Georgia Department of Transportation

Construction Engineering Inspection Training

Earthwork—Group 3

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Section 201: Clearing and Grubbing Right-of-Way

General

- This work includes clearing, grubbing, removing and disposing of vegetation, buildings, and debris within limits of construction and easement areas adjacent to the Right-of-Way as shown on the Plans or as designated by the Engineer
- The Engineer will establish right-of-way; construction lines; and trees, shrubs, and plants that should remain per the plans
- Prevent spread of "Introduced Invasive Pest Species" by:
  - Disposing of vegetative parts of plants that reproduce (roots and above ground parts that bear fruit) by burning(where permitted) or burying with minimum 3 ft (1 m) at approved site
  - Engineer must approve other disposal methods per the *GDOT Construction Manual 2-2*
  - Adhere to requirements of Section 155.3.05

Strip grass immediately ahead of grading (*GDOT Construction Manual 8-1*)

Clearing

Clearing includes removing/disposing of fences, bridges, buildings, and other incidental structures within right-of-way.

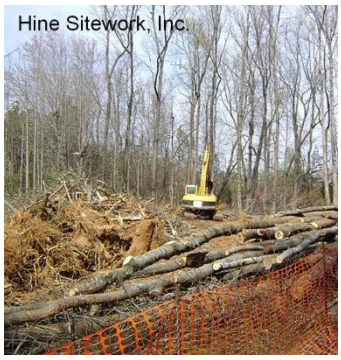
- Choose a method of clearing that prevents damage to property, trees, or retained shrubbery
- Remove stumps as part of the clearing operation
- Cut the stumps not grubbed
- Dispose of cleared materials

Required Grubbing Depths for Structures

Structures	Grubbing depth (minimum)
Under Pavements	• 3 ft (1 m) below finished subgrade
Underneath Other Structures	• 3 ft (1 m) below foundation of any proposed structure including guardrail posts and utility poles
Slopes and Shoulders	• 3 ft (1 m) below finished grade and 1 ft (0.3 m) below natural ground outside construction lines
Cracked/Abandoned Concrete Slabs	• Structures within 10 ft (3 m) of finished grade • Break so that no section greater than 10 ft² (1 m²) remains intact

Grubbing procedure:

- Remove stumps and other matter not removed by root rake to a minimum depth of 2 ft (0.6 m) below ground line
- Rake areas with roots to a depth of 6 in. (150 mm) below surface
- Remove other matter (including small roots) by hand or other suitable means.
- Backfill stump holes and compact backfill at the density of the surrounding soil
- Use a heavy-duty disc harrow to penetrate the ground at 6 in. (0.15 m) minimum
- Remove matter exposed by harrowing and level with blading equipment
- Leave grubbed areas smooth enough for mowing



Roots for removal include:

- Matted trees and brush roots (regardless of size)
- Individual roots more than 0.75-in. (20 mm) diameter
- Individual roots more than 3 ft (1 m) long regardless of size
- Large quantities of smaller roots present in top 1 ft (0.3 m) of finished subgrade or road surface as determined by the Engineer

Stumps are tree ends with minimum diameter of 4 in. (0.1 m)

Removal and Disposal of Materials

Material	Inspection Notes
Merchantable Timber and Buildings	• Department may dispose or allow property owner to remove (prior to Notice to Proceed, *GDOT Construction Manual 1-1*) • Salvaged material becomes the property of the Contractor (unless specified in the plans or Contract)
Combustible	• Abide by federal, state, or local codes when right-of-way is in a burning-restricted area • Allow burning of all material except sawdust piles except when prohibited (if restrictions allow) • Prevent fire from spreading to adjacent areas • Prevent damage to public/private installations within or near right-of-way • Obtain suitable areas for burning/disposing at the Contractor's expense (at the Engineer's approval) • Remove sawdust within construction limits to the approved disposal area • Allow deposit of sawdust on right-of-way in 3-in. (75 mm) maximum layer • Mix sawdust with underlying soil by disking or harrowing
Solid Waste	• Place in an embankment or Department-approved disposal site • The Engineer must approve and record solid waste material used as embankment • The Environmental Protection Division (EPD) of Georgia Department of Natural Resources (GDNR) classifies regulated and non-regulated waste (*GDOT Construction Manual)*

