INDEX OF CONSTRUCTION AND MATERIAL SPECIFICATIONS

SPEC NO.	CONSTRUCTION SPECIFICATION	SPEC NO.	MATERIAL SPECIFICATION
4	Channel Clearing and Shaping	521	Aggregates for Drainfill and Filters
5	Pollution Control	523	Rock for Riprap
6	Seeding, Sprigging, and Mulching		
8	Mobilization and Demobilization		
9	Traffic Control		
11	Removal of Water		
21	Excavation		
23	Earthfill		
24	Drainfill		
61	Rock Riprap		
94	Contractor Quality Control		

Construction Specification 4 — Channel Clearing and Shaping

Title 210 - Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of clearing designated areas by the removal and disposal of trees, logs, stumps, shrubs, brush, and rubbish and the shaping of the channel.

B. Protection of Existing Vegetation

1. Protect trees and other vegetation designated to remain undisturbed from damage throughout the duration of the construction period. Any damages resulting from the contractor's operations or neglect must be repaired by the contractor.
2. Earthfill, stockpiling of materials, vehicle or equipment parking, and excessive foot or vehicle traffic must not be allowed within the drip line of vegetation designated to remain in place. Vegetation damaged by any of these or similar actions must be replaced with viable vegetation of the same species, similar condition, and like size unless otherwise approved by the contracting officer.
3. Any cuts, skins, scrapes, or bruises to the bark of the vegetation must be carefully trimmed and local nursery-accepted procedures must be used to seal damaged bark.
4. Any limbs or branches 0.5 inch or larger in diameter that are broken, severed, or otherwise seriously damaged during construction must be cut off at the base of the damaged limb or branch, flush with the adjacent limb or tree trunk.
5. All roots 1 inch or larger in diameter that are cut, broken, or otherwise severed during channel shaping must have the ends smoothly cut perpendicular to the root. Roots exposed during channel shaping operations must be covered with moist soil as soon as possible to prevent them from drying out.

C. Marking

1. The limits of the areas to be cleared and shaped are marked by stakes, flags, paint, tree markings, or other suitable methods or as specified in Section H of this specification or will be shown on the drawings. Trees to remain standing, undisturbed, and uninjured are designated by special markings.

D. Clearing

1. Trees and other vegetation marked for clearing must be cut off as near the ground surface as conventional tools and equipment normally permit. All trees not

marked for preservation and all snags, logs, brush, shrubs, stumps, and rubbish must be cleared from within the area limits identified.

E. Disposal

1. Dispose of all woody material, vegetation, and rubbish resulting from clearing from designated areas at the locations and in a manner shown on the drawings or as specified in Section H of this specification.

F. Shaping

1. Shape the channel bottom and side slopes as shown on the drawings. The resulting shaped channel surface must be reasonably smooth. Remove and dispose material excavated during the channel-shaping operation from the channel as specified in Section H of this specification.

G. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established by the contract, the designated cleared and shaped area is measured and area is determined to the nearest 0.1 acre. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
2. Method 2. For items of work for which specific unit prices are established by the contract, the length of the cleared and shaped channel designated is measured to the nearest 100 feet. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory performance of the work.
3. Method 3. For items of work for which specific unit prices are established by the contract, the cleared and shaped areas is measured, and area is determined to the nearest 0.1 acre. The designated cleared and shaped areas is determined from the measured width at representative sections and the distance between the sections. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
4. Method 4. For items of work for which specific lump sum prices are established by the contract, the extent of clearing and shaping is not measured or determined for payment. Payment for clearing and shaping is made at the contract lump sum price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
5. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which

it is made subsidiary. Such items and items to which they have been made subsidiary are identified in Section H of this specification.

H. Items of Work and Construction Details

Bid Item 2 – Channel Clearing and Shaping

1. This item shall consist of the removal and disposal of trees, logs, stumps, brush, and rubbish located within the stream corridor and along the streambank and the shaping of the channel bank as shown and described in the drawings.

2. All removed woody material and rubbish shall be disposed off-site at an approved dump site. No on-site burning or burying will be authorized.

3. Excess or unsuitable material encountered during channel clearing and shaping such as soils unsuitable for use as fill material, organic material such as roots, or other foreign materials shall not be spoiled or graded within the floodplain nor within an existing wetland. Excess or unsuitable materials shall be disposed off site at an environmentally responsible site approved by the technical representative of the contracting agency.

4. Five stumps and root wads designated on the drawings that are located in the rock riprap slope area shall be removed. Stumps and root wads for removal will be marked on site.

5. The sand and gravel bar identified on the drawings shall be removed at the extents identified in the plan view and cross sections. Excavation of the gravel bar is from Sta. 10+32 to Sta. 11+80 across the full width of the stream corridor. Excavation shall not extend past Sta. 11+90 due to the presence of underground utilities. The final channel shall be a flat trapezoidal cross section in shape with a minimum bottom width of 30 ft at Sta. 10+32 and transition to a flat trapezoidal cross section in shape with a minimum bottom width of 25 ft at Sta. 10+80. The final channel shall have uniform grade connecting the upstream and downstream reaches of the project area where the sand and gravel bar excavation is performed. Channel side slopes shall be daylighted at 2H:1V slopes or flatter.

6. Fill material used in the shaping of the right bank (west bank) shall be obtained from the excavation of the gravel and sand deposit or sourced from an off-site location. Fill shall be placed to the lines and elevations indicated by the drawings. Fill material must be approved by the technical representative of the contracting agency.

7. Measurement and payment shall be by Method 4.

8. Items subsidiary to this bid item are:

    a. Removal of Water – Construction Specification – 11
    b. Excavation – Construction Specification – 21
    c. Earthfill – Construction Specification – 23

Construction Specification 5 — Pollution Control

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities.
2. The following BioPreferred® product categories are applicable to this specification:
    a. Mulch and compost materials
    b. Erosion control materials
    c. Fertilizers
    d. Dust suppressants
    e. Agricultural spray adjuvants

B. Material

1. Silt fence conform to the requirement of Materials Specification 592, Geotextile. All other material furnished meet the requirements of the material specifications listed in Section G of this specification.
2. Erosion and Sediment Control Measures and Works. The measures and works includes, but are not limited to, the following:
    a. Staging of Earthwork Activities. Scheduling the excavation and moving of soil materials to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time.
    b. Seeding. Seeding to protect disturbed areas occur as soon as reasonably possible following completion of that earthwork activity.
    c. Mulching. Mulching to provide temporary protection of the soil surface from erosion.
    d. Diversions. Diversions to divert water from work areas and to collect water from work areas for treatment and safe disposition. These are temporary and must be removed and the area restored to its near-original condition when the diversions are no longer required or when permanent measures are installed.
    e. Stream Crossings. Culverts or bridges where equipment must cross streams. These are temporary must and be removed and the area restored to its near-original condition when the crossings are no longer required or when permanent measures are installed.
    f. Sediment Basins. Sediment basins for collecting, settling, and eliminating sediment from eroding areas that impact properties and streams below the

construction sites. These basins are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

g. Sediment Filters. Straw bale filters or geotextile sediment fences for trapping sediment from areas with limited runoff. Sediment filters must be properly anchored to prevent erosion under or around them. Silt fences must be installed and maintained in accordance with ASTM D6462. These filters are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

h. Waterways. Waterways for the safe disposal of runoff from fields, diversions, and other structures or measures. These works are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

i. Other. Additional protection measures as specified in Section G of this specification or required by the federal, state, or local government.

C. Chemical Pollution

1. The contractor must provide watertight tanks or barrels or construct a sump sealed with plastic sheets to collect and temporarily contain chemical pollutants, such as drained lubricating or transmission fluids, grease, soaps, concrete mixer wash water, or asphalt, produced as a by-product from the construction activities. Dispose of pollutants in accordance with appropriate state and federal regulations. At the completion of the construction work, remove tanks, barrels, and sumps and restore the area to its original condition as specified in Section H of this specification. Sump removal must be conducted without causing pollution.

2. Sanitary facilities, such as chemical toilets, and septic tanks must not be located next to live streams, wells, or springs. They must be located at a distance sufficient to prevent contamination of any water source. At the completion of construction activities, facilities must be disposed of without causing pollution as specified in Section H of this specification.

D. Air Pollution

1. The burning of brush or slash and the disposal of other materials must adhere to state and local regulations.

2. Fire prevention measures must be taken to prevent the start or spreading of wildfires that may result from project activities. Firebreaks or guards must be constructed and maintained at locations shown on the drawings.

3. All public access or haul roads used by the contractor during construction of the project must be sprinkled or otherwise treated to fully suppress dust. All dust control methods must ensure safe construction operations at all times. If chemical dust suppressants are applied, the material must be a commercially available product specifically designed for dust suppression, and the application must follow the manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures must be provided to the engineer 5 working days before the first application.

E. Maintenance, Removal, and Restoration

1. All pollution-control measures and temporary works must be adequately maintained in a functional condition for the duration of the construction period. Remove all temporary measures and restore the site to near-original condition.

F. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established in the contract, each item is measured to the nearest unit applicable. Payment for each item is made at the contract unit price for that item. For water or chemical suppressant items used for dust control for which items of work are established in Section H of this specification, measurement for payment will not include water or chemical suppressants that are used inappropriately or excessively. Such payment will constitute full compensation for the completion of the work.
2. Method 2. For items of work for which lump-sum prices are established in the contract, payment is made as the work proceeds and is supported by invoices presented by the contractor that reflect actual costs. If the total of all progress payments is less than the lump-sum contract price for this item, the balance remaining for this item will be included in the final contract payment. Payment of the lump-sum contract price will constitute full compensation for completion of the work.
3. Method 3. For items of work for which lump-sum prices are established in the contract, payment will be prorated and provided in equal amounts on each monthly progress payment estimate. The number of months used for prorating must be the number estimated to complete the work as outlined in the contractor's approved construction schedule. The final month's prorate amount will be provided with the final contract payment. Payment as described will constitute full compensation for completion of the work.
4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items, and the items to which they are made subsidiary, are identified in Section H of this specification.

