SECTION 015639
TEMPORARY TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
2. Section 311000 "Site Clearing" for erosion and sediment control requirements, marking existing utilities, removing existing trees, shrubs and vegetation.
3. Section 312000 "Earth Moving" for excavation and compaction requirements in adjoining construction areas.
4. Section 329113 "Soil Preparation" for Planting Soil requirements.

1.3 DEFINITIONS

A. ANSI: American National Standards Institute.

B. ASCA: American Society of Consulting Arborists.

C. ASTM: American Society for Testing and Materials International.

D. Arborist: A licensed or certified professional experienced in the cultivation, management, and horticultural practices necessary to promote the health and safety of trees, shrubs, and woody plants.

E. Caliper (DBH): Diameter at breast height. Diameter of a trunk as measured by a diameter tape at a height fifty-four (54) inches above the ground line.

F. ISA: International Society of Arboriculture.

G. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction as indicated.

H. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated.

I. Tree Service Firm: A professional tree service firm operating in the State of Maryland as a “Licensed Tree Expert” as noted in Maryland DNR’s current Forest Service “Tree Expert List”. The tree service firm shall employ a full-time Arborist licensed in the State of Maryland, and shall have at least 10-years’ of successful experience performing these services.

J. Vegetation: Trees, shrubs, groundcovers, grass, and other woody and herbaceous plants.

1.4 PRE-INSTALLATION MEETING

A. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel and equipment required to make progress and avoid delays in the Work.

b. Arborist's responsibilities.

c. Quality-control program.
d. Coordination of site clearing operations and equipment movement adjacent to plant protection-zone locations.

e. Trenching by hand or with air spade within protection zones.

f. Field quality control.

2. Submit Meeting Notes to Landscape Architect and Owner’s Representative from Pre- Installation Conference.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing, signage, and gates. Show relationship of equipment-movement routes and material storage locations in relation to plant protection-zones.
2. Detail fabrication and assembly of protection-zone fencing, gates, and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

C. Samples: For each type of the following:

1. Shredded Hardwood Mulch: One (1) quart volume of shredded hardwood mulch, in sealed plastic bag labeled with composition of materials by

percentage of weight and source of mulch.

2. Protection-Zone Signage: One (1) full-size sample of each required, showing size and text, ready for installation.

D. Protection-Zone Fencing Mockups:

1. Install at least one (1) fully assembled mockup panel for each type of protection-zone fencing. Mockup panel may be incorporated into the Work if approved by the Landscape Architect or Owner's Representative.

E. Tree Branch, Root, and Crown Pruning Schedule: Submit written schedule that details the scope and extent of pruning for trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

F. Written Certification from Arborist: Certifying that trees have been protected during construction in accordance with referenced standards, and that trees were promptly and properly treated and repaired when damaged.

G. Maintenance Recommendations: From Arborist, for care and protection of trees affected by construction during and after completion of the Work.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Arborist and Tree Service firm.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Submit sufficiently detailed digital photographs or video recordings to document conditions of existing specimen trees and plant material to remain.
2. Include diagrams with notations to indicate specific wounds and damage conditions of each tree or other plants to remain.

C. Quality-control program from Arborist and Tree Service firm.

1.7 QUALITY ASSURANCE

A. American National Standards Institute (ANSI): Referenced standards and publications.

B. American Society for Testing and Materials International (ASTM): Referenced standards and publications.

C. Arborist Qualifications: Certified Arborist as certified by ISA„ Licensed Arborist in the State of Maryland, or Registered Consulting Arborist as designated by ASCA.

D. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and will assign an experienced, qualified Arborist to Project site during execution of the Work.

E. Quality-Control Program: Prepare and submit a written program to demonstrate systematically the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings.

1. Include Arborist's and Tree Service firm's responsibilities.
2. Include dimensioned diagrams for proposed placement of protection-zone fencing, gates and signage,
3. Instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, and excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation and proposed disturbances, unless otherwise indicated or prior written permission is provided by the Arborist and Landscape Architect.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Planting Soil for Adjusting Grades: Satisfactory stockpiled on-site topsoil mixed with prepared Planting Soil (refer to Section 329113 “Soil Preparation” for Planting Soil requirements), having satisfactory moisture content and granular texture for installing around trees and plants.

1. Planting Soil shall be free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and all other extraneous materials harmful to plant growth.

B. Shredded Hardwood Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.
2. Size Range: 3 inches maximum length, 1/2 inch minimum length, one (1) inch maximum diameter.
3. Color: Natural, Dark Brown.

C. Protection-Zone Fencing: Temporary fencing shall be installed in positions indicated and meeting the following requirements.

1. Plastic Mesh Protection-Zone Fencing: Plastic construction fencing constructed of high- density extruded and stretched polyethylene 'Blaze Orange' mesh fabric with 2-inch maximum opening in pattern, weighing a minimum of 0.4 lb./ft. Fencing shall remain flexible from minus 60 to plus 200 deg F, inert to most chemicals and acids, minimum tensile yield strength of 2000 psi, and ultimate tensile strength of 2680 psi. Secure to posts with plastic bands or galvanized-steel wire ties.

    a. Anchor Posts: Minimum 2-inch diameter galvanized steel 'U' channel or 'T' posts. Minimum length: 6 feet, or as indicated.
    b. Hardware: Provide hardware as required for mounting rail cross-braces to top of posts and hinges to mount gates on posts.
    c. Top Rail Cross-Braces: #2, Ground-Contact, Pressure-treated 2"x 4" lumber; Lengths as required.
    d. Fence Height: As indicated.
    e. Wire 'U' Staples: Minimum 8" long or as indicated, to secure plastic mesh into the ground.
    f. High Visibility Flagging: As indicated and noted.
    g. Gates shall allow access for maintenance activities within plant protection-zones: Pressure-treated wood, single or double leaf swing, sizes as indicated. Access gate fabric shall match the material and appearance of fencing fabric.

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre- punched and reinforced; legibly printed with nonfading lettering in accordance with local regulations, and as follows:

1. Size and Text Height: As indicated.
2. Lettering: 3-inch- high, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sediment Control Devices and Measures: Examine the site to verify that temporary erosion and sediment control devices and measures are in place.

1. Meet on-site with the Arborist and Grading/Sediment Control Inspector to resolve potential conflicts, and to make minor adjustment of devices and measures with the Inspector's approval in the field.
2. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report from Arborist to Landscape Architect listing conditions detrimental to tree and plant protection. Provide written recommendations for proposed corrective action.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs and shrub beds, and all other designated vegetation to remain with sequential numbering and labeled as such on a copy of the applicable Existing Conditions & Demolition Plan. Submit the marked-up Drawing to the Landscape Architect and Architect for review and approval.

1. For trees to remain, label and tie a 1-inch blue vinyl tape around each tree trunk at fifty- four (54) inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 4-inch uniform thickness of shredded hardwood mulch unless otherwise indicated. Do not place mulch within six (6) inches of tree trunks.

3.3 PLANT PROTECTION-ZONES

A. Plant Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones as indicated before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Plastic Mesh Protection-Zone Fencing: Install as indicated and noted.

B. Plant Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect. Install one sign spaced approximately every twenty
(20) feet on protection-zone fencing, but no fewer than four (4) signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect. Remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access might be allowed, subject to pre-approval in writing by Arborist, if recommended root buffer protection to avoid soil compaction is installed as directed by Arborist. Maintain root buffer as long as temporary access is allowed.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones where indicated adjacent to protection zones according to requirements in Section 312000 "Earth Moving".

B. Trenching within Protection Zones: With Arborist and Landscape Architect's advance written permission, where utility trenches are required within Plant Protection-Zones, excavate under or around tree roots by hand or with air spade, tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. With Arborist's approval, cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, with Arborist's direction expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction, and redirection is not practical, cut roots approximately three (3) inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before backfilling with Planting Soil. With Arborist's approval, install temporary earth cover or pack using peat moss and wrap with burlap. Water as required to maintain in a satisfactory moist condition. Install temporary support and protect roots from damage until they are permanently relocated and covered with Planting Soil.

3.5 PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by Landscape Architect and Arborist.

1. Prune to remove only injured, broken, dying, or dead branches and do not prune for shape unless directed by Landscape Architect.
2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1) as amended to date.

a. Type of Pruning: Raising and thinning as directed by Landscape Architect and Arborist.

B. Unless directed by Landscape Architect and Arborist, do not cut tree leaders.

C. Cut branches with sharp pruning instruments; do not break or chop.

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during the Project Warranty period as recommended by Arborist.

F. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Lowering Grade beyond Plant Protection-Zones: Where proposed finish grades are indicated to be lower than existing grade beyond the Plant Protection-Zone, provide satisfactory slope and grade transition as directed by Landscape Architect. Maintain existing grades within the Plant Protection-Zone.

B. Lowering Grade within a Plant Protection-Zone: Where proposed finish grade is indicated to be lower than existing grade around existing trees and vegetation, install Planting Soil and other measures indicated. Provide satisfactory slope and grade a transition away from existing trees and vegetation as directed by Landscape Architect and Arborist.

1. Root Pruning: Prune tree roots exposed by lowering the grade.
2. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as directed for root pruning.

C. Raising Grade within a Plant Protection-Zone: Where proposed finish grade is indicated to be higher than existing grade around existing trees and vegetation, install Planting Soil and other measures as indicated. Provide satisfactory slope and grade a transition within and beyond the Plant Protection-Zone as directed by Arborist and Landscape Architect.

D. Minor Fill within Plant Protection-Zones: Where existing grade is two (2) inches or less below proposed finish grade elevations, fill with Planting Soi1 as indicated. Place Planting Soil in a single layer, hand grade and lightly compact to designated proposed s finish grade elevations.

3.7 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified Arborist to direct plant-protection measures, root and crown pruning, and other necessary Work for trees, shrubs, and other vegetation to remain in a healthy condition.
1. Prepare and submit inspection reports to the Landscape Architect and Owner's Representative.

3.8 REPAIR AND PRUNING

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain, or be relocated, that are damaged by construction operations, as directed by Arborist and Landscape Architect.

1. Submit details of proposed pruning and repairs for approval by Arborist and Landscape Architect.
2. Perform repairs of damaged trunks, branches, and roots within twenty-four (24) hours according to Arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as directed by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than twenty-five (25) percent dead, or in an unhealthy condition, due to damage during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Small Trees: Provide one (1) new tree of same size and species as those being replaced for each tree that measures four (4) inches or smaller in caliper size.
2. Large Trees: Provide three (3) new trees of 6-inch caliper size for each tree being replaced that measure more than six (6) inches in caliper size.
3. Species: To be selected by Landscape Architect.
4. Plant and maintain replacement trees as specified in Section 329300 "Plants."

3.9 DISPOSAL OF SURPLUS SOIL, TRIMMINGS, MULCH AND WASTE MATERIALS

A. Trimmings: Immediately dispose of branches and limbs removed as the result of crown thinning and selective thinning.

B. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness.

C. Remove all excess excavated soil and temporary protection-zone fence at the completion of construction. Dispose of trees removed for replacement, branches and related trimmings, trash, and debris. Legally dispose of off the Owner's property.

END OF SECTION 015639

SECTION 311000
SITE CLEARING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing unknown site utilities, if encountered.
7. Temporary erosion and sediment control.
8. Temporary traffic control.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for temporary tree and plant protection requirements during demolition, clearing, and new construction activities.
2. Section 312000 "Earth Moving" for excavation, fill and backfill materials, and compaction requirements.
3. Section 329113 "Soil Preparation" for topsoil and Planting Soil requirements.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in- place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials,

or other non-soil materials.

D. Plant Protection-Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction as indicated.

E. Tree Protection-Zone: Area surrounding individual trees or groups of trees to be protected during construction as indicated and according to requirements in Section 015639 "Temporary Tree and Plant Protection".

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PRE-INSTALLATION MEETING

A. Pre-installation Conference: Conduct conference at Project site.

1. Review the field stakeout of the proposed Limit of Disturbance (LOD) and proposed locations for tree and plant protection measures.
2. Review the proposed locations of saw cuts within existing paved areas for utility trenching.

1.5 MATERIAL OWNERSHIP

A. All cleared and grubbed materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed digital photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
3. Refer to Section 015639 “Temporary Tree and Plant Protection” for additional information.

B. Topsoil stripping and stockpiling program.

C. Record Drawings: Identifying and accurately showing locations of existing:

1. Water, sanitary sewer, and storm drainage utilities and structures.
2. Subsurface structural, electrical, and mechanical features and conditions.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
3. Temporary Traffic Control: Provide and maintain temporary traffic control devices and labor as necessary to ensure 24-hour per day access requirements of the Owner and entities making deliveries, including maintenance and emergency vehicles that would require access through the Work area.

B. Utility Locating Services: Obtain utility locating services to field locate and mark existing utilities within the Limit of Disturbance (LOD) and adjoining areas where Project is located prior to beginning any site demolition, site clearing and earth-moving operations.

1. Obtain ”Miss Utility” services to field locate and mark utilities.
2. For utilities not located and marked by “Miss Utility”, obtain the services of a private utility locating service to identify and field mark remaining utilities.
3. Review marked utilities with Owner’s Representative in the field prior to proceeding with Work.

C. Do not commence site clearing and grubbing operations until temporary erosion and sediment control and plant protection measures are in place.

D. Tree and Plant Protection Zones: Protect as necessary and according to requirements in Section 015639 "Temporary Tree and Plant Protection".

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved satisfactory borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Stake out the proposed Limit of Disturbance (LOD) according to the approved erosion and sediment control Drawings, proposed saw cut limits for utility trench excavations, and temporary tree and plant protection zones for review and approval by Arborist and Landscape Architect prior to beginning clearing operations.

C. Verify that trees, shrubs, and other vegetation to remain have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

D. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner's Representative.

3.2 TEMPORARY EROSION AND SEDIMENT CONTROL

A. Install temporary erosion and sediment control measures and devices to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways in accordance with the approved erosion and sediment control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion and sediment control measures and devices after rainfall events and throughout construction until permanent vegetation has been established.

D. With the approval of the Sediment Control/Grading Inspector, remove erosion and sediment controls, restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants designated to remain on-site located within the Limit of Disturbance (LOD). Do not disturb existing trees and vegetation located outside of the LOD unless specifically noted and indicated.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain, or be relocated, that are damaged by demolition, clearing, grubbing, and construction operations in accordance with requirements in Section 015639 "Temporary Tree and Plant Protection".

3.4 EXISTING UTILITIES

A. Complete field locating and marking existing utilities prior to beginning any site demolition, clearing and earth moving operations. Owner will arrange for

disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than ten (10) days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner Representative's written permission.

3.5 CLEARING AND GRUBBING

A. Within the indicated Limit of Disturbance (LOD), remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated. Refer to Drawings for designated plant material to be relocated, if applicable.
2. Grind down stumps and remove roots larger than two (2) inches in diameter, obstructions, and debris to a depth of at least 18 inches below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of eight (8) inches, and compact each layer to a density matching adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to its full depth in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil including, but not limited to, clay lumps, gravel, and other objects larger than two (2) inches in diameter, trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.

2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which remains after finish grading and topsoiling have been satisfactorily completed.
4. With the Landscape Architect and Owner Representatives written approval, surplus satisfactory topsoil may be used for respreading topsoil to a deeper depth in proposed turf areas if proposed grading can be adjusted and positive drainage can be maintained.

3.7 EXISTING SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove concrete slabs, asphalt paving, and aggregate base courses, curbs and gutters, and all features within the indicated Limit of Disturbance (LOD).

1. Review limits of designated removals, and limits of proposed saw cutting of pavements, with Landscape Architect and Owner's Representative prior to removal. Where designated limits are within six (6) inches of existing full-depth joints, review with Landscape Architect and Owner's Representative to verify if minor adjustments to saw cutting locations should be made.
2. Unless existing full-depth joints coincide with proposed lines of demolition, neatly saw- cut existing pavement at designated limits before removing adjacent pavement. Cleanly saw-cut pavement faces vertically.
3. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off the Owner's property.

B. Burning tree, shrub, and other vegetation waste is prohibited. Burning of all other waste and debris is prohibited.

END OF SECTION 311000

SECTION 312000
EARTH MOVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for pavements and utilities.
4. Aggregate base course for concrete walks, and pavements.
5. Aggregate base course for asphalt paving.
6. Aggregate base and surface courses for pedestrian path.
7. Excavating and backfilling trenches for utilities.
8. Temporary traffic control.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for temporary tree and plant protection requirements during demolition, clearing, and new construction activities.
2. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling satisfactory topsoil, and removal of above- and below-grade improvements and utilities.
3. Section 329113 "Soil Preparation" for topsoil and Planting Soil requirements.
4. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing Planting Soil for turf areas.

1.3 UNIT PRICES

A. All excavation shall be Unclassified for this Project.

1.4 DEFINITIONS

A. Backfill: Satisfactory soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Aggregate Base Course: Aggregate layer placed between subgrade and hot-mix asphalt (HMA) base/binder course for asphalt paving or walk, or an aggregate layer placed between subgrade and a cement-concrete slab, pavement or walk.

C. Bedding: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Project Civil Engineer or Testing Agency. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Project Civil Engineer or Testing Agency. Unauthorized excavation, as well as remedial work directed by Project Civil Engineer or Testing Agency shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lb. and stick-crowd force of not less than 18,400 lb. with extra-long reach boom.
2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.
3. This classification does not include materials such as loose rock, concrete, or other materials that can be removed by means other than drilling and blasting, rock trenching, or hoe-ramming, but which for reasons of economy in excavating, the contractor chooses to remove by drilling and blasting, rock trenching, or hoe-ramming.
4. Conditions found on the site might be of a nature that prevents hard subsoil materials from being excavated from one direction, but may allow the

material to be broken apart if excavated from a direction to that which prevents cutting. Such conditions ARE NOT considered rock unless site conditions specifically prevent the material from being excavated in the direction which allows it to be broken, i.e. within utility or structure footing trenches running against the direction which allows cutting.

H. Structures: Buildings, footings, foundations, retaining walls, cement-concrete slabs, tanks, curbs, utility manholes and structures, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

J. Utilities: On-site and off—site underground pipes, conduits, ducts, cables, and utility structures as well as underground services within buildings.

1.5 PRE-INSTALLATION MEETING

A. Preinstallation Conference: Conduct pre-excavation conference at Project site.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.
b. Coordination of Work with underground utility locating service.
c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
d. Extent of trenching by hand or with air spade.
e. Field quality control.
f. Review the approved erosion and sediment control (ESC) Drawings and approved stormwater management (SWM) Drawings with related earth moving operations and sequence of construction.
g. Temporary traffic control requirements.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Detectable warning tapes.
3. Surface aggregate for pedestrian path.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches, of each type.
2. Detectable warning tape: 12 inches long; of each color.
3. Surface aggregate for pedestrian path: One (1) pound sample.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.

C. Laboratory compaction curve according to ASTM D698 (Standard Proctor).Pre-excavation Digital Photographs or Videotape: Submit sufficiently detailed digital photographs or videotapes showing existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.8 QUALITY ASSURANCE

A. Project Geotechnical Report: There is no project geotechnical report

B. Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials (MDSHA), July 2024, and current Special Provisions, as amended to date.

1. References to “Measurement and Payment” provisions do not apply to Section 312000.

C. Harford County, Department of Public Works, Standard Specifications for Construction and Materials (HCDPW), latest edition, as amended to date.

1. “Measurement and Payment” provisions do not apply to Section 312000.

D. Blasting is not allowed on this Project.

E. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1.9 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
3. Temporary Traffic Control: Provide temporary traffic control devices and labor as necessary to ensure access requirements of the Owner and entities making deliveries in the vicinity, including maintenance vehicles that would require access through the Project Work area.

C. Utility Locating Services: Obtain utility locating services to field locate and mark existing utilities within the Limit of Disturbance (LOD) and associated areas where Project is located prior to beginning any site demolition, site clearing and earth-moving operations.

a. Obtain "Miss Utility" services to field locate and mark utilities.
b. For utilities not located and marked by “Miss Utility”, obtain the services of a private utility locating service to identify and field mark utilities.
c. Review marked utilities with the Owner’s Representative in the field prior to proceeding with site clearing and earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing and erosion and sediment control measures specified in Section 311000 "Site Clearing" are in place.

E. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Basis of Design: Products specified in PART 2 — PRODUCTS are intended to establish the “Basis of Design” for product and material requirements.

2.2 SOIL MATERIALS

A. Provide satisfactory borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups CL, SM, SM-SP, SP, SW, GM, and GP according to ASTM D2487, or a combination of these groups approved by Testing Agency; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Liquid Limit: Less than 40.
2. Plasticity Index: Less than 20.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups unless approved in advance by Testing Agency.

1. Unsatisfactory soils also include satisfactory soils not maintained within -1 to +3 percent of optimum moisture content at time of compaction.

D. Aggregate Base Course: “Graded Aggregate — Base” in accordance with MDSHA Section 901, Table 901 A and Table 901 B; Naturally or artificially graded

mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

E. Aggregate Surface Course for Pedestrian Path: #10 Screenings in accordance with MDSHA Section 901, Table 901 A and Table 901 B; Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 98 percent passing a #10 sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1- 1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1- inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Sand: ASTM C33/C33M; fine aggregate.

I. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state as determined by Testing Agency.

2.3 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven geotextile, manufactured for subsurface drainage applications, composed of polypropylene fibers; complying with MDSHA Specification Section 919 GEOTEXTILES for Application SD, Type I, AASHTO M 288, and the following:

1. Survivability: Class 2; AASHTO M 288, and as follows:
   a. Grab Tensile Strength: 120-lbf minimum per ASTM D4632.
   b. Grab Tensile Elongation: 50% average per ASTM D4632.
   c. Sewn Seam Strength: 142-lbf minimum per ASTM D4632.
   d. Trapezoid Tear Strength: 50-1bf, minimum per ASTM D4533.
   e. CBR Puncture Strength: 310-lbf minimum per ASTM D641.

2. Apparent Opening Size: No. 70 sieve, maximum opening size per ASTM D4751.
3. Flow Rate: Minimum ll0 gal/min/ft ^{2} per ASTM D449l.
4. UV Resistance: 70 percent (minimum percent-retained test value) at 500 hours exposure per ASTM D4355.

B. Separation Geotextile: Non-woven needle-punched geotextile fabric, manufactured for separation applications, composed of polypropylene fibers; complying with complying with MDSHA Specification Section 919 GEOTEXTILES

for Application SE, AASHTO M 288, and the following:

1. Survivability: Class 1; AASHTO M 288, and as follows:

    a. Grab Tensile Strength: 205-lbf minimum per ASTM D4632.
    b. Grab Tensile Elongation: 50% average per ASTM D4632.
    c. Sewn Seam Strength: 222-lbf minimum per ASTM D4632.
    d. Trapezoid Tear Strength: 80-lbf per ASTM D4533.
    e. CBR Puncture Strength: 500-1bf minimum per ASTM D4833.

2. Apparent Opening Size: No. 80 sieve, maximum opening size per ASTM D4751.
3. Flow Rate: Minimum 95 gal/min/ft ^{2} per ASTM D4491.
4. UV Resistance: 70 percent (minimum percent-retained test value) at 500 hours exposure per ASTM D4355

2.4 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sediment controls during earth-moving operations.

C. Protect subgrades and satisfactory soils from water, freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

D. Temporary Traffic Control: Provide and maintain temporary traffic control devices and labor as necessary to ensure access requirements of the Owner and entities making deliveries in the vicinity, including maintenance vehicles that would require access through the Project Work area.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in accordance with approved Erosion and Sediment Control Drawings, and in a manner that avoids inconvenience to others.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

      a. 24 inches outside of concrete forms other than at footings.
      b. 12 inches outside of concrete forms at footings.
      c. 6 inches outside of minimum required dimensions of concrete cast against grade.
      d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
      e. 6 inches beneath bottom of concrete slabs-on-grade.
      f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

B. Excavations at Edges of Plant-Protection Zones:

   1. Perform excavations and grading within and adjacent to Tree Protection-Zones and Plant Protection-Zones in accordance with Section 015639 “Temporary Tree and Plant Protection” requirements.

2. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
3. Cut and protect roots in accordance with requirements in Section 015639 ”Temporary Tree and Plant Protection.”

3.4 EXCAVATION FOR WALKS, PEDESTRIAN PATH, AND PAVEMENTS

A. Excavate surfaces under walks, pedestrian path, and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit or as indicated.

1. Clearance: 12 inches each side of pipe or conduit, or as indicated.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow- tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 SUBGRADE INSPECTION

A. Notify Testing Agency when excavations have reached required subgrade.

B. If Testing Agency determines that unsatisfactory soil is present, continue excavation and replace with satisfactory backfill or fill material as directed and compact.

C. Densify exposed soil in accordance with the requirements of the project's geotechnical report and then proof-roll subgrade below pavements with a pneumatic-tired, loaded 10-wheel, tandem-axle dump truck weighing not less than 10 tons, or suitable compaction equipment approved by Testing Agency for trenches and confined areas, to identify soft pockets and areas of excess yielding. Do not test or proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Testing Agency, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Testing Agency, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under site related construction, pipe, or conduit as directed by the Project Civil Engineer, or Testing Agency.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Comply with the approved Erosion and Sediment Control Drawings.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.

4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of water, mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of water, mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

F. Detectable Warning Tape: Install detectable warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact satisfactory fill material in layers to required elevations as follows:

1. Under grass and planted areas: Use satisfactory soil material.
2. Under walks, pedestrian paths, and pavements: Use satisfactory soil material or engineered fill.

C. Place soil fill on subgrades free of water, mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within -1 to +3 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain water, frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified maximum dry density.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of utility structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698 (Standard Proctor):

1. Under pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material to at least 95 percent of maximum dry density.
2. Under walkways and pedestrian paths, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material to at least 95 percent of maximum dry density.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fil1 soil material to 85 percent of maximum dry density.
4. For utility trenches, compact each layer of initial and final backfill soil material to at least 95 percent of maximum dry density.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks and Pedestrian Paths: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

3.15 AGGREGATE BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place aggregate base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place aggregate base course under pavements and walks as follows:

1. Where recommended by Testing Agency, install geotextile on prepared subgrade as directed by the Testing Agency and in accordance with the manufacturer's written instructions, overlapping sides and ends. Authorized installation of geotextile recommended by the Testing Agency will be paid for according to Contract provisions for changes in the Work.
2. Place aggregate base course material over prepared subgrade beneath hot-mix asphalt pavement.
3. Shape aggregate base course to required crown elevations and cross-slope grades.
4. Place aggregate base course 6 inches or less in compacted thickness in a single layer.
5. Place aggregate base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact aggregate base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry density according to ASTM D698.

3.16 AGGREGATE BASE COURSE AND SURFACE COURSE FOR PEDESTRIAN PATHS

A. Place aggregate base course on subgrades free of mud, frost, water, snow, or ice.

B. On prepared subgrade, place aggregate base course for pedestrian path as follows:

1. Where recommended by Testing Agency, install geotextile on prepared subgrade as directed by the Testing Agency and in accordance with the manufacturer's written instructions, overlapping sides and ends. Authorized installation of geotextile recommended by the Testing Agency will be paid for according to Contract provisions for changes in the Work.
2. Place aggregate base course material over prepared subgrade.
3. Shape aggregate base course to required crown elevations and cross-slope grades.
4. Place aggregate base course 6 inches or less in compacted thickness in a single layer.

C. Compact aggregate base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry density according to ASTM D698.

D. Upon completed aggregate base course, install aggregate surface course, thickness as indicated, and compact at optimum moisture content to required grades, lines and cross sections to not less than 95 percent of maximum dry density according to ASTM D698.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified geotechnical engineering testing agency to perform tests and inspections. The testing agency shall be paid for by the contractor.

A. Testing agency will test compaction of soils in place according to one of the following methods as determined by Testing Agency:

1. ASTM D1556 (Standard Test Method for Density and Unit Weight of Soil in Place by Sand Cone Method);
2. ASTM D2167 (Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method);
3. ASTM D2937 (Standard Test Method for Density and Unit Weight of Soil in Place by Drive-Cylinder Method);
4. ASTM D6938 (Standard Test Method for In-Place Density of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

B. Tests will be performed at the following locations and frequencies:

1. Pavement and Field Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 10,000 sq. ft. (per lift) or less of pavement and field areas, but in no case fewer than three tests.
2. Utility Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 200 linear feet (per lift) or less of trench length, but no fewer than two tests.

C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

1. Recompact and retest until specified compaction is obtained.
2. If the required degree of compaction cannot be obtained as indicated above, notify the Owner's Representative and the Project Civil Engineer for consultation with the Testing Agency in order to determine a recommended course of action in order to achieve the specified compaction requirements.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Project Landscape Architect or Project Civil Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Project Engineer.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 323113

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. PVC-coated, steel chain-link fabric.
2. Galvanized steel framework.

B. Related Sections include the following:

1. Section 312000 "Earth Moving" for filling and for grading work.
2. Section 321313 "Concrete Paving"

1.3 DEFINITIONS

A. CLFMI: Chain Link Fence Manufacturers Institute.

B. Zn-5-Al-MM Alloy: Zinc-5 percent aluminum-mischmetal alloy.

1.4 SUBMITTALS

A. Product Data: Material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Gates and hardware.

B. Shop Drawings: Show locations of fence, each gate, posts, rails, and tension wires and details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, elevations, sections, gate swing and other required installation and operational clearances, and details of post anchorage and attachment and bracing.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information

specified.