Non-regulated Solid Waste Material

- Excess soil, rock, brick, concrete (with/without reinforcement), and cured asphalt may be disposed in the right-of-way
- Place common fill (soil, rock, brick, and concrete) in uniform layers of minimum 3 ft (1 m) thick; fill voids with finer material
- Cover the final layer with 2 ft (0.6 m) of soil

Regulated Material

- Dispose of inert waste (organic debris) off the right-of-way using an inert landfill permit according to GDNR/EPD rules. Or, take the material to a permitted solid waste landfill.
- Dispose of other waste in the construction/demolition municipal landfill
- Dispose oils, solvents, fuels, untreated lead paint residue, and other solid hazardous waste through a properly licensed hazardous waste disposal facility

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to the Public
109	Measurement and Payment
160	Reclamation of Material Pits and Waste Areas
161	Control of Erosion and Sedimentation

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Section 202: Random Clearing and Grubbing

Includes clearing/grubbing borrow pits, material pits, ditch inlets, outlets, channel changes, and easements

Measurement

- Clearing and grubbing is measured in acres (hectares)
- Measure only the area designated on the plans or by the Engineer
- The Department makes no separate payment for removing grass, weeds, debris, small underbrush, other vegetation from cultivated lands, and isolated trees or stumps
    - Include the removal cost in the price bid for other Pay Items

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to the Public

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Section 204: Channel Excavation

This work includes excavating and properly disposing of material encountered when changing, cleaning, or widening waterway channels.

Construction

- Coordinate work with grading, construction drainage structures, and performing other Project work
- Maintain adequate drainage until Final Project Acceptance
- Do not deposit material within jurisdictional Wetlands or within 3ft (1 m) of the channel edge
- The Engineer may permit surplus material to be wasted in flushing out slopes if ditch lines, slope stability, and other features
- Do not leave material in unsightly piles
    - Spread in uniform layers, neatly leveled and shaped
- Leave adequate openings in spoil banks to allow adjacent land surfaces to drain
- Apply provisions pertaining to soil erosion and stream pollution

Do not deposit material from channel excavation within 3 ft (1 m) of channel edge

Measurement

- Channel excavation is measured by the method of average end areas

Payment

- The Contract Unit Price is paid per cubic yard (meter) per *GDOT Construction Manual 11-1*

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Section 205: Roadway Excavation

General Notes

- Includes excavating, hauling, and placing/disposing of materials (not removed under another Contract item) from within limits of areas designated in Contract
- Temporarily stop excavation operations until directed by the Engineer if artifacts of historical or archaeological significance are encountered
- Includes ditches (except channels) and filling and/or plugging abandoned wells (dug and drilled)
- Remove paving, aggregates, and ballasts not included in work

Salvaged Materials

- The Department claims salvaged materials unless the Engineer directs that materials be wasted
- Salvaging aggregates, paving, (only if designated on the Plans) and removed railroad ballast
- Dispose of materials not salvaged
- Stockpile on the Project unless other sites are designated on plans

> The Engineer will designate unsuitable materials

Disposal of Surplus Material

- "Unless directed by the Engineer, do not waste excavated material until satisfying embankment and backfill requirements, unless material is designated on the Plans as "Unsuitable for embankment or backfill construction."
- Use suitable material to widen embankments uniformly, flatten fill slopes, or deposit on the Right-of-Way, as directed by the Engineer
- Do not leave unsightly material piles
- Do not place waste material on the waste bank edge closer than 10 ft (3 meters) from the top of the cut slope
- Do not deposit waste material within 3 ft (1 m) of the ditch edge

- *Waste Disposal Areas*: When unable to dispose of unsuitable or surplus excavation material on right-of-way, use the following areas:
  - Department-furnished disposal areas shown on plans
  - Other suitable disposal areas not shown on plans
  - Reclamation

General Construction

- Provide adequate openings in spoil banks to allow the adjacent surface to drain
- Cut the surface ditch at the top of cut slopes to carry water from the side hill
- Turn side ditches outward to avoid embankment erosion
- Provide outlets or flumes for roadway ditches when necessary
- Uniformly round the intersection of cut slopes with the natural ground surface
- Dispose of material from slides and overbreaks that occur before Final Acceptance