G. Items of Work and Construction Details

Subsidiary Item – Pollution Control

1. The Contractor is required to provide the technical representative of the contracting agency with a written Pollution Control Plan of Operations for this project. The plan shall be submitted prior to the pre-construction conference and reviewed by all parties during the pre-construction conference.

2. All equipment utilized in the project construction shall be properly maintained and free of operating fluid leaks such as fuel, oil, or hydraulic fluid. Equipment identified by the technical representative of the contracting agency as unfit for usage on site shall be removed from the site.

3. The Contractor shall perform the work of this project in a manner consistent and in conformance with Federal, State, and Local Government regulations to protect the site and downstream areas from degradation.

4. Method of Payment:

    a. Section F Measurement and Payment does not apply. No separate payment will be made for Pollution Control. Compensation for this item will be included in the payment for Bid Item 1 – Mobilization / Demobilization.

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Construction Specification 6 — Seeding, Sprigging, and Mulching

Title 210 - Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of preparing the area for treatment; furnishing and placing seed, sprigs, mulch, fertilizer, inoculant, lime, and other soil amendments; and anchoring mulch in designated areas as specified.
2. The following BioPreferred® product categories are applicable to this specification:

a. Mulch and compost materials
b. Erosion control materials
c. Fertilizers
d. Agricultural spray adjuvants

B. Material

1. Seed.

   a. All seed must conform to the current rules and regulations of the state where it is being used and must be from the latest crop available. It must meet or exceed the standard for purity and germination listed in Section G.
   b. Seed must be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.
   c. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious weed seed allowable must be as defined in the current state laws relating to agricultural seeds. Each type of seed must be delivered in separate sealed containers and fully tagged unless an exception is granted in writing by the contracting officer.

2. Fertilizer. Unless otherwise specified, the fertilizer must be a commercial-grade fertilizer. It must meet the standard for grade and quality specified by state law. Where fertilizer is furnished from bulk storage, the contractor must furnish a supplier's certification of analysis and weight. When required by the contract, a representative sample of the fertilizer must be furnished to the contracting officer for chemical analysis.

3. Inoculants. The inoculant for treating legume seeds must be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and must not be used later than the date indicated on the container or as otherwise specified. A mixing medium, as recommended by the manufacturer, must be used to bond the inoculant to the seed. Two times the amount of the inoculant recommended by the manufacturer must be used (unless seed is applied using a hydraulic seeder; then four times the amount must be used). Seed must be sown within 24 hours of treatment and must not remain in the hydraulic seeder longer than 4 hours.

4. Lime and Other Soil Amendments. Lime must consist of standard ground agriculture limestone or approved equivalent. Standard ground agriculture limestone is defined as ground limestone meeting current requirements of the state's Department of Agriculture. Other soil amendments must meet quality criteria and application requirements specified in Section G.

5. Mulch Tackifiers. Asphalt emulsion tackifiers must conform to the requirements of ASTM D977, Specification for Emulsified Asphalt. The emulsified asphalt may be rapid setting, medium setting, or slow setting. Non-asphaltic tackifiers required because of environmental considerations must be as specified in Section G.

6. Straw Mulch Material. Straw mulch must consist of wheat, barley, oat or rye straw, hay, grass cut from native grasses, or other plants as specified in Section G. The mulch material must be air-dried reasonably light in color and must not be musty, moldy, caked, or otherwise of low quality. The use of mulch that contains noxious weeds is not permitted. The contractor must provide a method satisfactory to the contracting officer for determining weight of mulch furnished.

7. Other Mulch Materials. Mulching materials, such as wood cellulose fiber mulch, mulch tackifiers, synthetic fiber mulch, netting, and mesh may be required for specialized locations and conditions. These materials, when specified, must be accompanied by the manufacturer's recommendations for methods of application.

C. Seeding Mixtures, Sod, Sprigs, and Dates of Planting

1. The application rate per acre for seed mixtures, sprigs, or sod and the date of seeding or planting must be as shown on the plans or as specified in Section G.

D. Seedbed Preparation and Treatment

1. Dress areas to be treated to a smooth, firm surface. On sites where equipment can operate on slopes safely, adequately loosen and smooth the seedbed (4 to 6 inches deep). Depending on soil and moisture conditions, disking, cultipacking, or both, may be necessary to properly prepare a seedbed. Where equipment cannot operate safely, prepare the seedbed by methods like scarifying, providing a roughened soil surface by hand so that broadcast seed will remain in place.

2. If seeding is to be accomplished immediately following construction operations, seedbed preparation may not be required except on a compacted, polished, or freshly cut soil surface.

3. Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance operations must be removed or disposed of as specified in Section G.

4. Discontinue seedbed preparation when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the responsible engineer.

E. Seeding, Sprigging, Fertilizing, Mulching, and Stabilizing

1. Perform all seeding or sprigging operations in such a manner that the seed or sprigs are applied in the specified quantities uniformly in the designated areas. The method and rate of seed application must be as specified in Section G. Unless otherwise specified, seeding or sprigging must be accomplished within 2 days after final grading is completed and approved.

2. Apply fertilizer, lime, and other soil amendments as specified in Section G. When specified, the fertilizer and soil amendments must be thoroughly incorporated into the soil immediately following surface application.

3. The rate, amount, and kind of mulching or mesh must be as specified in Section G. Apply mulches uniformly to the designated areas. They must be applied to areas seeded not later than 2 working days after seeding has been performed. Stabilize straw mulch material within 24 hours of application using a mulch crimper or equivalent anchoring tool or by a suitable tackifier. When the mulch crimper or equivalent anchoring tool is used, it must have straight blades and be the type manufactured expressly for and capable of firmly punching the mulch into the soil. Where the equipment can be safely operated, it must be operated on the contour. Use hand methods where equipment cannot safely operate to perform the work required.

4. Apply the tackifier uniformly over the mulch material at the specified rate or inject it into the mulch material as it is being applied. Stabilizing materials like mesh or netting must be applied smoothly but loosely on the designated areas. The edges of these materials must be buried or securely anchored using spikes or staples as specified in Section G.

5. The contractor must maintain the mesh or netting areas until all work under the contract has been completed and accepted. Maintenance must consist of the repair of areas damaged by water erosion, wind, fire, or other causes. Such areas must be repaired to reestablish the intended condition and to the design lines and grades required by the contract. The areas must be re-fertilized, reseeded, and re-mulched before the new application of the mesh or netting.

F. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established in the contract, each area treated is measured as specified in Section G and area is

calculated to the nearest 0.1 acre. Payment for treatment is made at the contract unit price for the designated treatment, which will constitute full compensation for completion of the work.

a. When specified as an item of work, mesh or netting is measured to the nearest square yard of surface area covered and accepted. Payment is made at the contract unit price and will constitute full compensation for completion of the work.

2. Method 2. For items of work for which specific lump-sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for this item is made at the contract lump-sum price for the item and will constitute full compensation for the completion of the work.

3. Method 3. For items of work for which lump-sum prices are established in the contract, payment is made as the work proceeds. Progress payments will be determined as specified in Section G. Payment of the lump-sum contract price will constitute full compensation for completion of the work.

4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section G.

G. Items of Work and Construction Details

Subsidiary Item – Seeding, Sprigging, and Mulching

1. This item shall include seeding and mulching of all disturbed areas within the work limits as shown and described in the drawings.

2. Fertilizer
   a. All areas shall have fertilizer uniformly applied at the following rates:
      i. Nitrogen (N) – 150 pounds per acre
      ii. Phosphorus (P_2O_5) – 150 pounds per acre
      iii. Potassium (K_2O) – 150 pounds per acre
   b. This specification can be met by applying fertilizer having an analysis of 15-15-15 at the rate of 1000 pounds per acre or 23 pounds per thousand square feet.

3. Seed
   a. All seed shall be labeled, tagged, or marked in accordance with Section 907.03 of the Ohio Revised Code. Seed tags showing germination and purity shall be attached to all bags. No pre-mixed seed shall be used unless the following conditions are met:
      i. The weight, purity, and germination of each kind of seed is specified on the tag for each lot of seed. Seeding rates shall be adjusted for Pure Live Seed (PLS) at the time of seeding. PLS equals percent germination. Seed shall have the equivalent of a minimum of 80% PLS.

ii. When the percent purity multiplied by the percent germination gives a percentage less than 80, the rate of seeding will be increased to provide the minimum PLS of 80.

b. Seeding mixtures and rates per acre for disturbed construction areas:
   i. Turf Type Tall Fescue – 60 lbs per acre or 1.5 lbs per 1,000 square ft.
   ii. Annual Ryegrass – 10 lbs per acre or 0.25 lbs per 1,000 square ft.

4. Seedbed Preparation
   a. Seedbed preparation shall be completed within 48 hours after application of fertilizer. Seedbed shall be composed of mineral soils capable of sustaining fescue grass growth. Sands and gravels shall not be used within 12" depth of the finish grade areas to be seeded above the Rock Riprap slope. All areas accessible to equipment shall be disked to incorporate fertilizer and to prepare the seedbed a minimum of 3 inches deep. The final seedbed preparation operation shall be performed across the across the slopes and immediately prior to seeding. Suitable equipment shall be used to smooth the seedbed prior to seeding. On areas inaccessible to a disk, a 1-inch minimum seedbed will be prepared using suitable tillage tools or hand tools. All rocks greater than 3 inches in size shall be removed.