D. Field Test Reports: Indicate and interpret test results for compliance of chain-link fence and gate grounding and bonding with performance requirements.

E. Maintenance Data: For the following to include in maintenance manuals specified in Division 1:

1. Polymer finishes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Chain-Link Fences and Gates: Obtain each color, grade, finish, type, and variety of component for chain-link fences and gates from one source with resources to provide chain-link fences and gates of consistent quality in appearance and physical properties.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. Steel Chain-Link Fence Fabric: Height indicated on Drawings. Provide fabric fabricated in one-piece widths for fencing in height of 12 feet (3.6 m) and less. Comply with CLFMI's "Product Manual" and with requirements indicated below:

1. Mesh and Wire Size: As indicated on Drawings.

2. PVC-Coated Fabric: ASTM F 668, Class over metallic-coated steel wire.

   a. Metallic Coating: Zinc, Aluminum, Zn-5-Al-MM alloy.
   b. Color: Black complying with ASTM F 934.

3. Coat selvage ends of fabric that is metallic coated during the weaving process with manufacturer's standard clear protective coating.

B. Selvage: Knuckled at both selvages.

C. Gate Posts, Gates, and Accessories: Comply with ASTM F 654 and the following:

1. Type: I, single swing.
2. Type: II, double swing.
3. Metal Pipe and Tubing: Galvanized steel.
4. Frames: Fabricate from round tubing with outside dimension and minimum wall thickness and weight according to ASTM F 654.
5. Posts: Round with outside dimension and minimum wall thickness and weight according to ASTM F 654 for the following individual gate widths:

    a. As indicated.

    b. Hardware: Latches permitting operation from both sides of gate

6. All Gate Posts, Gates and accessories shall be painted or powder coated black.

D. Protective Coating for Steel: Posts, rails, and frames protected with an external coating of not less than
0.6 oz. of zinc/sq. ft. (183 g of zinc/sq. m), a chromate conversion coating, and a clear, verifiable polymer film; and an internal protective coating of not less than 0.6 oz. of zinc/sq. ft. (183 g of zinc/sq. m) or 81 percent, not less than 0.3-mil- (0.0076-mm-) thick, zinc pigmented coating.
1. All posts, rails and frames shall be painted or powder coated black.

2.2 INDUSTRIAL FENCE FRAMING

A. Round Steel Pipe: Standard weight, Schedule 40, galvanized steel pipe complying with ASTM F 1083. Comply with ASTM F 1043, Material Design Group IA, external and internal coating Type A, consisting of not less than 1.8-oz./sq. ft. (0.55-kg/sq. m) zinc; and the following strength and stiffness requirements:

1. Line, End, Corner, and Pull Posts and Top Rail:
    a. Line Posts – 2 1/2”
    b. Top Rail – 1 5/8”
    c. Brace Rail – 1 5/8”
    d. End Posts – 3” O.D.
    e. Corner Posts – 3” O.D.
    f. Gate Posts – 3” O.D.
    g. Gate Frame – 2” O.D.
    h. Bottom Rail – 1 5/8”

B. Post Brace Rails: Provide brace rail with truss rod assembly for each gate, end, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly, for each corner post and for pull posts. Provide rail ends and clamps for attaching rails to posts.

C. Top Rails: Fabricate top rail from lengths 21 feet (6.4 m) or longer, with swedged-end or fabricated

for expansion-type coupling, forming a continuous rail along top of chain-link fabric.

D. Intermediate Rails: Match top rails

E. Bottom Rails: Match top rails

2.3 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations: 1. As indicated on drawing

B. Metallic-Coated Steel Wire: 0.177-inch- (4.5-mm-) diameter, marcelled tension wire complying with ASTM A 824 and the following:

a. Matching chain-link fabric coating weight.

2.4 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

2.5 POLYMER FINISHES

A. Supplemental Color Coating: In addition to specified metallic coatings for steel, provide fence components with polymer coating as indicated on drawings.

B. Metallic-Coated Steel Tension Wire: PVC-coated wire complying with ASTM F 1664, Class 1 or 2a or 2b.

C. Metallic-Coated Steel or Aluminum Framing: Comply with ASTM F 1043 for polymer coating applied to exterior surfaces and, except for tubular shapes, to exposed interior surfaces.

1. Polymer Coating: Not less than 10-mil- (0.254-mm-) thick PVC.
2. Polymer Coating: Not less than 3-mil- (0.076-mm-) thick polyester finish.
3. Polymer Coating: Not less than 10-mil- (0.254-mm-) thick PVC or 3-mil- (0.076-mm-) thick polyester finish.

D. Fittings: Comply with ASTM F 626 for polymer coating applied to exterior surfaces and, except inside cap shapes, to exposed interior surfaces.

1. Polymer Coating: Not less than 10-mil- (0.254-mm-) thick PVC.

E. Color: To match chain-link fabric complying with ASTM F 934.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.

1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.

2. Fence to be staked out by surveyor.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

C. Post Setting: Excavate holes for post foundations in firm, undisturbed or compacted soil. Set terminal or gate posts in concrete footing. Protect portion of posts aboveground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Using mechanical devices to set line posts per ASTM F 567 is permitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.

1. Dimensions and Profile: As indicated on Drawings.
2. Exposed Concrete Footings: Extend concrete 2 inches (50 mm) above grade, smooth, and shape to shed water.
3. Concealed Concrete Footings: Stop footings below grade as indicated on Drawings to allow covering with surface material.
4. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into

concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

5. Posts Set into Concrete in Voids: Form or core drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of as indicated on Drawings.

B. Line Posts: Space line posts uniformly as indicated on Drawings.

C. Post Bracing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

D. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- (3.05-mm-) diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches (609 mm) o.c. Install tension wire in locations indicated before stretching fabric.

1. Top Tension Wire: Install tension wire through post cap loops.
2. Bottom Tension Wire: Install tension wire within 6 inches (150 mm) of bottom of fabric and tie to each post with not less than same gage and type of wire.

E. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.

F. Intermediate Rails: Install in one piece as indicated on Drawings, spanning between posts, using fittings, special offset fittings, and accessories.

G. Bottom Rails: Install, spanning between posts, using fittings and accessories.

H. Chain-Link Fabric: Apply fabric to outside of enclosing framework for decorative / barrier fencing; and, to inside of enclosing framework for athletic fields and facilities. Leave 2 inches (50 mm) between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.

J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain- link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts 12 inches (304 mm) o.c. and to braces 24 inches (609 mm) o.c.

K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.5 GATE INSTALLATION

A. General: Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION 323113

SECTION 321216
ASPHALT PAVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Hot-mix asphalt paving.
2. Pavement markings.
3. Parking wheel stops.
4. Parking signage and accessible (ADA) parking signage.

B. Related Requirements:

1. Section 311000 "Site Clearing" for demolition and removal of existing asphalt pavement.
2. Section 312000 "Earth Moving" for subgrade preparation, fill and backfill materials, aggregate base courses, and compaction requirements.
3. Section 321313 "Concrete Paving" for concrete pavement, concrete curb and gutter, and driveway aprons.

1.3 ACTION SUBMITTALS

A. Hot-Mix Asphalt Designs: For each MDSHA Hot-Mix Asphalt (HMA) Course indicated.

1. Job-Mix Designs: Current MDSHA-OMT approved "Superpave" asphalt paving mixture for each job-mix proposed for the Work.
2. Submit copies of MDSHA-Office of Materials Technology's (OMT) current approved "HMA Mix Design Report" which includes technical data and tested physical properties for each proposed job-mix.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For paving-mix producer and testing agency.

B. Material Certificates: Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1. Aggregates.
2. Asphalt binder.

3. Asphalt cement.
4. Tack coat.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of referenced specifications, standards and publications for hot-mix asphalt paving construction.

1. Unless indicated otherwise, the most stringent requirement applies to materials and construction of hot-mix asphalt paving.
2. If a conflict is apparent between referenced standards and publications, bring it to the attention of the Civil Engineer and Testing Agency for resolution.

B. American Association of State Highway and Transportation Officials (AASHTO) referenced standards and publications.

C. American Society for Testing & Materials (ASTM) referenced standards and publications.

D. Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials (MDSHA), July 2021, and current Special Provisions, as amended to date.

1. References to “Measurement and Payment” and “Price Adjustment” provisions do not apply to specification Section 321616.

E. Americans with Disabilities Act (ADA), 2010 ADA Standards for Accessible Design regulations, as amended to date, published by the United States Department of Justice.

F. Asphalt Pavement Alliance (AI), “MS-22 Construction of Asphalt Pavements”, referenced publications as amended to date.

G. U.S. General Services Administration “Federal Specifications” (FS) referenced specifications and standards.

H. Testing Agency Qualifications: Qualified in accordance with ASTM D3666 for testing indicated.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply aggregate base course and asphalt materials if subgrade is wet, if rain is imminent or expected before time required for adequate cure. Comply with MDSHA Specifications.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Comply with referenced specifications, standards and publications.

2.2 AGGREGATES

A. General: In accordance with MDSHA Specifications.

2.3 ASPHALT MATERIALS

A. In accordance with MDSHA Specifications.

B. Water: Potable.

2.4 AUXILIARY MATERIALS

A. Roadway, Parking, and Accessible (ADA) Parking Signage: As indicated.

B. Precast Concrete Wheel Stops:

1. Minimum 4000-psi compressive strength, steel-reinforced, air entrained concrete.
2. Size: 4-1/2 inches high by 9 inches wide by 72 inches long, or as indicated.
3. Provide chambered corners, transverse drainage slots on underside, and a minimum of two factory-formed vertical holes through wheel stop for anchoring to substrate.
4. Surface Appearance: Free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
5. Installation Hardware: Deformed-steel rebar dowels, 1/2-inch diameter and 15-inch minimum length.

C. Joint Sealant: ASTM D6690, Type I, hot-applied, single-component, polymer-modified sealant for hot-mix asphalt and concrete pavements, or approved equal.

D. Pavement Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type I, with drying time of less than three minutes.

1. Color: White for general applications, except handicapped space symbol shall be blue and white, and fire lane curb shall be red.

E. Recycled Materials for Hot-Mix Asphalt (RAP): In accordance with MDSHA Specifications.

2.5 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-mix “Superpave” asphalt plant mixes in accordance with MDSHA Specifications and as indicated on the Drawings. Materials and ingredient composition for Recycled Hot-Mix Asphalt (RAP) shall be in accordance with MDSHA Specifications.

1. HMA “Superpave” Base/Binder Course: As indicated.
2. HMA “Superpave” Surface Course: As indicated.

PART 3 - EXECUTION

3.1 GENERAL

A. Construct in accordance with MDSHA Specifications, referenced standards and publications.

3.2 EXAMINATION AND PREPARATION

A. Verify that subgrade is dry and in satisfactory condition prior to beginning paving operations.

B. Proof-roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding in accordance with Section 312000 “Earth Moving” before installing aggregate base course. Correct unsatisfactory subgrade conditions.

C. Proceed with installation of aggregate base course and paving only after unsatisfactory conditions have been corrected.

D. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

3.3 INSTALLATION OF AGGREGATE BASE COURSE FOR NEW HMA PAVING

A. Ensure that prepared subgrade has been proof-rolled in accordance with Section 312000 “Earth Moving” and corrective repair of unsatisfactory subgrade areas have been performed.

B. Install aggregate base course in accordance with Section 312000 “Earth Moving.”

3.4 INSTALLATION OF HOT-MIX ASPHALT (HMA) PAVEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Install hot-mix asphalt base/binder course in number of lifts and thicknesses indicated.
2. After applying tack coat, install hot-mix asphalt surface course in single lift.
3. Spread mix at a minimum temperature of 250 deg F.
4. Begin installing mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than ten (10) feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement approximately 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base/binder course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both ”Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within two (2) percent of specified course density.

3.6 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot- mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density, Marshall Test Method: 96 percent of reference laboratory density in accordance with ASTM D6927, but not less than 94 percent or greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:

1. Base/Binder Course: Plus or minus 1/4 inch.
2. Surface Course: Plus 1/8 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base/Binder Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. All ADA handicapped parking spaces and associated aisles: Completed surface course slopes shall not exceed two (2) percent in any direction.
4. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.8 PAVEMENT MARKINGS, ACCESSIBLE (ADA) PARKING AND SIGNAGE INSTALLATION

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Owner's Representative.

B. Allow paving to age for at least fifteen (15) days or minimum time recommended by paint manufacturer before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of fifteen (15) mils.

E. Install accessible (ADA) parking markings and signage as indicated, in accordance with State of Maryland and ADA regulations.

3.9 PARKING WHEEL STOP INSTALLATION

A. Securely anchor wheel stops to finished pavement surface with reformed bars in each preformed vertical hole as indicated, or with hardware recommended by wheel stop manufacturer.

B. Recess head of bar or dowel flush with top of wheel stop.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined in accordance with ASTM D3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with ASTM D979.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared in accordance with ASTM D2041, and compacted in accordance with job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples in accordance with ASTM D1188 or ASTM D2726.

    a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.

b. Field density of in-place compacted pavement may also be determined by nuclear method in accordance with ASTM D2950 and coordinated with ASTM D1188 or ASTM D2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace hot-mix asphalt or install additional material as directed by the Owner with written approval, where test results or measurements indicate that it does not comply with specified requirements.

3.11 WASTE HANDLING

A. General: Handle asphalt-paving waste in accordance with State of Maryland and local jurisdictional requirements as applicable.

END OF SECTION 321216

SECTION 329113
SOIL PREPARATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

1.2 Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

B. Related Requirements:

1. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.

1.4 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Clay: Soil particles smaller than 0.002mm.

E. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

F. Imported Soil: Soil that is transported to Project site for use.

G. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

H. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

I. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

J. Planting Soil: Soil produced by blending a combination of approximately equal parts by volume Base Loam, Coarse Sand and Organic Amendment/Compost (1L:1S:lC).

K. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

L. SSSA: Soil Science Society of America.

M. Silt: Soil particles ranging in size from 0.002-0.05mm.

N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

Q. USCC: U.S. Composting Council.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:

    a. Manufacturer's qualified testing agency's certified analysis of standard products.
    b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
    c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in

"Preconstruction Testing" Article.

C. Field quality-control reports.

D. Test results: For soil and percolation testing, including actions being taken resulting from testing recommendations.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1. Laboratories: Subject to compliance with requirements, provide testing by one of the following:

a. A&L Eastern Laboratories 7621 Whitepine Road Richmond, VA 23237
b. Virginia Tech Soil Testing Lab; 145 Smyth Hall (MD 0465), 185 Ag Quad Ln. Blacksburg, VA 24061; soil test.vt.edu.
c. CLC Labs, 325 Venture Drive, Westerville OH 43081.
d. Turf Diagnostics and Design, Lindwood KS.
e. Leaf Yard Waste Compost Stability Test and Pathogens/ Metals/ Vector Attraction: Woods End Research Laboratory, P.O. Box 297, Mt. Vernon, ME, 04352, telephone: 201.293.2457, fax: 201.293.2488.
f. Leaf Yard Waste Compost/ All other tests except those listed above: University of Massachusetts, West Experiment Station, Amherst, MA 01003, telephone: 413.545.2311, fax: 413.545.1931.
g. Mechanical Gradation and Chemical Analysis, All Components and Soil Mixes: Penn State Extension, 2 Penn Center Plaza, Suite 200, Philadelphia, PA 19102, telephone 215- 471-2200 Ext 100
h. University of Massachusetts, West Experiment Station, Amherst, MA 01003, telephone: 413.545.2311, fax: 413.545.1931.
i. University of Delaware Soil Testing Program, 152 Townsend Hall, 531 S. College Avenue Newark, DE 19717, telephone: 302-831-1392.
j. Other testing laboratories if determined approved equal after submission of qualification documents.

B. Installer Qualifications: An Installer who has successfully completed work similar in extent to that required for this Project.

1. Installer's Field Supervision. Require installer to maintain an experience full time supervisor, with a minimum of 5 years of successful experience in supervising projects with similar scope in the region, on the Project site during the work of this section. Similar scope shall include the preparation, mixing, and installation of custom topsoil and planting mixes.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on—site soil or if all planting soil is imported then imported soil.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

C. All testing will be at the expense of the Contractor. The Project Manager may request additional planting mix tests on different mix component ratios in order to attain results that more closely meet the mix requirements.

D. Testing for Planting Soil is required at the following intervals:

1. Testing of individual components for all soil mixes.
2. After test results for components have been accepted, create sample mixes of each planting soil mix and perform tests described in this Section.
3. After the test results for planting soil mixes have been accepted, and following the placement of planting soils on site, provide one test per 2,500 SF of planting area for Planting Soil delivered to the job site, the results of which are to be reviewed and approved by the Landscape Architect prior to any plant material being placed. Placed soils shall be amended per testing recommendations to address any soil deficiencies.

1.9 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by soil scientist (CPSS) certified by SSSA, soil classifier (CPSC) certified by SSSA, soil scientist (RPSS) registered by the National Society of Consulting Soil Scientists or state-certified, -licensed, or -registered soil scientist under the direction of the testing agency.

1. Number and Location of Samples: Minimum of ten representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.10 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by the following methods according to SSSA's "Methods of Soil Analysis - Part I-Physical and Mineralogical Methods":

   a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
   b. Hydrometer Method: Report percentages of sand, silt, and clay.

2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part I-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis
   - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soi1 Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).

4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Material shall not be handled or hauled, placed or compacted when it is wet as after a heavy rainfall, early spring or if frozen. Soil shall be handled only when the moisture content is compliant with soil moisture content requirements. The Landscape Architect shall be consulted to determine if the soil is too wet to handle.

C. Store and handle packaged materials in strict compliance with manufacturer’s instructions and recommendations. Protect all materials from weather, damage, injury and theft.

D. Sequence deliveries to avoid delay. On-site storage space is permissible only with written notice from Owner. Deliver materials only after preparations for placement of planting soil have been completed.

E. Prohibit vehicular and pedestrian traffic on or around stockpiled planting soil.

F. Planting Soil that is to be stockpiled longer than two weeks, whether on or offsite, shall not be placed in mounds greater than six feet high.

G. Soil Moisture Content:

1. Contractor shall not move, blend or grade soil when moisture content is so great that free moisture is apparent, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, or allow drying to bring soil moisture between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 for compaction, grading and plantings.

2. Field Soil Moisture Test:

a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
b. If the soil will not retain shape it is too dry and should not be worked.
c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
d. If the soil glistens or free water is observed when the sample is patted in the palm of hand the soil is too wet and should not be worked.

H. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

B. Imported Base Loam:

1. Imported Base Loam, as required for blending with sand and compost, shall be a naturally occurring A-horizon soil formed from geologic soil forming

processes without admixtures of sand or organic matter sources (composts). Base Loam, which has been contaminated by incorporation of subsoil shall not be acceptable for use. Base Loam as required for the work shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Base Loam shall not be delivered or used for planting while in a frozen or muddy condition. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	--	100
18	85	100
35	70	95
60	50	90
140	36	68
270	32	60
0.002m	3	12

2. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 15% by weight of the total sample. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.
3. The organic content shall be between 3.0 and 8.0 percent by weight.
4. Base loam with more than 42% passing the 270 sieve or with more than 8 percent clay must have a well developed and stable crumb (ped) structure as determined by an agricultural chemist.
5. pH shall be between 5.8 and 7.0.
6. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

C. Organic Amendment (Compost):

1. Organic Matter for amending planting soils shall be a stable, humus-like material produced from the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of nine months. The leaf yard waste compost shall be free of debris such as plastics, metal, concrete or other debris. The leaf yard waste compost shall be free of stones larger than 1/2", larger branches and roots. Wood chips over 1” in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no

unpleasant odor, and meeting the following criteria as reported by laboratory tests.

a. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.
b. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale.
c. Pathogens/Metals/Vector Attraction reduction shall meet applicable regulations for the State of Maryland.
d. Organic Content shall be at least 20 percent (dry weight). One hundred percent of the material shall pass a 1/2-inch (or smaller) screen. Organic content shall be determined by weight loss on ignition for particles passing a number 10 sieve.
e. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight.
f. pH: The pH shall be between 6.5 to 7.4 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy *Methods of soil Analysis,* Part 2, 1986.
g. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed
2.5 mmhos/cm (dS/m).
h. The compost shall be screened to 1/2 inch maximum particle size and shall contain not more than 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.

i. Nutrient content shall be determined by the one of the qualified Soil Testing Laboratories listed in this section or equivalent laboratory and utilized to evaluate soil- required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

D. Uniformly Graded Coarse Sand:
1. Sand for Planting Soil Blends, protection of filter fabric and for drainage as required, shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded to sub-angular grains of quartz or other durable rock free from loam or clay, mica, surface coatings and deleterious materials with the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing Minimum	Maximum
10	100	--
18	60	80
35	25	45
60	8	20
140	0	8
270	0	3
0.002m	0	0.5

2. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
3. The ratio of the particle size for 70% passing (D_{70}) to the particle size for 20% passing (D_{20}) shall be 2.8 or less ($D_{70}/D_{20} < 2.8$). Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422.
4. pH shall be less than 7.5.

E. Manufactured Planting Soil:

1. Planting Bed Soil shall consist of a combination of approximately equal parts by volume Base Loam, Coarse Sand and Organic Amendment/Compost (1L:1S:1C). The following gradation for material passing a Number 10 Sieve shall be achieved in the final mix.

U.S. Sieve Size Number	Percent Passing by Weight Minimum	Maximum
10	100	
18	85	95
35	60	85
60	42	65
140	21	44
270	18	24
0.002m	2	4

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

2.3 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION EXAMINATION AND PREPARATION

A. Reference other sections as necessary.

B. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.

C. Pre-Installation Examination Required: The Contractor shall examine previous work, related work, and conditions under which this work is to be performed and shall notify Landscape Architec in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Contractor accepts substrates, previous work, and conditions. The Contractor shall not place any planting soil until all work in adjacent areas is complete and approved by the Landscape Architect.

D. Kickoff Meeting: At least 10 working days prior to the start of work, the contractor shall request a landscape construction kickoff meeting with the owners representative, Landscape Architect and any other parties involved with landscape construction. The contractor must demonstrate familiarity with this Section, and other relevant sections of the construction documents. The contractor shall articulate the means and methods of soil blending, subgrade preparation, soil placement and other steps outlined in the Specification.

E. Examination of Subgrade: The subgrade shall be examined by the Contractor prior to the start of subgrade preparation, soil placement and planting. Any deficiencies shall be noted and related to the Landscape Architect in writing prior to acceptance of the subgrade by the Contractor. Deficiencies include, but shall not be limited to the following:

1. Construction debris present within the planting areas.
2. The subgrade is at incorrect depths for installing the designed soil profile and drainage layer.
3. Incomplete irrigation and/or subsurface drainage installation.
4. Incomplete lighting and exterior electrical installation.
5. Conflict with underground utilities.
6. Subgrade contaminated with oils, compressible material, silt or clay
7. Subgrade must infiltrate water at the rate of at least one inch per hour.

F. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace slopes where required and maintain sides of slopes of excavations in safe condition until completion of backfilling. Provide protection measures as required for public safety.
2. All subgrade areas to be filled with Planting Soil shall be free of construction debris, refuse, vegetation, compressible or decay able materials, all stones greater than 2 inches, concrete washout or soil crusting films of silt or clay that reduces or stops drainage from the Planting Soil into the subsoil; and/or

standing water. Such material shall be removed from the site.

3. The subgrade must slope at a minimum of two percent towards the bottom of slopes and subdrains. Subgrade levels shall be adjusted as required to ensure that all planting and lawn areas have adequate drainage.
4. Sub-grade shall be lowered to an elevation that allows for the installation of Planting Soil at the depths outlined below for non-turf and non-bioretention conditions:

    a. Prior to the placing of planting soil to be tilled into the sub-grade, the sub-grade shall be loosened to a depth of 18”.
    b. 6" of planting soil shall be tilled into the upper 12" of the loosened sub-grade.
    c. 6" of planting soil shall then be added and correctly graded and compacted to meet finished elevations.

G. Do not proceed with the installation of Planting Soil, until all utility work in the area has been installed.

1. The Contractor shall identify the locations of underground utilities prior to proceeding with soil work and shall protect all utilities from damage.

H. Planting Soil Preparation: Refer to Section 329113, Article 2.2 for planting soil and mixtures. Examine soil and remove foreign materials, stones and organic debris over 1/2” in size. Remove all vegetation from stockpiles prior to blending. Mix-in fertilizers and amendments as required by tests and as approved by the Landscape Architect. All preparation and mixing shall be accomplished when the soil moisture content is compliant with soil moisture content requirements and at a moisture content approved by the Landscape Architect. If lime is to be added, it shall be mixed with dry soil before fertilizer is added and mixed.

3.2 SUBGRADE INSPECTIONS AND PERCOLATION TESTING

A. After subgrade levels have been reached, the Landscape Architect shall inspect soil conditions to evaluate subsurface drainage conditions. The Contractor shall carry out percolation tests according to the following procedures in locations identified by the Landscape Architect. The Contractor shall conduct one test per 2,500 square feet throughout the entire site and provide written test results to the Landscape Architect.

B. Percolation tests shall be performed according to the following test procedures.

1. Utilize perforated canisters or buckets seven to ten inches in diameter and a minimum of six inches high.
2. A test hole shall be hand dug at the soil horizon to be tested approximately one-inch larger than the diameter of the test canister and approximately six inches deep. The sides of the test hole shall not be smoothed.
3. Place one-half inch of clean coarse sand in the bottom of the hole and place the canister firmly into the hole. The space around the canister shall then be

filled with coarse sand. Tamp the coarse sand to firmly fill any void space around the test canister.

4. Fill the canister with water to the soil horizon level and allow to drain until approximately one inch of water remains, or a minimum of 1 hour.
5. Refill the canister to the soil horizon level. After the water level drops approximately one inch, start the test. Record time versus water level as the water level drops. The percolation rate is the length of time for the water level to drop per inch. The field scientist shall record the rate of percolation for a minimum of two hours or until the water level has dropped a minimum of three inches after the start of measurements.

C. If subgrade fails percolation testing, the Contractor shall utilize Subgrade Compaction Mitigation Measure and retest until subgrade passes percolation testing.

3.3 WORKING AROUND UTILITIES

A. Carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.

B. Known underground and surface utility lines are indicated on the utilities drawings. Contact “Miss utility” and provide them their required time to respond and mark the property. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.

C. Perform work in a manner that will protect utilities from damage. Hand excavate as required and provide adequate means of support and protection of utilities during soil installation operations. Maintain grade stakes set by others until parties concerned mutually agree upon removal. The Contractor shall repair all utilities damaged by soil operations at the Contractor’s expense.

3.4 SUBGRADE COMPACTION MITIGATION MEASURES

A. Coordinate the following scarification work to eliminate subgrade compaction resultant from Construction Operations when located in lawn and planting areas. Maintain 12” clearance from any underground utilities during subgrade de-compaction. Perform subsoiling work for all areas to receive plantings that are located outside of tree and plant protection zones prior to placement of planting soil. Do not perform subsoiling within tree protection zones.

B. Spread 3” depth compost prior to beginning subsoiling.

C. Using a subsoiler or ripper, backhoe with 3-4 inch teeth, trenching machine or other suitable device, break up the compacted subsoil to a depth of 30” below the required subgrade elevation. Use of rototillers for subsoiling is not acceptable.

D. Pull the subsoiler or ripper through the soil or make trenches every 24 inches. Make one set of passes with the ripper or trencher 18 inches on center through the subgrade. Make one set of passes with the ripper or trencher 18 inches on center

through the subgrade and repeat a second set of passes 18 inches on center at 90 degrees to the first pass.

E. If using a backhoe, break up the soil evenly and consistently throughout.

F. Utilize rubber tracked equipment designed to have low impact on soil. Equipment shall be designed to impact the soil less than four pounds per square inch of bearing track surface.

G. Subsoiling shall be performed immediately prior to the installation of Planting Soil. Protect subsoiled areas from re-compaction.

3.5 MODIFICATION OF EXISTING IN PLACE SOILS FOR TURF PLANTING

A. General: Amend existing in-place soils with amendments specified below or as recommended by laboratory soil test report to produce viable planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Perform the following actions:

1. Under the supervision of the Project Arborist, using an air knife or similar pneumatic digging tool, loosen the existing soil to a depth of six inches
2. Spread a four inch layer of Compost over loosened soil.
3. If any additional soil amendments or fertilizers are recommended as a result of the soil test reports, apply at recommended rates.
4. Using the air knife, turn the Compost and amendments into the soil to create an evenly blended composition.
5. Fine grade by hand rakes to a smooth, uniform surface plane matching pre-construction elevations, Do not operate grading equipment in tree protection zones.

3.6 PLACING AND MIXING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

A. Soil Placement Preparation:

1. Verify that the plumbing for the irrigation system has been installed and accepted.
2. Verify that the subgrade preparations have been reviewed and accepted, including removal of all existing vegetation prior to placement of planting soils, and percolation testing.
3. Notify the Landscape Architect of soil placement operations at least seven calendar days prior to the beginning of work.
4. Do not proceed with the installation of Planting Soils, until all utility work in the area has been installed.
5. The Contractor shall identify the locations of underground utilities prior to proceeding with soil work and shall protect all utilities from damage.
6. Do not begin Planting Soil installation until all drainage, irrigation main lines,

lateral lines, subgrade preparations and irrigation risers shown on the drawings are viewed and approved by the Landscape Architect.

7. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use plywood and/or plastic sheeting as directed to cover existing asphalt, concrete, metal and masonry work.

    a. Clean up any soil or dirt spilled on any paved surface, including at the end of each working day.

    b. Any damage to the paving or architectural work shall be repaired by the Contractor at the Contractor's expense.

B. Placement of Planting Soil:

1. Planting Soil shall be placed in lifts not to exceed 8 inches in thickness and compacted to meet minimum and maximum requirements as specified below:

    a. A transition zone shall be formed between the prepared subgrade, and Planting Soil by placing six inches of the upper-layer soil and tilling into the lower soil to a twelve-inch thickness. This may be done with the teeth of an excavator, roto-tiller or manual equipment (shovels, hoe), or other approved means.
    b. Place an additional six inch layer of the upper-layer Planting Soil atop this mix.
    c. Planting Soil shall be compacted to between 82 and 85 percent Standard Proctor.
    d. In all cases, the soil being placed shall be in a dry to damp condition. No wet soils shall be placed. Soil moisture content must be compliant with soil moisture content requirements. All testing of in-place density for planting materials shall be made by the soil scientist or according to ASTM D1556 Density of soil and rock in place using Sand Cone Method, ASTM D6398-10 Nuclear Methods, ASTM D2167-08 Rubber Balloon Method, or ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

2. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
3. In-place Soil Testing: One soils have been tested in place, amend as recommended by required testing.

3.7 RESTORATION OF HEAVILY COMPACTED SOILS

A. Heavily compacted soils occur where an auger cannot penetrate to a minimum depth of 8 inches.

B. For areas indicated to be heavily compacted, perform the following remedial actions:

1. Remove the top 6 inches of soil.
2. Spread 2” thick layer of compost
3. Using a spade shovel, dig and drop composted into compacted soil below
4. Re-spread soil removed as part of step 1
5. Till with a spade tiller only. Do not use rototillers.
6. Fine grade.

3.8 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is over compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.9 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials off-site.

END OF SECTION 329113

SECTION 329200

TURF ESTABLISHMENT

PART 1. GENERAL

1.01 SCOPE

Turf establishment for play on Hickory Park shall include, but not necessarily be limited to, soil preparation, seeding, fertilizing, mulching, liming as required, over seeding, and re-fertilizing all areas disturbed by construction and where designated for turf establishment in accordance with the Contract Documents

1.02 RELATED AND REFERENCED DOCUMENTS

Drawings and General Provisions of the Contract, including General Conditions and Supplementary Conditions and Division 01 Specification Sections and the following publications apply to this section:

A. Harford County Road Code (H.C.R.C., Book 1: "Specifications for Construction and Material" and Book 1: Standard Details for Design and Construction," latest edition as amended to date. "Measurement and Payment" provisions and "Basis of Payment" of the Harford County Road Code do not apply to this Contract.

B. 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control (MDESESC) published jointly by the Maryland Department of Environment, Water Management Administration in association with the Soil Conservation Service and the State Soil Conservation Committee, as amended to date.

C. Maryland Department of Agriculture "Nutrient Management Program" Legal Authority Fertilizer Use Act of 2011or as amended

D. Water Quality Improvement Act of 1998 or as amended, including compliance with requirements for soil testing prior to nutrient application.

1.03 STANDARDS OF WORK

A. All work and materials shall be in strict accordance with the latest edition of the Harford County "Standard Specifications" and "Details of Construction" and as herein modified.

B. All landscaping and seeding work shall comply with the Water Quality Improvement Act of 1998, including compliance with requirements for soil testing prior to nutrient application as per the Maryland Nutrient Management Plan.

C. Grading and preparation of field subgrade shall be accomplished by laser grading. The Contractor must provide survey confirmation of elevations and dimensions on a 25-foot grid and have them approved before spreading topsoil and soil amendments. The finished subgrade elevation tolerances shall be 1/2 inch in 25 feet in any direction on a 25-foot grid. Areas outside of playing fields shall be graded to plus or minus 0.1 foot while maintaining positive drainage.

D. The top four (4) inches of topsoil shall be screened material.

E. It shall be the Contractor's responsibility to determine if the material will be screened in place, on a remote screener, or off site and trucked in. No on-site topsoil shall be removed from the site without the County's written approval.

F. Contractor must receive approval of County prior to placement of all topsoil.

G. The Contractor shall be responsible for the correction of grades and re-surveying as necessary to correctly complete the work, at no additional expense to the County.

1.04 TESTING

A. Earthwork/Compaction Testing.

1. All compaction testing shall be performed by a testing agency credited and insured.

2. Compaction testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:

In-place relative density:
Method: ASTM D-1556, Sand Cone Method
ASTM D-2922, Nuclear Method

Number of Tests:
One (1) per 5,000 SF in each vertical lift with a minimum of one (1) test per each vertical lift.

3. PM or his/her representative may request additional tests to establish gradation, maximum density, and in-place density as required by working conditions.

B. Fertility Testing

1. The Contractor shall submit a soil test during the grow-in period to an approved lab and provide a report to PM or his/her designated representatives.

2. The lab shall specify and make any recommendations to the Contractor and County for fertilizer ratios and rates of application regarding macro- and micro-nutrients during the maintenance period.

C. Soil Testing

1. Soil testing shall be performed to establish a report and needs assessment prior to any work being performed to establish a good growing medium for turf grass.

2. Soil report should consist of compaction ratio, fertility, soil analysis and organic content.

1.05 QUALITY ASSURANCE

A. The County will inspect all materials before, during and after installation to insure compliance with the Contract Documents.

B. Topsoil analysis: Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

1.06 SUBMITTALS

A. Product Data and Certificates for each type of product: Flexible growth medium, fertilizer, weed-and-feed products, lime, organic matter, herbicides and pesticides.

B. Certification of Grass seed for each grass seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include year of production and date of packaging.

C. Certification of Sod used shall be a cultivated state "Certified Sod" in accordance with standards set forth by the State of Maryland. State certification tags shall accompany shipment and be turned over to the County.

PRODUCTS

1.07 MATERIALS

A. Common Borrow

1. Common Borrow shall comply with Harford County Standards and Specifications. Common Borrow shall be two different grades. Borrow for fill areas twelve inches below grade and greater shall comply with general standards for Common Borrow. Borrow for fill four inches to twelve inches below finished grade shall be strictly a natural soil composition and may not contain old pavement materials or other construction debris, including stone base, asphalt, concrete or other similar items.

B. Topsoil

1. Topsoil shall be fertile, friable soil of a sandy-loam composition. Color shall be black or a darker shade of brown, grey or red than underlying subsoils. Topsoil shall not contain any subsoil. Topsoil shall be free from plants, plant parts, Bermuda grass, Quack grass, Johnson grass, Nutsedge, poison ivy, Canada thistle, and other plant material. It shall not contain any slag, cinders, lumps, sticks, roots, trash, glass, rocks, gravel, stones, woodchips, sawdust, or any other extraneous material.

2. Borrow and stockpiled topsoil may be used and both must be in accordance with this specification.

3. All topsoil requires inspection prior to placement and approval by the County.

4. Topsoil: Shall not contain any extraneous material in excess of 3/8" diameter. No more than 10% by weight, shall exceed a 4.75mm (No. 4) sieve maximum opening in any direction of any screen grid. Have a minimum organic content by weight of not less than 2.5% in field areas and 1.5% in non-field areas. Have a pH value of not less than 6.0 and not more than 7.5. PH of on-site topsoil may be adjusted through the application of appropriate materials to meet specified values. Have soluble salts less than 500 parts per million.

C. Amendments, Seed and Sod

1. Compost shall be a manure based turf enhancing organic such as Terra-Gro TM. Or approved equal.

2. Materials: Compost soil amendment shall be a thoroughly-composted, stable, mature, weed-free blended organic product derived from primary organic matter sources including horse and dairy manure, wood shavings

and sawdust livestock bedding, straw, hay and other agricultural components. Material shall contain no municipal solid waste, biosolids, or spent mushroom soil. The material shall contain no substances toxic to plants and be reasonably free (<1% by dry weight) or man-made foreign matter.

3. Guidelines for Organic Soil Amendment.

a. Appearance, size and odor:

Color: shall resemble dark topsoil (brown to very deep brown) and shall have a light, crumbly structure.

Particle size: The material shall be able to pass through a 3/8 inch or smaller screen.

Odor: Amendment shall have an "earthy" aroma, and should not emit peculiar or offensive odors.

Physical Properties

Moisture content: 30% - 55%
Organic matter: >40% (dry weight basis)
Ash content: <60%
Chemical Properties
C/N ration: <25:1
Nitrogen: 0.5% to 3.0%
Phosphorus: >0.2%
Potassium: >0.2%
PH: 6.5 to 8.5
Soluble salts: <4.0 dS (mmhos/cm) as measured in soil mix after amendment

4. Soil amendment manufacturer/supplier shall:

Provide current product analysis test reports demonstrating conformity to physical and chemical parameters specified in sections C.1 through C.3 above. Produce and supply product that is uniform and consistent from load to load and lot to lot.

5. Limestone

a) Shall be ground agricultural limestone suitable for this type of work. Lime shall contain not less than 85% total carbonates and shall be ground to such fineness that at least 50% will pass through a 100-mesh sieve and 98% will pass through a 20-mesh sieve

6. Gypsum

a) Shall be ground agricultural gypsum suitable for this type of work

7. Fertilizer

a) Shall be commercial grade, standard analysis. It shall conform to all State and Federal regulations, and shall be fully labeled in accordance with Maryland's State Law.

b) Specific fertilizer analysis shall be determined by following a soil test report obtained by the Contractor prior to compost application.

c) A minimum 20% of nitrogen content by weight of fertilizer shall be slow release form (sulfur-coated urea or urea form).

8. Grass Seed

a) Shall be fresh, clean, new crop seed. Seed lots shall be state certified and blended under the supervision of the Maryland Department of Agriculture, Turf and Seed section. All seed lots shall have been pre-tested by the Maryland Seed Laboratory to insure compliance with these specifications.

b) All seed used in the mix shall be a variety recommended in the latest edition of the "Agronomy Update" issued by the University of Maryland, Maryland Cooperative Extension, for use in Maryland. Tall Fescue shall be an improved turf-type variety.

c) K-31 is NOT acceptable.

d) Final mix to be submitted to PM or his/her designated representative for review and approval seven (7) days prior to ordering.

e) All seed and labeling shall fully comply with the Maryland Seed law and these specifications.

f) Seed shall be packed in 50-lbs. net weight, in new, clean, poly woven bags, tightly woven to prevent leaking and contamination. Each container shall have an accurate analysis tag, and a certification tag permanently affixed to it.

g) All seed shall be delivered within 48 hours after the seed is mixed and tagged.

h) Seed mixes shall be composed of the following varieties mixed in the proportion shown and tested to the following minimum percentages of purity and germination.

i) At least two (2) varieties of Fescue shall be used in the final mix.

Recommended Percentages:

SEED MIXTURE TO BE:	% BY WEIGHT	% PURITY	% GERMINATION
Kentucky Bluegrass	10%	98%	85%
Turf-type Tall Fescue	90%	98%	90%

9. Sod

a) Sod used shall be a cultivated state "Certified Sod" in accordance with standards set forth by the State of Maryland. It shall be a blend of three varieties of 90% Improved Tall Fescue as recommended by the Maryland Extension Service, and 10% Kentucky Bluegrass. State certification tags shall accompany shipment.

b) The sod shall be grown on a soil that is compatible with the root zone mixture to be used on the playing field.

c) Sod shall be a turf-type tall fescue/bluegrass blend.

d) Sod shall be 12-15 months old at time of harvest and machine stripped to a uniform thickness of 3/4" soil below the thatch layer.

1) Thickness shall not vary more than 1/4 inch from any place on

the roll.

2) Thin sod areas shall be cut out and acceptably patched.

3) No more than 24 hours shall pass from harvest to installation.

4) Sod shall be free of objectionable grasses and broad leafed weeds

5) Sod shall be mowed prior to stripping and have been maintained for a minimum of three months at or near height of final stripping at nursery. Maximum height shall be 2-1/2".

e) Rolled sod shall be big roll cut in approximate widths of greater than or equal to 30 inches and minimum lengths of 50 feet.

10. Mulch

a) Shall be in accordance with the Harford County Sediment and Erosion Control requirements.

11. Turf Covers

a) Turf Covers shall be an agricultural/horticultural specialty fabric consisting of both reinforcing polyethylene tapes and super UV stabilized polyethylene coating such as Covermaster Evergreen Sports Turf Cover or approved equal.

12. Laser Grading Equipment

a) The grading equipment for sports field areas shall consist of two (2) laser receivers with the following: Non-contact, automation control. The grader shall be equipped with dual laser pickup, dual laser grade range mode, and each laser pickup shall operate the one end of the blade elevation automatically once it is locked on the laser beam. The laser source shall be capable of accuracy to two (2) decimal places and shall be capable of operating either in the positive or negative angle configuration without physically moving the laser source head. Additionally and as may be warranted, radial lasers may be required to accomplish the grading plan on Baseball fields or those fields that have a "turtleback" type grading situation.

13. Other Equipment

a) Contractor shall practice care when driving onto or over playing fields under construction or fields adjacent to the project. Large turf or low ground pressure tires shall be used.

PART 2. EXECUTION

2.01 SUBGRADE PREPARATION

A. General: Strip and stockpile topsoil in accordance with Harford County standard specifications. Following the stripping of topsoil, perform excavation within the grading limits to establish sub grade five (5) inches below finished grade, and in conformance with the grades on the Contract Drawings, if provided for a specific project. Where rock or other unsuitable material is encountered, remove unsuitable material to minimum two (2) inches below established subgrade. Transport all suitable excavated material to fill areas and place as indicated on the Contract Drawings or as directed by the County's representative.

2.02 GRADING

A. Laser grade all areas, including transition areas. The finished subgrade surface shall be uniform, smooth, free from irregular surface changes, and properly compacted. The finished subgrade surface shall be obtainable from laser grader operations and shall have an elevation tolerance of 1/2 inch in 25 feet in any direction.

B. Compaction of top six (6) inches of subgrade in fill areas designated for turf and landscaping shall not exceed 90%. The Contractor shall submit two (2) compaction tests per field to the County for review and approval of compliance with the compaction requirement. Prior to top soiling and finish grading, all rough graded areas shall be corrected, adjusted and/or repaired, and brought to proper elevation. All mounds and ridges shall be leveled, gullies and depressions filled, and other necessary repairs performed. The finished sub-grade surface shall meet the above mentioned criteria.

C. Discing or Nail Drag. The subgrade surface shall be loosened and made friable by cross discing, nail dragging or other approved method, to a depth of three (3) inches. All stones and debris one (1) inch or more in any dimension shall be raked-up and removed from the field subgrade surface to a depth of two (2) inches.

D. Inspection/Observation: Subgrade shall be inspected and approved by the County for proper elevation, compaction, and discing and debris removal prior to placement of topsoil. No top-soiling or finished grading work shall occur until PM inspects and approves the subgrade. The Contractor shall provide sufficient notice to avoid an undue delay in the continuation of work.

E. Utility trenches do not need nail drag, discing or other preparation prior to topsoiling.

2.03 TOP SOILING

A. Topsoil: The suitability of material (on-site material or off-site borrow) shall be determined by the County, based on topsoil test reports. The Contractor shall obtain approval of on-site and borrow topsoil and additives by the County prior to delivery or use. No spreading of topsoil shall occur when the soil is in a muddy or frozen condition.

B. Screening: The top four (4) inches of topsoil on playing fields (including safety zones) shall be screened prior to placement to remove all sticks, stones, and other foreign matter over 3/8 inch in diameter. The top four (4) inches of topsoil in non-playing field areas shall be cleaned to remove sticks, stones and other foreign material over 3/8 inch diameter. Additional depth of topsoil used to meet specified grades beyond four (4) inches compacted depth shall comply with rock removal standards for subgrade.

C. Placement: Spread topsoil over all finished and approved subgrade or graded areas within the limits of work not designated for pavement, to a depth of four (4) inches after compaction leaving the sub-base graded to specification. Spread uniformly, without ridges, mounds, gullies or depressions, then add compost and/or lime or gypsum. Till material five (5) inches deep to incorporate the topsoil into the top layer of sub-base. The tilled material can then be screened in situ to remove oversize objects and further blend the root zone. The final finish grade of the topsoil shall take into consideration the addition of compost and soil amendments to be added to the topsoil layer.

2.04 COMPOST AND SOIL AMENDMENTS

A. Compost: Shall be incorporated into all proposed sports-field areas after the finished grade has been approved. A uniform one (1) inch thick layer of compost shall be spread on the finished grade of the entire field, including safety zones with a top dressing machine. Then thoroughly incorporated into the top four (4) inches of topsoil to provide a uniform, homogenous mixture. The contractor shall notify the County for verification of proper compost depth prior to this work.

B. Contractor shall have the option of blending the topsoil and the compost/organic amendment prior to placement onto the field. The method shall be presented to the

County and approved prior to proceeding with this scenario.

C. Contractor shall take care to maintain the finish slope and elevations of the field as verified in the top soiling part of the work

2.05 TOPDRESSING FOR ENHANCEMENT OF EXISTING TURF

A. Rate of application: As determined by soil report or PM, either 1/4 or 1/8 inch application.

B. Method of application: Compost shall be applied uniformly and consistently at rate specified or approved by using pull-behind top-dress spreader unit, modified fertilizer spreader, pneumatic blower equipment, or other appropriate equipment.

C. Incorporation: Existing turf shall be core aerated a maximum of two passes immediately prior to or immediately following topdressing application.

1. Aeration procedure shall be approved by the County prior to this installation. If aeration is deemed to be undesirable at that time, the topdressing shall be applied directly to the top of the existing grass area with a topdresser and broomed into the grass surface.

2. After aeration, compost shall be incorporated into existing soil by mechanical dragging (mat dragging) to effectively break up cores, thoroughly incorporate the turf enhancing organic topdressing with the soil from cores, and work the mixture into voids left from core aeration. This process shall be performed during cool and moist seasons when turfgrass is actively growing, or shall otherwise be supplemented with adequate irrigation.

2.06 OVERSEEDING:

Compost topdressing application may be combined with over seeding or slit seeding as directed by PM or his/her designated representative.

2.07 LIME OR GYPSUM:

Add lime or gypsum in accordance with the results of the soil test and the County's direction. Lime or gypsum shall be applied separately and prior to the application of fertilizer or seed, and only on seedbeds which have been previously prepared. Lime or gypsum shall be incorporated within 24 hours following application. Rototill to mix thoroughly into compost and topsoil.

2.08 FERTILIZER

Add fertilizer in accordance with the results of the soil test and the Maryland Nutrient Management Plan. Thoroughly incorporate into the top four (4) inches of topsoil to provide a uniform, homogenous.

A. Fertility: A complete fertility program shall be implemented. The approved lab shall make recommendations based from initial topsoil material testing. The Contractor and the County shall review the recommendations. Contractor shall submit a fertility plan. This program shall be approved prior to the placement of the seed/sod and based on the environmental conditions of the time of planting, soil fertility testing results of the rootzone mix, and condition of the sod being prepared for harvest for delivery to the site.

2.09 PRE-SEED / SOD FERTILITY APPLICATION

The fertility program shall include an application to the topsoil material mix prior to seeding/sodding. Micro-nutrients shall also be included in this application.

2.10 POST-SEEDING FERTILIZING

The Contractor shall provide post-seeding fertilization as recommended by the Fertility Testing Agent. These applications shall be made through Final Acceptance of the field.

2.11 FINE GRADING AND COMPACTION

A. All grading and shaping operations shall be completed prior to seeding. The surface shall conform to finish grade specifications and be free of water retaining depressions. The soil shall be friable and of uniformly firm textures.

B. No fine grading shall occur when the soil is in a muddy or frozen condition.

C. Proposed turf areas shall be lightly compacted prior to seeding by means of an approved athletic field roller weighing from forty to sixty-five pounds (40-65 lbs.) per foot of width for clay soils and other soils which have a tendency to pack, and from one hundred fifty to two hundred pounds (150-200 lbs.) per foot for sandy or light soils. Rolling shall not be performed when moisture from precipitation causes such rolling to be detrimental to the areas to be seeded as determined by County.

D. The finish grade of the topsoil and incorporated soil amendments shall be graded to smooth and uniform grade. The grading tolerance shall be 1/4 inch in 25 feet in any direction (25 foot grid). The final grade shall be verified using a certified survey performed by a state licensed surveyor and submitted to the County for review and approval.

E. Inspection/Observation: Finish grade shall be inspected and approved by the County for proper elevation, and compaction prior to seeding or sodding. No seeding or sodding work shall occur until a PM or his/her designated representative inspects and approves the finish grade upon reviewing the certified survey and visually observing the field. The Contractor shall provide sufficient notice to avoid an undue delay in the continuation of work.

2.12 SODDING

A. Sod shall be harvested in a uniform manner and placed within 24 hours or harvest.

B. Lay sod to form a solid mass with tightly fitted joints; do not overlap. Wherever a break in the big roll occurs, overlap all ends and trim to tightly fitted joint, removing the excess. Stagger strips to offset joints in adjacent courses. Tamp or roll lightly to ensure contact with soil mixture. Use of plastic mesh shall not be permitted. Contractor shall not rut or damage big roll sod with tires or tracks from the sod machine.

C. All mesh shall be removed prior to placement of big roll sod.

D. Patching: All patches necessary to fill in undesirable areas shall be a minimum of twelve (12) inches in length and the width shall match that of the roll. Patches shall be of the same source and type as the original installation and shall be installed at specified finish grade and watered thoroughly.

E. Sod installation shall be absent of all joints and cracks and appear seamless.

F. The sod shall be rolled, upon completing of installation, with a roller that has a minimum weight of 100 lb/foot and shall have a minimum width of ten (10) feet and a maximum two (2) ton rollers.

2.13 WATERING: GENERAL

A. Begin watering sod as each section is completed.

B. Water to a depth of four (4) inches below the new sod pad.

C. After a short drying period, roll the sod area in two directions to ensure contact with soil mixture and to smooth the area.

D. Water sod areas, as required, through Substantial Completion and until County takes possession.

2.14 MULCH

A. If needed, mulch shall comply with County Erosion and Sediment Control requirements with completion of top dressing on total field grass surfaces if applicable.

PART 3. MAINTENANCE AND ACCEPTANCE

3.01 MAINTENANCE OF NEWLY SEEDED AREAS UNTIL ACCEPTED:

A. General:

1. Perform all operations necessary to maintain the playing field system through the date of Final Acceptance. Contractor shall be responsible for supervising subcontractors' work during this period.

2. Maintenance Period: Shall be for a period sixty (60) days after Preliminary Completion. If after sixty (60) days the requirements described in "Final Acceptance" are not met, this period will be extended at no cost to the County.

3. Minimum Requirements: The following list of items represents the minimum operations necessary to maintain the fields during the installation period. Prepare and present to the County and its' representatives in writing maintenance procedures and schedule prior to grow-in for approval. Schedule items shall include, but not be limited to the following:

a) Mowing: Grass shall be maintained to a neat uniform appearance using clean, sharp, non-contaminated equipment. Grass shall be maintained to a height of 2-1/2 inches through Final Acceptance. Frequency will be dependent on the removal of no more than 1/3 of the grass blade height at any one time to achieve the desired grass height. Remove grass clippings only when an unsightly condition will occur. Mowing pattern to vary with each cut. The mower shall have suitable tires to ensure that there is no rutting of the surface.

b) Rolling: This operation shall only be done after a joint discussion has been held between the Contractor and the County. Additional rolling shall accompany additional aeration operations.

c) Flooded, washed-out, or otherwise damaged or defective areas of seeding, mulch, grade, swales or berms shall be reconstructed and all grades re-established in accordance with the grading plans or other specifications when in the judgment of the PM, such defects or damages are the result of poor workmanship, or failure to meet the requirements of the specifications.

d) Aeration: This operation shall only be done after a joint discussion has been held between the Contractor and PM. Aeration of the field may be required prior to Final Acceptance if determined to be at the appropriate time of year and only after the sod is firmly knitted. Removal of cores may be required. Only hollow tine equipment shall be utilized with a 3/8-inch diameter core and a three (3) inch by three (3) inch grid in one direction or as agreeable.

1) The Contractor shall test during the maintenance period to determine the degree of compaction in seeded areas. If soil is compacted to a degree that water and air penetration is impaired, the Contractor shall aerate these areas to the satisfaction of the County, in a manner that will not be harmful to the plants. The use of slicing or spike type aerators is encouraged, to a minimum depth of three (3) inches. The surface shall be rolled with a roller that has a minimum width of ten (10) inches if deep tine aerification is performed.

e) Sod Replacement/Patching: Verified sod of the same type and source shall be used when necessary. All patches shall be a minimum of twelve (12) inches in width and length.

f) Bare spots that persist after three weeks of favorable growing weather shall be re-cultivated, reseeded, raked, re-mulched and rolled at the Contractor's expense. The Contractor's maintenance period shall continue until the project is accepted.

1) Areas seeded in the Fall which fail to show an adequate stand shall be replanted as above during the following Spring before April 30.

2) Areas seeded in the Spring which fail to show an adequate stand shall be replanted as above during the following Fall before September 30.

g) If the project, in its entirety, is not accepted by the following seeding season, it shall be the responsibility of the Contractor to re-fertilize all of the grassed areas during the following seeding season. Proper maintenance of the turf will continue until Final Acceptance.

h) Watering: The Contractor shall provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of four (4) inches through Final Acceptance of lawn areas.

i) Weed and Pest Control: Herbicides shall be selected for the specific weeds to be controlled. Herbicide application shall conform to the Maryland Pesticide Applicator's Law and the manufacturer's recommendations.

1) Proposed – weed control products and application schedule shall be submitted to the County in accordance with section 1.06 seven (7) days prior to application for approval of use, in order to assure no impact on programmed use of the site.

2) Utilize only commercially licensed personnel and applicators to perform these operations.

PART 4. COMPLETION AND ACCEPTANCE

4.01 General: Field completion shall be separated into two (2) phases, "Preliminary Completion" and "Final Acceptance".

4.02 Preliminary Completion:

A. Shall commence when all finish materials are in place. This will generally be sixty (60) days prior to the date identified by the County for Substantial Completion. Notify the County or its' representative in writing, one week prior to schedule an observation date for "Preliminary Completion". To be considered "Preliminary Complete" the

following items shall be provided:

1) Topsoil material and amendments in place, compacted and to grade.
2) Sod areas laid, joints and seams filled.
3) Seeding completed in all disturbed areas.
4) Topdressing completed if required.
5) Evidence that SWM As-builts have been completed and submitted to Harford County Department of Public Works for review.

4.03 Final Acceptance:

A. After the "Preliminary Completion" observation, the County's representative shall prepare and submit to the Contractor, a punch list of items to be completed to achieve "Final Acceptance." The Contractor shall request from the County, in writing, a site observation meeting one week prior to the anticipated date to meet "Final Acceptance." To be considered "Final Acceptance" the following items shall be provided:

B. Evidence that all "Preliminary Completion" punch list items are complete.

C. Three (3) copies of written operating and maintenance instructions for all appropriate systems shall be furnished. Provide format and contents as directed by the County.

D. Two (2) copies of all certified surveys performed during construction for Quality Control shall be submitted.

E. Completion of top dressing on total field grass surfaces if applicable.

F. Sod installation shall be absent of all joints and cracks and appear seamless.

G. Seeded areas shall be healthy, vigorous grass, covering ninety-five (95) percent of the soil surface in unit increments of one (1) square yard, with no bare areas three (3) inches square or larger, and with an allowable weed content not to exceed five (5) percent.

H. Sod shall be healthy and vigorous, covering ninety-nine (99) percent of the soil surface in unit increments of one (1) square yard, with no bare areas and with an allowable weed content not to exceed one (1) percent. Turf shall have no brown sections or cracks evident.

I. Playing surfaces shall be smooth, level, compacted, and conform to grading tolerances.

J. Written warranties/guarantees shall have been provided.

K. Grass shall have been maintained at a height of 2-1/2 inches.

L. Installation of field markers shall be complete as required.

M. Grass edges shall be cut in crisp, straight lines as depicted on the drawings.

N. SWM As-builts have been accepted and approved by Harford County Department of Public Works.

4.04 Warranty Period:

A. One (1) year warranty period shall begin after final acceptance of the project.

--END OF SECTION--

SECTION 334100
STORM DRAINAGE UTILITIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the Owner's General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Pipe and fittings.
   2. Pre-cast concrete inlets and custom fabricated PVC drainage inlet-basins.
   3. Pre-cast concrete pipe outfall end sections.

B. Related Requirements:

   1. Section 312000 "Earth Moving"

1.3 DEFINITIONS

A. HDPE: High density polyethylene pipe

B. RCCP: Reinforced concrete culvert pipe.

1.4 QUALITY ASSURANCE

A. Harford County, Department of Public Works, Standard Specifications for Construction and Materials (HADPW), latest edition, as amended to date.

   1. Measurement and payment provisions included in standard specifications do not apply to Section 334100.

B. Harford County, Department of Public Works, Book of Standard Details, as amended to
date.

C. Harford County, Department of Public Works, Division of Construction Contracts Administration, Approved List of Suppliers and Materials, latest edition, as amended to date.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Custom fabricated PVC drainage inlets and basins: Include shop drawing plans, sections, details, frames, grates and covers from the manufacturer. Shop drawing plans and sections shall include inverts, top/grate and bottom elevations.

B. HADPW Standard Details:

1. Pre-cast concrete inlets and pipe outfalls: Include standard details, frames, grates, and covers.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of pipe and fitting, from manufacturer.