Construction Item	Inspection Notes
Serrated Slopes	• Grade back slope according to Construction Detail • Ensure the first serration is level • Use tilt-control blade dozer to cut steps in alternate directions • Department will not pay additional for serrated slopes
Non-Serrated Slopes	• Leave front and back slopes in roughened condition to provide seed bed for grass

Rock Excavation

- Transition any flattening of cut slope already started when rock is encountered
- Use presplitting to reduce over breakage and establish free surface or shear place
- Conduct presplitting by drilling appropriately sized holes
- Adhere to Section 107.12 when using explosives, including the submittal of a blasting plan
- Load and stem holes with appropriate light charge explosive
- Detonate explosives simultaneously
- Excavate solid rock and boulders on roadbed at least 1 ft (0.3 m) below finished subgrade
- Backfill excavated space to correct grade with suitable subgrade material
- Remove loose rock on cut slopes immediately after blasting per *GDOT Construction Manual 8-6*

Unsuitable Material Excavation

- Remove material and backfill with properly compacted approved material
- Undercut material to the depth shown on the plans or directed by the Engineer

Final Finishing of Roadway

- Shape the surface of the roadbed and slopes to a reasonably true grade alignment and cross section shown on the plans; finish according to Section 209
- Leave cut slopes in rock reasonably uniform and remove loose overhanging rock
- Open ditches, drains, and culverts constructed to effectively drain roadway
- Maintain excavated areas until final acceptance of Project

Measurement

- Original and final ground surface are measured using conventional methods or photogrammetric means
- Unclassified roadway excavation is computed by method of average end areas, or other means (directed by the Engineer)

Payment

Per *Construction Manual 11-1*:

- Removing paving, aggregates, and ballast are paid at the Contract Price bid per cubic yard (meter)
- The Department withholds a percentage of progress payments for estimated quantity of earthwork (not exceeding 5%) until final dressing, subgrade, and disposal is completed

- Roadway excavation—unclassified is paid as the Contract Price per cubic yard (meter) and includes: excavating, hauling, placing, compaction, stockpiling, pre-splitting rock, disposal, ditches, subgrades, shoulders, finishing, dressing, and maintaining until Final Acceptance

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to the Public
109	Measurement and Payment
411	Asphaltic Concrete Pavement, Partial Removal
610	Removal of Miscellaneous Roadway Items

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Section 206: Borrow Excavation

This work includes the excavating of material from borrow pits outside the Right-of-Way, hauling and using the material, and stripping, excavating, and disposing of unsuitable material from borrow areas.

Submittals

- National Historical Preservation Act *GDOT Spec. 106* must be fulfilled
- Approval for environmental considerations and material acceptability required
- Approval for pit investigation, cross sectioning, and staking required

Materials

- Do not use materials containing roots or stumps
- The Engineer must approve borrow excavation materials
- Use selected borrow of Class II B3 or better for subgrade
- Use material within slope stakes or stockpile material for topping roadbed before using borrow areas

> Leave borrow pits or waste disposal areas presentable

Construction

- Do not use materials containing roots or stumps
- Prevent water from standing in pits unless directed otherwise by the Engineer
- Machine slope the bottom of the excavated area to smooth surfaces suitable for re-vegetation
- Dispose of material in a manner satisfactory to the Engineer
- Grade boundary slopes of reclaimed areas to 3:1 slope or flatter

Measurement and Payment

Item	Inspection Notes
Measurement	• Borrow pits are measured using the average end method
Payment	• Borrow material is paid at the Contract Price per cubic yard (meter)

Related Specifications

Section	Title
106	Control of Materials
107	Legal Regulations and Responsibility to the Public
160	Reclamation of Material Pits and Waste Areas

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Section 207: Excavation and Backfill for Minor Structures

Construction

- This work includes excavating, backfilling, or disposing of materials required to install a bridge culvert, box culvert, pipe, arch culvert, headwall and retaining wall
- The Engineer determines final structure locations and elevations (plans are approximate)
- The Engineer determines minimum requirements for length and depth of excavation

