SECTION 32 12 16 - ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

A. Provide asphalt concrete paving work of varying thicknesses and applications as noted on the construction drawings. Pavements will be classified using NJ DOT Hot Mix Asphalt (HMA) mix designations.

B. Construction of asphalt pavement bases.

C. Bituminous Pavement markings.

1.3 RELATED SECTIONS

A. Section 31 20 00: Earthwork subgrade preparations

B. Section 03 12 00: Saw-cutting of edges of existing pavement is specified in site clearing section.

C. Section 02 41 19: Removal of existing pavement surfaces is specified in site demolition section.

1.4 REFERENCE STANDARDS

A. AASHTO American Association of State Highway & Transportation Officials:

1. M17.
2. M20.
3. M22.
4. M82.
5. M140.
6. M208.
7. M248.

B. ASTM American Society for Testing and Materials:

1. D242.
2. D946.

3. D977.
4. D2027.
5. D2397.
6. D3381.
7. D3515.

C. FS Federal Standard

1. TT-P-115.

D. NJ DOT New Jersey State Department of Transportation, Standard Specifications for Roadway & Bridge Construction, latest edition.

1.5 SUBMITTALS

A. Project Data: Provide copies of materials certificates signed by material producer (batch plant) and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

B. Schedule and coordinate all work with a Materials Testing & Inspection Consultant & Geotechnical Engineer to provide subgrade and subbase course compaction test results prior to paving, demonstrating that required compaction levels have been achieved.

C. Coordinate with the Materials Testing & Inspection Consultant to provide construction inspection report of all pavement construction verifying compliance with the project specifications in all areas. Provide subgrade soil compaction test reports.

1.6 QUALITY ASSURANCE

A. For all paving work, comply with NJ DOT standard specifications, latest edition, and with local governing regulations if more stringent than specified.

B. The thickness and density of all asphalt pavement courses constructed in the project shall be measured by the Materials Testing and Inspection Company and written report certifying compliance with the specifications shall be submitted.

C. Verify the subbase elevations across the footprint of paving with a pre-paving survey after base has been tested for compaction. Adjust elevations of the base course.

1.7 REGULATORY REQUIREMENTS

A. Comply with the applicable provisions of codes, standards and specifications referenced in this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations.

B. Surface Course: Aggregate used in the surface course shall consist of crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand. The surface course shall be NJ DOT Hot Mix Asphalt Mix 9.5M64, as indicated on the drawings.

C. Bituminous Stabilized base course, NJ DOT Hot Mix Asphalt Mix 19M64, as indicated on the construction drawings. Standard NJ DOT aggregate composition and gradation shall apply.

D. Leveling course: NJ DOT HMA 4.75M64 may be used as a thin lift leveling course to adjust base course irregularities before paving the final surface course.

E. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHO M17 (ASTM D242).

F. Asphalt Cement: AASHO M226 (ASTM D3381) for viscosity-graded material and AASHO M20 (ASTM D946) for penetration-graded material.

G. Traffic Markings: All pavement markings shall be standard traffic paint per NJDOT Specifications. Barrier free (ADA) markings shall be cyan, parking stalls shall be white, and “no parking” area markings shall be yellow. Markings shall be placed where noted on the site plan and shall conform to Federal Specification TT-E-489 -595. Replace all existing striping and pavement markings in public roadways where pavement has been removed, in kind, with what existed previously to a like new condition. Black out existing linework as needed to clearly delineate the new markings.

H. Traffic Signs & Handicapped parking signage: including all materials, posts, bollards, hardware, labor, equipment and all else necessary to install the signage where indicated on the plans. (Refer to Traffic Control Section for additional signage requirements)

2.2 ASPHALT-AGGREGATE MIXTURE

A. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with new NJ DOT Standard Marshal Mix designations, ASTM D3515 and as recommended by local paving authorities to suit project conditions. Air void content shall be between 2 and 8 percent based upon the maximum theoretical specific gravity per NJ DOT specifications.

2.3 PAVEMENT THICKNESS

A. Various pavement sections may be shown on the plan. The pavement sections shown will vary in degree of structural integrity.

1. The Bituminous (Asphalt) Pavement shall consist of a stone subbase course, a stabilized base course and a surface (wearing) course. The thickness and mix designations shall be per plan.
2. Pavement for temporary pavements shall be a single fine aggregate surface wearing course (FABC), measured at least 1.5 inches thick, placed upon a uniformly graded and firmly compacted dense graded aggregate or quarry processed (dust bound) stone subbase, measuring at least 4 inches thick.

PART 3 EXECUTION

3.1 SITE CONDITIONS

A. Weather Limitations: Construct when ambient temperature is above 50 degrees F and when temperature has not been below 35 degrees F for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

1. Construct asphalt concrete surface course when atmospheric temperature is above 50 degrees F and when base is dry. Base course may be placed when air temperature is above 30 degrees F and rising.