1. Pipe.
2. Aggregate materials.
3. Concrete Job-Mix Design reports.

B. Field quality-control reports.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic drainage components and pipe in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle pre-cast concrete inlets and pipe end sections according to manufacturer's written rigging instructions.

1.8 PROJECT CONDITIONS

A. Interruption or Disruption of Existing Storm Drain Facilities and Components: Do not interrupt or disrupt the proper functioning storm drain facilities and components unless permitted under the following conditions, and then only after arranging and providing temporary components and facilities if required:

1. Notify Construction Manager and Owner’s Representative no fewer than ten (10) days in advance of proposed interruption or disruption of components and facilities.
2. Do not proceed with interruption or disruption of components and facilities without Construction Manager and Owner Representative's written permission.

PART 2 - PRODUCTS

2.1 GENERAL

A. All pre-cast concrete inlets and pipe end sections shall be in accordance with HADPW specifications and standard details.

B. Custom fabricated PVC drainage inlet-basins: Include plans, sections, details, frames, grates, covers shall be in accordance with the manufacturer's requirements.

2.2 HDPE PIPE AND FITTINGS

A. Corrugated HDPE Drainage Pipe and Fittings NPS 4 through NPS 10: AASHTO M 252, Type S, with smooth interior waterway.

1. Soiltight Couplings: PE sleeve with ASTM D1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings. Gaskets, when applicable, shall be installed by the manufacturer.

B. Corrugated PE Pipe and Fittings NPS 12 through NPS 60: AASHTO M 294, Type S, with smooth waterway for coupling joints.

1. Soiltight Couplings: PE sleeve with ASTM D1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings. Gaskets, when applicable, shall be installed by the manufacturer.

C. Fittings shall be in accordance with AASHTO M 252, AASHTO M294, or ASTM F2306.

2.3 2.3 CONCRETE PIPE

A. Reinforced-Concrete Culvert Pipe (RCCP) and Fittings: ASTM C76.

1. Bell-and-spigot or tongue-and-groove ends and gasketed joints with ASTM C443, rubber gaskets
2. Class III, Wall B.
3. Class IV, Wall B.
4. Class V, Wall B.
5. Refer to the Drawings for classes of pipe required.

2.4 BEDDING FOR PIPES AND STORM DRAIN INLET-BASIN COMPONENTS

A. Bedding for pipes and components shall be #57 washed aggregate in accordance with HADPW specifications.

2.5 CONCRETE

A. General: Cast-in-place concrete in accordance with ACI 318, ACI 350/350R, and HADPW specifications:

1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Concrete Job-Mix Design: Mix No. 3 (3500 psi minimum) in accordance with HADPW specifications.

2.6 RE-CAST CONCRETE INLETS

A. Standard Precast Concrete Inlets: In accordance with HADPW specifications and standard details, as indicated on the Drawings.

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: As indicated, in accordance with HADPW specifications and standard details.

2.7 CUSTOM FABRICATED PVC DRAINAGE INLET-BASINS

A. PVC Drainage Basins, Inlets, and Stormwater Management Control Structures

1. Shall be as manufactured by the following, or

approved equal: Nyloplast
3130 Verona Avenue
Buford, GA 30518
Telephone: 866-932-2443 Website: nyloplast-us.com

2. Configuration of drainage basins, in-line drains, stormwater management control structures, incoming and outgoing pipes, frames and grates shall be as indicated.

2.8 PRE-CAST CONCRETE PIPE OUTLETS AND END SECTIONS:

A. In accordance with HADPW specifications and standard details.

B. End Sections: As indicated on the Drawings.

PART 3 - EXECUTION

3.1 GENERAL:

A. Installation shall be in accordance with HADPW specifications, standard details, the Harford County Plumbing Code as applicable, and the manufacturer's instructions for custom fabricated PVC drainage inlet-

basin components.

3.2 EARTHWORK

A. Excavation, trenching, backfilling and compaction are specified in Section 312000 "Earth Moving."

3.3 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install inlets or manholes for changes in direction unless fittings are indicated. Use fittings for branch connections.

D. Where applicable, install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process or microtunneling.

F. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.
2. Install HDPE corrugated storm drain piping according to ASTM D2321 and the manufacturer’s recommendations.
3. Install reinforced-concrete culvert piping according to ASTM C1479 and ACPA's "Concrete Pipe Installation Manual."

3.4 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated HDPE piping according to ASTM D3212 for push-on joints, and the manufacturer’s recommendations.
2. Join reinforced-concrete sewer piping according to ACPA's

"Concrete Pipe Installation Manual" for rubber-gasketed joints.

3.5 PRE-CAST CONCRETE INLET INSTALLATION

A. Install inlets, sizes and shapes indicated as indicated, in accordance with HADPW specifications and standard details.

B. Set frames and grates to elevations indicated.

3.6 PRE-CAST CONCRETE PIPE END SECTION INSTALLATION

A. Install pipe outlets that spill onto grade, with flared end sections that match pipe, as indicated, in accordance with HADPW specifications and standard details.

3.7 CUSTOM FABRICATED PVC DRAINAGE INLET-BASIN INSTALLATION

A. Install custom fabricated PVC inlet-basins as indicated and in accordance with the approved shop drawings provided by the manufacturer.

B. Set tops/grates to elevation indicated.

3.8 CONCRETE PLACEMENT

A. Place cast-in-place in accordance with ACI 318 and HADPW specifications.

3.9 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

A. General: In accordance with HADPW specifications. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Repair or replace defective workmanship in accordance with HADPW specifications.
3. Replace defective piping using new materials, and repeat

inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
3. Submit separate report for each test.
4. Gravity-Flow Storm Drainage Piping: Test according to requirements of the following:

a. Option: Test plastic piping according to ASTM F1417.
b. Option: Test concrete piping according to ASTM C924.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 334100

HARFORD COUNTY
PUBLIC SCHOOLS
JOPPATOWNE HIGH SCHOOL
DRAINAGE IMPROVEMENTS

HARFORD COUNTY, MARYLAND
BID NUMBER: 25-JHP-023

OWNER'S/DEVELOPER'S CERTIFICATE

"I/We hereby certify that all clearing, grading, construction and/or development will be done pursuant to this plan and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of Natural Resources approved training program for the control of sediment and erosion before beginning this project."

Signature _____ Date _____

Printed Name and Title _____

GENERAL NOTES

1. OWNER: BOARD OF EDUCATION OF HARFORD COUNTY
   102 SOUTH HICKORY AVENUE
   BEL AIR, MD 21014
   CONTACT: JENNIFER HORNER
   PHONE: 410-838-4753 EXT. 7643
   EMAIL: JENNIFER.HORNER@HCPS.ORG
2. SURVEY PERFORMED BY SMC DATED FEBRUARY 10, 2025.
3. THE HORIZONTAL DATUM OF THIS SURVEY IS MARYLAND STATE PLANE (NAD83/11)
4. THE LOCATION OF UNDERGROUND UTILITIES IS BASED ON AVAILABLE RECORDS. CONTRACTOR TO VERIFY IN FIELD.
5. NRCS WEB SOIL SURVEY IDENTIFIES SOILS AT THIS SITE AS BoA – BAILE SILT LOAM, GcC – GLENELG LOAMM, GcB2 – GLENELG LOAM, GNB – GLENVILLE SILT LOAM, MbC – MANOR LOAM, HcA – HATBORO-CODORUS COMPLEX, MbD – MANOR LOAM, MfE – MANOR SOILS.
6. FLOODPLAIN ASSOCIATED WITH THIS SITE HAS BEEN INCLUDED IN THE REPORT.
7. DETAIL DRAWINGS AND SCHEDULES DESCRIBE CONSTRUCTION AT GIVEN AREAS. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL UTILIZE EQUIVALENT CONSTRUCTION METHODS IN ALL AREAS NOT DETAILED.
8. ALL NOTES ON DRAWINGS SHALL BE ASSUMED AS TYPICAL, UNLESS OTHERWISE SHOWN OR NOTED ON THE DRAWINGS.
9. IT SHALL BE THE DUTY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS GIVEN ON THE DRAWINGS AND TO REPORT TO THE ENGINEER ANY ERROR OR INCONSISTENCY WITH THE ACTUAL CIRCUMSTANCES IN THE FIELD BEFORE COMMENCING WORK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL ITEMS REQUIRED TO PROVIDE A SITE CLEAR OF OBSTRUCTIONS (ABOVE & BELOW GRADE) AND GRADED TO SPECIFIED ELEVATIONS.
11. ALL BIDDERS: THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE HIM/HERSELF WITH THE EXISTING CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED PRIOR TO SUBMITTING BID.
12. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL SITE SUB-CONTRACTORS/BIDDERS WITH FULL AND COMPLETE SETS OF ALL CIVIL DRAWINGS AND SPECIFICATIONS FOR THEIR USE IN PREPARING BIDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DELAYS AND COSTS ARISING DURING CONSTRUCTION FROM BIDS BASED UPON INCOMPLETE SETS OF SITE BID DOCUMENTS.
13. ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY, SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST HARFORD COUNTY DPW STANDARDS AND SPECIFICATIONS. THIS WORK INCLUDES, BUT NOT LIMITED TO: REPAIRING; RESTORING; AND OBTAINING FINAL INSPECTION APPROVALS.
14. PRIOR TO VEGETATIVE STABILIZATION, ALL DISTURBED AREAS MUST BE TOPSOILED PER THE SPECIFICATION FOR TOPSOIL (SEE SHEET C-410) AND TECHNICAL SPECIFICATIONS. IF ON-SITE MATERIALS DO NOT MEET REQUIREMENTS OF TOPSOIL, COORDINATE WITH OWNER REGARDING TILLING-IN OF CERTIFIED COMPOST TO ON-SITE SOILS IN ORDER TO MEET SPECIFICATION.
15. ANY DISCREPANCIES, OMISSIONS, AMBIGUITIES, OR CONFLICTS IN AND AMONG THE CONSTRUCTION DOCUMENTS OR DOUBT ABOUT THEIR MEANING, SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER FOR DIRECTION BEFORE PROCEEDING WITH WORK. IF AMBIGUITIES EXIST, THE BETTER QUALITY AND GREATER QUANTITY OF WORK SHALL BE BID UPON AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE INDICATED BY THE OWNER IN WRITING.
16. CLARK | AZAR AND ASSOCIATES (CAA) WILL RELEASE CAD BASE FILES OF THE SITE CIVIL DRAWINGS TO THE SUCCESSFUL CONTRACTOR WITHOUT FEE AFTER A RELEASE IS SIGNED. NO CAD FILES WILL BE RELEASED PRIOR TO AWARD OF CONTRACT.
17. ALL MATERIALS AND METHODS SHALL COMPLY WITH THE FOLLOWING:
    - HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, LATEST EDITION
    - MARYLAND STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, LATEST EDITION
    - HARFORD COUNTY ROAD CODE BOOKS, LATEST EDITION
18. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HIRE A THIRD-PARTY INSPECTION/TESTING AGENCY TO PERFORM BACKFILL COMPACTION TESTING.

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. BEFORE EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION THAT ALL UTILITIES HAVE BEEN MARKED, 48 HOURS AFTER CALLING MISS UTILITY. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE HARFORD COUNTY CODE.

VICINITY MAP
SCALE: 1"=2000'

OVERALL SHEET INDEX		
SHEET	SHEET NAME	SHEET NUMBER
C-001	COVER SHEET	1
C-100	EXISTING CONDITIONS AND DEMOLITION PLAN	2
C-200	SITE AND GRADING PLAN	3
C-310	STORM DRAIN DETAILS	4
C-340	STORM DRAIN PROFILES	5
C-341	STORM DRAIN PROFILES	6
C-400	EROSION AND SEDIMENT CONTROL PLAN	7
C-410	EROSION AND SEDIMENT CONTROL NOTES	8
C-415	EROSION AND SEDIMENT CONTROL NOTES	9

ENGINEER'S CERTIFICATION

I certify that this plan for erosion and sediment control and stormwater management represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the 1994 Maryland Standard and Specifications for Soil Erosion and Sediment Control

Engineer _____ APRIL 30, 2025 Date

Site Analysis:

Total Site Area	66.33 Ac.
Total disturbed Area	2.31 Ac.
Area to be paved	0.10 Ac.
Area to be stabilized	2.21 Ac.
Cut	368 CY
Fill	450 CY
Topsoil	225 CY

NPDES ID PT. N: 636944.71 E: 1495076.63

(FYI: Please provide the Maryland Grid Coordinates, NAD'83 for a point within your limit of project [center of a bldg or a point in a new entrance road into a subdivision for example,]. The NPDES I D pt is used as a project identifier for the State of Maryland's Notice of Intent document under the NPDES program)

DEVELOPER'S/LANDOWNER'S CERTIFICATION

I/We hereby certify that all proposed work shown on these construction drawing(s) will be accomplished pursuant to these plans. I/We also understand that it is my/our responsibility to have the construction supervised and certified, including the submittal of "As-Built" plans within 30 days of completion, by a Registered Professional Engineer.

Signed: _____
Print Name: _____
Date: _____

ENGINEER'S CERTIFICATION

I hereby certify that this plan has been prepared by me, or under my supervision, and meets the minimum standards of the Harford County Department of Public Works and/or the United States Department of Agriculture, Soil Conservation Service, and/or the Maryland Department of the Environment, Water Management Administration.

Signed: _____
Print Name: JASON AZAR
Date: APRIL 30, 2025
P.E. No.: 31168

AS-BUILT CERTIFICATION

I hereby certify that the facility shown on this plan was constructed as shown on the "As-Built" plans and meets the approved plans and specifications.

Signed: _____
Print Name: _____
Date: _____
P.E. No.: _____

FIELD VERIFICATION CERTIFICATION

I HEREBY CERTIFY THAT I COMPLETED A FIELD VERIFICATION TO THE INFORMATION SHOWN ON THE PLANS ON MARCH 2025 AND THAT THE INFORMATION SHOWN ON THE PLANS IS IN AGREEMENT WITH THE ACTUAL FIELD CONDITIONS.

JASON AZAR
PRINTED NAME _____
SIGNED _____ APRIL 2025 DATE

EROSION AND SEDIMENT CONTROL
PLAN #: 52532

TECHNICAL CONCURRENCE _____

HARFORD SOIL CONSERVATION _____

APPROVED

HARFORD SOIL CONSERVATION _____

CLARK | AZAR & ASSOCIATES
10451 Mill Run Circle, Suite 630
Owings Mills, MD. 21117
T(301) 528-2010
www.clarkazar.com
A Woman Owned Small Business

4/30/2025

DATE:	APRIL 2025
CAA PROJECT NO.	511.001
DRAWN BY:	AN
CHECKED BY:	JA

PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 31168
EXPIRATION DATE: 01/12/2027

NO.	DATE	ISSUE OR REVISION
1	04/30/2025	BID SET

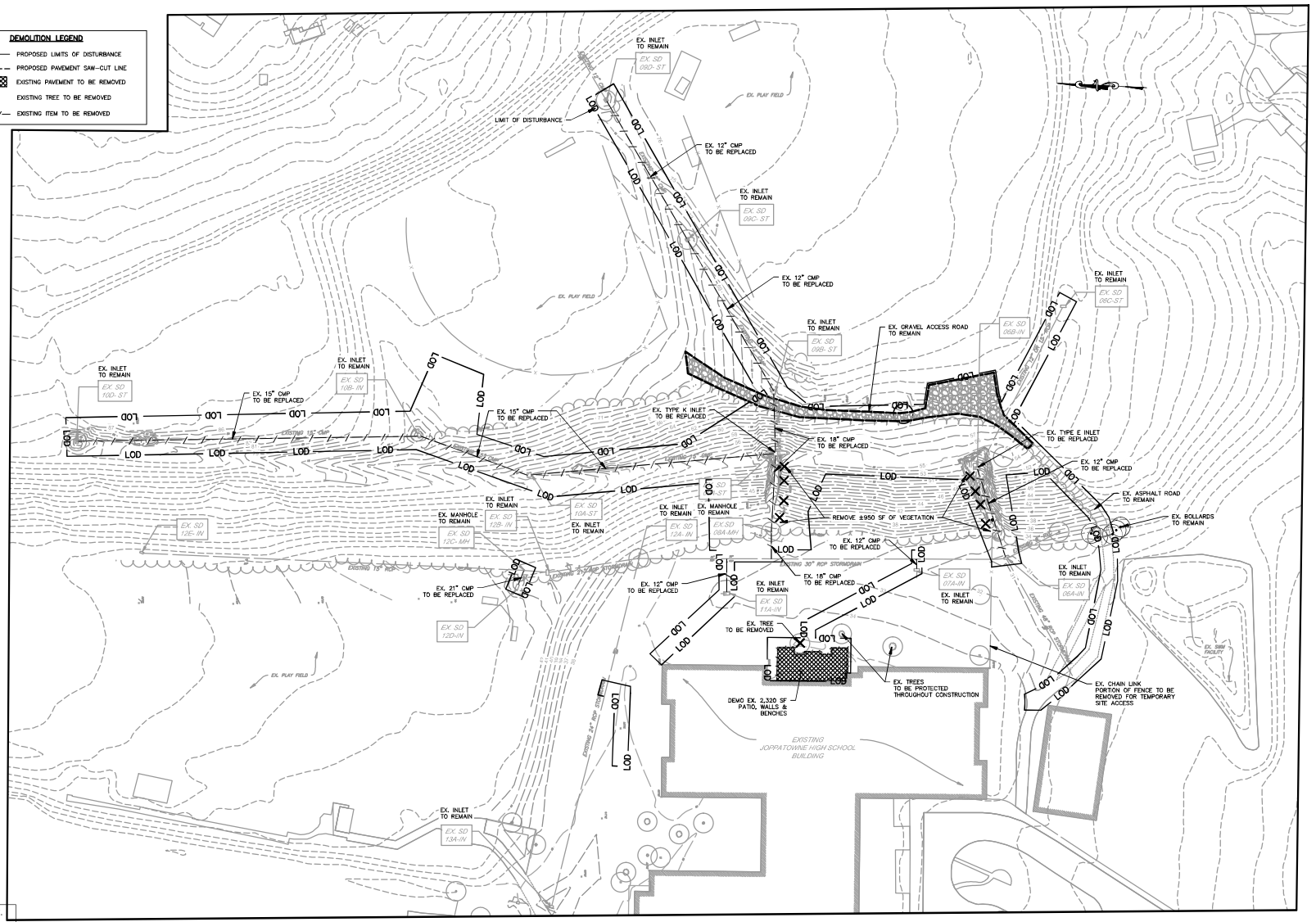
JOPPATOWNE HIGHSCHOOL
DRAINAGE IMPROVEMENTS
555 JOPPA FARM ROAD
HARFORD COUNTY
JOPPA, MD 21085

TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

COVER SHEET

C-001

SHEET 1 OF 9



GENERAL NOTES

1. TOPOGRAPHY SURVEY PROVIDED BY SMC DATED FEBRUARY 7, 2025 AND SUPPLEMENTED BY HARFORD COUNTY GIS DATA. NO BOUNDARY SURVEY WAS PERFORMED.
2. THE LOCATIONS OF EXISTING TREES ARE APPROXIMATE, AND WERE NOT FIELD LOCATED.

GENERAL DEMOLITION NOTES

1. THE CONTRACTOR SHALL BE LIMITED TO STORING MATERIALS IN DESIGNATED STAGING AREAS OR WITHIN THE LIMITS OF DISTURBANCE FOR THIS PROJECT.
2. ALL CONSTRUCTION ACTIVITY SHALL BE COORDINATED WITH THE OWNER.
3. CONTRACTOR SHALL PROVIDE REQUIRED SIGNAGE AND FLAGMEN ALONG ALL PUBLIC STREETS ADJACENT TO THE SITE, TO ASSURE THE SAFETY OF ALL VEHICULAR AND PEDESTRIAN TRAFFIC IF REQUIRED. ALL TRAFFIC CONTROLS MUST BE IN ACCORDANCE WITH THE MOST CURRENT MUTCD AND MdMUTCD REQUIREMENTS AND WITH THE MOST CURRENT MDOT WORK ZONE TRAFFIC CONTROL STANDARDS AND DETAILS.
4. ALL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH THE MOST CURRENT APPLICABLE EPA, OSHA, AND MOSHA REGULATIONS AND MUST COMPLY WITH THE MOST CURRENT FEDERAL, STATE AND/OR LOCAL REGULATIONS AND CODES APPLICABLE TO SAID WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK WITH REPRESENTATIVE UTILITY COMPANIES AND IMPLEMENTING REQUIRED UTILITY-RELATED WORK ACCORDINGLY.
6. THE CONTRACTOR SHALL NOTIFY THE OWNER AND/OR OWNERS REPRESENTATIVE IMMEDIATELY UPON ENCOUNTERING ANY HAZARDOUS MATERIALS. THE CONTRACTOR SHALL DOCUMENT SAME TO THE OWNER TO OBTAIN DIRECTION AS TO THE APPROPRIATE ACTION(S) TO BE TAKEN.
7. WHERE NEW WORK IS TO BE DONE, CARE SHALL BE TAKEN TO PROTECT ALL EXISTING ADJACENT SURFACES, STRUCTURES, AND AREAS FROM DAMAGE. ANY ITEM SHOWN TO REMAIN THAT IS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
8. CONTRACTOR SHALL BACKFILL EXCAVATED AREAS WITH ACCEPTABLE MATERIAL, AS SPECIFIED IN THE CONTRACT DOCUMENTS.
9. THE CONTRACTOR SHALL SHEET/SHORE AND BRACE ANY AND ALL STRUCTURES EXPOSED BY EXCAVATION/CONSTRUCTION IF REQUIRED AND SHALL CONTAIN ALL EXCAVATION WITHIN THE LIMITS OF DISTURBANCE. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN OF SHEETING AND SHORING IN ACCORDANCE WITH LOCAL, STATE, OR FEDERAL REQUIREMENTS.
10. IN THE EVENT THAT, DURING DEMOLITION OR CONSTRUCTION ACTIVITIES THE CONTRACTOR ENCOUNTERS ANY EXISTING UTILITIES/STRUCTURES NOT SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE OWNER FOR DIRECTIONS PRIOR TO PROCEEDING WITH ANY WORK.
11. ALL SAWCUTS ARE TO BE STRAIGHT AND EVEN, JAGGED EDGES WILL NOT BE ACCEPTED.
12. IT IS THE INTENT OF THIS DEMOLITION PHASE TO PROVIDE A SITE CLEAR OF ALL PHYSICAL CONSTRUCTIONS THAT WILL IMPEDE NEW CONSTRUCTION. PHASE STORM DRAIN REMOVAL AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE THROUGHOUT CONSTRUCTION.
13. THE DEMOLITION PLAN IS INTENDED TO PROVIDE AN OVERALL INTENT OF DEMOLITION THAT WILL BE PERFORMED THROUGHOUT CONSTRUCTION. SOME DEMOLITION IS PHASED AND PROGRESSES AS CONSTRUCTION CONTINUES. ALL DEMOLITION, AND MOST IMPORTANTLY UTILITY DEMOLITION, MUST BE PERFORMED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND THE SEQUENCE OF CONSTRUCTION.
14. PRIOR TO THE START OF CONSTRUCTION AN ON-SITE MEETING WITH THE OWNER AND THEIR GENERAL CONTRACTOR SHALL BE HELD TO DISCUSS TIMING OF OPERATIONS AND CONSTRUCTION COORDINATION.
15. BEFORE ANY EXCAVATION BELOW SUBGRADE IS ALLOWED, THE CONTRACTOR SHALL VERIFY THAT NO UTILITY PIPING IS IN THE VICINITY OF EXCAVATION.
16. THE CONTRACTOR SHALL CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL UNDERGROUND UTILITIES IN THE AREA OF PROPOSED WORK ARE LOCATED PRIOR TO COMMENCING CONSTRUCTION WORK.
17. THE CONTRACTOR IS ALSO RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES (NOT LOCATED BY MISS UTILITY) WITHIN THE WORK AREA AT THEIR EXPENSE. ALL UTILITIES SHOWN ON THE PLANS ARE PROVIDED FOR INFORMATION ONLY AND SHALL BE CONSIDERED APPROXIMATE. THE OWNER WILL NOT LOCATE ANY OF THE EXISTING UNDERGROUND UTILITIES. ANY UTILITIES OR OTHER UNDERGROUND FACILITIES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED/REPLACED AT THE CONTRACTOR'S EXPENSE.
18. WHEN AN ITEM IS STATED TO BE REMOVED, IT SHALL INCLUDE REMOVAL OF ANY AND ALL APPURTENANCES ABOVE OR BELOW GRADE ASSOCIATED WITH SAID ITEM.
19. ALL SIDEWALKS ARE TO BE REMOVED AT THE NEAREST WHOLE PANEL

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. BEFORE EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION THAT ALL UTILITIES HAVE BEEN MARKED, 48 HOURS AFTER CALLING MISS UTILITY. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE HARFORD COUNTY CODE.

EXISTING CONDITIONS AND DEMOLITION PLAN
SCALE: 1" = 50'

CLARK | AZAR & ASSOCIATES
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Owings Mills, MD. 21117
T(301) 528-2010
www.clarkazar.com
A Woman Owned Small Business

4/30/2025

DATE:	APRIL 2025
CAA PROJECT NO.:	511.001
DRAWN BY:	AN
CHECKED BY:	JA

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO.: 31168 EXPIRATION DATE: 01/12/2027

NO.	DATE	ISSUE OR REVISION
1	04/30/2025	BID SET

JOPPATOWNE HIGHSCHOOL DRAINAGE IMPROVEMENTS

555 JOPPA FARM ROAD
HARFORD COUNTY
JOPPA, MD 21085

TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

0 50' 100'
GRAPHIC SCALE

EXISTING CONDITIONS AND DEMOLITION PLAN

C-100

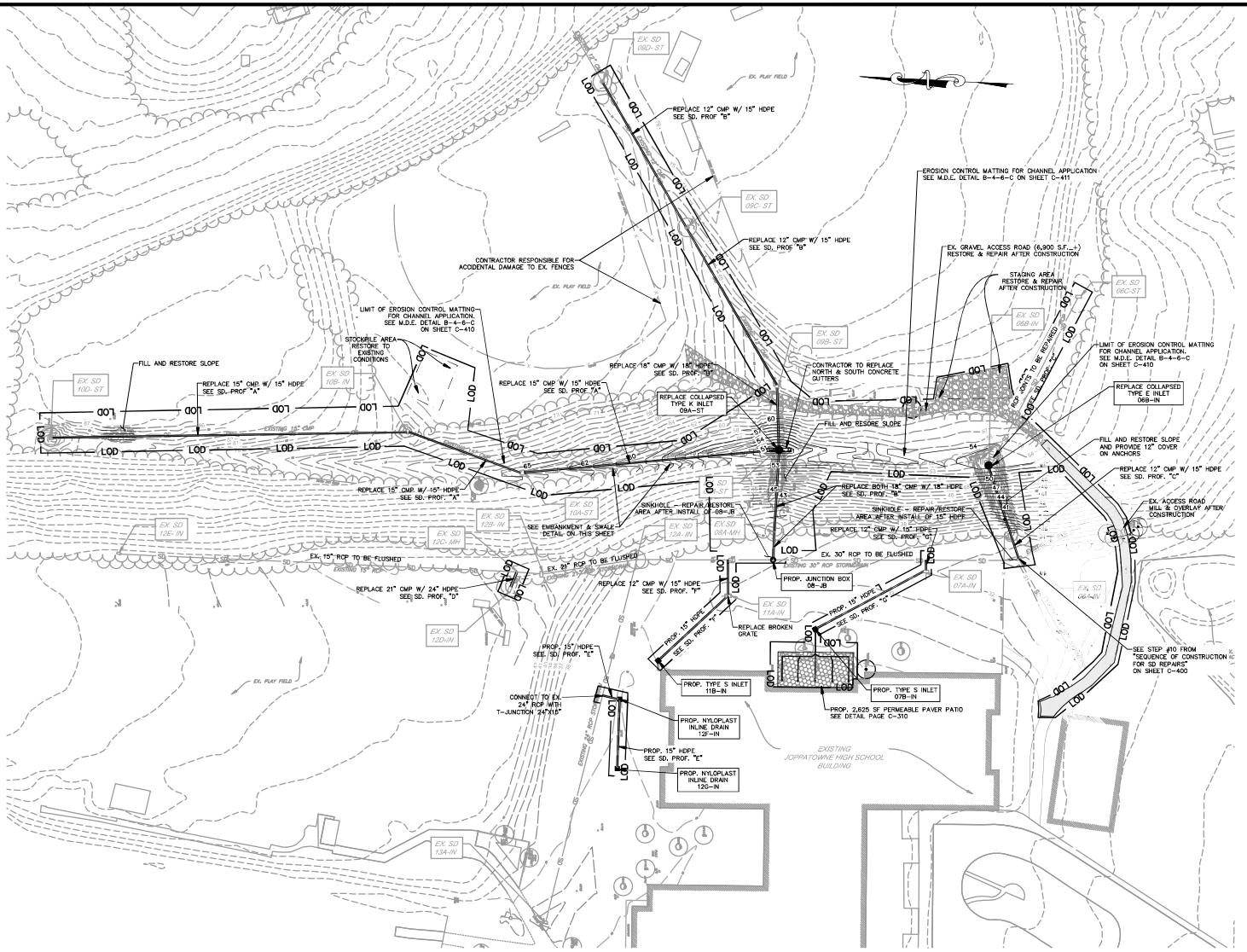
SHEET 2 OF 9

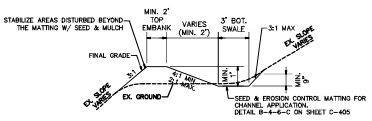
GENERAL NOTES

1. ALL WORK PERFORMED ON THIS PROJECT SHALL BE IN ACCORDANCE WITH HARFORD COUNTY ROAD CODE AND STANDARD SPECIFICATIONS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO, AND MAINTENANCE AND PROTECTION OF EXISTING UTILITIES AND STRUCTURES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING THE LATEST APPROVED EROSION AND SEDIMENT CONTROL PLAN NUMBER.
4. THE CONTRACTOR IS TO CLEAR THE FILL LIMIT OF DISTURBANCE AND ANY AREA WHICH WILL RECEIVE FILL.
5. REINFORCED CIRCULAR CONCRETE PIPE (RCCP) STORM DRAIN SHALL CONFORM TO AST C76 STANDARDS. ALL PIPE JOINTS SHALL BE MORTARED AND WRAPPED IN FILTER CLOTH OR SHALL HAVE RUBBER GASKETS CONFORMING TO AST C443 STANDARDS.
6. WHEN BITUMINOUS BLACK BASE IS USED, A TACK COAT WILL BE REQUIRED BEFORE FINAL SURFACE COURSE IS LAID.
7. ALL DISTURBED AREAS AS A RESULT OF ROADWAYS AND STORM DRAIN CONSTRUCTION SHALL BE SEEDED AND MULCHED WITHIN FOURTEEN (14) DAYS AFTER COMPLETION.
8. THE DEVELOPER SHALL BE RESPONSIBLE FOR MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL DURING CONSTRUCTION AND PRIOR TO ACCEPTANCE BY THE COUNTY;CONSISTENT WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES--LATEST EDITION.
9. ALL INLETS AND MANHOLES SHALL BE BACKFILLED WITH NO.57 AGGREGATE FOR A WORTH OF 1.5 FEET OUTSIDE THE PERIMETER OF THE INLET AS PER SECTION 305 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, HARFORD COUNTY EDITION EFFECTIVE DATE DEC 8,2008.
10. HARFORD COUNTY REQUIRES ALL INLETS TO BE BICYCLE SAFE CONSTRUCTION,GRATES SHALL BE APPROVED BY HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS.
11. BEFORE THE START OF CONSTRUCTION, THE CONTRACTOR IS TO VERIFY THE LOCATION OF EXISTING UTILITIES BY CONTACTING "MISS UTILITY" @ (1-800-257-7777 OR 811)