> Excavate rock or bolder formations at least 1 ft (0.3 m) below bottom of structure

- Backfill with Type I or Type II material to subgrade elevation
- Pipe may be placed incrementally on steep gradients of embankment
- Cut surfaces at structure trenches to prevent damage to the pavement
- Saw pavements to cause the edges to break in straight lines
- Width, depth, and vertical walls of trench meet plan dimensions within 2 in. (50 mm)

Backfill

- Use Type I material in dry structure trenches and Type II material in wet trenches
- Use Type I material as finishing course for Type II material when directed by the Engineer
- Place Type I and Type II materials in layers no more than 6 in. (0.15 m) loose

Material	Compaction
Type I Type II	• 95% of theoretical dry density • Satisfactory uniform density as directed by the Engineer

Normal Backfill

- Do not place rock more than 4 in. (0.1 m) in diameter with 2 ft (0.6 m) of drainage structure
- For retaining walls, use pervious material that meets Case I or II:
  - *Case I*: Backfill for retaining walls that support roadbed and parking areas
    - Ensure that the backfill conforms to Section 208
  - *Case II*: Backfill for retaining walls that do not support roadbed and parking areas

Measurement

- Backfill materials (Type I, II, and III) are measured in cubic yards (meters) compacted
- Type III is measured complete in place according to line and grade (uncompacted) in cubic yards (meters)
- Lateral measurements are confined to the area bounded by vertical planes lying no more than 1 ft (0.3 m) outside of and parallel to structural limits

Payment

- Type II and III are paid separately by the Department at the Contract Unit Price per cubic yard (meter)
- The Department will not pay for:
  - Excavation of minor structures
  - Excavation of imperfect trench
  - Removal of water

- Excavation and backfill of temporary drainage ditches
- Extra depth excavation

Related Specifications

Section	Title
104	Scope of Work
109	Measurement and Payment
810	Roadway Materials
812	Backfill Materials

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Section 208: Embankments

This work includes placing embankments, backfilling structures, and constructing earth berms and surcharges with suitable material excavated under Sections, 204, 205, 206 and 207

Use Class I, II, III, V, or VI for embankment material except:

- *Inundated Embankments*:
  - Proposal includes special provision for required gradation
- *Intermittently Inundated Embankments*:
  - Build using any suitable material
- *Embankment at Structures*:
  - Place within 10 ft (3 m) of bridge structure (Class I or II)
  - Ensure rocks are not larger than 3 in. (75 mm) for any dimensions

Benching Excavation for Embankment

- Form benches to increase the bond between the existing ground and proposed embankment
- Require where embankments are placed on hillsides or against existing embankments
- Construct approximately 12 ft (3.7 m) wide unless indicated differently on plans
- Use material removed in benching operation during embankment excavations

Formation

- Deposit material and spread in horizontal layers no more than 8 in. (0.2 m) thick, loose Measurement, for the full width of the cross-section
- Keep layers uniform using motor graders, bulldozers, or other approved equipment across the cross section
- Compact the layer within the range of optimum moisture content to achieve compaction
- Do not construct successive layers on previous layers that exhibit excessive pumping

- Add water if the material is too dry and uniformly mix it with the soil for stability and compaction

- Compact the embankment at bridge structures to 100% max dry density for the full depth of the Embankment, beginning at the toe of slop and extending 100 ft (30 m) from the end of the bridge
- Compact embankment other than at bridge structures to 95% max dry density to within 1ft (0.3 m) of top of embankment and compact the top 1 ft (0.3 m) to 100% max dry density
- Ensure the moisture content is sufficient for stability and compaction

Construct embankments in parallel layers

Embankment at Structures

- Use Class I or II material for pipes, culverts, arches, and bridges
- Place specified material on both sides of the bridge at a minimum distance of 10 ft (3 m)
- Provide sufficient depth of material over and around the structure

Do not place rock larger than 4 in. (0.1 m) diameter within 2 ft (0.6 m) of any drainage structure