5. Sowing the Seed
   a. Seeding shall be completed as soon as practical after final grading. Broadcast the seed and cover approximately ¼ inch deep with a light harrow, cultipacker, or other suitable equipment operated across the slopes. On areas too steep or otherwise inaccessible to equipment, the seed shall be covered with a hand rake or other suitable equipment.

6. Mulch and Method of Anchoring
   a. Mulch shall consist of (wheat, rye, or barley) straw and shall be applied uniformly at 2 air-dried tons per acre or 100 lbs. per 1,000 square feet. Mulch shall be applied within 48 hours after application of seeding. All bailing wire and twine shall be removed from the seeded and mulched areas. No anchoring is required.

7. Method of Payment
   a. Section 7 Measurement and Payment does not apply. No separate payment will be made for Seeding, Sprigging, and Mulching. Compensation for this item will be included in the payment for Bid Item 1 – Mobilization / Demobilization.

Construction Specification 8 — Mobilization and Demobilization

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

B. Equipment and Material

1. Mobilization includes all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in Section D of this specification.
2. Demobilization includes all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site, including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.
3. This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

C. Payment

1. Payment will be made as the work proceeds after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump-sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work.

2. Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

D. Items of Work and Construction Details

Bid Item 1 – Mobilization and Demobilization

1. This item shall consist of mobilizing and demobilizing all forces, equipment, and materials necessary for performing the work required under this contract.

2. Any ingress/egress or storage/lay-down areas within the Work Limits must be returned to the condition existing prior to construction. Any storage/lay-down areas outside of the Work Limits shall be coordinated between the Contractor and the Landowner.

3. Paved asphalt and concrete areas within the work limits shall be protected as necessary from damage during construction by restricting traffic, protective mats, or other means approved by the technical representative of the contracting agency.

4. A written and detailed construction schedule, prepared by the Contractor, will be required prior to beginning work.

5. A portable toilet provided and maintained by the Contractor is optional for this contract. The portable toilet shall be placed within the Work Limits and shall be operated and maintained by the Contractor for the duration of the project. Public bathroom access is located at the Fairfield County Soil and Water Conservation District office.

6. Construction fence restricting pedestrian access to the Sensory Trail Park shall be installed and maintained by the Contractor as shown on the drawings for the duration of the construction project. Fencing shall be continuous safety barrier fence, chain link fence, or equivalent as approved by the technical representative of the contracting agency. Fencing shall have a minimum height of 4 ft. Fencing shall begin at the northwest College Ave bridge guard rail and shall extend along the west and northwest end of the work limits ending at point F as shown on the engineering drawings. Fencing shall prohibit pedestrian traffic from entering the west Work Limit area from the north and south trails. Signage shall be posted on the north and south trail intersections to direct pedestrian traffic from the Fairfield Heritage Trail west through the Forest Rose School parking lot to regain access to the trail.

7. Multiple public utilities are located within the Work Limits. The contractor shall notify the OHIO 811 locate service and coordinate with the utility providers at minimum 2 working days prior to the start of construction and excavation.

8. At minimum 2 working days prior to work and excavation near the exposed fiber optic line, the City of Lancaster IT & Telecommunications department shall be contacted directly at their office number 740-687-6645 and by contacting the Fiber Maintenance Specialist David Farlow at 740-215-5516.

9. Construction traffic shall follow all posted weight restrictions designated for the College Ave bridge.

10. Items subsidiary to this bid item area:
    a. Pollution Control – Construction Specification 5
    b. Traffic Control - Construction Specification 9
    c. Contractor Quality Control - Construction Specification 94

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Construction Specification 9 — Traffic Control

Title 210 – Engineering
Part 642 – Specifications
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of establishing traffic control and maintaining safe, convenient use of public roads and right of way.

B. Traffic and Access

1. The contractor's operations must cause no unnecessary inconvenience to the public. Maintain the public right of way at all times unless interruption is authorized by proper local authority. Contractor's authorized closing or detour plans must be provided to the engineer for approval.
2. Provide and maintain safe and adequate access to all public protection devices and to all critical utility-control locations. Facility access must be continuous and unobstructed unless otherwise approved.

C. Storage of Equipment and Material in Public Streets

1. Construction materials and equipment must not be stored or parked on public streets, roads, or highways. During any material or equipment loading or unloading activities that may temporarily interfere with traffic, an acceptable detour must be provided for the duration of the activity. Any associated expense for this activity is the responsibility of the contractor.
2. Excavated material, including suitable material that is intended for adjacent trench backfill or other earth backfill as specified in Section E of this specification, must not be stored on public streets, roads, or highways that remain in service for the public. Any waiver of this requirement must be obtained from the proper local authority and approved by the engineer. All excess and unsuitable material must be removed from the site as soon as possible. Remove any spillage from roadways before they are used by the public.

D. Street Closures, Detours, and Barricades

1. The contractor must comply with the requirements of all applicable, responsible units of government for closure of any street, road, or highway. The contractor must provide the required barriers, guards, lights, signs, temporary bridges, and flaggers and inform the public of any detours and construction hazards by the most suitable means available, such as local newspapers or radio stations. The contractor is also responsible for compliance with additional public safety requirements that may arise during construction. The contractor must furnish,

install, and, upon completion of the work, promptly remove all signs, warning devices, and other materials used in the performance of this work.

2. Unless otherwise specified, the contractor must notify, in writing, the fire chief, police chief, county sheriff, state patrol, schools that operate school buses, or any other government official as appropriate no less than 7 days before closing, partly closing, or reopening any street, road, or highway.
3. Unless otherwise specified, the contractor must furnish to the engineer a written plan showing the proposed method of signing, barricading for traffic control, and safety for street detours and closures.
4. All temporary detours will be maintained to ensure use of public rights of way is provided in a safe manner. This may include dust control, grading, and graveling as required in Section G of this specification.

E. General and Specific References

1. All signs, signals, barricades, use of flaggers, and other traffic control and public safety devices must conform to the general requirements set forth in the Manual of Uniform Traffic Control Devices (MUTCD) and the latest edition of Standard Highway Signs and Standard Alphabets for Highway Signs and OSHA Construction Industry Standards (29 CFR Part 1926), Subpart G, Signs, Signals, and Barricades, unless otherwise specified in Section G of this specification.

F. Measurement and Payment

1. For items of work for which specific lump-sum prices are established in the contract, payment for the work is made at the contract lump-sum price. Progress payments will be made based upon the percentage of estimated total time that traffic control will be required unless otherwise specified in Section G of this specification. Payment will constitute full compensation for all flaggers, labor, materials, equipment, and other items necessary and incidental to completion of the work.
2. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section G of this specification.

G. Items of Work and Construction Details

<u>Subsidiary Item – Traffic Control</u>

1. College Ave and the College Ave bridge shall be maintained open to at minimum one full lane of through traffic during the period of construction.

2. Road closures shall be in accordance with ODOT Construction and Materials Specifications Item 614.05 and other applicable portions of the specifications, as well as the Ohio Manual of Uniform Traffic Control Devices. A written Traffic Control & Road Closure Plan shall be submitted to the technical representative of the contracting agency at the pre-construction conference.

3. Construction signage shall be posted on College Ave at the east and west sides of the Work Limits.

4. Method of Payment

    a. Section F Measurement and Payment does not apply. No separate payment will be made for Traffic Control. Compensation for this item will be included in the payment for Bid Item 1 – Mobilization and Demobilization.

Construction Specification 11 — Removal of Water

Tile 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the removal of surface water and ground water as necessary to perform the construction required by the contract in accordance with the specifications. It must include: (1) constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions; (2) furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment; and (3) removing all such temporary works and equipment after their intended function is no longer required.

B. Diverting Surface Water

1. The contractor must install, maintain, and operate all cofferdams, channels, flumes, sumps, and all other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site. Control of surface water must be continuous during the period that damage to construction work could occur. Unless otherwise specified or approved, the diversion outlet must be into the same drainageway that the water would have reached before being diverted.
2. The contractor must furnish the contracting officer, in writing, a proposed plan for diverting surface water before beginning any construction activities for which a diversion is required, unless waived in Section H of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities related to this activity during the process of completing the work as specified.

C. Dewatering the Construction Site

1. Foundations, cutoff trenches, and all other parts of the construction site must be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work. The contractor must furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the site as specified. Dewatering systems that cause a loss of soil fines from the foundation areas will not be permitted.
2. The contractor must furnish the contracting officer, in writing, a proposed plan for dewatering before commencing with any construction activity for which dewatering may be required unless waived in Section H of this specification.

Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities for completing the specified work.

D. Dewatering Borrow Areas

1. The contractor must maintain all borrow areas free of surface water or otherwise provide for timely and effective removal of surface and subsurface water that accumulates within the borrow area unless waived in Section H of this specification. Process borrow material as necessary to achieve proper and uniform moisture content at the time of placement.
2. If pumping to dewater borrow areas is included as a bid item of work in the bid schedule, equip each pump discharge pipe with a water meter. The meter must be such that the measured quantity of water is accurate within 3 percent of the true quantity. The contractor must provide necessary support to perform accuracy tests of the water meter when requested by the contracting officer.