GENERAL NOTES

1. ALL MATERIALS TO BE USE AS FILL OR BACKFILL SHOULD BE INSPECTED, TESTED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
2. THE CONTRACTOR SHALL FIRST REMOVE ALL DEBRIS FROM THE CUT/FILL AREAS.ALL EXCAVATION FROM THE REMOVAL OF EXISTING DEBRIS SHOULD BE BACKFILLED WITH CONTROLLED , COMPACTED FILL.
3. SOIL IMPORTED TO THE SITE FOR USE AS COMPACTED FILL (SELECT FILL) SHOULD BE CLASSIFIED AS SM OR BETTER ACCORDING TO THE UNIFIED CLASSIFICATION SYSTEM,CONTRACTOR SHALL USE A DRY DENSITY OF 110 PSF ACCORDING TO THE MODIFIED PROCTOR.THE MOISTURE CONTENT OF THE IMPORT FILL SHALL BE WITHIN 2 PERCENTAGE POINTS OF THE OPTIMUM MOISTURE CONTENT OF THE SOIL.
4. THE FINISH SUBGRADE AT ALL CUT/FILL AREAS SHALL BE COMPACTED AT 95 PERCENT.
5. THE FILL SHOULD BE PLACED IN 8-INCH MAXIMUM LOOSE LIFTS AND BE COMPACTED TO AT LEAST 95 PERCENT OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM-D1557). FIELD MOISTURE CONTENTS OF THE FILL MAY HAVE TO BE ADJUSTED IN ORDER TO OBTAIN SUSTAINABLE DEGREES OF COMPACTION.IT IS ANTICIPATED THAT FIELD MOISTURE CONTENTS OF FILL MATERIALS WILL NEED TO BE CONTROLLED TO THE RANGE OF OPTIMUM MOISTURE CONTENT PLUS OR MINUS 2 PERCENTAGE POINTS IF STABLE FILLS WITH ADEQUATE DEGREES OF COMPACTION ARE TO BE OBTAINED ON THE MOISTURE CONTENT TESTS OF THE BORING SAMPLES, AERATION AND DRYING OF THE SITE FILLS SHOULD BE ANTICIPATED.
6. SLOPES NO STEEPER THAN 2(H):1(V) SHOULD BE USED.
7. ALL FILL PLACEMENT AND COMPACTION OPERATIONS IN CRITICAL AREAS (I.E. STRUCTURAL AREAS), SHOULD BE MONITORED BY AN EXPERIENCED SOILS INSPECTOR ON A FULL-TIME BASIS TO ENSURE THAT FILL MATERIALS ARE BEING PLACE AND COMPACTED IN COMPLIANCE WITH PROJECT SPECIFICATIONS.
8. SHOULD ANY COMPACTION PROBLEMS DEVELOP DURING GRADING OPERATIONS, THE GEOTECHNICAL ENGINEER SHOULD BE CONSULTED FOR AN EVALUATION OF THE PROBLEMS.
9. NRCS WEB SOIL SURVEY IDENTIFIES SOILS AT THIS SITE AS GAILA SILT LOAM, GLENELG SILT LOAM AND BRINKLOW-BLOCKTOWN CHANNERY SILT LOAMS ("HSG-B', "HSG-B' & "HSG-C').
10. THERE IS NO MAPPED FLOODPLAIN ASSOCIATED WITH THIS SITE PER FEMA FLOOD INSURANCE RATE MAP NUMBER 24031C0187D, DATED SEPTEMBER 29, 2006.





EMBANKMENT & SWALE DETAIL
NOT TO SCALE

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. BEFORE EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION THAT ALL UTILITIES HAVE BEEN MARKED, 48 HOURS AFTER CALLING MISS UTILITY. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE HARFORD COUNTY CODE.

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A Woman Owned Small Business

4/30/2025

DATE: APRIL 2025
CAA PROJECT NO.: 511.001
DRAWN BY: AN
CHECKED BY: JA

PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 31168
EXPIRATION DATE: 01/12/2027

NO.	DATE	ISSUE OR REVISION
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JOPPATOWNE HIGHSCHOOL
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555 JOPPA FARM ROAD
HARFORD COUNTY
JOPPA, MD 21085

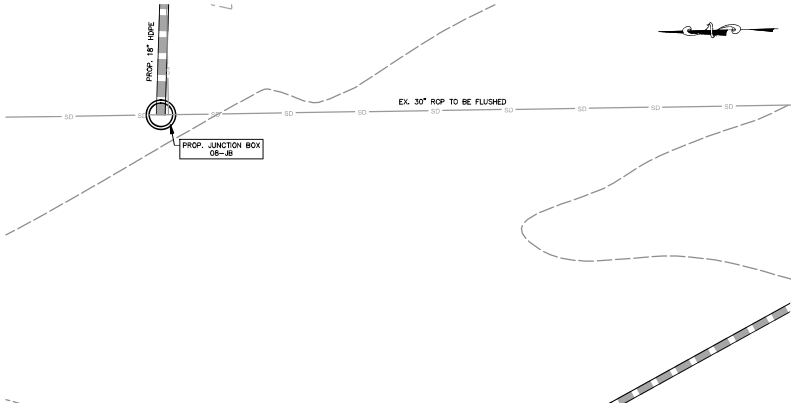
TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

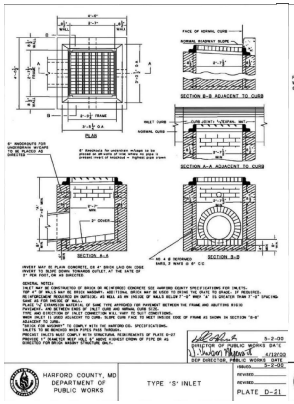
0 50' 100'
GRAPHIC SCALE

SITE AND GRADING PLAN

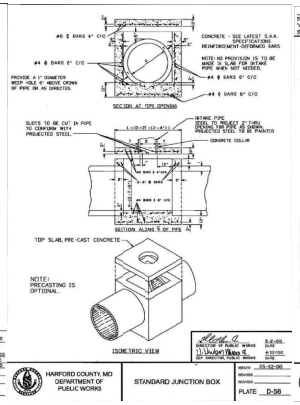
C-200

SHEET 3 OF 9

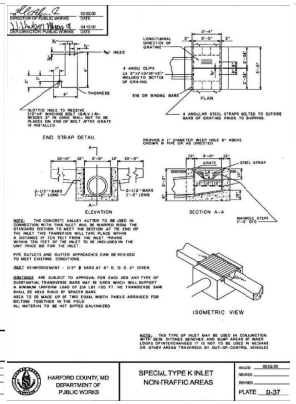




(FOR PROP. 07B-IN, 11B-IN)



(FOR PROP. 08-JB)



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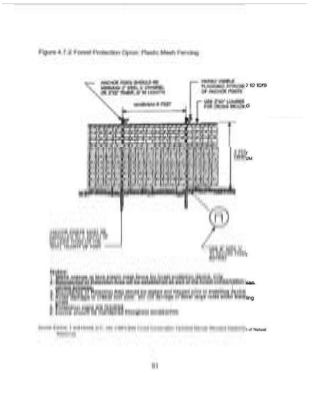
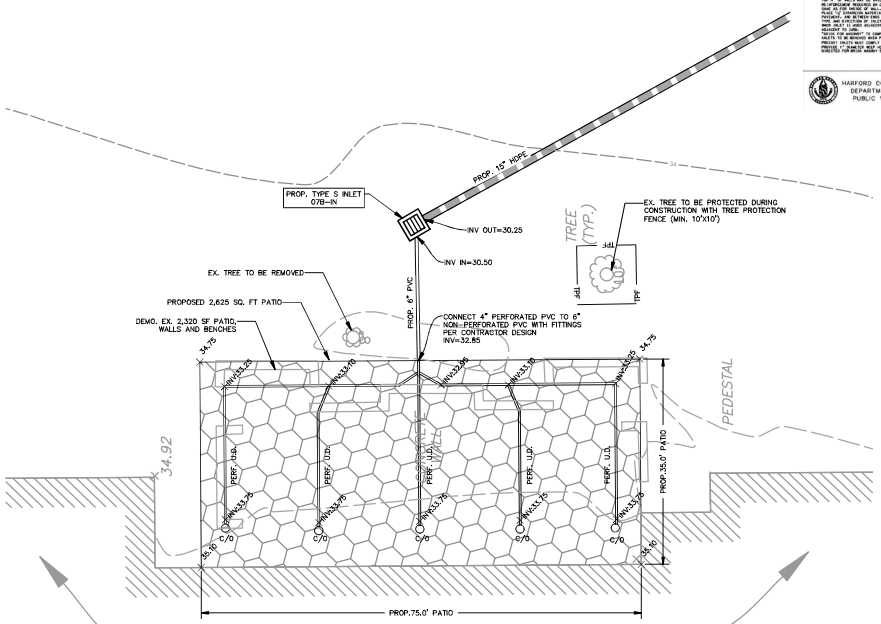
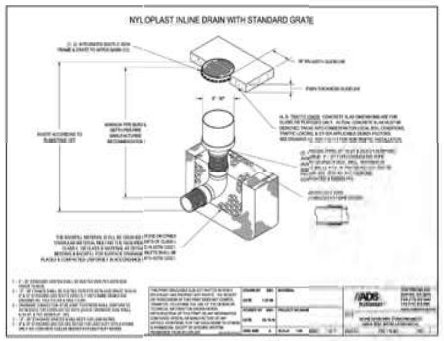


TREE PROTECTION DETAIL



PATIO DETAIL



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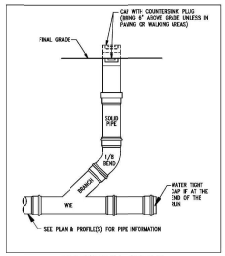
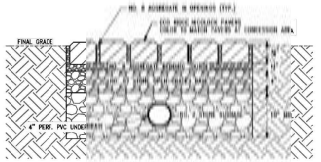


C.E.A.N.O.U.T. DETAIL
NOT TO SCALE



PERMEABLE PAVERS SECTION
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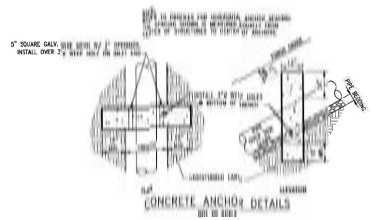

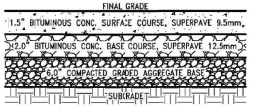

LIGHT DUTY PAVING SECTION
NOT TO SCALE

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. BEFORE EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION THAT ALL UTILITIES HAVE BEEN MARKED, 48 HOURS AFTER CALLING MISS UTILITY. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE HARFORD COUNTY CODE.

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4/30/2025

DATE:	APRIL 2025
CAA PROJECT NO.	511.001
DRAWN BY:	AN
CHECKED BY:	JA

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 31168 EXPIRATION DATE: 01/12/2027

NO.	DATE	ISSUE OR REVISION
1	04/30/2025	BID SET

JOPPATOWNE HIGHSCHOOL
DRAINAGE IMPROVEMENTS

555 JOPPA FARM ROAD
HARFORD COUNTY
JOPPA, MD 21085

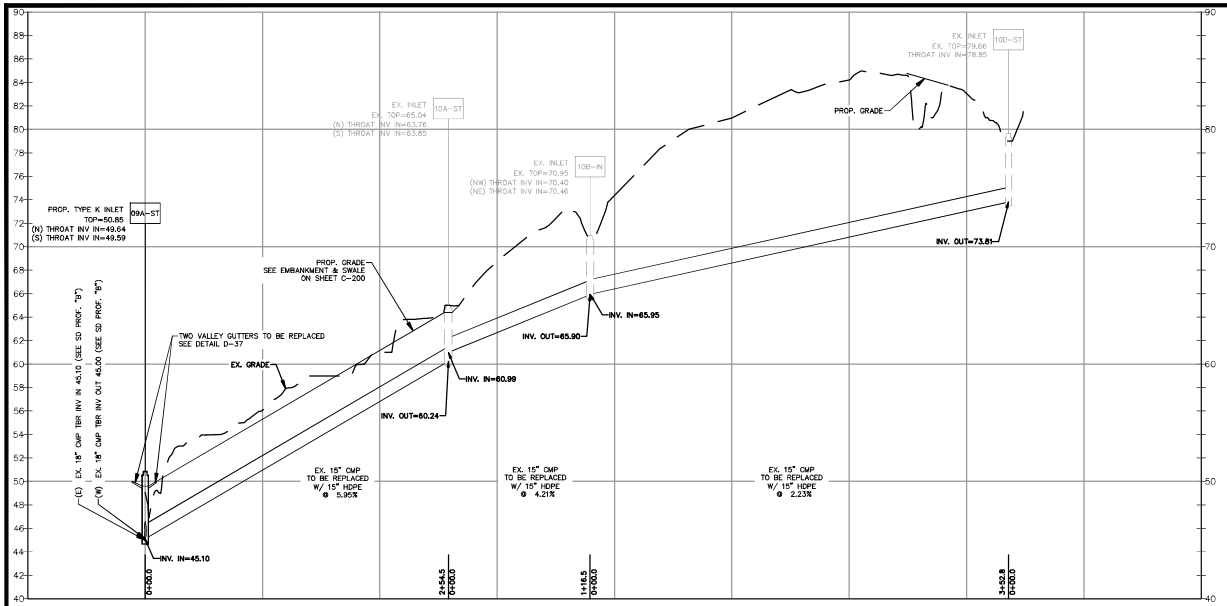
TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

0 10' 20'
GRAPHIC SCALE

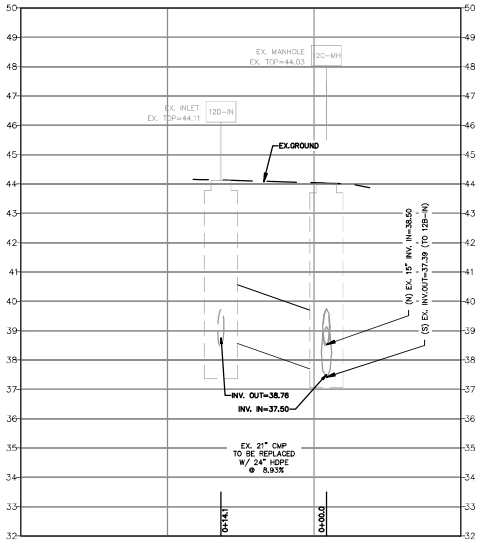
STORM DRAIN DETAILS

C-310

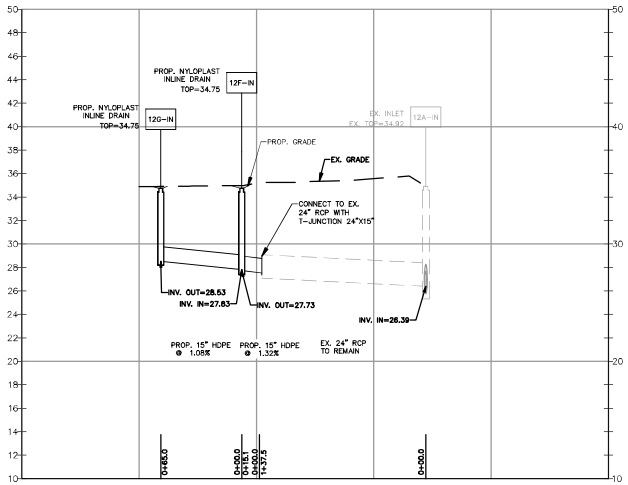
SHEET 4 OF 9



1 STORM DRAIN PROFILE "A"
1"=50' (HOR) 1"=5' (VER)



2 STORM DRAIN PROFILE "D"
1"=10' (HOR) 1"=1' (VER)



3 STORM DRAIN PROFILE "E"
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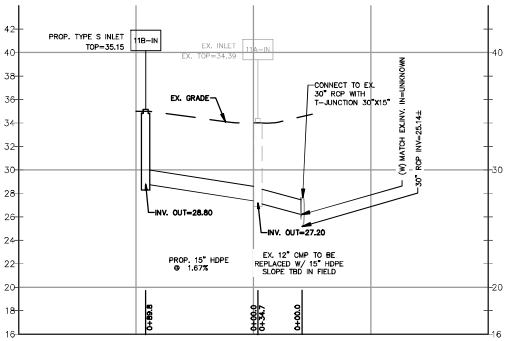

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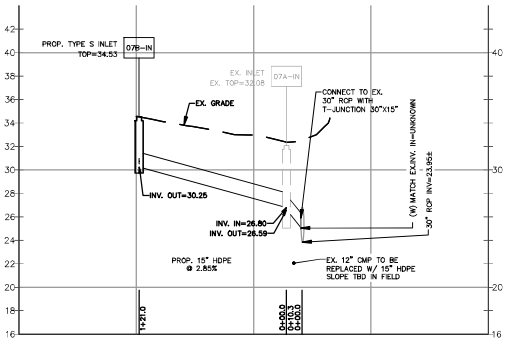

5 STORM DRAIN PROFILE "G"
1"=50' (HOR) 1"=5' (VER)

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JOPPA, MD 21085

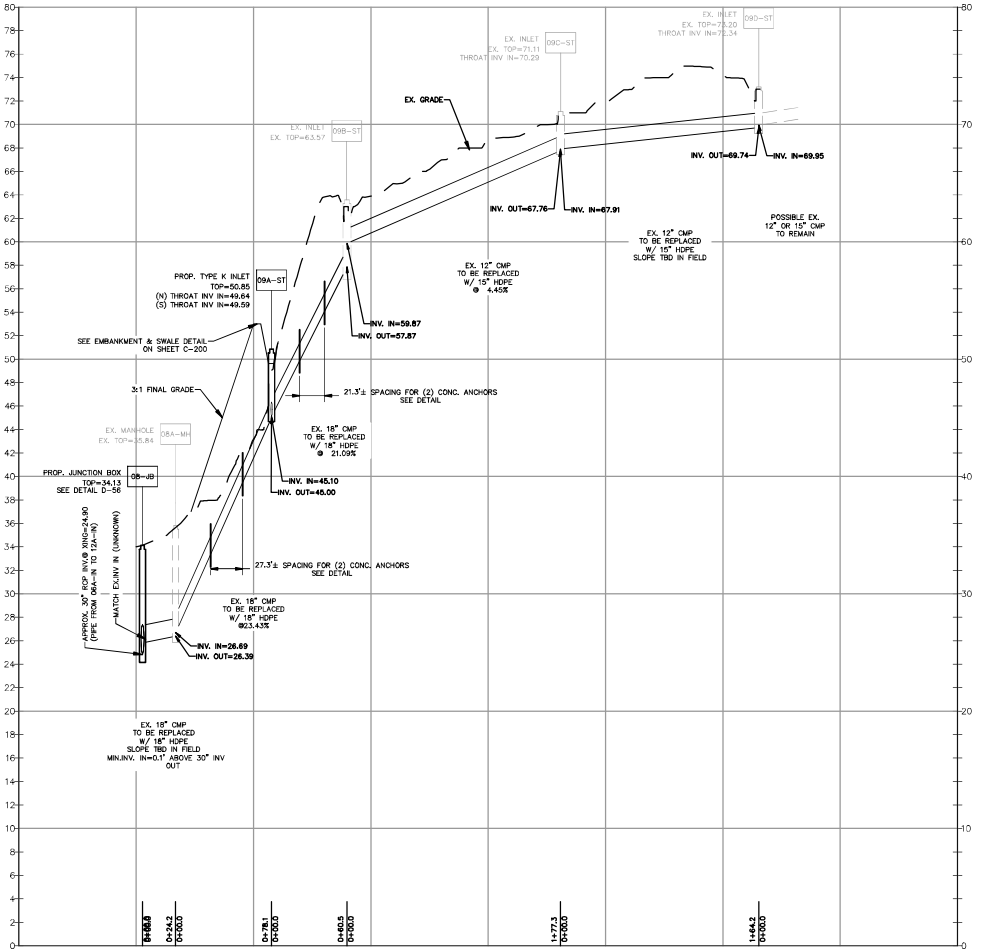
TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

0 50' 100'
GRAPHIC SCALE

STORM DRAIN PROFILES

C-340

SHEET 5 OF 9



6 STORM DRAIN PROFILE "B"
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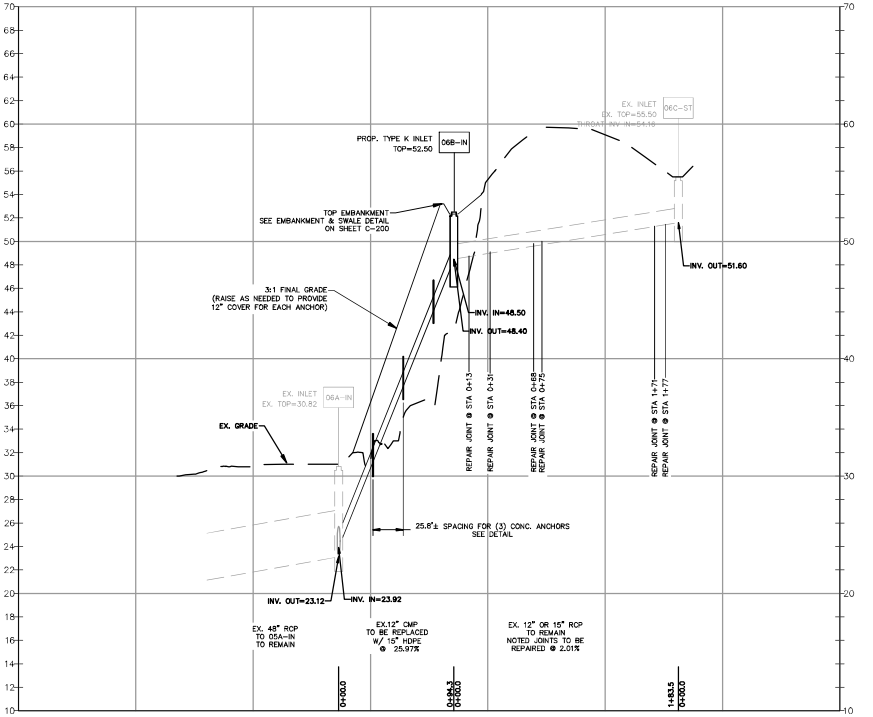

7 STORM DRAIN PROFILE "C"
1"=50' (HOR) 1"=5' (VER)

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0 50' 100'
GRAPHIC SCALE

STORM DRAIN PROFILES

C-341

SHEET 6 OF 9

SEQUENCE OF CONSTRUCTION FOR STORM DRAIN REPAIRS:

1. NOTIFY HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS, SEDIMENT CONTROL INSPECTOR, STORMWATER MANAGEMENT INSPECTOR AND THE ENGINEER PREPARING THE AS-BUILT DRAWINGS, AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
2. STAKEOUT LIMIT OF DISTURBANCE AND LIMIT OF GRADING AS SHOWN ON THE PLAN.
3. CLEAR AND GRUB FOR PERIMETER SEDIMENT & EROSION CONTROL MEASURES OR DEVICES ONLY.
4. INSTALL ALL E.S.C. MEASURES AS SHOWN ON THE PLANS.
5. NOTIFY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF E.S.C. INSTALLATION.
6. UPON INSTALLATION OF PERIMETER SEDIMENT CONTROLS, FINISH CLEARING/GRUBBING WITHIN THE LIMIT OF DISTURBANCE.
7. WITH THE APPROVAL OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, BEGIN GRADING AS NEEDED.
8. UPON COMPLETION OF GRADING, EXCAVATE AND REPLACE/REPAIR THE STORM DRAINS AS SHOWN ON THE STORM DRAIN PLANS.
9. PROVIDE PERMANENT STABILIZATION FOR ALL REMAINING DISTURBED AREAS.
10. TEMPORARILY PLUG THE OUTGOING 48" RCP AT INLET 06A-IN. FLUSH THE DESIGNATED PIPES SHOWN ON THE PLANS AND PUMP SEDIMENT WATER FROM INLET 06A-IN USING A VACUUM TRUCK.
11. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.

DAILY STABILIZATION NOTE

THIS NOTE SHOULD BE USED FOR MINIMAL AREAS WITHIN THE LIMITS OF DISTURBANCE THAT DO NOT DRAIN TO A SEDIMENT CONTROL MEASURE AND/OR WHERE THE INSTALLATION OF CONTROLS IS NOT FEASIBLE.(ROAD, WIDENING, SIDEWALK INSTALLATION. ETC)

CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY.

STABILIZATION SHALL BE AS FOLLOWS:
1. FOR AREAS TO BE PAVED, THE APPLICATION OF STONE BASE
2. FOR AREAS TO BE VEGETATIVELY STABILIZED:
   2.1. PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES
   2.2. PERMANENT SEED AND MULCH FOR ALL OTHER AREAS.

ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWNSLOPE SIDE.

NOTES:
1. USE SOD TO PROVIDE STABILIZATION OUTSIDE OF SEEDING PERIODS. SEEDING PERIODS ARE SHOWN ON SHEET C-415

SOIL CLASSIFICATIONS

NAME	UNIT SYMBOL	HYDROLOGIC SOIL GROUP*	HIGHLY ERODIBLE SOIL*
GLENELG-LOAM, 3-8% SLOPES	GcB2	B	NO
MANOR LOAM, 8-15% SLOPES	MbC	B	NO
GLENVILLE SILT LOAM, 3%-8% SLOPES	GnB	C/D	YES
GLENELG-LOAM, 8-15% SLOPES	GcC	B	NO
MANOR LOAM, 15%-25% SLOPES	MbD	B	NO
BAILE SILT LOAM, 0-3% SLOPES	BaA	C/D	YES
HATBORO-CODORUS COMPLEX, 0-3% SLOPES	HcA	B/D	YES

*HIGHLY ERODIBLE SOILS: K FACTOR GREATER THAN 0.35 AND SLOPES STEEPER THAN 15%

LEGEND

- LOD — LIMITS OF DISTURBANCE
- SF — SILT FENCE
- SSF — SUPER SILT FENCE
- EXISTING TREE LINE
- 84 — EXISTING GRADE ELEVATION
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- AGIP — AT-GRADE INLET PROTECTION
- SIP — STANDARD INLET PROTECTION

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. BEFORE EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION THAT ALL UTILITIES HAVE BEEN MARKED, 48 HOURS AFTER CALLING MISS UTILITY. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE HARFORD COUNTY CODE.