Material Handling

Soil Class	Handling Notes
II B3	• Distribute and compact in 8 in. (0.2 m) uniform layers over the embankment width • Use in the top 1 ft (0.3 m) of the roadbed
II B4, V	• Distribute and compact in 8 in. (0.2 m) uniform layers over the embankment width • Do not use in the top 1 ft (0.3 m) of roadbed without adding stabilizing agent
III, IV	• Do not use in embankments unless directed by the plans or the Engineer
VI	• Place rock in uniform layers not over 3 ft (1 m) thick • Distribute to avoid pockets • Fill voids with finer material • Do not use rock larger than 6 in. (0.15 m) in diameter within 3 ft (1 m) of the finished surface

In-Place Embankment

- Use either a hydraulic or conventional dry land construction method
- Obtain material from within construction limits or borrow pits

Rock Embankment

- Place rock in uniform layers not over 3 feet thick
- Fill voids with rock fines

Embankment Construction Procedure

- Clear and grub the embankment area
- Fill depressions below ground surface and undercut areas with suitable material
- Plow and scarify the entire area upon an area at least 6 in. (0.15 m)
- Re-compact loosened soil to approximate the density of the soil
- Plow or scarify all portions of existing unpaved pavements
- Destroy cleavage planes before placing the embankment

General Embankment Construction

- Use either a hydraulic or conventional dry land construction method
- Allow use of excess material placed outside of prescribed slopes to raise fill
- Dredge material that invades openings or existing channels
- Do not excavate or dredge material within 500 ft (0.15 m) to toe or existing structures
- Construct at the farthest points along the roadway from bridge ends and progress to the end excavation area beyond the slope toe at bridge ends

Final Finishing

- Shape roadbed surface and slopes to true grade and cross sections
- Open ditches, channels, and drainage structures to drain the roadway
- Maintain embankment areas until Final Acceptance of Project

Measurement and* P*ayment

Construction Item	Inspection Notes
Measurement	• Placing embankment is measured using the average end area method • Ground surface is determined by conventional field, photogrammetric, or other methods • Backfill volume is calculated from the cross section on the plans
Payment	• In-place and rock embankments are paid at the Contract Unit Price per cubic yard (meter)

Related Specifications

Section	Title
161	Control of Soil Erosion and Sedimentation
810	Roadway Materials
811	Rock Embankment
813	Pond Sand

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Section 209: Subgrade Construction

> Subgrade Construction refers to the top 6 in. (0.15 m) of the roadbed or Plan-indicated thickness

Subgrade Construction

- Plow, harrow, and mix the surface of in-place subgrade
- Ensure the subgrade can support construction equipment before placing subsequent layers
- Rework unstable areas of the subgrade to the moisture content providing stability
- Compact using a sheepsfoot roller

Subgrade Stabilization

- Undercut and dispose of subgrade material that is displaced with aggregate or Engineer-selected material
- Leave material off the subgrade in fill sections requiring stabilization
- Incorporate material into existing subgrade to a minimum depth of 6 in. (0.15 m)
- Plow, disk, harrow, blade, and mix with rotary tillers until mixture is uniform
- Finish the stabilized subgrade to plan line, grade, and cross section
- Compact to 100% of maximum laboratory dry density

Shoulder Stabilization

- Spread stabilizer aggregate at the rate and dimensions on the plans
- Mix aggregate with in-place shoulder material at the plan depth

- Compact the area and finish it to plan dimensions
- Prime the stabilized area when paving course is required on the shoulders

Finished Subgrade

- Leave underlying subgrade in cuts and fills low enough to accommodate additional material for subgrade stabilization, select material subgrade, or stabilization for shoulders
- Short test sections in curb and gutter areas might be necessary to obtain proper elevation
- Blade the surface to the completed subgrade to a smooth and uniform texture

Measurement and Payment

Item	Measurement	Payment
Subgrade Stabilization	Ton (megagram), cubic yard (meter), or square yard (meter)	Contract Unit Price for cubic yard (meter), per ton (megagram), or per square yard (meter)
Subgrade Material	Cubic yard (meter), ton (megagram), or square yard (meter)	Contract Unit Price per cubic yard (meter), per ton (megagram), or per square yard (meter)
Shoulder Stabilization	Cubic yard (meter) or ton (megagram)	Contact Unit Price per cubic yard (meter), per ton (megagram), or per square yard (meter)