B. Grade Control:

1. The contractor shall take special measures to mark paving limits and check elevations at frequent intervals to insure positive drainage.
2. The contractor shall establish and maintain required lines and elevations.
3. The contractor shall meet existing pavement surfaces flush along saw-cut limits and milling edges. The intent of the grading plan is for positive drainage to be maintained at all times.

C. Provide traffic control during all paving operations.

3.2 PRE-PAVING PREPARATION

A. Saw cut the pavement along demolition limits in the areas shown at the prescribed depths.

B. Remove all loose surface pavement in broken areas and compact subbase material to a firm and unyielding condition 95% MPD using vibratory compactors. If the area is large enough, use of a mechanical vibratory roller or compactor is preferred.

C. Subgrade Preparation

1. Construct the subbase and subgrade materials to the depth specified on the plans and compact the underlying soils to a firm and unyielding consistency or 95% dry density per ASTM D1557, under the supervision of the contractor's geotechnical engineer. Reconstruct any soft areas of the subgrade material using compacted suitable on site materials or dense graded aggregate in accordance with the geotechnical engineer's requirements. Compact subgrade to 95% dry density per ASTM D-1557 to the depths indicated on the plans.

a. Dense graded aggregate size shall not exceed 3 inches in any dimension.
b. Dense graded aggregate should be well-graded with a mixture of fine, small and larger particles to provide a tightly compacted homogenous layer.
c. Apply herbicide to compacted subbase before applying prime coat or bituminous stabilized base course.
d. Discard subgrade and subbase materials that cannot be re-used off site in a legal manner.

2. Apply Prime coat to subbase and construct bituminous stabilized base course per details.

D. After all required subgrade areas have been reconstructed and bituminous stabilized base has been installed, sweep all pavement surfaces and wash with clean water to remove all loose particles before constructing the bituminous pavement overlay.

3.3 PLACING MIX

A. General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 degrees F. Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness.

B. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

C. Pavement shall be placed in such a manner to insure continuous overland drainage flow to the nearest storm water collection point (inlet, manhole grate, or depressed curb opening).

D. Insure surface of pavement is clean prior to placement of subsequent courses. Clean surface and apply tack coat between base and top courses.

3.4 ROLLING

A. General: Begin rolling when mixture can bear roller weight without excessive displacement.

1. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

B. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

C. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

D. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Spray watering may be used to accelerate cooling during summer months.

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

F. Schedule paving operations to avoid impacting the existing traffic circulation.

3.5 QUALITY CONTROL

A. General: Coordinate with the Materials Testing and Inspection Consult to test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Check grade, cross slope and surface uniformity of compacted subgrade with line levels or suitable alignment testing apparatus before placing drainage subbase fill course or final pavement courses. Verify tolerances of each successive pavement course in similar fashion.

C. Thickness: In-place compacted thickness shall not be acceptable if it exceeds the following allowable variation from required thickness:

1. Surface Course: plus or minus 1/4 inch.
2. Stabilized Base Course: plus or minus 1/4 inch.
3. Subbase Drainage Course: plus or minus 1/2 inch.

D. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10 feet straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces shall not be acceptable if exceeding the following tolerances for smoothness.

1. Wearing Course Surface: 3/16 inch.

E. Pavement shall be placed in such a manner to insure continuous overland drainage flow without puddles or ponding of storm water

F. Test the compaction and elevation (lines & grades) of underlying subgrade and subbase courses prior to the construction of each course and subsequent pavement courses. The areas shall be tested at sufficient intervals as determined by the geotechnical engineer to insure that adequate compaction in all pavement areas has been achieved prior to paving. Provide certified test results to the engineer for acceptance at least 2 days prior to the scheduled paving operation.

G. Joints between paving lanes shall be tight, uniform, and nondescript to permit surface waters to pass seamlessly from section to section. Heat and overdress joints to promote bonding and to inhibit long term joint separation and cracking.

H. Bituminous pavement shall be flush with all sidewalks, depressed curbs, and slabs used for barrier free accessibility.

I. Refer to the grading plan for the location of key spot elevations, contour lines, designated ridge lines and valley gutters.

END OF SECTION 321216

SECTION 32 13 13 - PORTLAND CEMENT CONCRETE PAVING AND CURBS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

A. Provide cast-in-place Portland cement concrete paving required, walkways, slabs and other concrete pavements.

B. Contractor to establish lines and grades for construction stakeout by engaging the services of a licensed land surveyor or professional engineer in the State of New Jersey. Note designated spot elevations and slope requirements on the plan for all walkways and intersections with landings and other pedestrian areas.

1.3 RELATED SECTIONS

A Section 31 20 00: Prepared subgrade is specified in "Earthmoving" section.