E. Erosion and Pollution Control

1. Removal of water from the construction site, including the borrow areas, must be accomplished so that erosion and the transporting of sediment and other pollutants are minimized. Dewatering activities must be accomplished in a manner that the water table water quality is not altered. Pollution control activities must not conflict with the requirements of Construction Specification 5, Pollution Control, if it is a part of this contract.

F. Removal of Temporary Works

1. When temporary works are no longer needed, the contractor must remove and return the area to a condition similar to that which existed before construction. Areas where temporary works were located must be graded for sightly appearance and proper functioning and access to the installed works of improvement and may not obstruct natural surface waterflows. The contractor must exercise extreme care during the removal stages to minimize the loss of soil sediment and debris that was trapped during construction.
2. Pipes, casings, and any other material used to dewater the site must be removed from temporary wells. Fill the wells to ground level with clean gravel or other suitable material approved by the contracting officer. The contractor must exercise extreme care to prevent pollution of the ground water by these actions.

G. Measurement and Payment

1. Method 1.
   a. Items of work listed in the bid schedule for removal of water, diverting surface water, and dewatering construction sites and borrow areas are paid for at the contract lump-sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.
2. Method 2.

a. Items of work listed in the bid schedule for removal of water, diverting surface water, dewatering construction sites, and dewatering borrow areas are paid for at the contract lump-sum prices. Such payment will constitute full compensation for furnishing, installing, operating, and maintaining the necessary trenches, drains, sumps, pumps, piping, and for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. The exception is that additional payment for pumping to dewater borrow areas and the removal of water will be made as described in the following paragraph.

b. If pumping to dewater borrow areas is a contract bid item, payment is made at the contract unit price, which must be the price per 1,000 gallons shown in the bid schedule. Such payment will constitute full compensation for pumping only. Compensation for equipment, preparation, and other costs associated with pumping is included in the lump-sum payment for removal of water or the lump-sum payment for dewatering the borrow areas. Payment is made only for pumping that is necessary to dewater borrow areas that cannot be effectively drained by gravity or that must have the water table lowered to be usable as a suitable borrow source. Pumping for other purposes will not be included for payment under this item.

3. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the contract line item to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section H of this specification.

H. Items of Work and Construction Details

Subsidiary Item – Removal of Water

1. This item shall consist of all dewatering required for the work under this contract including but not limited to pumping and temporary cofferdams.

2. A written dewatering plan from the Contractor is required at the preconstruction conference and shall be provided to the technical representative of the contracting agency.

3. Method of Payment

    a. Section G Measurement and Payment does not apply. No separate payment will be made for Removal of Water. Compensation for this item will be included in the payment for Bid Item 2 – Channel Clearing and Shaping.

Construction Specification 21 — Excavation

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the excavation required by the drawings and specifications, as well as the disposal of the excavated materials.

B. Classification

1. Excavation is classified as common excavation, rock excavation, or unclassified excavation in accordance with the following definitions.
2. Common excavation is defined as the excavation of all materials that (1) can be excavated, transported, and unloaded using heavy ripping equipment and wheel tractor-scrapers with pusher tractors or (2) can be excavated and dumped into place or loaded onto hauling equipment by excavators having a rated capacity of 1 cubic yard or larger and equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.
3. Rock excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of ripping and excavating equipment larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than 1 cubic yard encountered in materials otherwise conforming to the definition of common excavation must be classified as rock excavation. The presence of isolated boulders or rock fragments larger than 1 cubic yard is not in itself sufficient cause to change the classification of the surrounding material.
    a. For the purpose of these classifications, the following definitions apply:
        (1) Heavy ripping equipment is a rear-mounted, heavy-duty, single-tooth, ripping attachment mounted on a track-type tractor having a power rating of at least 250-flywheel horsepower, unless otherwise specified in Section J.
        (2) A wheel tractor-scraper is a self-loading (not elevating) and unloading scraper having a struck-bowl capacity of at least 12 cubic yards.
        (3) A pusher tractor is a track-type tractor having a power rating of at least 250-flywheel horsepower equipped with appropriate attachments.

4. Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the manner in which they are removed.

C. Blasting

1. The transportation, handling, storage, and use of dynamite and other explosives must be directed and supervised by someone of proven experience and ability who is authorized and qualified to conduct blasting operations.
2. Blasting must be done in a manner that prevents damage to the work or unnecessary fracturing of the underlying rock materials. It must conform to any special requirements in Section J of this specification. When specified in Section J, the contractor must furnish the engineer, in writing, a blasting plan before blasting operations begin.

D. Use of Excavated Material

1. Method 1. To the extent they are needed, all suitable material from the specified excavations must be used in the construction of required permanent earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer. The contractor must not waste or otherwise dispose of suitable excavated material.
2. Method 2. Suitable material from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer.

E. Disposal of Waste Materials

1. Method 1. All surplus or unsuitable excavated materials are designated as waste and must be disposed of at the locations shown on the drawings.
2. Method 2. All surplus or unsuitable excavated materials are designated as waste and disposed of by the contractor at chosen sites away from the site of the work. The disposal must be in an environmentally acceptable manner that does not violate local rules and regulations.

F. Excavation Limits

3. Excavations must comply with the Occupational Safety and Health Administration Construction Industry Standards Subpart P, Excavations, Trenching, and Shoring (29 CFR pt. 1926). All excavations must be completed and maintained in a safe and stable condition throughout the total construction phase. Structure and trench excavations must be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein are required to meet safety requirements and must be the responsibility of the contractor in constructing and maintaining a safe, stable excavation.

G. Borrow Excavation

1. When the quantities of suitable material obtained from specified excavations are insufficient to construct the specified earthfills and earth backfills, obtain additional material from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas are as specified in Section J or as approved by the engineer.
2. Borrow pits must be excavated and finally dressed to blend with the existing topography. They are sloped to prevent ponding and to provide drainage.

H. Over Excavation

1. Correct excavation in rock beyond the specified lines and grades by filling the resulting voids with Portland Cement concrete. Materials and mix proportions must be approved by the engineer. Concrete that will be exposed to the atmosphere when construction is completed must meet the requirements of concrete selected for use under Construction Specification 31, Concrete for Major Structures, or 32, Structure Concrete, as appropriate.
2. Concrete that will be permanently covered must contain not less than five bags of cement per cubic yard. The concrete must be placed and cured as specified by the engineer.
3. Correct excavation in earth beyond the specified lines and grades by filling the resulting voids with approved compacted earthfill. The exception to this is that if the earth will become the subgrade for riprap, rockfill, sand or gravel bedding, or drainfill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drainfill. Before correcting an over excavation condition, the contractor must review the planned corrective action with the engineer and obtain approval of the corrective measures.

I. Measurement and Payment

1. Unit Price Methods. For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas or by methods outlined in Section J of this specification. Regardless of quantities excavated, the measurement for payment is made to the specified pay limits except when excavation outside the specified lines and grades directed by the engineer to remove unsuitable material is included. Excavation required because unsuitable conditions result from the contractor's improper construction operations, as determined by the engineer, is not included for measurement and payment.
2. Method 1. The pay limits are as designated on the drawings.
3. Method 2. The pay limits are defined as follows:
    a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.

b. The lower and lateral limits are the neat lines and grades shown on the drawings.

4. Method 3. The pay limits are defined as follows:
   a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.
   b. The lower and lateral limits is the true surface of the completed excavation as directed by the engineer.
5. Method 4. The pay limits are defined as follows:
   a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.
   b. The lower limit is at the bottom surface of the proposed structure.
   c. The lateral limits are 18 inches outside of the outside surface of the proposed structure or are the vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in paragraph d below.
   d. For trapezoidal channel linings or similar structures that are to be supported by the sides of the excavation without intervening forms, the lateral limits are at the underside of the proposed lining or structure.
   e. For the purposes of the definitions in paragraphs b, c, and d above, any specified bedding or drainfill directly beneath or beside the structure will be considered to be a part of the structure.
6. All Methods. The following provisions apply to all methods of measurement and payment.
   a. Payment for each type and class of excavation is made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and other items necessary and incidental to the performance of the work with the exception that extra payment for backfilling over excavation will be made in accordance with the following provisions.
   b. Payment for backfilling over excavation, as specified in Section H of this specification, is made only if the excavation outside specified lines and grades is directed by the engineer to remove unsuitable material and the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.
   c. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section J of this specification.

J. Items of Work and Construction Details

Subsidiary Item – Excavation (Unclassified)

1. This item shall consist of all excavation required to construct this project. This includes excavation under and behind drainfill and rock riprap. Excavation for removal of gravel bar is included in this item.

2. All excavation on this project is designated as "unclassified excavation" and shall consist of all materials encountered regardless of their nature or the manner in which they are removed.

3. Blasting for excavation is prohibited.

4. Use of excavated materials shall be by Method 2.

5. Disposal of waste or excess material shall be by Method 2.

6. Method of Payment

    a. Section I Measurement and Payment does not apply. No separate payment will be made for Excavation. Compensation for this item will be included in the payment for Bid Item 2 – Channel Clearing and Shaping.

Construction Specification 23 — Earthfill

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the construction of earth embankments, other earthfills, and earth backfills required by the drawings and specifications.
2. Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated conventionally.
3. Earth backfill is composed of natural earth material placed and compacted in confined spaces or adjacent to structures (including pipes) by hand tamping, manually directed power tampers or vibrating plates, or their equivalent.

B. Material

1. All fill material must be obtained from required excavations and designated borrow areas. The selection, blending, routing, and disposition of material in the various fills must be subject to approval by the engineer.
2. Fill materials must contain no frozen soil, sod, brush, roots, or other perishable material. Rock particles larger than the maximum size specified for each type of fill must be removed prior to compaction of the fill.
3. The types of material used in the various fills must be as listed and described in the specifications and drawings.