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TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

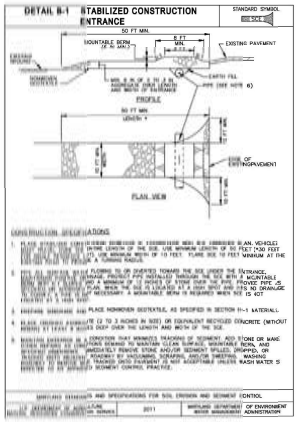
0 50' 100'
GRAPHIC SCALE

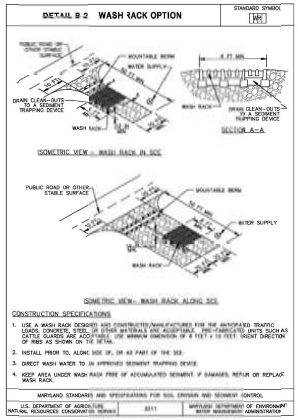
EROSION AND SEDIMENT CONTROL PLAN

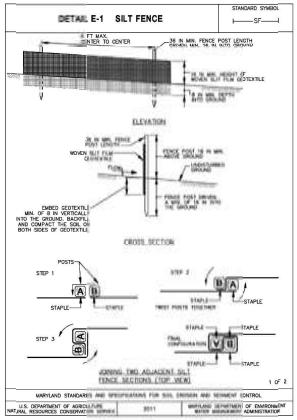
C-400

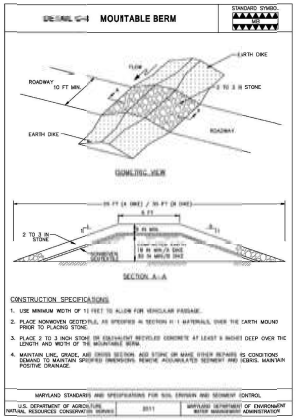
SHEET 7 OF 9

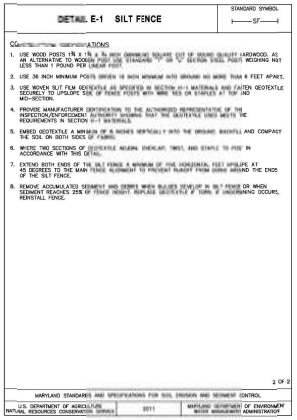
NOTE: PROP. SILT FENCE AND SUPER SILT FENCE SHOWN FOR GRAPHICAL PURPOSES ONLY, ACTUAL LOCATION SHALL BE AT LIMITS OF DISTURBANCE

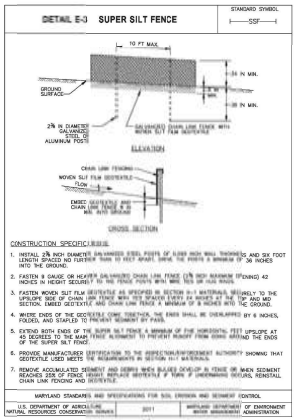


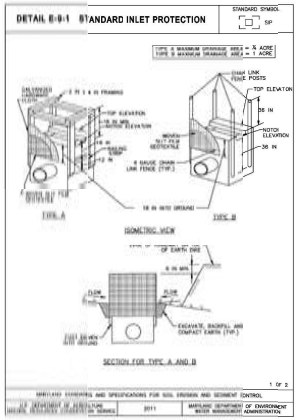


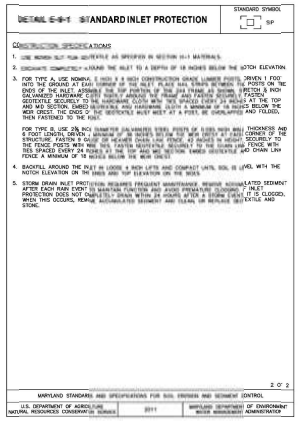


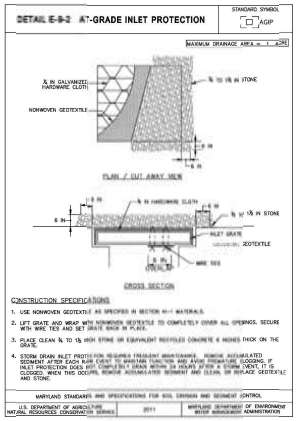


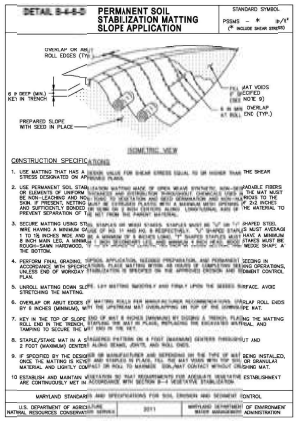


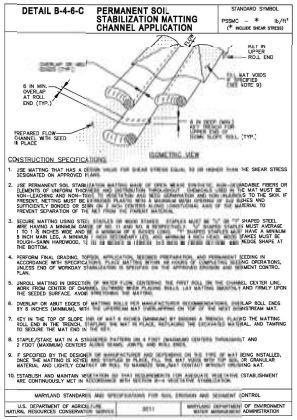












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EROSION AND SEDIMENT CONTROL DETAILS

C-410

SHEET 8 OF 9

B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

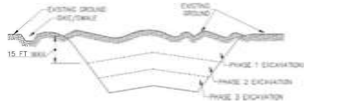
DEFINITION
USING VEGETATION AS COVER TO PROTECT EXPOSED SOIL FROM EROSION.
PURPOSE
TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL.
CONDITIONS WHERE PRACTICE APPLIES
ON ALL DISTURBED AREAS NOT STABILIZED BY OTHER METHODS. THIS SPECIFICATION IS DIVIDED INTO SECTIONS ON INCREMENTAL STABILIZATION; SOIL PREPARATION, SOIL AMENDMENTS AND TOPSOILING; SEEDING AND MULCHING; TEMPORARY STABILIZATION; AND PERMANENT STABILIZATION.
EFFECTS ON WATER QUALITY AND QUANTITY
STABILIZATION PRACTICES ARE USED TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL. WHEN SOIL IS STABILIZED WITH VEGETATION, THE SOIL IS LESS LIKELY TO ERODE AND MORE LIKELY TO ALLOW INFILTRATION OF RAINFALL, THEREBY REDUCING SEDIMENT LOADS AND RUNOFF TO DOWNSTREAM AREAS.
PLANTING VEGETATION IN DISTURBED AREAS WILL HAVE AN EFFECT ON THE WATER BUDGET, ESPECIALLY ON VOLUMES AND RATES OF RUNOFF, INFILTRATION, EVAPORATION, TRANSPIRATION, PERCOLATION, AND GROUNDWATER RECHARGE. OVER TIME, VEGETATION WILL INCREASE ORGANIC MATTER CONTENT AND IMPROVE THE WATER HOLDING CAPACITY OF THE SOIL AND SUBSEQUENT PLANT GROWTH.
VEGETATION WILL HELP REDUCE THE MOVEMENT OF SEDIMENT, NUTRIENTS, AND OTHER CHEMICALS CARRIED BY RUNOFF TO RECEIVING WATERS. PLANTS WILL ALSO HELP PROTECT GROUNDWATER SUPPLIES BY ASSIMILATING THOSE SUBSTANCES PRESENT WITHIN THE ROOT ZONE.
SEDIMENT CONTROL PRACTICES MUST REMAIN IN PLACE DURING GRADING, SEEDBED PREPARATION, SEEDING, MULCHING, AND VEGETATIVE ESTABLISHMENT.
ADEQUATE VEGETATIVE ESTABLISHMENT
INSPECT SEEDED AREAS FOR VEGETATIVE ESTABLISHMENT AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON.
1. ADEQUATE VEGETATIVE STABILIZATION REQUIRES 95 PERCENT GROUNDCOVER.
2. IF AN AREA HAS LESS THAN 40 PERCENT GROUNDCOVER, RESTABILIZE FOLLOWING THE ORIGINAL RECOMMENDATIONS FOR LIME, FERTILIZER, SEEDBED PREPARATION, AND SEEDING.
3. IF AN AREA HAS BETWEEN 40 AND 94 PERCENT GROUNDCOVER, OVER-SEED AND FERTILIZE USING HALF OF THE RATES ORIGINALLY SPECIFIED.
4. MAINTENANCE FERTILIZER RATES FOR PERMANENT SEEDING ARE SHOWN IN TABLE B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

DEFINITION
ESTABLISHMENT OF VEGETATIVE COVER ON CUT AND FILL SLOPES.
PURPOSE
TO PROVIDE TIMELY VEGETATIVE COVER ON CUT AND FILL SLOPES AS WORK PROGRESSES.
CONDITIONS WHERE PRACTICE APPLIES
ANY CUT OR FILL SLOPE GREATER THAN 15 FEET IN HEIGHT. THIS PRACTICE ALSO APPLIES TO STOCKPILES.
CRITERIA
A. INCREMENTAL STABILIZATION - CUT SLOPES
1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES.
2. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.1):
 a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.
 b. PERFORM PHASE 1 EXCAVATION, PREPARE SEEDBED, AND STABILIZE.
 c. PERFORM PHASE 2 EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.
 d. PERFORM FINAL PHASE EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

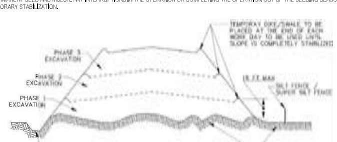
NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

FIGURE B.1: INCREMENTAL STABILIZATION - CUT



B. INCREMENTAL STABILIZATION - FILL SLOPES
1. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.
2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.
3. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
4. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.2):
 a. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
 b. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
 c. PLACE PHASE 1 FILL, PREPARE SEEDBED, AND STABILIZE.
 d. PLACE PHASE 2 FILL, PREPARE SEEDBED, AND STABILIZE.
 e. PLACE FINAL PHASE FILL, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.



B-4-2 SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

A. SOIL PREPARATION
1. TEMPORARY STABILIZATION
 a. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OR CHISEL PLOWS OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
 b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.
 c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
2. PERMANENT STABILIZATION
 a. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:
I. SOIL PH BETWEEN 6.0 AND 7.0.
II. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (PPM).
III. SOIL CONTAINS LESS THAN 40 PERCENT CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 30 PERCENT SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION: IF LOVEGRASS WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30 PERCENT SILT PLUS CLAY) WOULD BE ACCEPTABLE.
IV. SOIL CONTAINS 1.5 PERCENT MINIMUM ORGANIC MATTER BY WEIGHT.
V. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
 b. APPLICATION OF AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.
 c. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLAN, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.
 d. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.
 e. MIX SOIL AMENDMENTS INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED EQUIPMENT LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRIABLE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

B. TOPSOILING
1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.
2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.
3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:
 a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
 b. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
 c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.
 d. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.
4. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN.
5. TOPSOIL SPECIFICATIONS: SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:
 a. TOPSOIL MUST BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, OR LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. TOPSOIL MUST NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5 PERCENT BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1½ INCHES IN DIAMETER.
 b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUT SEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.
 c. TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF NATURAL TOPSOIL.
6. TOPSOIL APPLICATION
 a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.
 b. UNIFORMLY DISTRIBUTE TOPSOIL IN A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
 c. TOPSOIL MUST NOT BE PLACED IF THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

C. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)
1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSES.
2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE LAWS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.
3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 50 PERCENT TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 50 PERCENT WILL PASS THROUGH A #100 MESH SIEVE AND 98 TO 100 PERCENT WILL PASS THROUGH A #20 MESH SIEVE.
4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 4 TO 8 TONS/ACRE(200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

B-4-3 SEEDING AND MULCHING

A. SEEDING
1. SPECIFICATIONS
 a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON ANY PROJECT. REFER TO TABLE B.4 REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.
 b. MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAWS.
 c. INOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANT AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 75 TO 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.
 d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.
2. APPLICATION
 a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
 i. INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3, OR SITE-SPECIFIC SEEDING SUMMARIES.
 ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
 b. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
 i. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
 ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
 c. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER).
 i. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES SHOULD NOT EXCEED THE FOLLOWING: NITROGEN, 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P205 (PHOSPHOROUS), 200 POUNDS PER ACRE; K20 (POTASSIUM), 200 POUNDS PER ACRE.
 ii. LIME: USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.
 iii. MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITHOUT INTERRUPTION.
 iv. WHEN HYDROSEEDING DO NOT INCORPORATE SEED INTO THE SOIL.

B. MULCHING
1. MULCH MATERIALS (IN ORDER OF PREFERENCE)
 a. STRAW CONSISTING OF THOROUGHLY THRESHED WHEAT, RYE, OAT, OR BARLEY AND REASONABLY BRIGHT IN COLOR. STRAW IS TO BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW AND NOT MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY. **NOTE: USE ONLY STERILE STRAW MULCH IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.**
 b. WOOD CELLULOSE FIBER MULCH (WCFM) CONSISTING OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
 i. WCFM IS TO BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
 ii. WCFM, INCLUDING DYE, MUST CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
 iii. WCFM MATERIALS ARE TO BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL MUST FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND MUST COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.
 iv. WCFM MATERIAL MUST NOT CONTAIN ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
 v. WCFM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH OF APPROXIMATELY 10 MILLIMETERS, DIAMETER APPROXIMATELY 1 MILLIMETER, PH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6 PERCENT MAXIMUM AND WATER HOLDING CAPACITY OF 90 PERCENT MINIMUM.
2. APPLICATION:
 a. APPLY MULCH TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
 b. WHEN STRAW MULCH IS USED, SPREAD IT OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE TO A UNIFORM LOOSE DEPTH OF 1 TO 2 INCHES. APPLY MULCH TO ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. WHEN USING A MULCH ANCHORING TOOL, INCREASE THE APPLICATION RATE TO 2.5 TONS PER ACRE.
 c. WOOD CELLULOSE FIBER USED AS MULCH MUST BE APPLIED AT A NET DRY WEIGHT OF 1500 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER TO ATTAIN A MIXTURE WITH A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
3. ANCHORING:
 a. PERFORM MULCH ANCHORING IMMEDIATELY FOLLOWING APPLICATION TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON THE SIZE OF THE AREA AND EROSION HAZARD:
 i. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 2 INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD BE USED ON THE CONTOUR.
 ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER BINDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER AT A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
 iii. SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRO-TACK), DCA-70, PETROSET, TERRA TAX II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEEDS TO BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. USE OF ASPHALT BINDERS IS STRICTLY **PROHIBITED.**
 iv. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG.

B-4-4 TEMPORARY STABILIZATION

CONDITIONS WHERE PRACTICE APPLIES
EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS. FOR LONGER DURATION OF TIME, PERMANENT STABILIZATION PRACTICES ARE REQUIRED.

TEMPORARY SEEDING SUMMARY

Seed Mixture (Hardiness Zone 7a)				Fertilizer Rate 10-20-20	Lime Rate
Species	Application Rate	Seeding Dates	Depths		
CEREAL RYE	112 lb/ac	3/1 - 4/30 8/15 - 11/15	1"	436 lb/ac (10 lb/ 1000 sf)	2 tons/ac (90 lb/ 1000 sf)
FOXTAIL MILLET	40 lb/ac	5/1 - 8/14	1/2"		

B-4-5 PERMANENT STABILIZATION

CONDITIONS WHERE PRACTICE APPLIES
EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR 6 MONTHS OR MORE.

CRITERIA
A. SEED MIXTURES
1. GENERAL USE
 a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3), AND BASED ON THE SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
 b. ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAM BANKS, OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR AESTHETIC TREATMENT MAY BE FOUND IN USDA-NRCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 -CRITICAL AREA PLANTING.
 c. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, USE AND SHOW THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY.
 d. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREA FORM FERTILIZER (46-0-0) AT 3 ½ POUNDS PER 1000 SQUARE FEET (150 POUNDS PER ACRE) AT THE TIME OF SEEDING IN ADDITION TO THE SOIL AMENDMENTS SHOWN IN THE PERMANENT SEEDING SUMMARY .
2. TURFGRASS MIXTURES
 a. AREAS WHERE TURFGRASS MAY BE DESIRED INCLUDE LAWNS, PARKS, PLAYGROUNDS, AND COMMERCIAL SITES WHICH WILL RECEIVE A MEDIUM TO HIGH LEVEL OF MAINTENANCE.
 b. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED BELOW BASED ON THE SITE CONDITIONS OR PURPOSE. ENTER SELECTED MIXTURE(S), APPLICATION RATES, AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.
 i. KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
 ii. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.
 iii. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES; CERTIFIED TALL FESCUE CULTIVARS 95 TO 100 PERCENT, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0 TO 5 PERCENT. SEEDING RATE: 5 TO 8 POUNDS PER 1000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.
 iv. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MANAGED TURF AREA. MIXTURE INCLUDES; CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30 TO 40 PERCENT AND CERTIFIED FINE FESCUE AND 60 TO 70 PERCENT. SEEDING RATE: 1½ TO 3 POUNDS PER 1000 SQUARE FEET.

NOTES:
SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND"

CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMER PROTECTION AND ASSURES A PURE GENETIC LINE

 c. IDEAL TIMES OF SEEDING
 WESTERN MD: MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5B, 6A)
 CENTRAL MD: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONE: 6B)
 SOUTHERN MD, EASTERN SHORE: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7A, 7B)
 d. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES, LEVEL AND RAKE THE AREAS TO PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1½ INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL POSE NO DIFFICULTY.
 e. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (½ TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS, OR ON ADVERSE SITES.

PERMANENT SEEDING SUMMARY

Seed Mixture (Hardiness Zone 7a)					Fertilizer Rate (10-20-20)			Lime Rate
Mix No.	Species	Application Rate	*Seeding Dates	Depths	N	P205	K20	
3	DEERTONGUE SHEEP FESCUE REDTOP COMMON LESPEDEZA	20 lb/ac. 20 lb/ac. 1 lb/ac. 10 lb/ac.	3/1 to 5/15 8/15 to 10/15	1/4"-1/2"	45 lb/ac. (1 lb/ 1000 sf)	90 lb/ac. (2.0 lb/ 1000 sf)	90 lb/ac. (2.0 lb/ 1000 sf)	2 tons/ac (90 lb/ 1000 sf)
7	CREEPING RED FESCUE KENTUCKY BLUEGRASS	60 lb/ac. 15 lb/ac.	3/1 to 5/15 8/15 to 10/15					
11 (LOW MOW)	CREEPING RED FESCUE CHEWINGS FESCUE KENTUCKY BLUEGRASS	30 lb/ac. 30 lb/ac. 20 lb/ac.	2/15 to 4/30 8/15 to 10/31					

* FOR THE PERIOD 5/1 - 8/14 ADD FOXTAIL, OR PEARL MILLET TO THE PERMANENT SEED MIX. DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX.

B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).
1. GENERAL SPECIFICATIONS
 a. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.
 b. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF ¾ INCH, PLUS OR MINUS ¼ INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.
 c. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10 PERCENT OF THE SECTION.
 d. SOD MUST NOT BE HARVESTED OR TRANSPLANTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.
 e. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.
2. SOD INSTALLATION
 a. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.
 b. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS.
 c. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.
 d. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARE THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.
3. SOD MAINTENANCE
 a. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY DURING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.
 b. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.
 c. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN ⅓ OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN GRASS HEIGHT AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

CLARK | AZAR & ASSOCIATES
10451 Mill Run Circle, Suite 630
Owings Mills , MD. 21117
T(301) 528-2010
www.clarkazar.com
A Woman Owned Small Business

4/30/2025

DATE:	APRIL 2025
CAA PROJECT NO.:	511.001
DRAWN BY:	AN
CHECKED BY:	JA

PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 31168
EXPIRATION DATE: 01/12/2027

NO.	DATE	ISSUE OR REVISION
△	04/30/2025	BID SET

JOPPATOWNE HIGHSCHOOL
DRAINAGE IMPROVEMENTS

555 JOPPA FARM ROAD
HARFORD COUNTY
JOPPA, MD 21085

TAX MAP: 0065
PARCEL: 0604
DEED REFERENCE: 638/105

EROSION AND SEDIMENT CONTROL NOTES

C-415

SHEET 9 OF 9

SITE IMPROVEMENTS FOR JOPPATOWNE HIGH SCHOOL
555 JOPPA FARM ROAD
EROSION AND SEDIMENT CONTROL

PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 31168 EXPIRATION DATE: 1/12/2027
4/11/2025

CLARK | AZAR & ASSOCIATES
20501 Seneca Meadows Parkway, Suite 230
Germantown, MD, 20876
T(301) 528-0100
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ISSUE or REVISION:

No.	DESCRIPTION	DATE
-	CD SUBMISSION	02/03/20
-	FINAL REVIEW	04/01/20
-	RELEASE FOR BIDDING	04/17/20
-	ADDENDUM NO. 2	05/11/20
1	ADDENDUM NO. 3	05/28/20
1	DRAIN & SLOPE REPAIRS	11/11/21
2	SD/SLOPE REPAIR REVISIONS	04/11/25

OPPATOWNE HIGH SCHOOL

PSC NO. 12.046.16_P

EROSION AND SEDIMENT CONTROL - GENERAL NOTES

1. A GRADING UNIT OF 20 ACRES IS THE MAXIMUM CONTIGUOUS AREA ALLOWED TO BE GRADED AT A GIVEN TIME.
2. THE CONTRACTOR/OWNER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS. NO CONSTRUCTION ACTIVITY SHALL TAKE PLACE UNTIL ALL REQUIRED PERMITS HAVE BEEN OBTAINED.
3. THE LIMITS OF DISTURBANCE SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO GRADING OF THE SITE TO ENSURE COMPLIANCE WITH APPROVED PLANS. ALL FOREST RETENTION AREAS WILL BE DELINEATED WITH BLAZE ORANGE FENCE AS WELL AS ANY SWM INFILTRATION PRACTICE PRIOR TO ANY CLEARING. WORK BEYOND THE LIMITS OF DISTURBANCE AND IN ANY AREA INSIDE THE FOREST RETENTION AND SWM INFILTRATION AREA IS CONSIDERED TO BE A VIOLATION OF THIS PLAN.
4. ALL SEDIMENT CONTROL PRACTICES MUST BE INSTALLED PRIOR TO ANY CONSTRUCTION ACTIVITY. UPON COMPLETION OF THE INSTALLATION OF PERIMETER SEDIMENT CONTROL PRACTICES THE SITE MUST BE INSPECTED BY THE DPW. NO ADDITIONAL CONSTRUCTION ACTIVITY WILL BE AUTHORIZED WITHOUT THE APPROVAL FROM THE DPW.
5. ALL POINTS OF INGRESS AND EGRESS SHALL BE PROTECTED TO PREVENT TRACKING OF MUD INTO PUBLIC WAYS. DURING CONSTRUCTION, EVERY MEANS WILL BE TAKEN TO CONTROL SOIL EROSION AND SILTATION. IF NECESSARY A WASH RACK MAY NEED TO BE ESTABLISHED.
6. EARTH DIKES, SEDIMENT TRAPS, ETC. WILL BE LOCATED AS SHOWN ON THESE DRAWINGS. FIELD CHANGES AND MINOR ADJUSTMENTS ARE PERMISSIBLE AS LONG AS THE INSTALLATION FUNCTIONS AND CONFORMS TO SPECIFICATIONS. THE SITE INSPECTOR PRIOR TO INSTALLATION MUST APPROVE ALL SUCH CHANGES. MAJOR CHANGES TO THE APPROVED PLAN WILL REQUIRE RE-APPROVAL BY THE HARFORD SOIL CONSERVATION DISTRICT.
7. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN:
   A) THREE CALENDAR DAYS ON SLOPE GREATER THAN 3:1 ALL WATERWAYS AND TO THE SURFACE OF ALL PERIMETER CONTROLS.
   B) SEVEN CALENDAR DAYS AS TO ALL ATHER DISTURBED OR GRADED AREAS OF THE PROJECT SITE.
9. DUST CONTROL MUST BE MANAGED AS PART OF ALL SEDIMENT CONTROL PLANS. FAILURE TO DO SO IS A VIOLATION OF THIS PLAN.
10. SEDIMENT BASINS MUST BE BUILT TO DESIGN SPECIFICATIONS SHOWN ON THE PLAN. IF THE BASIN IS TO BE USED AS A FUTURE SWM FACILITY, THE BASIN WILL BE BUILT IN ACCORDANCE WITH THE LATEST MD-378 STANDARDS AND SPECIFICATIONS. SPECIFIED MATERIALS MUST BE USED. NO CHANGES OR MODIFICATIONS WILL BE MADE WITHOUT WRITTEN AUTHORIZATION OF THE HARFORD SOIL CONSERVATION DISTRICT.
11. TEMPORARY FENCING SHALL BE PLACED AROUND ALL SEDIMENT BASINS, TRAPS, AND PONDS DURING CONSTRUCTION AND SITE GRADING.
12. AT THE END OF EACH WORKING DAY ALL SEDIMENT CONTROL PRACTICES WILL BE INSPECTED AND LEFT OPERATIONAL. A WEEKLY LOG WILL BE KEPT IN ACCORDANCE WITH MDE/NPDES REGULATIONS. A COPY OF THE APPROVED SEDIMENT CONTROL PLANS SHALL BE AVAILABLE AT THE SITE AT ALL TIMES.
13. ENSURE POSITIVE DRAINAGE TO ALL ROAD INLETS DURING AL. PHASES OF ROAD CONSTRUCTION TO ENSURE POSITIVE FLOW TRAPS AND OR BASINS.
14. CUT AND/OR FILL SHALL BE DONE IN CONFORMANCE WITH 2011 EROSION AND SEDIMENT CONTROL STANDARDS AND SPECIFICATIONS FOR LAND GRADING.
15. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRAVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY CONVEY VATER DOWN SLOPES WITHOUT CAUSING EROSION.
16. OFF-SITE WASTE OR BORROW AREAS SHALI HAVE AN APPROVED EROSION AND SEDIMENT CONTROL PLAN PRIOR TO THE IMPORT OR EXPORT OF MATERIAL TO/FROA THE PROJECT SITE.
17. ALL MATERIAL ORIGINATING FROM THE DEVELOPMENT OF THE PROPERTY AND DEPOSITED ON THE PUBLIC RIGHT-OF-WAY SHALL BE IMMEDIATELY REMOVED.
18. STORM DRAIN INLETS AND OUTLETS SHALL BE PROTECTED PIR 2011 EROSION AND SEDIMENT CONTROL STANDARDS AND SPECIFICATIONS.
19. TOPSOIL, LIMING, FERTILIZING, SEEDING, MILCHING, SOD, ETC. ARE ALL ESSENTIAL PARTS OF THE SEDIMENT CONTROL AND MUST BE COMPLETED ALONG WITH ALL OTHER PRACTICES.
20. TRAPS TO BE REMOVED SHALL BE DEWATEIED AS PER THE 2011 EROSION AND SEDIMENT CONTROL STANDARDS AND SPECIFICATIONS.
21. PRIOR TO REMOVAL OF TRAPS OR CONVERSION OF SEDIMENT BASINS TO SWM FACILITIES, THE STORM DRAINS WILL BE FLISHED.
22. SEDIMENT CONTROL PRACTICES WILL BE MANTAINED UNTIL ALL DISTURBED AREAS FOR WHICH THE PRACTICES WERE INSTALLED HAVE BEEN STABILIZED. SEDIMENT CONTRO. PRACTICES MAY BE REMOVED ONLY WITH THE AUTHORIZATION OF THE DPW INSPECTOR. ALL DISTURBED AREAS RESULTING FROM THE REMOVAL OF SEDIMENT CONTROL DEVICES SHALL BE STABILIZED IMMEDIATELY. REMOVAL PRIOR TO INSPECTOR'S APPROVAL CONSTITUTES A VIOLATION.
23. OWNER/DEVELOPER MUST CONTACT THE APPROPRIATE ENFORCEMENT AUTHORITY OR ITS AGENT AT THE FOLLOWING STAGES OF THE PROJECT:
   A. PRIOR TO THE START OF EARTH DISTURBANCE.
   B. UPON COMPLETIONG OF THE INSTALLATIN OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING.
   C. PRIOR TO THE START OF ANOTHER PHAJE OF CONSTRUCTION OR OPENING OF ANOTHER GRADING UNIT.
   D. PRIOR TO THE REMOVAL OF SEDIMENT CONTROL PRACTICES.

DAILY STABILIZATION NOTE

THIS NOTE SHOULD BE USED FOR MINIMAL AREAS WITHIN THE LIMITS OF DISTURBANCE THAT DO NOT DRAIN TH A SEDIMENT CONTROL MEASURE AND/OR WHERE THE INSTALATION OF CONTROLS IS NOT FEASIBLE. (ROAD WIDENING, SIDEWALK INSTALLATION, ETC.).

CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY.

STABILIZATION SHALL BE AS FOLLOWS:
1. FOR AREAS TO BE PAVED, THE APPLICATIOI OF STONE BASE.
2. FOR AREAS TO BE VEGETATIVELY STABILIZED:
   A. PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES.
   B. PERMANENT SEED AND MULCH FOR ALL OTHER AREAS

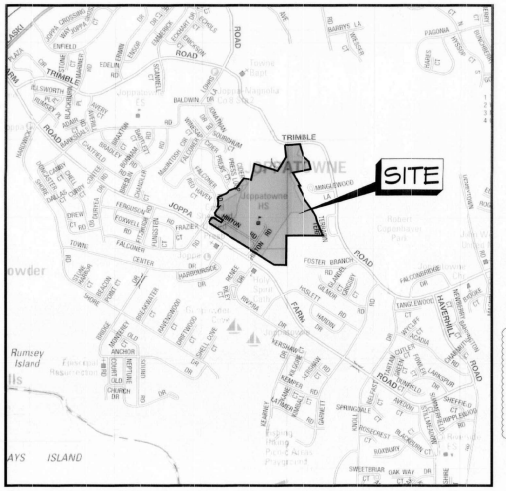
ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWNSLOPE SIDE.