B. Section 02 41 19: Removal of existing pavement, concrete, curbs, and other obstructions is noted in this section.

C. Section 31 15 00: Traffic control

D. Section 32 12 16: Asphalt Concrete Paving

1.4 REFERENCED STANDARDS

A. ASTM American Society for Testing and Materials:

1. A185.
2. A615.
3. A184.
4. A307.
5. A309.
6 D-4632

B. AASHTO American Association of State Highway and Transportation Officials:

1. M233.

C. ACI American Concrete Institute, Design of Concrete Mixes.

D. NJ DOT Standard Specifications for Road and Bridge Construction, latest edition.

1.5 SUBMITTALS

A. Provide Data: Furnish samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

1.6 QUALITY ASSURANCE

A. Codes and Standards: Comply with local governing regulations if more stringent than specified.

B. Furnish to owner’s representative, job-specific concrete batch plant tickets with quantities and mix proportions clearly indicated.

C. Contractor to establish lines and grades for construction stakeout by engaging the services of a licensed land surveyor or professional engineer in the State of New Jersey.

1. Detailed spot elevations are shown on the Site Grading Plan. Each elevation has been calculated to insure positive overland drainage and ADA (barrier free) compliance. Grade stakes and forms set for concrete shall be checked at appropriate intervals to insure that plan grades are met. The as-built survey must demonstrate that required paving and sidewalk grades have been met.
2 Extreme care must be taken to insure pavement is placed in such a manner to insure positive overland drainage can occur.
3 The contractor’s surveyor shall take additional spot elevations along paving limits where new work adjoins existing work to verify that positive drainage can occur. Construction limits shall be adjusted accordingly to suit field conditions.

D. The location and elevation of all sidewalks, ramps, and other paving shall be established by a land surveyor or professional engineer licensed in the State of New Jersey. Contractor shall insure the correct alignment and positioning of constructed improvements.

E. The contractor shall remove and reconstruct all work found to be poorly constructed, poorly finished, deficient, mis-aligned, damaged, or otherwise vandalized as determined by the engineer without additional cost.

F. The contractor shall coordinate and schedule the installation of pole footings, concrete walkways, pad, etc., with other trades and contractors to insure that newly constructed concrete is not damaged by activities of other trades. If necessary, postpone specific concrete construction in some areas until other trades have completed their work and the risk of damage is minimal.

G. Contractor shall coordinate with their Materials Testing and Inspection Consultant to provide report of compliance for materials used in construction of concrete paving and curbs.

1.7 REGULATORY REQUIREMENTS

A. Comply with applicable provisions of codes, standards and specifications referenced in this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185.

1. Furnish in flat sheets, not rolls, unless otherwise acceptable to the Engineer. Use wire mesh in all concrete slabs, aprons, and sidewalk subject to frequent or occasional vehicle loading per the construction plans, minimum gage shall be 6X6-W2.9xW2.9

C. Fiber Reinforcement: shall be nylon or blended nylon polypropylene fiber reinforcement.

D. Geotextile Fabric: High modulus, woven geotextile fabric, ASTM D-4632-86, et al.

2.2 CONCRETE MIX, DESIGN AND TESTING

A. Comply with requirements of applicable Division 03 sections for concrete mix design, sampling and testing, and quality control, and as specified.

B. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticizer), air-entraining admixture and water to produce the following properties:

1. Compressive Strength: 4000 psi, minimum at 28 days, unless otherwise indicated.
2. Slump Range: 6 inches for concrete containing HRWR admixture (super-plasticizer); 3 inches for other concrete.
3. Air Content: Use air-entraining admixtures to provide 5 percent to 8 percent.

PART 3 EXECUTION

3.1 JOB CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic on the site as required for the Owner's use of the property and other construction activities that may be underway on the site.

B. Concrete placed in areas subject to vehicle loading shall be a minimum 6 inches thick (or 8" if specified on plans) and reinforced with welded wire fabric or reinforcing steel bars as noted on the construction detail(s).

C. When meeting existing construction with new work, align top of concrete surfaces.

3.2 SURFACE PREPARATION

A. Set forms to the lines and grades that are shown on the plans. For reconstruction without any grade adjustments reconstruct to original lines and grades.

B. Remove trash, debris, and loose material from compacted subbase surface immediately before placing concrete.

C. Place drainage fill material layer and compact subbase before placing concrete.

D. Removal all water from subgrades, allow to dry thoroughly, re-compact as needed before the placement of concrete.

E. Saw-cut adjoining surfaces to provide a smooth transition with new construction.

F. Subgrades shall be thoroughly compacted to insure maximum moisture-density criteria is established. See "C" above.

G. Concrete shall not be placed in wet forms or on saturated surfaces.

3.3 FORM CONSTRUCTION

A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed form work for grade and alignment to following tolerances:

1. Top of forms not more than 1/8 inch in 10 feet.
2. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

C. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.4 CONCRETE PLACEMENT

A. General: Comply with requirements of NJ DOT Standard Specifications and ACI standards for mixing and placing concrete, and as herein specified.

B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

1. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
2. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than ½-hour, place a construction joint.

D. Curbs: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

E. Do not place concrete if inclement weather or freezing conditions are expected within the following 24 hours.

3.5 JOINTS

A. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

1. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
2. Expansion joints shall be placed in such a manner to insure that slabs shall be allowed to expand in no less than 2 directions and slabs shall not exceed 8 feet in any single dimension.

B. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas measuring 4'x4', 5'x5', or 6'x6' as required subject to A2 above. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

C. Expansion Joints: Provide pre-molded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, fence posts, walls, walks and other fixed objects, unless otherwise indicated.
1. For 4" thick concrete, locate expansion joints at maximum 16 feet spacing, unless noted otherwise on the plans.
2. For 6" thick concrete, locate expansion joints at 24 feet maximum spacing, unless otherwise indicated on the plans.
3. Extend joint fillers full-width and depth of joint, and not less than 1/4 inch or more than ½ inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.
4. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.
5. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
6. Slabs adjoining building walls at doorways shall be doweled into the wall to prevent differential settling.

3.6 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10 feet straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to ½ inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

1. Broom finish, by drawing a fine-hair broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture as reviewed by Architect or Engineer.
2. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by the Engineer.

3.7 CURING

A. Protect and cure finished concrete paving. Use membrane- forming curing and sealing compound or Engineer's reviewed moist-curing methods. Keep concrete surfaces moist during curing period.

3.8 REPAIRS AND PROTECTIONS

A. Repair or replace broken, stained, misaligned, defective, or vandalized concrete, as directed by Engineer or Architect at no additional cost to the owner.

B. Drill test cores where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION 321313

SECTION 32 31 13 - CHAIN LINK FENCING AND GATES: STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

A. Provide galvanized steel fencing and gates, including accessories and concrete footings for posts.

1.3 RELATED SECTIONS: NOT USED

1.4 REFERENCED STANDARDS

A. ASTM American Society for Testing and Materials:

1. Standards and Test Methods referenced in Part 2 - Products.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for metal fencing, fabric, gates and accessories.

B. Compliance: Not used.

C. Shop Drawings: Not required.

1.6 QUALITY ASSURANCE

A. Provide chain link fences and gates as complete units from a single source, including necessary erection accessories, fittings, and fastenings.

1.7 REGULATORY REQUIREMENTS

A. Comply with the applicable provisions of codes, standards and specifications referenced in this section.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:

1. Steel Fencing and Fabric:
   a. American Fence Corp.
   b. Anchor Fence, Inc.
   c. United States Steel. (Cyclone Fence Division)
   d. Substitution: Only if demonstrating equivalence.

2.2 GENERAL

A. Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

2.3 STEEL FABRIC

A. Fabric: Number 6 gage (0.162 inch) steel wires, 2 inches mesh with top selvage twisted and bottom selvage knuckled for fabric over 60 inches high, and both top and bottom selvages knuckled for fabric 60 inches high and under. Provide one piece fabric widths for fencing up to 12 feet high.

1. Fabric Finish: Galvanized, ASTM A392, Class II, with not less than 2.0 oz. zinc per sq. ft. of surface.
   a. Comply with ASTM F668, Class 2, except provide fabric with diameter (gage) of core wire equivalent to fabric diameter specified when measured prior to application of non-metallic coating.

2.4 FRAMING AND ACCESSORIES

A. General: Galvanized steel, ASTM A120 or A123, with not less than 1.8 oz. zinc per sq. ft. of surface. Color black to match proposed fence fabric.

1. Fittings and Accessories: Galvanized, ASTM A153, with zinc weights per Table I.

B. End, Corner and Pull Posts: Minimum sizes and weights:

1. Up to 6 feet fabric height, 2.375 inches OD steel pipe, 3.65 lbs. per lin. ft., or 3.5 inches x 3.5 inches roll-formed sections, 4.85 lbs. per lin. ft.
2. Over 6 feet fabric height, 2.875 inches OD steel pipe, 5.79 lbs. per lin. ft., or 3.5 inches x 3.5 inches roll-formed sections, 4.85 lbs. per lin. ft.
3. HEAVY DUTY FENCE: 5 inches OD steel pipe, filled with concrete.

C. Line Posts: Space 10 feet o.c. maximum, unless closer spacing indicated, of following minimum sizes and weights:

1. Up to 6 feet fabric height, 2.375 inches OD steel pipe, 3.65 lbs. per lin. ft., or 3.5 inches x 3.5 inches roll-formed sections, 4.85 lbs. per lin. ft.
2. Over 6 feet fabric height, 2.875 inches OD steel pipe, 5.79 lbs. per lin. ft., or 3.5 inches x 3.5 inches roll-formed sections, 4.85 lbs. per lin. ft.
3. HEAVY DUTY FENCE: 5 inches OD steel pipe, filled with concrete.

D. Top Rail: 1.66 inches OD pipe, 2.27 lbs. per ft. or 1.625 inches x 1.25 inches roll-formed sections, 1.35 lbs. per ft. Manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

E. Bottom Rail: Same as top rail, continuous for Heavy Duty Fence.

F. Tension Wire: 7-gage, coated coil spring wire, metal and finish to match fabric. Locate at bottom of fabric.

G. Post Brace Assembly: Adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace at mid-height of fabric. Use same material as top rail for brace; truss to line posts with 0.375 inch diameter rod and adjustable tightener.