C. Foundation preparation

1. Foundations for earthfill must be stripped to remove vegetation and other unsuitable material or must be excavated as specified.
2. Except as otherwise specified, earth foundation surfaces must be graded to remove surface irregularities and must be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material must be controlled as specified for the earthfill and the surface material of the foundation must be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.
3. Earth abutment surfaces must be free of loose, uncompacted earth in excess of 2 inches in depth normal to the slope and must be at such a moisture content that the earthfill can be compacted against them to produce a good bond between the fill and the abutments.
4. Rock foundation and abutment surfaces must be cleared of all loose material by hand or other effective means and must be free of standing water when fill is

placed upon them. Occasional rock outcrops in earth foundations for earthfill, except in dams and other structures designed to restrain the movement of water, must not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

5. Foundation and abutment surfaces must be no steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities must be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

D. Placement

1. Earthfill must not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the engineer. Earthfill must not be placed upon a frozen surface nor have snow, ice, or frozen material incorporated in the earthfill matrix.
2. Earthfill must be placed in approximately horizontal layers. The thickness of each layer before compaction must not exceed the maximum thickness specified in section J or shown on the drawings. Materials placed by dumping in piles or windrows must be spread uniformly without exceeding the specified thickness before being compacted.
3. Hand-compacted earth backfill must be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of earth backfill compacted by manually directed power tampers.
4. Place earth backfill in a manner that prevents damage to the structures and allows the structures to assume the loads from the earth backfill gradually and uniformly. The height of the earth backfill adjacent to a structure must be increased at approximately the same rate on all sides of the structure.
5. Meet the following additional requirements for earthfill and earth backfill in dams, levees, and other structures designed to restrain the movement of water.
    a. The distribution of materials throughout each zone must be essentially uniform and the earthfill free from lenses, pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material. Zone earthfills must be constructed concurrently unless otherwise specified.
    b. Scarified the surface of each layer parallel to the axis of the fill to at minimum a depth of 2 inches before the next layer is placed.
    c. The top surface of embankments must be maintained approximately level during construction with two exceptions: a crown or cross-slope of about 2 percent must be maintained to ensure effective drainage, or as otherwise specified for drainfill or sectional zones.
    d. Construct dam embankments in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of streamflow during construction are specifically authorized in the contract.

e. Embankments built at different levels as described under paragraphs c or d above must be constructed so that the slope of the bonding surfaces between embankments in place and embankments to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place must be stripped of all material not meeting the requirements of this specification and must be scarified, moistened, and recompacted when the new earthfill is placed against it. This ensures a good bond with the new earthfill and obtains the specified moisture content and density at the contact of the in-place and new earthfills.

E. Control of moisture content

1. During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed must be maintained within the specified range.
2. The application of water to the earthfill material must be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the material after placement on the earthfill, if necessary. Obtain a uniform moisture distribution by disking.
3. Material that is too wet when deposited on the earthfill must either be removed or dried to the specified moisture content prior to compaction.
4. If the top surface of the preceding layer of compacted earthfill or a foundation or abutment surface in the contact zone with the earthfill becomes too dry to permit suitable bond, it must either be removed or scarified and moistened by sprinkling to an acceptable moisture content before placement of the next layer of earthfill.

F. Compaction

1. Earthfill. Earthfill must be compacted according to the following requirements for the class of compaction specified:
   a. Class A compaction. Compact each layer of earthfill as necessary to provide the density of the earthfill matrix not less than the minimum density specified in Section J or identified on the drawings. The earthfill matrix is defined as the portion of the earthfill material finer than the maximum particle size allowed in the reference compaction test method specified (ASTM D698 or ASTM D1557).
   b. Class B compaction. Compact each layer of earthfill to a mass density not less than the minimum density specified.
   c. Class C compaction. Compact each layer of earthfill by the specified number of passes of the type and weight of roller or other equipment specified or by an equivalent approved method. Each pass must consist of at least one passage of the roller wheel or drum over the entire surface of the layer.
2. Earth backfill. Compact earth backfill adjacent to structures to a density equivalent to that of the surrounding in-place earth material or adjacent required earthfill or earth backfill. Compaction must be accomplished by hand tamping or manually directed power tampers, plate vibrators, walk-behind, miniature, or self-

propelled rollers. Unless otherwise specified, heavy equipment, including backhoe-mounted power tampers or vibrating compactors, and manually directed vibrating rollers must not be operated within 3 feet of any structure. Towed or self-propelled vibrating rollers must not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist is not permitted.

3. Heavy Equipment. The passage of heavy equipment will not be allowed:
   a. Over cast-in-place conduits within 14 days after placement of the concrete
   b. Over cradled or bedded precast conduits within 7 days after placement of the concrete cradle or bedding
   c. Over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 3 feet, whichever is greater, except as may be specified in Section J.
4. Compacting adjacent to structures. Compacting of earth backfill adjacent to structures must not be started until the concrete has attained the strength specified in Section J for this purpose. The strength is determined by compression testing of test cylinders cast by the contractor's quality control personnel for this purpose and cured at the worksite in the manner specified in ASTM C31 for determining when a structure may be put into service.
5. Placement Interval Against Concrete. When the required strength of the concrete is not specified as described above, compaction of earth backfill adjacent to structures must not be started until the following time intervals shown in figure 23-1 have elapsed after placement of the concrete.

Figure 23-1 Time interval before placing backfill

Structure	Time interval (days)
Vertical or near-vertical walls with earth loading on one side only	14
Walls backfilled on both sides simultaneously	7
Conduits and spillway risers, cast-in-place (with inside forms in place)	7
Conduits and spillway risers, cast-in-place (inside forms removed)	14
Conduits, pre-cast, cradled	2
Conduits, pre-cast, bedded	1
Cantilever outlet bents (backfilled both sides simultaneously)	3

G. Reworking or removal and replacement of defective earthfill

1. Earthfill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content, or otherwise not conforming to the requirements of the specifications must be reworked to meet the requirements or removed and replaced by acceptable earthfill. The replacement earthfill and the foundation, abutment, and earthfill surfaces upon which it is placed must conform to all requirements of this

specification for foundation preparation, approval, placement, moisture control, and compaction.

H. Testing

1. During the course of the work, the contractor must perform quality control tests, as applicable, to identify earthfill and earth backfill materials; determine the reference maximum density and optimum moisture content; and document that the moisture content of material at the time of compaction and the density of earthfill and earth backfill in place conform to the requirements of this specification.
2. Determining Reference Maximum Density and Optimum Moisture Content. For Class A compaction, the reference maximum density and optimum moisture content must be determined in accordance with the compaction test and method specified on the drawings or in section J.
3. Documenting Specification Conformance. In-place densities of earthfill and earth backfill requiring Class A compaction must be measured in accordance with ASTM D1556, D2167, D2937, D6938, or D8167. Moisture contents of earthfill and earth backfill at the time of compaction must be measured in accordance with ASTM D2216, D4643, or D6938. Values of moisture content determined by ASTM D2216 are considered the true value of the soil moisture. Values of moisture content determined by ASTM D4643 or D6938 must be verified by comparison to values obtained by ASTM D2216. Values of in-place density and moisture content determined by these tests must be compared to the minimum density and moisture content range specified on the drawings or in Section J.
4. Correction for Oversize Particles. If the materials to be used for earthfill or earth backfill contain more than 5 percent by dry weight of oversize rock particles (particles larger than those allowed in the specified compaction test and method), corrections for oversize particles must be made using the appropriate procedures explained in ASTM D4718.

I. Measurement and payment

1. Unit Price Methods. For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earthfill and earth backfill within the specified zone boundaries and pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified in Section J, no deduction in volume is made for embedded items such as, but not limited to, conduits, inlet structures, outlet structures, embankment drains, sand diaphragm and outlet, and their appurtenances.
2. Pay Limits. The pay limits must be as defined below, with the further provision that earthfill required to fill voids resulting from over excavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only under the following conditions:

a. Where such over excavation to remove unsuitable material is directed by the engineer
b. Where the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.

3. Beyond Specified Lines and Grades. Earthfill beyond the specified lines and grades to backfill excavation required for compliance with OSHA requirements will be considered subsidiary to the earthfill bid items.
4. Method 1. The pay limits must be as designated on the drawings.
5. Method 2. The pay limits must be the measured surface of the foundation when approved for placement of the earthfill and the specified neat lines of the earthfill surface.
6. Method 3. The pay limits must be the measured surface of the foundation when approved for placement of the earthfill and the measured surface of the completed earthfill.
7. Method 4. The pay limits must be the specified pay limits for excavation and the specified neat lines of the earthfill surface.
8. Method 5. The pay limits must be the specified pay limits for excavation and the measured surface of the completed earthfill.
9. Method 6. Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and other items necessary and incidental to the performance of the work.
10. Method 7. Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and other items necessary and incidental to the performance of the work except furnishing, transporting, and applying water to the foundation and earthfill material. Water applied to the foundation and earthfill material is measured and payment made as specified in Construction Specification 10.
11. All methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section J of this specification.

J. Items of work and construction details

Subsidiary Item – Earthfill (Class C)

1. This item shall consist of the placement of the Class C Earthfill as shown on the drawings.

2. Earthfill sourced from an off site location shall be reviewed and approved by the technical representative of the contracting agency prior to placement.

3. Earthfill shall be placed with a maximum lift thickness of 12” prior to compaction. Earthfill lifts shall be placed and compacted horizontally.