SEQUENCE OF CONSTRUCTION FOR STORM DRAIN REPAIRS:

1. NOTIFY HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS, SEDIMENT CONTROL INSPECTOR, STORMWATER MANAGEMENT INSPECTOR AND THE ENGINEER PREPARING THE AS-BUILT DRAWINGS, AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
2. STAKEOUT LIMIT OF DISTURBANCE AND LIMIT OF GRADING AS SHOWN ON THE PLAN.
3. CLEAR AND GRUB FOR PERIMETER SEDIMENT & EROSION CONTROL MEASURES OR DEVICES ONLY.
4. INSTALL ALL E.S.C. MEASURES AS SHOWN ON THE PLANS.
5. NOTIFY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF E.S.C. INSTALLATION.
6. UPON INSTALLATION OF PERIMETER SEDIMENT CONTROLS, FINISH CLEARING/GRUBBING WITHIN THE LIMIT OF DISTURBANCE.
7. WITH THE APPROVAL OF PERMITS, APPROVALS AND INSPECTIONS, DSEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, BEGIN GRADING AS NEEDED.
8. UPON COMPLETION OF GRADING, EXCAVATE AND REPLACE/REPAIR THE STORM DRAINS AS SHOWN ON THE STORM DRAIN PLANS.
9. PROVIDE PERMANENT STABILIZATION FOR ALL REMAINING DISTURBED AREAS.
10. TEMPORARILY PLUG THE OUTGOING 48" RCP AT INLET D6A-N. FLUSH THE DESIGNATED PIPES SHOWN ON THE PLANS AND PUMP SEDIMENT WATER FROM INLET D6A-N USING A VACUUM TRUCK.
11. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.

E.S.C. - SEQUENCE OF CONSTRUCTION

1. NOTIFY HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS, SEDIMENT CONTROL INSPECTOR, STORMWATER MANAGEMENT INSPECTOR AND THE ENGINEER PREPARING THE AS-BUILT DRAWINGS, AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
2. STAKEOUT LIMIT OF DISTURBANCE & LIMIT OF GRADING AS SHOWN ON PLAN.
3. CLEAR AND GRUB FOR PERIMETER SEDIMENT & EROSION CONTROL MEASURES OR DEVICES ONLY.
4. INSTALL ALL E.S.C. MEASURES AS SHOWN IN PLANS.
5. THE TEMPORARY ACCESS ROAD AND STAGING AREAS ARE TO BE STABILIZED VIA SAME DAY STABILIZATION USING STONE. (NOTE THAT A MAJORITY OF THE WORK IS ON THE INTERIOR OF THE MAIN SCHOOL BUILDING. NO SUBSTANTIAL GRADING IS ASSOCIATED WITH THE CONSTRUCTION OF THE TEMPORARY ACCESS ROADS/STAGING AREAS)
6. NOTIFY DEPARTMENT OF PEIMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF SAID INSTALLATION.
7. UPON INSTALLATION OF PERIMETER SEDIMENT CONTROLS, CLEAR AND GRUB AND REMOVE REQUIRED PAVING WITHIN THE LIMIT OF DISTURBANCE.
8. WITH THE APPROVAL OF DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, BEGIN MASS GRADING OF THE SITE.
9. FINE GRAIE SITE.
10. UPON COMPLETION OF GRAIING, INSTALL ALL PROPOSED UTILITIES AS SHOWN ON PLANS.
11. INSTALL STONE BASE FOR YAVED AREAS AND BEGIN PAVING.
12. UPON STABILIZATION OF SITE AND WITH THE PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, BEGIN SWM CONSTRUCTION. SEE THE APPROVED SWM PLANS FOR SEQUENCE OF CONSTRUCTION OF EACH SWM FACILITY.
13. PROVIDE PERMANENT STABILIZATION FOR ALL REMAINING DISTURBED AREAS.
14. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS.



VICINITY MAP
SCALE: 1" = 1,000'
ADC MAP # 4583

FOLLOWIG INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TIMPORARY STABILITATION MUST BI COMPLETED WITHIN:

A.) THRIE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERMETER EARTI DIKES, SWALES, DITCHES, PERIMETR SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND

B.) SEVIN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNIER ACTIVE GRADING.

REVISION #4 CHANGES FOR THIS SHEET:
1. REVISED MATERIAL QUANTITIES.
2. REVISED LIMIT OF DISTURBANCE.
3. REVISED AREA TO BE VEGETATIVELY STABILIZED.
4. ADDED NEW SEQUENCE OF CONSTRUCTION.

SHEET INDEX

SHEET NO.	SHEET TITLE
EROSION AND SEDIMENT CONTROL	
C-21	TITLE SHEET
C-22	OVERLAY PLAN
C-23.1	NOTES AND DETAILS 1 OF 2
C-23.2	NOTES AND DETAILS 2 OF 2

REVISED SHEET INDEX

SHEET NO.	SHEET TITLE
EROSION AND SEDIMENT CONTROL	
C-21	TITLE SHEET
C-22	OVERLAY PLAN
C-22.1	DRAIN & SLOPE REPAIRS
C-23.1	NOTES & DETAILS 1 OF 2
C-23.2	NOTES & DETAILS 2 OF 2

ADDED SHEET→

SITE DATA:

1. OWNER:
   BOARD OF EDUCATION OF HARFORI COUNTY
   102 SOUTH HICKORY AVENUE
   BEL AIR, MD 21014
2. DEVELOPER:
   BOARD OF EDUCATION OF HARFORI COUNTY
   102 SOUTH HICKORY AVENUE
   BEL AIR, MD 21014
3. ENGINEER
   GEORGE WILLIAM STEPHENS, JR. & ASSOC. INC.
   4972 MILLENNIUM DRIVE, SUITE 102
   BEICAMP MD, 21317
4. SITE ADDRESS:
   555 JOPPA FARM ROAD
   JOPPATOWNE, MD 21085
5. SITE AREA:
   EXISTING: 69.33 AC±
   PROPOSED: 69.33 AC±
6. TAX ACCOUNT: 1207145
7. TAX BLOCK: N/A
8. TAX GRID: 48
9. TAX MAP: 41
10. TAX PARCEL: 604
11. PLAT REFERENCE: 132/49
12. DEED REFERENCE: 638/105
13. ELECTION DISTRICT: 02
14. WATERSHED: GUNPOWDER RIVER: 02130801
15. USE:
   EXISTING: EXEMPT COMMERCIAL
   PROPOSED: EXEMPT COMMERCIAL
16. ZONING: URBAN RESIDENTIAL(RQ)
17. SETBACKS:
   FRONT: 50 LF
   SIDE: 40 LF
   REAR: 80 LF
   MAX. BUILDING HEIGHT: 30 LF
17. LIMIT OF DISTURBANCE: 187,684 SF = 4.32 AC±
   ADD: 71,500 SF = 1.64 AC±
   TOTAL: 259,484 SF = 5.96 AC±
   ADD: 90,733 SF = 2.08 AC±
   TOTAL: 278,717 SF = 6.40 AC±
18. BENCHMARKS:
   JH400: GWS P&C SET GPS
   N: 637,556.11
   E: 1,495,666.16
   ELEV: 42.47
   JH402A: GWS P&C SET
   N: 637,804.34
   E: 1,495,829.35
   ELEV: 48.51
   JH400B: MAG NAIL SET
   N: 637,684.27
   E: 1,495,575.72
   ELEV: 34.51
   MG1: MAG NAIL SET
   N: 637,380.53
   E: 1,495,393.75
   ELEV: 34.20

HARFORD COUNTY CONTRACT #52532
GRADING PERMIT #6627-2025
UPDATE TO GRADING PERMIT #12445-2020

ENGINEER'S CERTIFICATION
I certify that this plan for erosion and sediment control and stormwater management represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the 1994 Maryland Standard and Specifications for Soil Erosion and Sediment Control.
APRIL 11, 2025
Engineer Date

Erosion and Sediment Control Plan # 52532
Recommended For Approval
Harford County DPW

Technical Concurrence
8-10-20
Harford Soil Conservation District

Approved
8-11-2020
Harford Soil Conservation District

HARFORD COUNTY ESC PLAN #: 52532
GRADING PERMT #: 12445-2020

OWNER'S / CONTRACT PURCHASER'S CERTIFICATE
I/We certify that all development and construction will be done according to this plan of development and plan for erosion and sediment control and that all responsible personnel involved in the construction project will have a Certificate of Attendance at Resources Approval Training Program for the control of a Department of Natural Sediment and Erosion before beginning the project. I also authorize periodic onsite inspection by Harford Soil Conservation District or their authorized agents, as are deemed necessary.
Signature of Owner/Developer
7-29-2020
Date

ENGINEER'S CERTIFICATE
I certify that this plan for Erosion and Sediment Control and Stormwater Management represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the Standards and Specifications for Soil Erosion and Sediment Control, dated 1994.
Reg. P...S. No.
12/1/21
Date

SITE ANALYSIS

TOTAL SITE AREA	69.33 AC±
TOTAL DISTURBED AREA (L.O.D. FOR ALL PHASES/ALTS.)	4.45 AC±
AREA TO BE VEGETATIVELY STABILIZED	3.28 AC±
PROP. FINAL IMPERVIOUS AREA	9.42 AC±

N.P.D.E.S. I.D. JOINT 'A'
N=636944.97
E=1495078.63

N.P.D.E.S. I.D. JOINT 'B'
N=636960.36
E=1495428.65

E.S.C. MATERIALS ESTIMATE

DETAIL	ITEM	QUANTITY
B-1	STABILIZED CONSTRUCTION ENTRANCE	2 EA
E-9-1	STANDARD INLET PROTECTION	3 EA
E-9-2	AT-GRADE INLET PROTECTION	7 EA
E-1	SILT FENCE	1,734 LF
E-3	SUPER SILT FENCE	40 LF
D-4-1-A	ROCK OUTLET PROTECTON I	4 EA
D-4-1-C	ROCK OUTLET PROTECTION III	1 EA

REVISED SITE ANALYSIS

TOTAL SITE AREA	69.33 AC±
TOTAL DISTURBED AREA (L.O.D. FOR ALL PHASES/ALTS + REVISIONS)	~~3.86 AC±~~ 6.40 AC±
AREA TO BE VEGETATIVELY STABILIZED (INCLUDING REVISIONS)	~~4.92 AC±~~ 5.36 AC±
PROP. FINAL IMPERVIOUS AREA	9.42 AC±

REVISED E.S.C. MATERIALS ESTIMATE

DETAIL	ITEM	QUANTITY
E-9-1	STANDARD INLET PROTECTION	7 EA
E-9-2	AT-GRADE INLET PROTECTION	~~9~~ 5 EA
E-1	SILT FENCE	~~519~~ 363 LF
E-3	SUPER SILT FENCE	~~1,150~~ 880 LF
B-1	STABILIZED CONSTRUCTION ENTRANCE	1 EA
B-2	WASH RACK	1 EA
C-8	MOUNTABLE BERM	1 EA

EARTHWORKS QUANTITIES ESTIMATE

AREA	CUT	FILL	(-)REQUIRED OR (+)EXCESS VOLUME
BLEACHERS & CONCESSION BUILDING	9 CY	776 CY	-767 CY
TEAMROOMS BUILDING	1 CY	277 CY	-276 CY
FRONT (SOUTH) HC PARKING	100 CY	1 CY	99 CY
MICROBIORETENTION 1 & 1.2FT (WEST) DRIVE/HC PARKING	279 CY	391 CY	-112 CY
MICROBIORETENTION 2A & 2B	114 CY	187 CY	-73 CY
GRADING FOR TEMPORARY ACCESS SOUTH OF CONCESSIONS	84 CY	0 CY	84 CY
DRAIN & SLOPE REPAIRS	368 CY	~~450~~ 306 CY	~~450~~ 306 CY OF SELECT BACKFILL

NOTES:
1. QUANTITIES ARE BASED ON A 3D COMPARISON OF EXISTING AND PROPOSED SURFACES. THEY ARE THE ENGINEER'S ESTIMATE ONLY. CONTRUCTOR IS ENCOURAGED TO VERIFY QUANTITIES AT THE TIME OF CONTRACT BIDDING.
   1.1. QUANTITIES DO ACCOUNT FOR PROPOSED STONE UNDER BLEACHERS.
   1.2. QUANTITIES DO NOT ACCOUNT FOR PAVING DEPTHS, BUILDING FOOTERS, MATERIAL BELOW THE SURFACE OF SWM FACILITIES, ITC.
2. CONTRACTOR TO VERIFY EXISTING TYPOGRAPHY AS SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT O' GRADING OPERATIONS.
3. ANY EXTRA CUT MUST BE TAKEN TO A SITE WITH AN APPROVED EROSION AND SEDIMEN' CONTROL PLAN.
4. NO COMPACTION FACTOR WAS USED IN DETERMINING THE CUT AND FILL QUANTITIES.

811 MISS UTILITY LAW
LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES CANNOT BE GUARANTEED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY, AS REQUIRED BY THE MISS UTILITY LAW, WHICH WENT INTO EFFECT ON 10-1-91, CONTRACTORS MUST VERIFY LOCATIONS OF UNDERGROUND UTILITIES BY DIGGING TEST PITS AHEAD OF EXCAVATION. TEST PITS SHOULD BE DUG NO LESS THAN 2 DAYS, NOR MORE THAN 10 DAYS PRIOR TO EXCAVATION OR DEMOLITION WORK.

NOTE:
NO UNDERGROUND UTILITIES WERE MARKED BY MISS UTILITY PRIOR TO THE SURVEY. CONTRACOR SHALL CALL MISS UTILITY 48 HOURS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE TO TEST PIT AND VERIFY ANY POTENTIAL CONFLICTS AS A RESULT OF PROPOSED GRADING AND PROPOSED UTILITIES CROSSING ANY EXISTING UTILITIES. ANY DISCREPANCY SHALL BE REPORTED TO G.W. STEPHENS PRIOR TO ANY OTHER WORK BEING STARTED.

EG: SWMENG-000-134-2020 9'862

GEORGE WILLIAM STEPHENS, JR. and ASSOCIATES, INC.
ENGINEERS • PLANNERS • SURVEYORS • TRANSPORTATION
Ph (410) 297-3240 Fax (410) 297-3245

2011/6

JOPPATOWNE HIGH SCHOOL
LIMITED RENOVATION
555 JOPPA FARM ROAD
JOPPTOWNE, MARYLAND 21085

OWNER/DEVELOPER:
HARFORD COUNTY PUBLIC SCHOOLS
102 SOUTH HICKORY AVENUE
BEL AIR, MARYLAND 21018

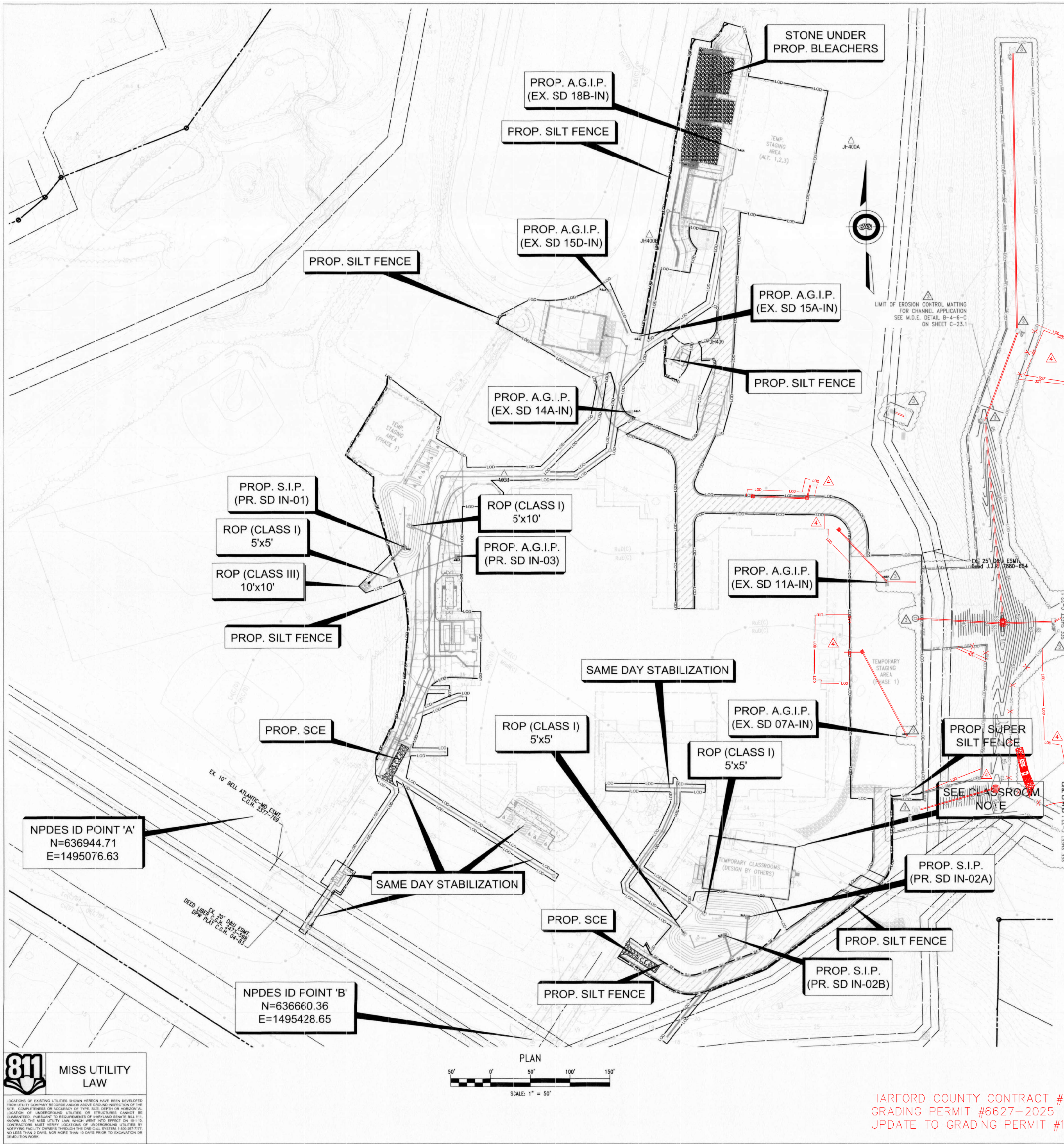
SHEET TITLE:
EROSION AND SEDIMENT CONTROL TITLE SHEET

PROFESSIONAL CERTIFICATION:
I certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 31168, Expiration Date: JAN. 13, 2022.

BCA Banta Campbell ARCHITECTS, INC.
10221 Wincopin Circle, Suite 210
Columbia, Maryland 21044
410.290.9006
www.bantacampbell.com

DATE: 07/28/2020
PROJ. NUMBERS:
GWS: 10793-6
BCA: 19-554

C-21



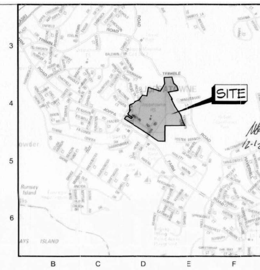
DAILY STABILIZATION NOTE

THIS NOTE SHOULD BE USED FOR MINIMAL AREAS WITHIN THE LIMITS OF DISTURBANCE THAT DO NOT DRAIN TO A SEDIMENT CONTROL MEASURE AND/OR WHERE THE INSTALLATION OF CONTROLS IS NOT FEASIBLE. (ROAD WIDENING, SIDEWALK INSTALLATION, ETC.).

CONTRACTOR SHALL ONLY DISTURB THAT AREA WHICH CAN BE COMPLETED AND STABILIZED BY THE END OF EACH WORKING DAY.

STABILIZATION SHALL BE AS FOLLOWS:
1. FOR AREAS TO BE PAVED, THE APPLICATION OF STONE BASE.
2. FOR AREAS TO BE VEGETATIVELY STABILIZED:
   A. PERMANENT SEED AND SOIL STABILIZATION MATTING OR SOD FOR ALL STEEP SLOPES, CHANNELS OR SWALES.
   B. PERMANENT SEED AND MULCH FOR ALL OTHER AREAS

ANY AREAS WHICH CAN NOT BE STABILIZED BY THE END OF EACH WORKING DAY MUST HAVE SILT FENCE INSTALLED ON THE DOWNSLOPE SIDE.



VICINITY MAP
SCALE: 1" = 2,000'
ADC MAP # 4583

HARFORD COUNTY SEDIMENT CONTROL NOTES

1. The contractor/owner is responsible for obtaining all necessary permits. Further, no construction activity shall take place until all required permits have been obtained.
2. The limits of disturbance shall be clearly delineated in the field prior to grading of the site to ensure compliance with approved plans. All Forest Retention areas will be delineated with Blaze Orange Fence as well as any SWM infiltration practice prior to any clearing. Work beyond the limits of disturbance and in any area inside the Forest Retention and SWM infiltration area is considered to be a violation of this plan.
3. All sediment control practices must be installed prior to any construction activity. Upon completion of the installation of perimeter sediment control practices the site must be inspected by the Department of Public Works (DPW). No additional construction activity will be authorized without the approval from DPW.
4. All points of ingress and egress shall be protected to prevent tracking of mud into public ways. During construction, every means will be taken to control soil erosion and siltation. If necessary a wash rack may need to be established.
5. Earth dikes, sediment traps, etc. will be located as shown on these drawings. Field changes and minor adjustments are permissible as long as the installation functions and conforms to specifications. The site inspector prior to installation must approve all such changes. Major changes to the approved plan will require re-approval by the Harford Soil Conservation District.
6. Following initial soil disturbance or re-disturbance permanent or temporary stabilization shall be completed within:
   a) Three calendar days on slopes greater than 3:1, all waterways and to the surface of all perimeter controls.
   b) Seven calendar days as to all other disturbed or graded areas of the project site.
7. Dust Control must be managed as part of all Sediment Control plans. Failure to do so is a violation of this plan.
8. Sediment basins must be built to design specifications shown on the plan. If the basin is to be used as a future SWM facility, the basin will be built in accordance with the latest MD-378 standards and specifications. Specified materials must be used. No changes or modifications will be made without written authorization of the Harford Soil Conservation District.
9. Temporary fencing shall be placed around all sediment basins, traps, and ponds during construction and site grading.
10. At the end of each working day all sediment control practices will be inspected and left operational. A weekly log will be kept in accordance with NOI/NPDES regulations. A copy of the approved sediment control plans shall be available at the site at all times.
11. Ensure positive drainage to all road inlets during all phases of road construction to ensure positive flow to traps and or basins.
12. Cut and/or fill shall be done in conformance with 2011 Erosion and Sediment Control Standards and Specifications for land grading.
13. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from traversing the slopes or by installing mechanical devices to safely convey water down slopes without causing erosion.
14. Off-site waste or borrow areas shall have an approved erosion and sediment control plan prior to the import or export of material to/from the project site.
15. All material originating from the development of the property and deposited on the public right-of-way shall be immediately removed.
16. Storm drain inlets and outlets shall be protected per 2011 Erosion and Sediment Control standards and specifications.
17. Topsoil, liming, fertilizing, seeding, mulching, sod, etc. are all essential parts of the sediment control plan and must be completed along with all other practices.
18. Traps to be removed shall be dewatered as per the 2011 Erosion and Sediment Control standards and specifications.
19. Prior to removal of traps or conversion of sediment basins to SWM facilities, the storm drains will be flushed
20. Sediment control practices will be maintained until all disturbed areas for which the practices were installed have been stabilized. Sediment control practices may be removed only with the authorization of the DPW inspector. All disturbed areas resulting from the removal of sediment control devices shall be stabilized immediately. Removal prior to inspector's approval constitutes a violation.

Revised July 2019

REVISION #4 CHANGES FOR THIS SHEET:
1. INCREASED LIMIT OF DISTURBANCE FROM ADDITIONAL 71,500 SF TO 90,733 SF FOR THE FOLLOWING REASONS:
   1.1. REMOVAL OF VEGETATION TO EASE FUTURE MAINTENANCE.
   1.2. ADDED STOCKPILE AREA.
   1.3. ADDED PROPOSED INLETS: "12F-IN" AND "12G-IN" AND "11B-IN" AND "07B-IN" TO ADDRESS PONDING (USING SAME DAY STABILIZATION).
   1.4. ADDED NEW STABILIZED CONSTRUCTION ENTRANCE WITH WASH RACK AND MOUNTABLE BERM (THE PREVIOUS S.C.E. HAD BEEN REMOVED).
   1.5. ADDED EXISTING PATIO TO BE REPLACED.
2. ADDED PUMPING INSTRUCTIONS FOR INLET 06A-IN (SEE STEP #10 OF NEW SEQUENCE ON TITLE SHEET).
3. REVISED SILT FENCE AND SUPER SILT FENCE.
4. PIPES TO BE REPLACED ARE NOW DRAWN SOLID AND CONTINUOUS.
5. NOW REPLACING EXISTING COLLAPSED INLETS "09A-ST" AND "06B-IN"

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T(301) 528-2010
www.clarkazar.com
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MISS UTILITY LAW

HARFORD COUNTY ESC PLAN #: 52532
GRADING PERMIT #: 12445-2020
EG: SWMENG-000-134-2020 91862

HARFORD COUNTY CONTRACT #52532
GRADING PERMIT #6627-2025
UPDATE TO GRADING PERMIT #12445-2020

201117

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ENGINEERS • PLANNERS • SURVEYORS • TRANSPORTATION

ISSUE or REVISION:

No.	DESCRIPTION	DATE
-	CD SUBMISSION	02/03/20
-	FINAL REVIEW	04/10/20
-	RELEASE FOR BIDDING	04/17/20
-	ADDENDUM NO. 2	05/11/20
1	ADDENDUM NO. 5	05/18/20
3	DRAIN & SLOPE REPAIRS	12/1/21
4	SD/SLOPE REPAIR REVISIONS	04/11/25

JOPPATOWNE HIGH SCHOOL

PSC NO. 12.046.16LP

JOPPATOWNE HIGH SCHOOL LIMITED RENOVATION

555 JOPPA FARM ROAD
JOPPTOWNE, MARYLAND 21085

OWNER/DEVELOPER:
HARFORD COUNTY PUBLIC SCHOOLS
102 SOUTH HICKORY AVENUE
BEL AIR, MARYLAND 21018

SHEET TITLE:
EROSION AND SEDIMENT CONTROL OVERLAY PLAN

PROFESSIONAL CERTIFICATION:
I certify that these documents were prepared or approved by me and that I am a duly licensed professional engineer under the laws of the State of Maryland. Expiration Date: JAN 13, 2022.

BCA
Banta Campbell
ARCHITECTS, INC.
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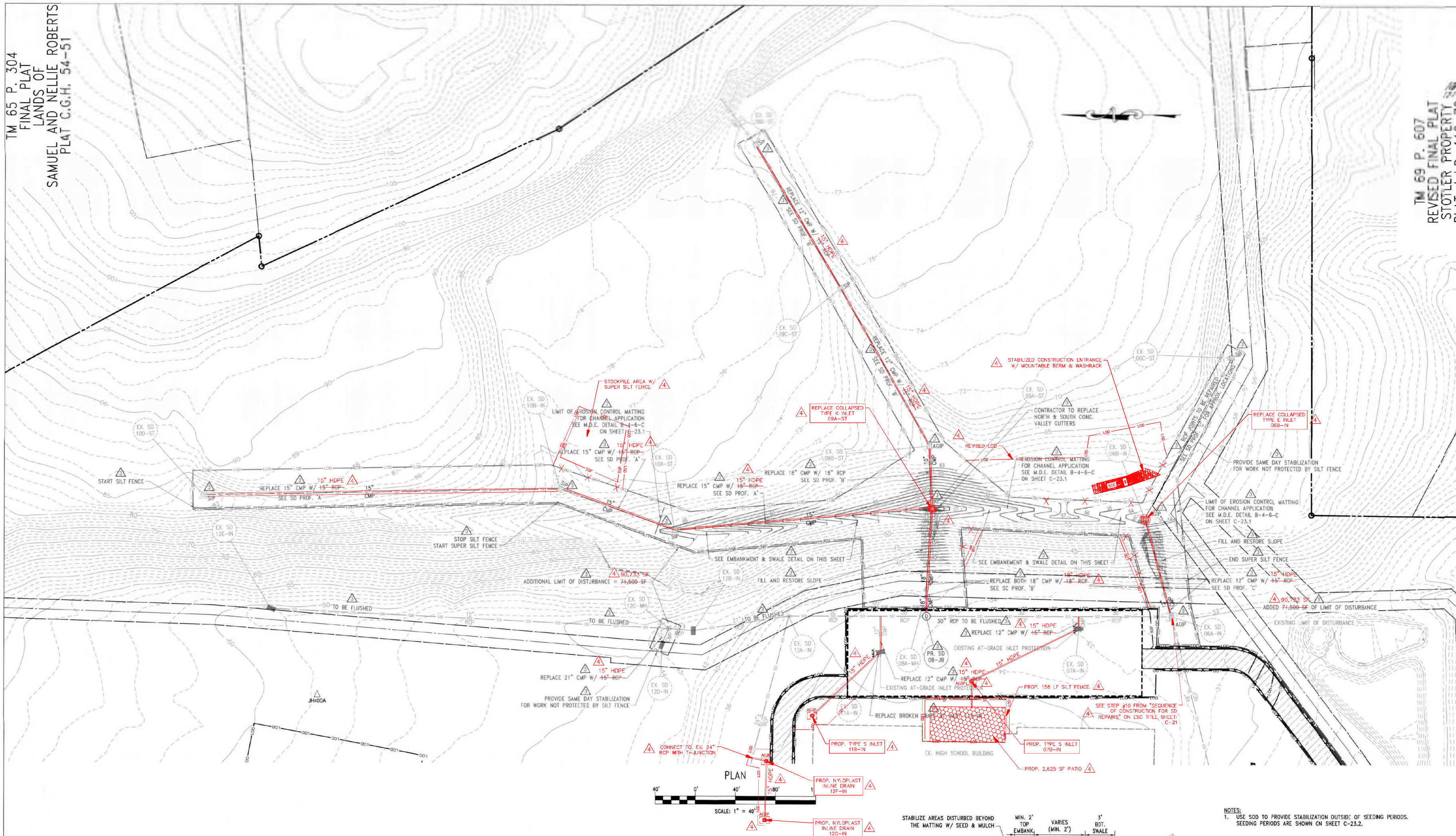
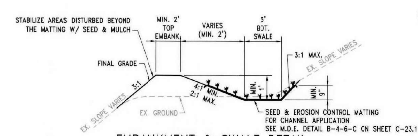
DATE: 07/28/2020
PROJ. NUMBERS:
GWS: 10793-6
BCA: 19-554

C-22

180





EMBANKMENT & SWALE DETAIL

NOT TO SCALE

NOTES:
1. USE SOD TO PROVIDE STABILIZATION OUTSIDE OF SEEDING PERIODS. SEEDING PERIODS ARE SHOWN ON SHEET C-23.2.