H. Post Tops: Pressed steel, wrought iron, or malleable iron, to form a weather tight closure cap for posts. Provide one cap for each post, except where combination post top caps and barbed wire supporting arms are used. Provide caps with openings for through passage of top rail.

I. Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16 inch x 3/4 inch. Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.

J. Stretcher Bar Bands: Steel, wrought iron, or malleable iron. Space not over 15 inches o.c., to secure stretcher bars to end, corner, pull, and gate posts.

2.5 CONCRETE

A. Provide concrete consisting of Portland cement, ASTM C150, aggregates ASTM C33, and clean water. Minimum 28-day compressive strength 2500 psi. Use at least 4 sacks of cement per cu. yd., 1 inch maximum size aggregate, maximum 3 inches slump, and 2 percent to 4 percent entrained air.

2.6 POST ISOLATION

A. Selected fence posts shall be installed in concrete slabs and walkways. Fence posts installed in new concrete must have a foam isolation sleeve installed between the post and adjacent concrete to prevent stress cracking.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not begin installation and erection before final grading is completed and finish elevations established.

B. Excavation: Drill or hand excavate (using post hole digger) holes for posts in firm, undisturbed or compacted soil.

1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
2. Excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface, except to greater depths where indicated.

C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing. Extend concrete footings to be flush with finish grade, except extend footings for swing gate posts to underside of bottom hinge. Trowel tops of footings to a crown to shed water away from posts.

1. Set keeps, stops, sleeves and other accessories into concrete.
2. Grout-in posts set into sleeved holes, concrete construction, or rock excavations, with non-shrink Portland cement grout.
3. Allow concrete to attain at least 75 percent of its minimum 28-day compressive strength and wait at least seven (7) days after placement before installing rails, tension wires, barbed wire, or fabric. Do not stretch and tension fabric and wires, and do not hang gates, until the concrete has obtained its full design strength.

D. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.

E. Center Rails: Provide where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.

F. Install braces so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install by weaving through fabric before stretching fabric, and tie to each post with not less than 6 gage galvanized wire. Fasten fabric to tension wire using 11 gage galvanized steel hog rings spaced 24 inches o.c.

H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

I. Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to posts with metal bands spaced 15 inches o.c.

J. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing. Tie fabric to line posts with wire ties 12 inches o.c. Tie fabric to rails and braces with wire ties 24 inches o.c. Tie fabric to tension wires with hog rings 24 inches o.c.

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

3.2 PROTECTION AND REPAIR

A. Protect installed fencing and gates from damage until final acceptance. Install barriers or attach protective materials at gate posts and other points subject to impact or abrasion.

B. Repair damaged coatings by recoating with high zinc dust content paint for repair of galvanizing, or by compatible and equivalent coating for repair of PVC. Match adjacent coating, and apply per manufacturer's directions.

C. Replace any metal components distorted in the course of construction work. Remove and replace concrete footings displaced by impact.

END OF SECTION 32 31 13

SECTION 32 91 13 - SOIL PREPARATION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Restoration of lawn areas disturbed by construction.

1.2 WORK INCLUDED

A. Topsoil Screening & debris removal.

B. pH adjusters.

C. Soil Conditioners.

D. Fertilizer.

1.3 RELATED SECTIONS

A. Section 02 41 19 - Selective Site Demolition

B. Section 31 20 00 - Earthwork - Site

C. Section 32 92 00 - Lawns and Grasses.

1.4 SUBMITTALS

A. Product Data: Manufacturer's technical literature with installation and storage instructions for each product specified.

B. Samples: If requested by Engineer.

C. Quality Control:

1. Test Reports: Topsoil composition, in duplicate. Acid-producing deposits, in duplicate
2. Certifications: In duplicate.

1.5 QUALITY ASSURANCE

A. Reference Standards: Applicable requirements of standards and specifications referenced herein apply to the Work of this Section.

B. Regulatory Agencies: Conform to applicable requirements of Local and State department of Architecture Extension service of the state in which the project is located.

C. Contractor's certification that products installed conform with requirements specified.

D. Pre-Installation Conference:

1. Hold at time and place designated by Owner or Owner’s Representative, and attended by representative of Architect, Contractor, landscaping trades and other trades whose work affects landscaping before starting work.
2. Discuss and finalize the following for record:
    a. Review project drawings and specifications, including revisions, approved shop drawings and documented local landscaping practice; resolve conflicts, deviations or differences in local practice and project documents.
    b. Review drawings for correct drainage, appropriate plants for locations shown, location and purity of water and verification of soil test results.
    c. Time schedule and sequence of events proposed for installation.
    d. Review limitations imposed by weather and special requirements of Contractor.
    e Establish storage and working areas of site available for use.
    f. Clarify specifications, details, application/ installation, requirements what work should be completed before start of landscaping, and other items affecting installation and quality application of landscaping.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in unopened containers bearing manufacturer's name and content identification.