4. Class C Compaction applies. The entire surface of each lift shall be traversed with 2 passes of the placing and spreading equipment. Earthfill inaccessible to the spreading equipment shall be tamped at minimum twice by the placing bucket of the excavator, hoe, or other spreading equipment on site as identified by the technical representative of the contracting agency.

5. The moisture content of the fill material shall be suitable for compaction such that a hand molded ball will maintain its shape.

6. The top 12” of Earthfill material shall be soil capable of supporting grass growth in areas of Earthfill above the riprap slope along the park boundary. The amount of rock present in the top 12” shall meet the requirements of Specification 6 Seeding, Sprigging, and Mulching. Material excavated from the gravel and sand bar during Channel Clearing and Shaping will likely not be viable for use as fill material in areas of grass growth. Prior to the placement of fill material, approval shall be provided by the technical representative of the contracting agency.

7. Measurement and Payment

    a. Section I Measurement and Payment does not apply. No separate payment will be made for Earthfill (Class C). Compensation for this item will be included in Bid Item 2 – Channel Clearing and Shaping.

Construction Specification 24 — Drainfill

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of furnishing, placing, and compacting drainfill required in the construction of structure drainage systems.

B. Material

1. Method 1. Drainfill material must conform to the requirements of Material Specification 521, Aggregates for Drainfill and Filters. At a minimum of 30 days before delivery of materials to the site, the contractor must inform the engineer, in writing, of the source(s) from which drainfill material will be obtained. The contractor must provide the engineer free access to the source(s) for the purpose of obtaining samples for testing.
2. Method 2. Drainfill material must be sand, gravel, or crushed stone (or mixtures thereof) obtained from the specified sources. Select the material as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles, or other substances that would interfere with its free-draining properties.

C. Base Preparation

1. Foundation surface and trenches must be clean and free of organic matter, loose soil, foreign substances, and standing water when the drainfill is placed. Earth surfaces upon or against which drainfill will be placed must not be scarified.

D. Placement

1. Drainfill must not be placed until the subgrade has been inspected and approved by the engineer. Drainfill must not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.
2. Place drainfill uniformly in layers not exceeding 12 inches in thickness before compaction. When compaction is accomplished by manually controlled equipment, the layers must not exceed 8 inches in thickness. Place the material to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign material must be allowed to become intermixed with or otherwise contaminate the drainfill.
3. Traffic must not be permitted to cross over drains at random. Equipment cross overs must be maintained and the number and location of such cross overs must be established and approved before beginning drainfill placement. Each cross over must be cleaned of all contaminating material and must be inspected and approved by the engineer before the placement of additional drainfill material.

4. Any damage to the foundation surface, trench sides, or bottom occurring during placement of drainfill must be repaired before drainfill placement is continued.
5. The upper surface of drainfill constructed concurrently with adjacent zones of earthfill must be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.
6. Place drainfill over and around pipe or drain tile to avoid any displacement in line or grade of the pipe or tile.
7. Drainfill must not be placed adjacent to structures until the concrete has attained the strength specified in Section I of this specification. Determine the strength by compression testing of concrete test cylinders cast and field cured at the project site in accordance with ASTM C31 for determining when a structure may be placed into service.
8. When the required strength of the concrete is not specified as described above, placement of drainfill adjacent to concrete structures must not commence until the time intervals specified in figure 24-1 have elapsed following placement of the concrete.

Figure 24-1 Elapsed Time Before Fill Can be Place Near Concrete Structures

Structure Type	Time Interval (Days)
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, cast-in-place (with inside forms in place)	7
(inside forms removed)	14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

E. Control of Moisture

1. Control the moisture content of drainfill material as specified in Section I of this specification. When additional water is required, apply it in a manner to avoid excessive wetting to adjacent earthfill. Except as specified in Section I of this specification, control of moisture content will not be required.

F. Compaction

1. All Items. Compact drainfill according to the following requirements for the class of compaction specified. A pass in this section is defined as at least one complete coverage of the roller wheel, tire, or drum over the entire surface for each layer.
2. Class A Compaction. For drainfill materials with more than 70 percent passing the 3/4-inch sieve, compact each layer of drainfill to the minimum dry density specified in Section I of this specification as determined by ASTM D698. For drainfill materials with 70 percent or less passing the 3/4-inch sieve, compact each layer of drainfill to a relative density of not less than 70 percent as determined by ASTM D4254.

3. Class I Compaction. Compact each layer of drainfill by making a minimum of two passes over the entire surface with a steel drum vibrating roller weighing at least 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at a minimum frequency of 1,200 times per minute or by an approved equivalent method.
4. Class II Compaction. Compact each layer of drainfill by one of the following methods or by an approved equivalent method.
    a. A minimum of two passes over the entire surface with a pneumatic-tired roller exerting a minimum pressure of 75 pounds per square inch.
    b. A minimum of four passes over the entire surface with the track of a crawler-type tractor weighing at least 20 tons.
    c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded hauling equipment.
5. Class III Compaction. No compaction will be required beyond that resulting from the placing and spreading operations.
6. Class I and II. When compaction other than Class III compaction is specified, material placed in trenches or other locations inaccessible to heavy equipment must be compacted by manually controlled pneumatic or vibrating tampers as specified in Section I of this specification.
7. Heavy Equipment Limits. Heavy equipment must not be operated within 2 feet of any structure. Vibrating rollers must not be operated within 5 feet of any structure. Compaction by means of drop weights operating from cranes, hoists, or similar equipment will not be permitted.

G. Testing

1. The contractor must conduct such tests as necessary to verify that the drainfill material and the in-place drainfill meets the specification requirements.
2. The engineer must be granted access to perform such tests as are required to verify that the drainfill materials and the drainfill in place meets the requirements of the specifications. These tests are not intended to provide the contractor with information needed to ensure that the materials and workmanship meet the specification requirements. These verification tests will not relieve the contractor of the responsibility of performing required tests for that purpose.

H. Measurement and Payment

1. Method 1.
    a. For items of work for which specific unit prices are established in the contract, the volume of drainfill within the neat lines shown on the drawings are measured and computed to the nearest cubic yard. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the volume of such drainfill is included. The volume included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation as determined by the engineer.

b. Payment for drainfill is made at the contract unit price for each type of drainfill, complete and in place. Except as otherwise specified in Section I of this specification, such payment will constitute full compensation for all labor, equipment, material, and other items necessary and incidental to the performance of the work.

2. Method 2. For items of work for which specific unit prices are established in the contract, the quantity of drainfill placed within the specified limits is computed to the nearest 0.1 ton by actual weight. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the weight of such drainfill is included. The weight included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation as determined by the engineer.

3. Exceptions. Payment for drainfill is made at the contract unit price for each type of drainfill, complete and in place. Except as otherwise specified in Section I of this specification, such payment will constitute full compensation for all labor, equipment, material, and other items necessary and incidental to the performance of the work.

4. All Methods. Compensation for any item of work described in the contract but not included in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section I of this specification.

I. Items of Work and Construction Details

Subsidiary Item – Drainfill (AASHTO M43 No. 57 Crushed Limestone Aggregate)

1. This item shall consist of furnishing and placing drainfill bedding for the ODOT Type C rock riprap as shown and described in the drawings.

2. Material shall be by Method 2 as stated in Section B Material.

3. Material shall be crushed limestone from any source.

4. Drainfill furnished under this item shall meet the gradation requirements for No. 57 aggregate as specified in Table 703.1 of the most recent edition of the State of Ohio Department of Transportation, Construction and Material Specifications.

5. Compaction shall be Class III as stated in Section F Compaction.

6. Section H Measurement and Payment does not apply. No separate payment will be made for Subsidiary Item – Drainfill (AASHTO M43 No. 57 Crushed Limestone Aggregate). Compensation for this item will be included in the payments for Bid Item 3 - Rock Riprap ODOT Type C.

Construction Specification 61 — Rock Riprap

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the construction of rock riprap revetments and blankets, including filter or bedding where specified.

B. Material

1. Rock riprap must conform to the requirements of Material Specification 523, Rock for Riprap, or, if so specified, must be obtained from designated sources. It must be free from dirt, clay, sand, rock fines, and other material not meeting the required gradation limits.
2. At least 30 days before rock is delivered from other than designated sources, the contractor must designate in writing the source from which rock material will be obtained and provide information satisfactory to the contracting officer that the material meets contract requirements. The contractor must provide the responsible engineer free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock must be as specified in section H.
3. Rock from approved sources must be excavated, selected, and processed to meet the specified quality and grading requirements at the time the rock is installed.
4. Based on a specific gravity of 2.65 (typical of limestone and dolomite) and assuming the individual rock is shaped midway between a sphere and a cube, typical size/weight relationships are given in figure 61-1:

Figure 61-1 Typical riprap size/weight relationship

Sieve Size of Rock	Approx. Weight of Rock	Weight of Test Pile
16 inches	300 pounds	6,000 pounds
11 inches	100 pounds	2,000 pounds
6 inches	15 pounds	300 pounds

5. When specified in section H or when it is necessary to verify the gradation of the rock riprap, a particle size analysis must be performed in accordance with ASTM D5519, Test Method A or B. The analysis must be performed at the worksite on a test pile of representative rock. The mass of the test pile must be at least 20 times the mass of the largest rock in the pile. The results of the test are compared to the gradation required for the project. Test pile results that do not meet the construction specifications must be cause for the rock to be rejected. The test pile that meets contract requirements must be left on the jobsite as a sample for visual comparison. The test pile must be used as part of the last rock riprap to be placed.