Related Specifications

Section	Title
109	Measurement and Payment
412	Bituminous Prime
803	Stabilizer Aggregate
810	Roadway Materials
815	Graded Aggregate

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Section 210: Grading Complete

This work includes:

- Clearing and grubbing according to Section 201 and Section 202 unless these items are established as Pay Items in the Contract
- Excavating of all materials including ditches, undesirable material (including removal and replacement), and borrow (if required)
- Hauling
- Forming embankments
- Constructing shoulders and subgrades
- Finishing, dressing, and disposing of undesirable or surplus material
- Removing and disposing of miscellaneous roadway items, including but not limited to curbs, drainage structures, and pavements (unless established as separate contract items)

The Engineer may require the Contractor to remove and replace unsuitable material

Measurement and Payment

Item	Measurement	Payment
Grading Complete	Total	Lump Sum Price bid
Grading Per Mile	Linear miles (kilometers) along centerline	Contract Unit Price per linear mile (kilometer)
Undercut Excavation	Volume of excavation	$750 per cubic yard ($9.80 per cubic meter) up to 750 yd^3 (575 m^3)

Shoulder Stabilization	Cubic yard (meter) or ton (megagram)	Contact Unit Price per cubic yard (meter), per ton (megagram), or per square yard (meter)

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Section 211: Bridge Excavation and Backfill

Cofferdams and Sheeting

- Use necessary protection such as cofferdams and sheeting when working in excavations
- Use cofferdams or sheeting to prevent undesirable changes in channels and slopes

Preparation of Foundations

- Do not subject the concrete to the action of the water before final setting
- Step the foundation, remove loose fragments, and clean/fill the seams as directed by the Engineer per *GDOT Construction Manual 2-1*

> Provide the Engineer ample opportunity and safe conditions to inspect foundations and measure removed materials

Construction

- Do not place concrete or close the foundation areas from view until the area has been approved
- Bore the foundations in the Engineer's presence per *GDOT Construction Manual 2-1*
- Bore at least 6 ft (1.8 m) deep in rock and 10 ft (3 m) deep in other materials

Backfill Procedure

- Place backfill in layers not exceeding 1 ft (0.3 m) of loose material
- Backfill around substructures except when located in banks of stream
- Place backfill material to apply only balanced horizontal loads to newly placed structure
- Do not backfill portions of structures that do not have backfill on all sides until the concrete has reached the required strength

Compact layers before placing the next layer

Bents and Piers

- Complete backfilling around substructures not supported by piling on the next workday after placing the lift
- Backfill at least 3 calendar days after placement
- Backfill the footings before beginning form work on the columns
- Backfill around the pile-supported footings and columns after removing the forms
- Complete backfilling within 5 calendar days after placing the concrete

Measurement

- Bridge excavation is measured in cubic yards (meters)
- Each portion of a stepped footing is considered a separate footing

Payment

- The Department will pay for eligible excavation down to 2 ft (0.6 m) below plan foundation elevation at the Contract Price for bridge excavation. There are also payments available for 2 ft through 6 ft, 6 ft through 10 ft, and greater than 10 ft
- Bridge excavation, grade separation, stream crossing, and porous backfill are paid at the Contract Unit Price per cubic yard (meters)

Related Specifications

Section	Title
500	Concrete Structures
525	Cofferdams
540	Removal of Existing Bridge

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Section 212: Granular Embankment

Ensure granular material meets Class I A2 soil:

Percent passing No. 200	0–18
Percent Clay	1–10

Construction

- Place embankment at location(s) shown on plans
- The Engineer must approve lift thickness and compaction

Measurement

- Granular embankment is measured by volume in hauling vehicle for pits
  - Weight of material delivered from quarry is converted to volume based on dry loose unit weight
- Average end area is also an approved method from a pit dedicated exclusively to the Project

Payment: Granular embankment is paid at Contract Price per cubic yard (meter)

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Section 215: Removal of Solid Waste

Material

- Soil materials used to cover exposed area of removal site may be any noncontaminated earth material approved by the Engineer