B. Store materials as recommended by the manufacturer.

1.7 PROJECT CONDITIONS

A. Coordination: Coordinate this Work with the Work of other Sections to avoid any delay or interference with other Work.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Existing Soil: Existing topsoil is present in all construction areas and shall be stripped and temporarily stockpiled in the general locations shown. Provide silt fence around stockpiles per the Soil Erosion & Sediment Control Plan Modify and screen existing topsoil to conform to composition requirements specified below as needed to provide minimum topsoil thicknesses suitable for new lawns and grasses.

B. Off-Site Topsoil:

1. The contractor may import offsite topsoil to the site, provided that it conforms to composition requirements specified below.
2. Screened Topsoil: Furnished by Contractor

C. Composition:

1. Specific for lawns, grasses, trees, plants and ground covers specified and shown on the drawings. No organic matter or stone larger than one (1) inch in the topsoil is acceptable.
2. Physical Analysis (Soil Texture):

Quantity Percent by Oven Dry Weight	Size Fraction	Range of Particle Diameter (Inches)
Less than 2%	gravel	Larger than 3/4
Less than 3%	gravel	1/4 to 3/4
Less than 10%	gravel	2/25 to 1/4
40% to 65%	sand	1/500 to 2/25
25% to 60%	silt	1/12,500 to 1/500
Less than 20%	clay	Smaller than 1/12,500

a. Determine amounts of sand, soil and clay in the bail by hydrometer method or mechanical analysis. Size gravel by separation on screens with appropriate size openings.
b. Soil should be relatively free of undecomposed roots, sticks, leaves, paper and other organic material. Remove undesirable trash such as glass, plastic or metal fragments before seeding or planting.

3. Chemical Analysis:
   a. Organic matter content (% oven dry weight of soil):
      1) Sandy loam 1.25% to 20%.
      2) Loam and silt loam 2.5% to 20%.
      3) Soil with less than 10% organic matter use wet oxidation method of analysis.

4) Soil with more than 10% organic matter use loss on ignition method of analysis.

b. Soil reaction: pH of 4.5 to 7.0.

c. Soluble salt content:

1) Conductivity (Ece, millimhos per centimeter):
Less than 1.0 mmhos/cm for a 1:1 soil:water ratio.
Less than 0.5 mmhos/cm for a 1:2 soil:water ratio.
Less than 0.33 mmhos/cm for a 1:3 soil:water ratio.

2.2 PH ADJUSTERS

A. Lime:

1. Natural dolomitic limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates.
2. Gradation: Minimum 50 percent passing 100-mesh sieve and 90 percent passing 10-mesh sieve.

B. Aluminum Sulfate: Commercial grade.

2.3 SOIL CONDITIONERS

A. General:

1. Use singly or in combinations required to meet requirements for topsoil.
2. Soil Conditioners: Nontoxic to plants. Acid-neutralization as required.

B. Peat:

1. Peat humus derived from a freshwater site and conforming to ASTM D 2607 as modified herein.
2. Shred and granulate peat to pass ½-inch mesh screen and condition in storage pile for minimum six months after excavation.

C. Sand: Clean and free of toxic materials.

D. Perlite: Horticultural grade for planters.

E. Vermiculite: Horticultural grade for planters, free of toxic substances.

F. Rotted Manure:

1. Wall rotter horses or cattle manure containing maximum 25 percent by volume of straw, sawdust, or other bedding materials; free of stones, sticks and soil and containing no chemicals or ingredients harmful to plants.

2.4 FERTILIZER

A. Commercial Grade fertilizer:

1. Complete, neutral character, with elements derived from organic sources, containing the following percentages of available plant nutrients:
   a. Lawns: For each 100 square feet of area provide fertilizer with a minimum of 1 lb. actual nitrogen with a minimum of 50 percent in organic form, 4 percent phosphoric acid, and 2 percent potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth.
   b. Trees and Shrubs: Provide fertilizer with not less than 5 percent total nitrogen, 10 percent available phosphoric acid and 5 percent soluble potash.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas in which Work is to be performed. Report in writing to Owner and Engineer all prevailing conditions that will adversely affect satisfactory execution of Work. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Starting Work constitutes acceptance of the existing conditions and this Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective Work encountered.

C. Examine existing topsoil found at the project site for suitable for re-use as specified herein. Determine if existing topsoil satisfies topsoil requirements as defined herein and/or if they can be modified to comply. Supplement with additional topsoil as needed to restore all disturbed areas to lawns and grasses as shown on the drawings.

3.2 PREPARATION

A. Subgrade:

1. After areas required to be restored as lawn or landscaped have been brought to required subgrade, thoroughly till to minimum depth of 8 inches by scarifying, disking, harrowing, or other approved methods.
2. Remove debris and stones larger than one inch in any dimension remaining on surface after tillage.