6. Filter or bedding aggregates, when required, must conform to Material Specification 521, Aggregates for Drainfill and Filters, unless otherwise specified. Geotextiles must conform to Material Specification 592, Geotextile.

C. Subgrade preparation

1. The subgrade surface on which the rock riprap, filter, bedding, or geotextile is to be placed must be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it must consist of approved material and conform to the requirements of the specified class of earthfill.
2. Rock riprap, filter, bedding, or geotextile must not be placed until the foundation preparation is completed and the subgrade surface has been inspected and approved.

D. Equipment-placed rock riprap

1. The rock riprap must be placed by equipment on the surface and to the depth specified. It must be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock for riprap must be delivered and placed in a manner that ensures the riprap in place is reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.
2. Rock riprap must be placed in a manner to prevent damage to structures. Hand placing is required as necessary to prevent damage to any new and existing structures.

E. Hand-placed rock riprap

1. The rock riprap must be placed by hand on the surface and to the depth specified. It must be securely bedded with the larger rocks firmly in contact one to another without bridging. Spaces between the larger rocks must be filled with smaller rocks and spalls. Smaller rocks must not be grouped as a substitute for larger rock. Flat slab rock must be laid on its vertical edge except where it is laid like paving stone and the thickness of the rock equals the specified depth of the riprap course.

F. Filter or bedding

1. When the contract specifies filter, bedding, or geotextile beneath the rock riprap, the designated material must be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate is not required, but the surface of such material must be finished reasonably smooth and free of mounds, dips, or windrows.

G. Measurement and payment

1. Method 1.
    a. For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is

computed to the nearest ton by actual weight. The volume of each type of filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock riprap placed as specified, the contractor must furnish to the responsible engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

2. Method 2.

a. For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest 0.1 ton by actual weight. The quantity of each type of filter or bedding aggregate delivered and placed within the specified limits is computed to the nearest 0.1 ton. For each load of rock riprap placed as specified, the contractor must furnish to the engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton. For each load of filter or bedding aggregate, the contractor must furnish to the responsible engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

3. Method 3.

a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap and filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

4. Method 4.

a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap, including filter and bedding aggregate, is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

b. Payment is made at the contract unit price for each type of rock riprap, including filter and bedding. Such payment is considered full compensation for completion of the work.

5. Method 5.

a. For items of work for which specific unit prices are established by the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest ton by actual weight. For each load of rock for riprap placed as specified, the contractor must furnish to the responsible

engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, and includes compensation for any aggregate or geotextile installed as specified for filter or bedding. Such payment is considered full compensation for completion of the work.

6. Method 6.

   a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.
   b. Payment is made at the contract unit price for each type of rock riprap and includes compensation for any aggregate or geotextile installed as specified for filter or bedding. Such payment is considered full compensation for completion of the work.

7. All methods.

   a. The following provision applies to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section H.
   b. No separate payment is made for testing the gradation of the test pile. Compensation for testing is included in the appropriate bid item for riprap.

H. Items of work and construction details

Bid Item 3 – Rock Riprap ODOT Type C

1. This item shall consist of furnishing and placing the equipment-placed and hand-placed Rock Riprap as shown and described in the drawings.

2. Rock Riprap furnished under this item shall meet the gradation requirements for "Type C" as described in section 703.19 of the most recent edition of the State of Ohio Department of Transportation, Construction and Material Specifications.

   a. At least 85% of the material by weight shall be larger than 6-inch but less than a 18-inch square opening.
   b. At least 50% of the material by weight shall be larger than a 12-inch square opening.
   c. The material smaller than a 6-inch square opening shall consist predominantly of rock spalls and rock fines and shall be free of soil.

3. Approved sources for the Rock Riprap are all suppliers specified in the most current Ohio Department of Transportation list of Certified Suppliers.

    a. https://cmsportal.dot.state.oh.us/
    b. Select “Contractor Reports,” and then select “Certified Aggregate”

4. Trucks delivering ODOT Type C riprap to the site shall not line their beds with smaller aggregate which contaminates the riprap.

5. The finished surface of the Rock Riprap shall not project more than 3 inches above the adjacent grades or the planned surface.

6. Equipment placed Rock Riprap shall not be freely dumped over the bank. Riprap shall be placed from a drop height of not more than 5 ft above the ground surface. All placed riprap shall be tamped at minimum 2 times with the bucket of the excavator, hoe, or other spreading equipment.

7. Method of Payment shall be by Method 5 as stated in Section G.

8. Items subsidiary to this bid item are:

    a. Subsidiary Item – Drainfill (AASHTO M43 No. 57 Crushed Limestone Aggregate).

Construction Specification 94 — Contractor Quality Control

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of developing, implementing, and maintaining a quality control system to ensure that the specified quality is achieved for all materials and work performed.

B. Equipment and Materials

1. Equipment and material used for quality control must be of the quality and condition required to meet the test specifications cited in the contract. Testing equipment must be properly adjusted and calibrated at the start of operations with the calibration maintained at the frequency specified. Records of equipment calibration tests must be available to the engineer at all times. Equipment must be operated and maintained by qualified operators as prescribed in the manufacturer's operating instructions, the references specified, and as specified in Section J of this specification. All equipment and materials used in performing quality control testing must be as prescribed by the test standards referenced in the contract or in Section J.
2. Handle and operate all equipment and materials in a safe and proper manner and comply with all applicable regulations pertaining to their use, operation, handling, storage, and transportation.

C. Quality Control System

1. Method 1. The contractor must develop, implement, and maintain a system of quality control to provide the specified material testing and verification of material quality before use. The system activities must include procedures to verify adequacy of completed work, initiate corrective action to be taken, and document the final results. The identification of the quality control personnel and their duties and authorities must be submitted to the contracting officer in writing within 15 calendar days after notice of award.
2. Method 2. The contractor must develop, implement, and maintain a system adequate to achieve the specified quality of all work performed, material incorporated, and equipment furnished before use. The system established must be documented in a written plan developed by the contractor and approved by the contracting officer. Include in the system activities the material testing and inspection needed to verify the adequacy of completed work and procedures to be followed when corrective action is required. Daily records to substantiate the

conduct of the system must be maintained by the contractor. The quality control plan must cover all aspects of quality control and must address, at a minimum, all specified testing and inspection requirements. Provide the plan consistent with the planned performance in the contractor's approved construction schedule. Identify in the plan the contractor's onsite quality control manager and provide an organizational listing of all quality control personnel and their specific duties. The written plan must be submitted to the contracting officer within 15 calendar days after notice of award. The contractor must not proceed with any construction activity that requires inspection until the written plan is approved by the contracting officer.

3. All Methods. The quality control system must include, but not be limited to, a rigorous examination of construction material, processes, and operation, including testing of material and examination of manufacturer's certifications as required, to verify that work meets contract requirements and is performed competently.

D. Quality Control Personnel

1. Method 1. Quality control activities must be accomplished by competent personnel. A competent person is one who is experienced and capable of identifying, evaluating, and documenting that materials and processes being used will result in work that complies with the contract. This person also has authority to take prompt action to remove, replace, or correct such work or products not in compliance. Off-site testing laboratories must be certified or inspected by a nationally recognized entity. The contractor must submit to the contracting officer for approval laboratory certification or inspection information. The contractor must submit to the contracting officer for approval the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.
2. Method 2. Quality control activities must be accomplished by competent personnel who are separate and apart from line supervision and report directly to management. A competent person is experienced and capable of identifying, evaluating, and documenting that material and processes being used will result in work that complies with the contract. This person has authorization to take prompt action to remove, replace, or correct such work or products not in compliance. Off-site testing laboratories must be certified or inspected by a nationally recognized entity. The contractor must submit to the contracting officer for approval laboratory certification or inspection information. The contractor must submit to the contracting officer for approval the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.

E. Post-award Conference

1. The contractor must meet with the contracting officer before any work begins and discuss the contractor's quality control system. The contracting officer and the contractor must develop a mutual understanding regarding the quality control system including procedures for correcting quality control issues.

F. Records

1. The contractor's quality control records must document both acceptable and deficient features of the work and corrective actions taken. All records must be on forms approved by the contracting officer, be legible, and be dated and signed by the competent person creating the record.
2. Unless otherwise specified in Section J of this specification, records must include:
    a. Documentation of shop drawings including date submitted to and date approved by the contracting officer, results of examinations, need for changes or modifications (if any), manufacturer's recommendations and certifications (if any), and signature of the authorized examiner.
    b. Documentation of material delivered including quantity, storage location, and results of quality control examinations and tests.
    c. Type, number, date, time, and name of individual performing quality control activities.
    d. The material or item inspected and tested, the location and extent of such material or item, and a description of conditions observed and test results obtained during the quality control activity.
    e. The determination that the material or item met the contract provisions and documentation that the engineer was notified.
    f. For deficient work, the nature of the defects, specifications not met, corrective action taken, and results of quality control activities on the corrected material or item.

G. Reporting Results

1. The results of contractor's quality control inspections and tests must be communicated to the engineer immediately upon completion of the inspection or test. Unless otherwise specified in Section J, the original plus one copy of all records, inspections, tests performed, and material testing reports must be submitted to the engineer within 1 working day of completion. The original plus one copy of documentation of material delivered must be submitted to the engineer before the material is used.

H. Access

1. The contracting officer and the engineer must be given free access to all testing equipment, facilities, sites, and related records for the duration of the contract.