4 REVISION #4 CHANGES FOR THIS SHEET:
1. INCREASED LIMIT OF DISTURBANCE FROM ADDITIONAL 71,500 SF TO 90,733 SF FOR THE FOLLOWING REASONS:
   1.1. REMOVAL OF VEGETATION TO EASE FUTURE MAINTENANCE.
   1.2. ADDED STOCKPILE AREA.
   1.3. ADDED PROPOSED INLETS: "12F-IN" AND "12G-IN" AND "11B-IN" AND "07B-IN" TO ADDRESS PONDING (USING SAME DAY STABILIZATION).
   1.4. ADDED NEW STABILIZED CONSTRUCTION ENTRANCE WITH WASH RACK AND MOUNTABLE BERM (THE PREVIOUS S.C.E. HAD BEEN REMOVED).
   1.5. ADDED EXISTING PATIO TO BE REPLACED.
2. ADDED PUMPING INSTRUCTIONS FOR INLET 06A-IN (SEE STEP #10 OF NEW SEQUENCE ON TITLE SHEET).
3. REVISED SILT FENCE AND SUPER SILT FENCE.
4. PIPES TO BE REPLACED ARE NOW DRAWN SOLID AND CONTINUOUS AND WILL BE HDPE.
5. NOW REPLACING EXISTING COLLAPSED INLETS "09A-ST" AND "06B-IN"

HARFORD COUNTY CONTRACT #52532
GRADING PERMIT #6627-2025
UPDATE TO GRADING PERMIT #12445-2020

201840

HARFORD COUNTY ESC PLAN #: 52532
GRADING PERMIT #: 12445-2020
EG: SWMENG-000-134-2020 31862

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3	DRAIN & SLOPE REPAIRS	12/1/21
4	SD/SLOPE REPAIR REVISIONS	04/11/25

JOPPATOWNE HIGH SCHOOL

PSC NO. 12.046.16LP

JOPPATOWNE HIGH SCHOOL LIMITED RENOVATION

555 JOPPA FARM ROAD
JOPPTOWNE, MARYLAND 21085

HARFORD COUNTY PUBLIC SCHOOLS

OWNER/DEVELOPER:
HARFORD COUNTY PUBLIC SCHOOLS
102 SOUTH HICKORY AVENUE
BEL AIR, MARYLAND 21018

SHEET TITLE:
EROSION AND SEDIMENT CONTROL DRAIN & SLOPE REPAIRS

PROFESSIONAL CERTIFICATION:
I certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 24844 Expiration Date: JAN 13, 2022.

BCA
Banta Campbell
ARCHITECTS, INC.
10221 Wincopin Circle, Suite 210
Columbia, Maryland 21044
410.290.9006
www.bantacampbell.com

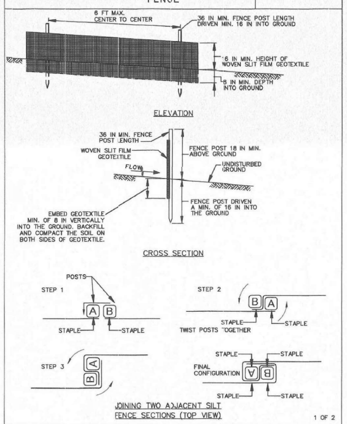
DATE: 11/18/2021
PROJ. NUMBERS:
GWS: 10783-6 / 11884
BCA: 14-554

ADDED SHEET
C-22.1

181

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: SF



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: SF

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ³¹⁄₆₄ ⅛ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

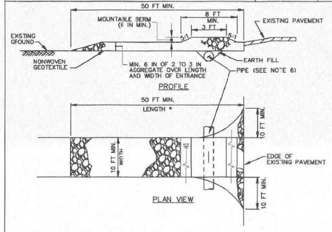
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL: SCE



CONSTRUCTION SPECIFICATIONS

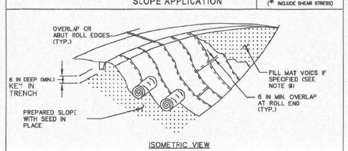
1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-4-6-D PERMANENT SOIL STABILIZATION MATTING SLOPE APPLICATION

STANDARD SYMBOL: PSSMS — * lb/ft² (* INCLUDE SHEAR STRESS)



CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE PERMANENT SOIL STABILIZATION MATTING MADE OF OPEN WEAVE SYNTHETIC, NON-DEGRADABLE FIBERS OR ELEMENTS OF UNIFORM THICKNESS AND DISTRIBUTION THROUGHOUT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES OR WOOD STAKES. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPE AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS, UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWN SLOPE. LAY MATTING SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT EDGES OF MATTING ROLLS PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE TOP OF SLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. IF SPECIFIED BY THE DESIGNER OR MANUFACTURER AND DEPENDING ON THE TYPE OF MAT BEING INSTALLED, ONCE THE MATTING IS KEYED AND STAPLED IN PLACE, FILL THE MAT VOIDS WITH TOP SOIL OR GRANULAR MATERIAL AND LIGHTLY COMPACT OR ROLL TO MAXIMIZE SOIL/MAT CONTACT WITHOUT CRUSHING MAT.
10. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

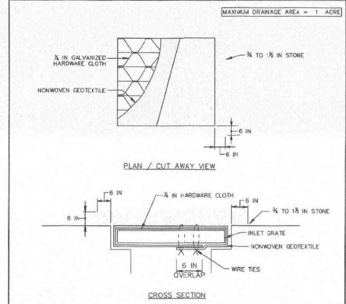
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-2 AT-GRADE INLET PROTECTION

STANDARD SYMBOL: AGIP

MAXIMUM DRAINAGE AREA = 1 ACRE



CONSTRUCTION SPECIFICATIONS

1. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
2. LIFT GRATE AND WRAP WITH NONWOVEN GEOTEXTILE TO COMPLETELY COVER ALL OPENINGS. SECURE WITH WIRE TIES AND SET GRATE BACK IN PLACE.
3. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE 6 INCHES THICK ON THE GRATE.
4. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

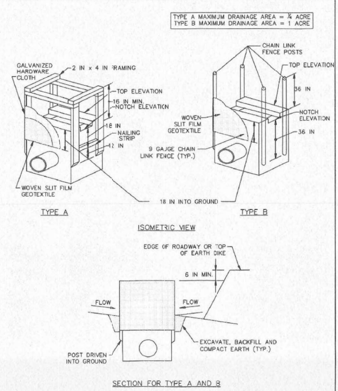
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-1 STANDARD INLET PROTECTION

STANDARD SYMBOL: SIP

TYPE A MAXIMUM DRAINAGE AREA = ¼ ACRE
TYPE B MAXIMUM DRAINAGE AREA = 1 ACRE



1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2311 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-1 STANDARD INLET PROTECTION

STANDARD SYMBOL: SIP

CONSTRUCTION SPECIFICATIONS

1. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
2. EXCAVATE COMPLETELY AROUND THE INLET TO A DEPTH OF 18 INCHES BELOW THE NOTCH ELEVATION.
3. FOR TYPE A, USE NOMINAL 2 INCH X 4 INCH CONSTRUCTION GRADE LUMBER POSTS, DRIVEN 1 FOOT INTO THE GROUND AT EACH CORNER OF THE INLET. PLACE NAIL STRIPS BETWEEN THE POSTS ON THE ENDS OF THE INLET. ASSEMBLE THE TOP PORTION OF THE 2X4 FRAME AS SHOWN. STRETCH ½ INCH GALVANIZED HARDWARE CLOTH TIGHTLY AROUND THE FRAME AND FASTEN SECURELY. FASTEN GEOTEXTILE SECURELY TO THE HARDWARE CLOTH WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND HARDWARE CLOTH A MINIMUM OF 18 INCHES BELOW THE WEIR CREST. THE ENDS OF THE GEOTEXTILE MUST MEET AT A POST, BE OVERLAPPED AND FOLDED, THEN FASTENED TO THE POST.

   FOR TYPE B, USE 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND 6 FOOT LENGTH, DRIVEN A MINIMUM OF 36 INCHES BELOW THE WEIR CREST AT EACH CORNER OF THE STRUCTURE. FASTEN 9 GAUGE OR HEAVIER CHAIN LINK FENCE, 42 INCHES IN HEIGHT, SECURELY TO THE FENCE POSTS WITH WIRE TIES. FASTEN GEOTEXTILE SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 18 INCHES BELOW THE WEIR CREST.
4. BACKFILL AROUND THE INLET IN LOOSE 4 INCH LIFTS AND COMPACT UNTIL SOIL IS LEVEL WITH THE NOTCH ELEVATION ON THE ENDS AND TOP ELEVATION ON THE SIDES.
5. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

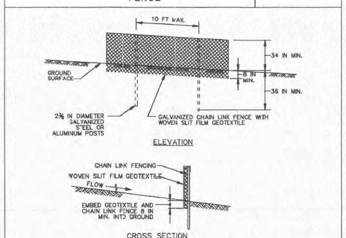
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL: SSF



CONSTRUCTION SPECIFICATIONS

1. INSTALL 2⅜ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2⅜ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

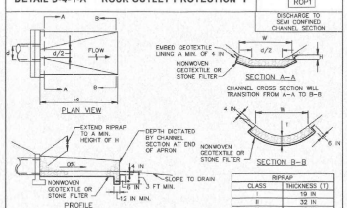
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL D-4-1-A ROCK OUTLET PROTECTION I

STANDARD SYMBOL: ROP1

DISCHARGE TO SEMI CONFINED CHANNEL SECTION



RIPRAP	
CLASS	THICKNESS (T)
I	19 IN
II	32 IN
III	46 IN

CONSTRUCTION SPECIFICATIONS

1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
3. PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (⅜ TO 1½ INCH STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
4. EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF THE RIPRAP.
5. CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE STONE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
6. WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
7. CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
8. MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.

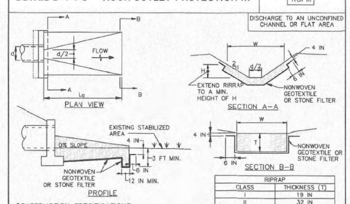
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL D-4-1-C ROCK OUTLET PROTECTION III

STANDARD SYMBOL: ROPIII

DISCHARGE TO AN UNCONFINED CHANNEL OR FLAT AREA



RIPRAP	
CLASS	THICKNESS (T)
I	19 IN
II	32 IN
III	46 IN

CONSTRUCTION SPECIFICATIONS

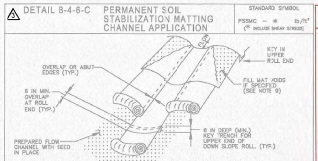
1. RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
2. USE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
3. PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (⅜ TO 1½ INCH MINIMUM STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
4. EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF RIPRAP.
5. CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
6. WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
7. CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
8. MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND RIPRAP DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL B-4-6-C PERMANENT SOIL STABILIZATION MATTING CHANNEL APPLICATION

STANDARD SYMBOL: PSSMC — * lb/ft² (* INCLUDE SHEAR STRESS)



CONSTRUCTION SPECIFICATIONS

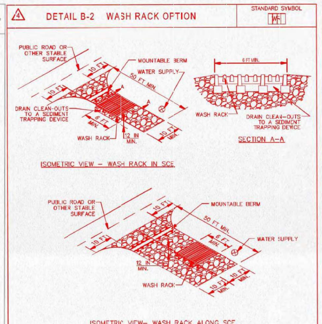
1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE PERMANENT SOIL STABILIZATION MATTING MADE OF OPEN WEAVE SYNTHETIC, NON-DEGRADABLE FIBERS OR ELEMENTS OF UNFORM THICKNESS AND DISTRIBUTION THROUGHOUT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES OR WOOD STAKES. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPE AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATKINS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS, UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING IN DIRECTION OF WATER FLOW, CENTERING THE FIRST ROLL ON THE CHANNEL CENTER LINE. WORK FROM CENTER OF CHANNEL OUTWARD WHEN PLACING ROLLS. LAY MATTING SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT EDGES OF MATTING ROLLS PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE NEXT DOWNSTREAM MAT.
7. KEY IN THE TOP OF SLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. IF SPECIFIED BY THE DESIGNER OR MANUFACTURER AND DEPENDING ON THE TYPE OF MAT BEING INSTALLED, ONCE THE MATTING IS KEYED AND STAPLED IN PLACE, FILL THE MAT VOIDS WITH TOP SOIL OR GRANULAR MATERIAL AND LIGHTLY COMPACT OR ROLL TO MAXIMIZE SOIL/MAT CONTACT WITHOUT CRUSHING MAT.
10. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

⚠4 DETAIL B-2 WASH RACK OPTION

STANDARD SYMBOL: WR



CONSTRUCTION SPECIFICATIONS

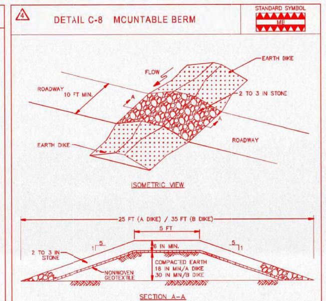
1. USE A WASH RACK DESIGNED AND CONSTRUCTED/MANUFACTURED FOR THE ANTICIPATED TRAFFIC LOADS. CONCRETE, STEEL, OR OTHER MATERIALS ARE ACCEPTABLE. PRE-FABRICATED UNITS SUCH AS CATTLE GUARDS ARE ACCEPTABLE. USE MINIMUM DIMENSION OF 6 FEET x 10 FEET. ORIENT DIRECTION OF RIBS AS SHOWN ON THE DETAIL.
2. INSTALL PRIOR TO, ALONG SIDE OF, OR AS PART OF THE SCE.
3. DIRECT WASH WATER TO AN APPROVED SEDIMENT TRAPPING DEVICE.
4. KEEP AREA UNDER WASH RACK FREE OF ACCUMULATED SEDIMENT. IF DAMAGED, REPAIR OR REPLACE WASH RACK.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

⚠4 DETAIL C-8 MOUNTABLE BERM

STANDARD SYMBOL: MB



CONSTRUCTION SPECIFICATIONS

1. USE MINIMUM WIDTH OF 10 FEET TO ALLOW FOR VEHICULAR PASSAGE.
2. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE EARTH MOUND PRIOR TO PLACING STONE.
3. PLACE 2 TO 3 INCH STONE OR EQUIVALENT RECYCLED CONCRETE AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE MOUNTABLE BERM.
4. MAINTAIN LINE, GRADE, AND CROSS SECTION. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN SPECIFIED DIMENSIONS. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. MAINTAIN POSITIVE DRAINAGE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE | 2011 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

⚠4 REVISION #4 CHANGES FOR THIS SHEET:
1. ADDED MOUNTABLE BERM AND WASH RACK DETAILS.

811 MISS UTILITY LAW

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PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 31168
EXPIRATION DATE: 1/12/2027
4/11/2025

HARFORD COUNTY ESC PLAN #: 52532
GRADING PERMIT #: 12445-2020
EG: SWMENG-000-134-2020 91862

HARFORD COUNTY CONTRACT #52532
GRADING PERMIT #6627-2025
UPDATE TO GRADING PERMIT #12445-2020

201118

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ISSUE or REVISION:

No.	DESCRIPTION	DATE
-	CD SUBMISSION	02/03/20
-	FINAL REVIEW	04/10/20
-	RELEASE FOR BIDDING	04/17/20
-	ADDENDUM NO. 2	05/11/20
1	ADDENDUM NO. 5	05/18/20
⚠	DRAIN & SLOPE REPAIRS	12/1/21
⚠	SD/SLOPE REPAIR REVISIONS	04/11/25

JOPPATOWNE HIGH SCHOOL

PSC NO. 12.046.16LP

JOPPATOWNE HIGH SCHOOL
LIMITED RENOVATION
555 JOPPA FARM ROAD
JOPPTOWNE, MARYLAND 21085

OWNER/DEVELOPER:
HARFORD COUNTY PUBLIC SCHOOLS
102 SOUTH HICKORY AVENUE
BEL AIR, MARYLAND 21018

SHEET TITLE:
EROSION AND SEDIMENT CONTROL NOTES AND DETAILS 1 OF 2

PROFESSIONAL CERTIFICATION:
I certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 29899 Expiration Date: JAN. 13, 2022.

BCA
Banta Campbell
ARCHITECTS, INC.
10221 Wincopin Circle, Suite 210
Columbia, Maryland 21044
410.290.9006
www.bantacampbell.com

DATE: 07/28/2020

PROJ. NUMBERS:
GWS: 10793-6
BCA: 19-554

C-23.1

SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

A. SOIL PREPARATION

1. TEMPORARY STABILIZATION

a. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OF CHISEL PLOWS OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.

b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.

c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

2. PERMANENT STABILIZATION

a. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:

i. SOIL PH BETWEEN 6.0 AND 7.0

ii. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (PPM).

iii. SOIL CONTAINS LESS THAN 40% CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 30% SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION: IF LOVEGRASS WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30% SILT PLUS CLAY) WOULD BE ACCEPTABLE.

iv. SOIL CONTAINS 1.5% MINIMUM ORGANIC MATTER BY WEIGHT.

v. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.

b. APPLICATION OF AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.

c. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLAN, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.

d. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.

e. MIX SOIL AMENDMENTS INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED EQUIPMENT LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRIABLE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

B. TOPSOILING

1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.

2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.

3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:

a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.

b. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.

c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.

d. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.

4. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN

5. TOPSOIL SPECIFICATIONS: SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:

a. TOPSOIL MUST BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, OR LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. TOPSOIL MUST NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1 1/2 INCHES IN DIAMETER.

b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUT SEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.

c. TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF NATURAL TOPSOIL.

6. TOPSOIL APPLICATION

a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.

b. UNIFORMLY DISTRIBUTE TOPSOIL IN A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.

c. TOPSOIL MUST NOT BE PLACED IF THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

C. SOIL AMENDMENTS

1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSES.

2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE LAWS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.

3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 50% WILL PASS THROUGH A #100 MESH SIEVE AND 98-100% WILL PASS THROUGH A #20 MESH SIEVE.

4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 4 TO 8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

A. SEEDING

1. SPECIFICATIONS

a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON ANY PROJECT. REFER TO TABLE B.4 REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.

b. MULCH ALONE MAY BE APPLED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAWS.

c. INOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANT AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOVE 75 TO 80 DEGREES FAHRENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.

d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.

2. APPLICATION

a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.

i. INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3, OR SITE-SPECIFIC SEEDING SUMMARIES.

ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT. B.16

b. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.

i. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.

ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

c. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER).

i. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES SHOULD NOT EXCEED THE FOLLOWING: NITROGEN, 100 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN; P2O5 (PHOSPHOROUS), 200 POUNDS PER ACRE; K2O (POTASSIUM), 200 POUNDS PER ACRE.

ii. LIME: USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.

iii. MIX SEED AND FERTILIZER ON SITE AND SEED IMMEDIATELY AND WITHOUT INTERRUPTION.

iv. WHEN HYDROSEEDING DO NOT INCORPORATE SEED INTO THE SOIL.

B. MULCHING

1. MULCH MATERIALS (IN ORDER OF PREFERENCE)

a. STRAW CONSISTING OF THOROUGHLY THRESHED WHEAT, RYE, OAT, OR BARLEY AND REASONABLY BRIGHT IN COLOR. STRAW IS TO BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW AND NOT MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY. NOTE: USE ONLY STERILE STRAW MULCH IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.

b. WOOD CELLULOSE FIBER MULCH (WCFM) CONSISTING OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.

i. WCFM IS TO BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.

ii. WCFM, INCLUDING DYE, MUST CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.

iii. WCFM MATERIALS ARE TO BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENEOUS SLURRY. THE MULCH MATERIAL MUST FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND MUST COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.

iv. WCFM MATERIAL MUST NOT CONTAIN ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.

v. WCFM MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH OF APPROXIMATELY 10 MILLIMETERS, DIAMETER APPROXIMATELY 1 MILLIMETER, PH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6 PERCENT MAXIMUM AND WATER HOLDING CAPACITY OF 90 PERCENT MINIMUM. B.17

2. APPLICATION

a. APPLY MULCH TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.

b. WHEN STRAW MULCH IS USED, SPREAD IT OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS PER ACRE TO A UNIFORM LOOSE DEPTH OF 1 TO 2 INCHES. APPLY MULCH TO ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. WHEN USING A MULCH ANCHORING TOOL, INCREASE THE APPLICATION RATE TO 2.5 TONS PER ACRE.

c. WOOD CELLULOSE FIBER USED AS MULCH MUST BE APPLIED AT A NET DRY WEIGHT OF 1500 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER TO ATTAIN A MIXTURE WITH A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

3. ANCHORING

a. PERFORM MULCH ANCHORING IMMEDIATELY FOLLOWING APPLICATION OF MULCH TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON THE SIZE OF THE AREA AND EROSION HAZARD:

i. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 2 INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD FOLLOW THE CONTOUR.

ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER BINDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. MIX THE WOOD CELLULOSE FIBER WITH WATER AT A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

iii. SYNTHETIC BINDERS SUCH AS ACRYLIC DLR (AGRO-TACK), DCA-70, PETROSET, TERRA TAX II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED. FOLLOW APPLICATION RATES AS SPECIFIED BY THE MANUFACTURER. APPLICATION OF LIQUID BINDERS NEEDS TO BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. USE OF ASPHALT BINDERS IS STRICTLY PROHIBITED.

iv. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG.

TEMPORARY STABILIZATION

1. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.1 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3) AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. IF THIS THIS SUMMARY IS NOT PUT ON THE PLAN AND COMPLETED, THEN TABLE B.1 PLUS FERTILIZER AND LIME RATES MUST BE PUT ON THE PLAN.

2. FOR SITES HAVING SOIL TESTS PERFORMED, USE AND SHOW THE RECOMMENDED RATES BY THE TESTING AGENCY. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.

3. WHEN STABILIZATION IS REQUIRED OUTSIDE OF A SEEDING SEASON, APPLY SEED AND MULCH OR STRAW MULCH ALONE AS PRESCRIBED IN SECTION B-4-3.A.1.B AND MAINTAIN UNTIL NEXT SEEDING SEASON.

Hardiness Zone (from Figure B.3): 7a Seed Mixture (from Table B.1):					Fertilizer Rate (10-20-20)	Lime Rate
No.	Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depths		
	Cereal Rye	112	2-15 to 4-30; 8-15 to 12-15	1.0"	436 lb/ac (10 lb/1000 sf)	2 tons/ac (90 lb/1000 sf)
	Foxtail Millet	30	5-1 to 8-14	0.5"		

I. KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1,000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10-35% OF THE TOTAL MIXTURE BY WEIGHT.

II. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1,000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10-35% OF THE TOTAL MIXTURE BY WEIGHT.

III. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES; CERTIFIED TALL FESCUE CULTIVARS 95-100%, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0-5%. SEEDING RATE: 5 TO 8 POUNDS PER 1,000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.

IV. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MANAGED TURF AREA. MIXTURE INCLUDES; CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30-40% AND CERTIFIED FINE FESCUE 60-70%. SEEDING RATE: 1 1/2 TO 3 POUNDS PER 1,000 SQUARE FEET.

NOTES:
SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND"

CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMER PROTECTION AND ASSURES A PURE GENETIC LINE.

C. IDEAL TIMES OF SEEDING FOR TURF GRASS MIXTURES

WESTERN MD: MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5B, 6A)

CENTRAL MD: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONE: 6B)

SOUTHERN MD, EASTERN SHORE: MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7A, 7B)

D. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES, LEVEL AND RAKE THE AREAS TO PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1 1/2 INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL POSE NO DIFFICULTY.

E. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (1/2 TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS, OR ON ADVERSE SITES.

Hardiness Zone (from Figure B.3): 7a Seed Mixture (from Table B.3):					Fertilizer Rates (10-20-20)			Lime Rates
No.	Species	Application Rate (lb/ac.)	Sedding Dates	Seeding Depths	N	P205	K20	
3	Deertongue Sheep Fescue Redtop Common Lespedeza	20 20 1 10	3-1 to 5-15 8-15 to 10-15	1/4 - 1/2 in	45 lb/ac (1.0 lb/1000 sf)	90 lb/ac (2 lb/ 1000 sf)	90 lb/ac (2 lb/ 1000 sf)	2 tons/ac (90 lb/ 1000 sf)
7	Creeping Red Fescue Kentucky Bluegrass	60 15	3-1 to 5-15 5-16 to 8-14 8-15 to 10-15	1/4 - 1/2 in				
10	Orchardgrass Creeping Red Fescue Redtop Alsike Clover White Clover	25 10 1 3 3	3-1 to 5-15 8-15 to 10-15	1/4 - 1/2 in				

A. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER)

1. GENERAL SPECIFICATIONS

A. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.

B. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4 INCH, PLUS OR MINUS 1/4 INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE

C. STANDARD SIZE SECTIONS OF SOD MUST BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED VERTICALLY WITH A FIRM GRASP ON THE UPPER 10% OF THE SECTION.

D. SOD MUST NOT BE HARVESTED OR TRANSPLANTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.

E. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.

2. SOD INSTALLATION

A. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.

B. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT IN TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS.

C. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.

D. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD AND THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.

3. SOD MAINTENANCE

A. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY DURING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.

B. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.

C. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN 1/3 OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN A GRASS HEIGHT OF AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

INCREMENTAL STABILIZATION - CUT SLOPES

1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES

2. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.1):
A. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.

B. PERFORM PHASE 1 EXCAVATION, PREPARE SEEDBED, AND STABILIZE.

C. PERFORM PHASE 2 EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.

D. PERFORM FINAL PHASE EXCAVATION, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

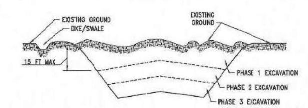

FIGURE B.1: INCREMENTAL STABILIZATION - CUT

INCREMENTAL STABILIZATION OF EMBANKMENTS - FILL SLOPES

1. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.

2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.

3. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.

4. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.2):
A. CONSTRUCT AND STABILZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.

B. AT THE END OF EACH DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.

C. PLACE PHASE 1 FILL, PREPARE SEEDBED, AND STABILIZE.

D. PLACE PHASE 2 FILL, PREPARE SEEDBED, AND STABILIZE.

E. PLACE FINAL PHASE FILL, PREPARE SEEDBED, AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.

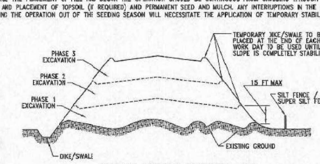

FIGURE B.2: INCREMENTAL STABILIZATION - FILL

ISSUE or REVISION:

No.	DESCRIPTION	DATE
-	CD SUBMISSION	02/08/20
-	FINAL REVIEW	04/10/20
-	RELEASE FOR BIDDING	04/17/20
-	ADDENDUM NO. 2	05/11/20
1	ADDENDUM NO. 5	05/18/20
△	DRAIN & SLOPE REPAIRS	12/1/21
△	SD/SLOPE REPAIR REVISIONS	04/11/25

JOPPATOWNE HIGH SCHOOL

PSC NO. 12.046.16LP

JOPPATOWNE HIGH SCHOOL
LIMITED RENOVATION

555 JOPPA FARM ROAD
JOPPTOWNE, MARYLAND 21085

PUBLIC SCHOOLS

OWNER/DEVELOPER:
HARFORD COUNTY PUBLIC SCHOOLS
102 SOUTH HICKORY AVENUE
BEL AIR, MARYLAND 21014

SHEET TITLE:

ERWSION AND SEDIMENT CONTROL NOTES AND DETAILS 2 OF 2

PROFESSIONAL CERTIFICATION:
I certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 29809 Expiration Date: JAN. 8, 2022.

7/28/20

BCA
Banta Campbell
ARCHITECTS, INC.
10221 Wincopin Circle, Suite 210
Columbia Maryland 21044
410.290.9006
www.bantacampbell.com

DATE: 07/28/2020

PROJ. NUMBERS:

GWS: 10793-6
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PROFESSIONAL CERTIFICATION:
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 31168
EXPIRATION DATE: 1/12/2027
4/11/2025

SCALE: 1 Inch

HARFORD COUNTY ESC PLAN #: 52532
GRADING PERMIT #: 12445-2020
EG: SWMENG-000-134-2020 91862

GEORGE WILLIAM STEPHENS, JR. and ASSOCIATES, INC.
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HARFORD COUNTY CONTRACT #52532
GRADING PERMIT #6627-2025
UPDATE TO GRADING PERMIT #12445-2020

201119

811 MISS UTILITY LAW