*
<i>A-1 Soils</i>	>120		15	*
<i>A-2 Soils</i>				*
<i>A-3 Soils</i>		$Cu \leq 3.0$	7	*
		$Cu > 3.0$	8	*

* *Test section required in accordance with ITM 513.*

Unless otherwise specified, all material directed to shall be compacted in accordance with 203.23 shall meet to the acceptable minimum DCP value for 95% compaction in accordance with 203.23 unless otherwise specified. Subgrade shall meet the acceptable minimum DCP value for 100% compaction when required.

As an alternative, all the embankments shall be compacted to at least 95% of their maximum dry density, and all subgrade shall be compacted to at least 100% of their maximum dry density. In situ density will be determined in accordance with AASHTO T 191 and the moisture content as specified.

For clay, silty, and sandy soils compacted to 100% of their maximum dry density, a test section is required in accordance with ITM 513 for DCP testing.

Clay soils shall be constructed and tested with DCP in 6 in. lifts, whereas silty, sandy, and granular soils shall be constructed in 6 in. lifts and tested with DCP for 12 in.