I. Payment

1. Method 1.
    a. For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds after presentation by the contractor of invoices showing related costs and evidence of charges by suppliers, subcontractors, and others for furnishing supplies and work performed. If the total of such payments is less than the lump sum contract price for this item, the remaining balance is included in the final contract payment. Payment of

the lump sum contract price constitutes full compensation for completion of the work.

b. Payment is not made under this item for the purchase cost of material and equipment having a residual value.

2. Method 2.

   a. For items of work for which lump sum prices are established in the contract, payment is prorated and paid in equal amounts on each monthly estimate. The number of months used for prorating must be the number estimated to complete the work. The final month's prorate amount is made with the final payment. Payment as described above constitutes full compensation for completion of the work.

   b. Payment is not made under this item for the purchase cost of material and equipment having a residual value.

3. All Methods. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section J.

J. Items of Work and Construction Details

Subsidiary Item – Contractor Quality Control

1. In Section C – Quality Control System, Method 1 applies. Verbal notification of the quality control personnel

2. In Section D – Quality Control Personnel, Method 1 applies. The project supervisor may act as the contractor's quality control manager.

3. Section I Payment does not apply. No separate payment will be made for Contractor Quality Control. Compensation for this item will be included in the payment for Bid Item 1 – Mobilization and Demobilization.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 521—Aggregates for Drainfill and Filters

A. Scope

This specification covers the quality of mineral aggregates for the construction of drainfill and filters.

B. Quality

(1) Drainfill and filter aggregates shall be sand, gravel, or crushed stone or mixtures thereof. Aggregates shall be composed of clean, hard, durable, mineral particles free from organic matter, clay balls, soft particles, or other substances that would interfere with the free-draining properties of the aggregates.
(2) Coarse aggregate may be crushed limestone or other material that has limestone particles included. Aggregates from crushed limestone shall be thoroughly washed and screened to remove limestone dust, limestone fines, and fine soil particles. Limestone shall not be used for fine aggregates except in combination with other material, such that not more than 5 percent of the portion finer than the No. 4 sieve shall be limestone.
(3) Aggregates shall be tested for soundness according to ASTM C88 and shall have a weighted average loss in 5 cycles of not more than 12 percent when sodium sulfate is used or 18 percent when magnesium sulfate is used.

C. Grading

Drainfill and filter aggregates shall conform to the specified grading limits after being placed or after being compacted when compaction is specified. Grading shall be determined by ASTM C136. The percentage of material finer than the No. 200 sieve shall be determined by the method in ASTM C117.

D. Storing and Handling

Drainfill and filter aggregates shall be stored and handled by methods that prevent segregation of particle sizes or contamination by mixing with other material.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 523—Rock for Riprap

A. Scope

This specification covers the quality of rock to be used in the construction of rock riprap.

B. Quality

(1) Individual rock fragments must be dense, sound, and free from cracks, seams, and other defects conducive to accelerated weathering. Except as otherwise specified, the rock fragments must be angular to subrounded. The least dimension of an individual rock fragment must be not less than one-third the greatest dimension of the fragment. ASTM D4992 provides guidance on selecting rock from a source.

(2) Except as otherwise provided, the rock must be tested and must have the following properties:

(i) Rock type 1

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.5 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 2 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must not be more than 10 percent when sodium sulfate is used or more than 15 percent when magnesium sulfate is used.

(ii) Rock type 2

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.5 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 2 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must be not more than 20 percent when sodium sulfate is used or more than 25 percent when magnesium sulfate is used.

(iii) Rock type 3

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.3 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 4 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must be not more than 20 percent when sodium sulfate is used or more than 25 percent when magnesium sulfate is used.

C. Methods of Soundness Testing

(1) Rock cube soundness—

(i) The sodium or magnesium sulfate soundness test for all rock types (1, 2, or 3) must be performed on a test sample of 5,000 ± 300 grams of rock fragments, reasonably uniform in size and cubical in shape, and weighing, after sampling, about 100 grams each. They must be obtained from rock samples that are representative of the total rock mass, as noted in ASTM D4992, and that have been sawed into slabs as described in ASTM

D5121. The samples must further be reduced in size by sawing the slabs into cubical blocks. The thickness of the slabs and the size of the sawed fragments must be determined by the size of the available test apparatus and as necessary to provide, after sawing, the approximate 100-gram samples. The cubes must undergo five cycles of soundness testing in accordance with ASTM C88.

(ii) Internal defects may cause some of the cubes to break during the sawing process or during the initial soaking period. Do not test any of the cubes that break during this preparatory process. Such breakage, including an approximation of the percentage of cubes that break, must be noted in the test report.

(iii) After the sample has been dried following completion of the final test cycle and washed to remove the sodium sulfate or magnesium sulfate, the loss of weight must be determined by subtracting from the original weight of the sample the final weight of all fragments that have not broken into three or more fragments.

(iv) The test report must show the percentage loss of the weight and the results of the qualitative examination.

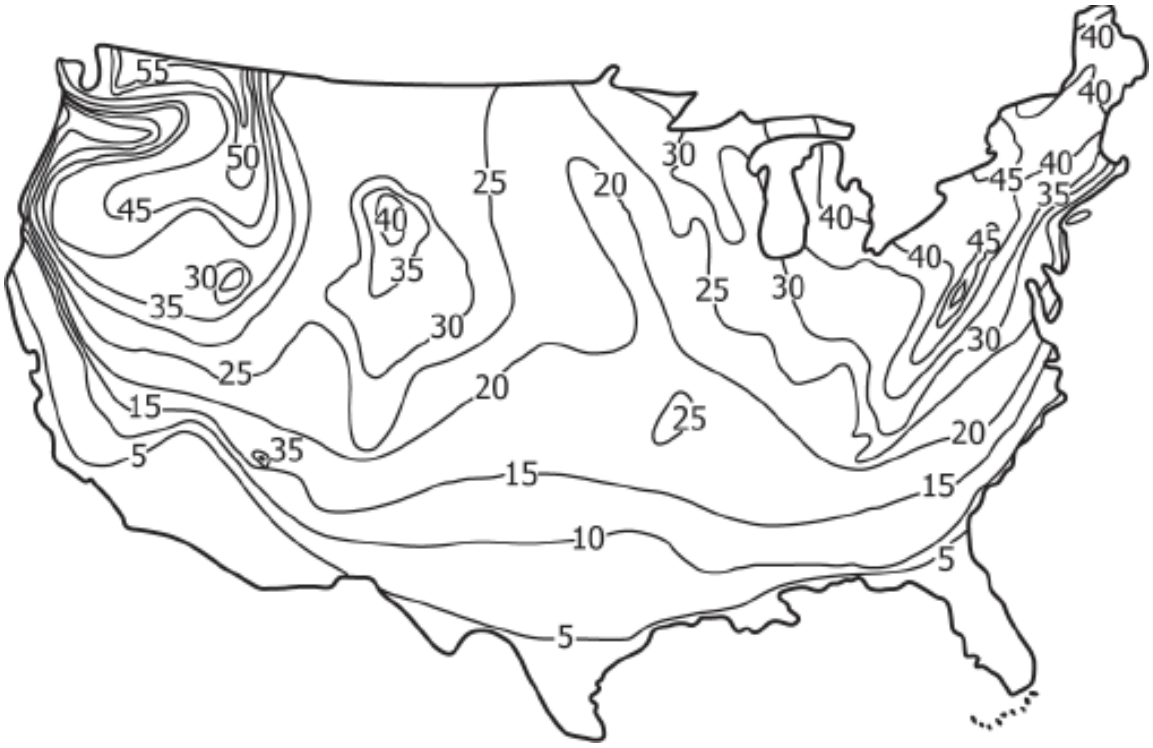
(2) Rock slab soundness—

(i) When specified, the rock must also be tested in accordance with ASTM D5240. Deterioration of more than 25 percent of the number of blocks must be cause for rejection of rock from this source. Rock must also meet the requirements for average percent weight loss stated below.

(ii) For projects located north of the Number 20 Freeze-Thaw Severity Index Isoline (fig. 523–1 below), unless otherwise specified, the average percent weight loss for Rock Type 1 must not exceed 20 percent when sodium sulfate is used or 25 percent when magnesium sulfate is used. For Rock Types 2 and 3, the average percent weight loss must not exceed 25 percent for sodium sulfate soundness or 30 percent for magnesium sulfate soundness.

(iii) For projects located south of the Number 20 Freeze-Thaw Severity Index Isoline, unless otherwise specified, the average percent weight loss for Rock Type 1 must not exceed 30 percent when sodium sulfate is used or 38 percent when magnesium sulfate is used. For Rock Types 2 and 3, the average percent weight loss must not exceed 38 percent for sodium sulfate soundness or 45 percent for magnesium sulfate soundness.

Figure 523–1 Isoline Map of the Freeze-Thaw Severity Index for Contiguous 48 United States (map is from ASTM D5312)



D. Field Durability Inspection

(1) Rock that fails to meet the material requirements stated above (if specified), may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification.

(2) A rock source may be rejected if the rock from that source deteriorates in less than 5 years under similar use and exposure conditions expected for the rock to be installed under this specification, even though it meets the testing requirements stated above.

(3) Deterioration is defined as the loss of more than one-quarter of the original rock volume, or severe cracking that would cause a block to split. Measurements of deterioration are taken from linear or surface area particle counts to determine the percentage of deteriorated blocks. Deterioration of more than 25 percent of the pieces must be cause for rejection of rock from the source.

E. Grading

The rock must conform to the specified grading limits after it has been placed within the matrix of the rock riprap. Grading tests must be performed, as necessary, according to ASTM D5519, Method A, B, or C, as applicable.