> The Contractor must submit a report of disposal from the municipal solid waste landfill to the Engineer

Construction

- Provide engineering and work practice controls to protect employee health and safety
- Give the Engineer 2 weeks' notice before removing solid waste
- The Engineer notifies the local governing authority of the proposed work and time schedule
- Excavate to the full depth and width of cut in one continuous operation, leaving minimum exposed surface

- Leave the working faces of the cut near the vertical-slope of soil to safely place the layer over the exposed area in an effort to stabilize the soil.
- Transport solid waste to a permitted municipal solid waste landfill
- Fill the trucks hauling material from the removal site to less than full capacity to prevent spills

- Cover the truck body with waterproof tarpaulin
- Cover exposed areas of removal with a 6 in. (0.15 m) layer of clean earth

Report solid waste discoveries during construction to the Engineer

Odor Control

- The Engineer will cooperate with the local governing authority to determine acceptability of an odor-control chemical
- Keep available a 3-day supply (minimum) of odor-control chemical

Measurement

- Removing solid waste from sites shown on plans is measured by cubic yard (meter)
- Volume of material measured for payment is based on cross section measurements using average end area

Payment

- Solid waste removal shown on plans is paid at the Contract Unit Price bid per cubic yard (meter)

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to Public
109	Measurement and Payment

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Section 216: Unpaved Shoulders

Construction

- Shape and compact shoulders in sequence as required for the type of base or pavement
- Repair damage to existing base, surface, or pavement due to shoulder construction
- Compact the shoulder area above subgrade elevations that require grassing or sodding to a firm and stable condition (determined by the Engineer)

Repair areas of excessive erosion to prevent damage to adjacent base or pavement

Maintenance

- Cut weep holes through shoulders constructed prior to flexible bases to prevent impoundment of water on the roadbed or subgrade
- Provide adequate temporary drainage facilities to prevent excessive erosion when the front slopes are subject to concentrated water at weep holes
- Repair and dress adjacent slopes and remove excess material from adjacent ditches when shaping, dressing, and compacting shoulders

Construction Sequence

1) Portland Cement Concrete Bases and Pavements	• Construct, shape, and compact shoulders when curing period is complete on each section
2) Hot Mix Asphalt Concrete Pavement	• Construct shoulders adjacent to hot mix asphaltic concrete pavement
3) Flexible Bases or Pavements	• Place loose shoulder material outside of proposed edge of base or pavement • Use blade grader to pull up shoulder • Use the same number of courses for shoulders, base, or pavement
4) Stabilized Shoulders	• Add stabilizer according to Specifications pertaining to each item
5) Shoulders Constructed with Base Material	• Place and construct shoulder material in the same way as base material
6) Shoulders Constructed under Traffic	• Do not remove existing shoulders or portions of existing shoulders more than 1500 ft (450 m) ahead of paving operations

Measurement

- Shoulders constructed with selected material are measured in cubic yards (meters), loose volume, in vehicles when dumping

Payment

- Roadbed material is paid at the Contract Unit Price per cubic yard (meter)
- Select shoulder material is paid at the Contract Unit Price per cubic yard (meter) or square yard (meter) of specified thickness

Related Specifications

Section	Title
106	Control of Materials
817	Shoulder Material

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Section 217: Removal of Underground Storage Tanks

Underground tanks include:

- Farm or residential tanks of 1100 gal (4160 L) or less capacity used for storing motor fuel for noncommercial uses
- Tanks used for storing heating oil for consumptive use of premises
- Pipeline facilities

See Specifications 217.01 for more information

Preparation

- Notify the Engineer (in writing) 2 weeks before working on the Underground Storage Tank (UST)
- The Engineer will inspect work with the Office of Materials and Research and District's UST Tank Pull Inspector

> Avoid spilling the contents of the tank and handle or transport the tank to the permitted disposal area

Construction

- The Contractor assumes liability for improperly removing and disposing of UST system
- Immediately contain spills and remove/dispose of contaminated soil
- Dispose of the tank, contents, and contaminated soils according to EPD
- Take soil samples (EPD required) after the tank is removed
- Submit soil samples to a laboratory approved by the Engineer for testing
- Place compact backfill material for tank pit areas within construction limits