3.3 TOPSOILING

A. Immediately prior to placing topsoil, prepare entire planting areas shown on drawings, scarify subgrade to a 8 inch depth for bonding of topsoil with subsoil.

B. Lawns: Spread screened topsoil evenly to a minimum depth of 5-6 inches. Do not spread topsoil when frozen or excessively wet or dry.

C. Correct irregularities in finished surfaces to eliminate depressions.

D. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

E. Topsoil shall be free of debris and any stone larger than 1 inch in dimension and said composition shall be as defined herein.

3.4 pH ADJUSTERS, SOIL CONDITIONERS AND FERTILIZER

A. Application: Apply fertilizer and soil conditioners in accordance with the Permanent Seeding Specification on the Soil Erosion and Sediment Control Plan.

B. Adjust pH level in topsoil and subgrade soils as discussed in related earthwork sections. Dispose of acid soils off-site in a legal manner.

END OF SECTION 329113

SECTION 32 92 00 - LAWNS & GRASSES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Temporary and permanent stabilization, as specified in this section, shall be carried out as outlined on the Soil Erosion and Sediment Control Plan and in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.

1.2 WORK INCLUDED

A. Seed.

B. Mulches.

C. Asphalt Adhesive.

D. Water.

E. Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on Drawings are not specified in this section.

F. The task items specified in A through D above must be applied to all disturbed areas, whether or not indicated on the drawings. Include adjacent property wherever grass is disturbed in execution of this contract.

1.3 RELATED SECTIONS

A. Section 31 20 00 – Earth Moving

B. Section 32 91 13 - Soil Preparation.

1.4 SUBMITTALS

A. Product Data: Manufacturer's technical literature with installation and storage instructions for each product specified.

B. Delivery Schedule: Ten working days prior to installation.

C. Samples: If requested by Engineer.

D. Quality Control:

1. Certifications: In duplicate.
2. Certificates of inspection required by regulatory agencies. Data substantiating that materials comply with requirements specified.
3. Seed supplier's certification for each grass seed species mixture specified, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed.

E. Contract Closeout:

1. Maintenance schedule: In duplicate.

1.5 QUALITY ASSURANCE

A. Reference Standards: Applicable requirements of standards and specifications referenced herein apply to the Work of this Section.

B. Regulatory Agencies: Conform to applicable requirements of Local and State agencies and boards.

C. Landscape Work: Executed by a single firm with a minimum of five years experience specializing in landscape work, and can demonstrate successful completion of comparable work in region in which this project is located.

D. Shipping: Ship landscape materials with certificates of inspection required by regulatory agencies. Comply with regulations applicable to landscape materials.

E. Non-availability: If specified landscape material is not obtainable, submit proof of non-availability to Architect, together with proposal for use of equivalent material.

F. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

G. Pre-Installation Conference:

1. Hold at time and place designated by Architect or Engineer and attended by representatives of Owner, Contractor, landscaping trades and other trades whose work affects landscaping before starting work.
2. Discuss and finalize the following for record:
   a. Review project Drawings and specifications, including revisions, approved shop Drawings and documented local landscaping practice; resolve conflicts, deviations or differences in local practice and project documents.

b. Review drawings for correct drainage, appropriate plants for locations shown, location and purity of water and verification of soil test results.
c. Time schedule and sequence of events proposed for installation.
d. Review limitations imposed by weather and special requirements of Contractor.
e. Establish storage and working areas of site available for use.
f. Clarify specifications, details, applications/installation requirements, what work should be completed before start of landscaping, and other items affecting installation and quality application of landscaping.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in unopened water tight containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site as recommended by manufacturer.

1.7 PROJECT CONDITIONS

A. Coordination: Coordinate this Work with the Work of other Sections to avoid any delay or interference with other Work.

B. Proceed with and complete work of this section as rapidly as portions of site become available, working within planting date limitations for work specified.

C. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion.

1.8 WARRANTY

A. Warranty lawns and grasses unconditionally for one full growing season beginning from date of final acceptance.

B. Beginning from the date of final acceptance, all lawns and grasses shall be alive and in satisfactory growth at end of warranty period.

C. Replace any material that is diseased or 25% dead or more at no cost to the Owner.

1.9 MAINTENANCE

A. Provide typewritten or printed maintenance instructions for one full growing cycle.

B. Maintenance Instructions Include:

1. Rate and frequency of irrigation.
2. Pesticide, fertilizer and herbicide application schedules.
3. Optimum moving height.

PART 2 - PRODUCTS

2.1 SEED

A. Classification:

1. Grass seed: Fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed mixture composed of grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, specified.
2. Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.
3. Label containers carrying seed in conformance with state seed laws.

B. Seed Mixture: Per Certified Soil Erosion and Sediment Control Plan.

2.3 MULCHES

A. General: Free from noxious weeds, mold, and other deleterious materials.

B. Threshed Straw: Seed free threshed straw stalks from oats, wheat, rye or barley. Air-dry condition of proper consistency for placing with commercial much blowing equipment.