Contamination Note: If the tank pit is visually contaminated, remove soils at a maximum of 4 ft (1.2 m) deep per *GDOT Construction Manual 8-1*

Measurement

- Removal of underground storage tanks is measured on a per each basis

Payment

- Removal of underground storage tanks is paid at the Contract Unit Price per each
- See Specifications 217.5B (Discovery during Construction) and 217.5C (Over-excavation of Contaminated Soils)

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to the Public
109	Measurement and Payment

Other Documents

Georgia EPD Rules (Chapter 391-3-15)

EPA Regulation 40 CFR Part 280

American Petroleum Institute's Recommended Practice 1604 (API 1604)

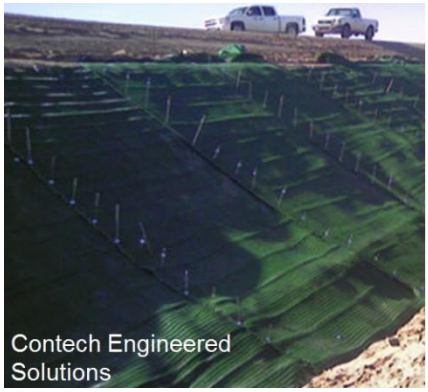
Georgia Department of Transportation Construction Engineering Inspection Training

Earthwork Inspection

Section 218: Blanket for Fill Slopes

Construction

- Remove vegetation, roots, trash, or materials that hinder preparation of bed for grassing
- Place soil shortly before and in conjunction with grassing operations
- Replace material lost from erosion



Measurement

- Material is measured in cubic yards (meters), loose measure, in vehicles at dumping point

Payment

- Blanket for fill slopes is paid per cubic yard (meter)

Georgia Department of Transportation Construction Engineering Inspection Training

Earthwork Inspection

Section 221: Special Subgrade Compaction and Test Rolling

Includes rolling subgrades using a special roller and repairing weak places discovered during rolling

This work includes:

- Test rolling and performing final compaction and preparation of finished subgrade using special rolling and compaction equipment
- Replacing or repairing weak areas that develop in the finished subgrade from manipulating the test rolling equipment
- Continuing test rolling to compact the repaired areas until the subgrade is firm
- Protect culverts and bridges from damage

Equipment Note

- Use a pneumatic-tired roller with a single-axle base, 4 wheels, gross weight 35–50 tons (31–45 Mg), free rocking/oscillating wheels, no more than 10 ft (3 m) overall width, maximum turning radius of 15 ft (4.5 m)

Preparation

- Prepare the surface to be test rolled to the proper grade and cross section
- Ensure the top 8 in. (0.2 m) of the surface is within 3 percentage points of the optimum moisture content

Construction

Item	Notes
Subgrade Preparation	• Stabilize in specified areas before test rolling
Extent of Rolling	• Test roll on all portions of subgrade under base, subbase, or pavement plus 2 ft (0.6 m) width on each side • Roll frontage roads, spur connections, crossovers, and intersections • Test roll parallel to the centerline with roller speed 2–5 mph (3–8 kph) • Progress uniformly toward the center section until passing over the entire surface twice • Roll the entire width in half-day segments of work • Stop rolling during extreme moisture • Add water if the subgrade moisture content is deficient • The Engineer will mark the extent of weak areas and depressions during rolling
Repairs to Subgrade	• Remove unsatisfactory materials and strengthen or stabilize materials in place • The Engineer will decide which repairs to make • Place and compact materials in the roadbed for embankment or subgrade • Test roll after making repairs until the area is satisfactory per the specifications
Test Rolling at Structures	• Prevent damage to structures during rolling • Do not allow rolling within 10 ft (3 m) of bridge ends and approach slabs • For culverts less than 4-ft (1.2 m) vertical distance from the surface, do not allow rolling within 10 ft (3 m) of the culvert

Measurement

- Test rolling is measured in miles (km) along center of road

Payment

- Special subgrade compaction and test rolling are paid at Unit Price bid per mile (km)
- Repairs to subgrade compaction and test rolling are paid per mile (km)

Earthwork References

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