C. Salt hay: Use only seed free salt hay for lawn areas. Air-dry condition of proper consistency for placing with commercial mulch blowing equipment.

2.4 ASPHALT ADHESIVE

A. ASTM D977, Grade rS-1. Use with straw or salt hay mulch.

2.5 WATER

A. Suitable quality for irrigation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas in which Work is to be performed. Report in writing to owner and engineer all prevailing conditions that will adversely affect satisfactory execution of Work. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Starting Work constitutes acceptance of the existing conditions and Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective Work encountered.

3.2 PLANTING CONDITIONS AND TIME RESTRICTIONS

A. Planting Dates: As specified on the Soil Erosion and Sediment Control Plan.

B. Restrictions: Do not plant when ground is frozen, snow covered, or muddy.

3.3 PREPARATION FOR PLANTING LAWNS

A. Loosen subgrade of lawn areas to a minimum depth of 8 inches. Remove stones over 1 inch in dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which can be plated promptly after preparation.

B. Place approximately ½ of total amount of screened top soil required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil to meet lines, grades and elevations shown, after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 4 inches of topsoil.

C. Provide Lime and Fertilizer as specified on the Soil Erosion and Sediment Control Plan.

D. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be plated immediately after grading.

E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before plating lawns. Do not create a muddy soil condition.

F. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.4 SEEDING

A. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 miles per hr. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.

B. Seeding Rate: Per Certified Soil Erosion and Sediment Control Plan.

C. Rake seed lighting into top 1/8 inch of soil, roll lightly, and water with a fine spray.

D. Protect seeded slopes against erosion with erosion control material.

E. Protect seeded areas against erosion with mulch after completion of seeding operations. Spread mulch uniformly to form a continuous blanket not less than 1-1/2 inches loose measurement over seeded areas.

1. Anchor mulch by crimping with serrated disc, or by spraying with asphalt emulsion. Take precautions to prevent damage or staining of structures, pavements, utilities or other plantings adjacent to mulched areas.

F. Rolling:

1. Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width.
2. If seeding is performed with cultipacker-type seeder or Hydro seeding, rolling may be eliminated.

G. Watering: Start immediately after completing each day's sodding. Apply at a rate sufficient to ensure thorough wetting of soil to minimum depth of 4 inches.

3.6 PROTECTION OF LAWN AND GRASS AREAS

A. Immediately after seeding, protect the area against traffic or other use.

3.7 RESTORATION

A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials and equipment, movement of vehicles, or where minor regrading is required.

1. Provide fertilizer soil amendments and seed or sod specified for new lawns and grasses as required to provide a satisfactorily reconditioned lawn. Provide new topsoil to fill low spots and meet new finish grades.
2. Cultivate bare and compacted areas thoroughly to provide a satisfactory, planting bed.
3. Remove diseased and unsatisfactory lawn areas; do not bury in cultivated soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil dripping, stone, gravel and other building materials.
4. Where substantial lawn remains:
   a. Remove weeds before seeding, if extensive, apply EPA approved selective chemical weed killer.
   b. Compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed.
   c. Apply a seedbed mulch, if required, to maintain moist condition.

B. Water newly planted areas and keep moist with daily watering schedule until new grass is established.

3.8 ESTABLISHMENT PERIOD

A. Definitions:

1. Lawns and grasses establishment period will be in effect until lawns and grasses have been mowed three times, and

2. Stand of lawn and grass is 95 percent ground cover of established species.

B. Maintenance During Establishment Period:

1. Begin maintenance immediately after planting.
2. Maintain lawns for not less than the following periods, and longer as required to establish an acceptable lawn.
   a. Seeded lawns: Not less than 60 days after Substantial Completion.
   b. If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
3. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading and replanting as required to establish a smooth lawn acceptable to the Engineer, free of eroded or bare areas.
4. Mow lawns and grassed areas to an average height of 2 inches whenever average height of grass becomes 3 inches.
5. Promotion of Growth: Mow, remove excess clippings, eradicate weeds, water, fertilize, overseed, and perform other operations necessary to promote growth.
6. Post-fertilize areas with commercial grade fertilizer approximately 7 days after planting and at intervals of 2 weeks thereafter until accepted. Apply fertilizer uniformly as specified in the Plan.

3.9 CLEANUP AND PROTECTION

A. During landscape work, keep pavements clean and work area in an orderly condition.

B. Protect landscape materials, and work from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed by the Engineer.

3.10 FINAL ACCEPTANCE

A. Final Inspection and Acceptance:

1. Final inspection will be made upon written request from the Contractor at least 10 days prior to last day of lawn and grasses establishment period.
2. Final acceptance will be based upon a satisfactory stand of lawns and grasses as defined in the paragraph entitled, "Establishment Period."

B. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected and accepted by Engineer. Contractor shall remove rejected plants and materials promptly form project site.

C. Replanting: Re-seed or Re-sod areas which do not have a satisfactory stand of lawns and grasses.

END OF SECTION 32 92 00