SECTION 09 90 00
INTERIOR, EXTERIOR AND HIGH PERFORMANCE PAINTS AND COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior paint and coating systems including surface preparation.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 00 - Unit Masonry: Concrete Masonry Units (CMU) and brick.

C. Section 05 12 16 - Fabricated Fireproofed Steel Columns.

D. Section 05 50 00 - Metal Fabrications.

E. Section 06 20 00 - Finish Carpentry.

F. Section 06 40 00 - Architectural Woodwork.

G. Section 08 11 13.16 - Custom Hollow Metal Doors and Frames.

H. Section 09 21 16.23 - Gypsum Board Shaft Wall Assemblies.

I. Section 23 05 00 - Common Work Results for HVAC.

J. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

A. Steel Structures Painting Council (SSPC):
1. SSPC-SP 1 - Solvent Cleaning.
2. SSPC-SP 2 - Hand Tool Cleaning.
3. SSPC-SP 3 - Power Tool Cleaning.
4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.

B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.

C. California Department of Public Health (CDPH):
1. CDPH v1.1-2010 and V1.2-2017

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: For each paint system indicated, including.
   1. Product characteristics.
   2. Surface preparation instructions and recommendations.
   3. Primer requirements and finish specification.
   4. Storage and handling requirements and recommendations.
   5. Application methods.
   6. Cautions for storage, handling and installation.

C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors and sheens available.

D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

E. Only submit complying products based on project requirements (i.e. LEED). One must also comply with the regulations regarding VOCs (CARB, OTC, SCAQMD, LADCO). To ensure compliance with district regulations and other rules, businesses that perform coating activities should contact the local district in each area where the coating will be used.

F. USGBC LEED V4 Submittals:
   1. MRc2 Environmental Product Declaration Product Language: Products shall be selected with a preference to products that have product-specific environmental product declaration documentation.
   2. EQc2 Low Emitting Materials: The VOC content of all adhesives, sealants, paints and coatings in this Section shall not exceed the VOC limits established in Division 01 Sustainable Design sections.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors and sheens available.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish surfaces for verification of products, colors and sheens.
   2. Finish area designated by Architect.
   3. Provide samples that designate primer and finish coats.
   4. Do not proceed with remaining work until the Architect approves the mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
   1. Product name, and type (description).
   2. Application and use instructions.
   3. Surface preparation.
   4. VOC content.
   5. Environmental handling.
   6. Batch date.
   7. Color number.

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: request infospecifications@sherwin.com; Web:www.swspecs.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS/SCOPE

A. Exterior Paint and Coating Systems:
1. Concrete: Non-vehicular concrete floors, patios, porches, steps and platforms.
2. Metal: Aluminum, galvanized steel.
3. Metal: Miscellaneous iron, ornamental iron, ferrous metal.
4. Architectural PVC, plastic, fiberglass.

2.3 PAINT MATERlALS - GENERAL

A. Paints and Coatings:
1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

D. Color: Refer to Finish Schedule for paint colors, and as selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
   1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
   2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
   3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
   4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
   5. All Exterior exposed ferrous metal surfaces to be painted except for stainless steel items and unless noted otherwise. Anodized aluminum surfaces are not to be painted; and galvalume roofing materials to be supplied with manufacturer's finishes and are not to be painted. Follow the attached Philadelphia Parks and Rec Paint color guide. Use Sherwin – William anti-graffitti coating and low VOC paints.
   6. Direct to metal paint systems in the same number of coasts by Sherwin Williams or Benjamin Moore can be used in liwu of Tnenmec projects specified below Exterior Paint for applications not covered in the paint color guide shall conform to the following minimum standards:
      a. . Ferrous Metal – Unprimed:
         1) One coat of primer; Tnemec 90-97 @ 2.5 - 3.5 mil dry thickness.
         2) First finish coat; Tnemec 161 @ 3.0 - 5.0 mil dry thickness. Slightly tinted to another shade than the final finish coat.
         3) Second finish coat; Tnemec 75 @ 2.0 - 3.0 mil dry thickness.
      b. B. Ferrous Metal - Shop Primed:
         1) First finish coat; Tnemec 161 @ 3.0 - 5.0 mil dry thickness. Slightly tinted to another shade than the final finish coat.
         2) Second finish coat; Tnemec 75 @ 2.0 - 3.0 mil dry thickness.
            Or

c.
Galvanized/Ferrous Metal – previously painted: Existing chain link fence support and handrails
Primer: S-W ProIndustrial Pro-Cryl Primer
2 coats of finish: S-W ProIndustrial WaterBased Alkyd Urethane, semi-gloss

d. Ferrous
Metal – Galvanized:
1) First finish coat; Tnemec 161 @ 3.0 - 5.0 mil dry thickness. Slightly tinted to another shade than the final finish coat.
2) Second finish coat; Tnemec 75 @ 2.0 - 3.0 mil dry thickness.

e. D. Non-Ferrous Metal - Unprimed (aluminum or copper):
1) One coat: Vinyl acid wash; #760 line or Galva-Prep Phosphoric acid wash.
2) One coat: DTM Acrylic primer; #073-189.
3) Two coat: Alkyd gloss; #074. Slightly tinted to another shade than the final finish coat.
4) One coat: GCP 1000. Color selected by the Architect.

f. Hockey Rink Game lines:

g. Conduit, plumbing piping to match existing columns:

B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

E. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.

F. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and

paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

G. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.

B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.

C. Apply coatings using methods recommended by manufacturer.

D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.

F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.

G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

SECTION 100610

EXTERIOR SIGNAGE

PART 1 REQUIRED SUBMITTALS

1.1 QUALIFICATIONS

A. The awarded Fabricator will have provided their qualifications at or prior to the time of Bid. The Fabricator is required to submit as part of the submittal process additional qualifications for any subcontractors, including but not limited to, installers, electrician, specialty sub-contractor and/or project managers not included or accepted with the bid award of the project. The Owner reserves the right to accept or reject any sub-contractor and/or project manager submitted for review. Qualifications should include: a minimum of 5-10 years relevant experience and shall provide information that illustrates the following:

1. Firm/Personnel qualifications.

2. Projects of similar size and complexity.

3. Demonstration of high-quality craftsmanship.

4. Project management team and experience.

B. Regional Vendors:

1. Urban Sign and Crane
   527 E. Chestnut Avenue
   Voorhees, NJ 08360
   856.691.8388
   www.urbansigncompany.com

2. M.S. Signs, Inc.
   6 Morris Street
   Paterson, NJ 07501
   973.569.1111
   www.mssign.com

3. L&H Sign Company
   425 North 3rd Street
   Reading, PA 19601
   www.lhsigns.com

4. Compass Sign Co LLC
   1505 Ford Road
   Bensalem, PA 19020
   215.639.677
   www.compass-sign.net

5. Allied Environmental Signage
   69 Megill Road

Farmingdale, NJ 07727
732.751.1818
www.allied-signs.com

6. Or proposed qualified manufacturer, qualifications to be submitted to the owner for approval.

1.2 SHOP DRAWINGS

A. Submit one **(1)** electronic set of shop drawings as outlined below: Include plans, elevations, sections and large-scale details of sign construction, wording, and lettering layout. Show anchorages and accessory items. Provide graphic layouts of each individual sign face and message for each sign location. Show fabrication and installation details, including all sign components such as: extrusions, brackets, bracing, hardware, internal framing, etc. Alphabet of each type style required by the contract documents; upper and lowercase, with numerals, punctuation and accents. Shop drawings MUST include all field verified conditions and dimensions. Show installation and mounting heights.

1.3 PRODUCT SPECS AND WARRANTY INFORMATION

A. Provide documentation outlining all project warranties, including both product and manufacturing. Submit cut sheets for all specified products.

1.4 SAMPLES

A. Samples shall be clearly labeled on the back (where possible), designating item number, name of manufacturer, sign type and location. Fabricator shall submit a minimum of two (2) samples of each color and finish applied on each material type as indicated in the drawing package. Samples should represent the final finish of each element and will be used as control samples for production approval. Samples should represent extreme variations in color and texture that might occur during fabrication. Please submit the following samples as specified in the drawing package, list project specific submittal requirements.

1.5 COLOR SAMPLES

A. Color sample(s) for each specified color, process and finish. Color submittal(s) shall be submitted on each relevant substrate specified.

1.6 MATERIAL SAMPLES

A. Material samples of each specified Material (M1, M2 etc.) in each color and finish specified. Submit manufacturer's standard color palette where required for color and finish selection.

1.7 CHPL SAMPLES

A. Custom High Pressure Laminate (CHPL) manufacturer must supply project-specific electronic PDF proofs for content approval and minimum 8" x 10" x .060" actual material lab samples for color and finish approval from production-ready digital art work and

specifications as provided by Designer.154 Philadelphia Parks and Recreation I SIGNAGE STANDARD MANUAL

1.8 PAPER TEMPLATES

A. Templates should be fully assembled or have complete registration marks for assembly. Fabricator shall provide for Designer approval, full-size paper templates for review and approval in the field of the following sign types:

1. CUS.1

1.9 SIGN SAMPLES

A. Sign Contractor shall construct the following sign samples/mock-ups:

1. PID-4 (only required by Fabricator on initial fabrication contract for this program)

1.10 REVIEW PROCESS

A. Each reviewing party, i.e. Designer, Owner, Architect, etc. will each require a minimum of 10 business days to review all submittals. The process and sequence of submittal and review shall be discussed and agreed to during the project kickoff meeting. Designer reserves the right to reject any submittal (shop drawing, sample, etc.) that does not satisfy the requirements as outlined in this document including but not limited to: field conditions, construction, finish or color requirements. Submit additional drawings/ samples as required to obtain final approval.

PART 2 PROJECT REQUIREMENTS

2.1 WORK INCLUDED

A. Site verification, fabrication, and delivery-of all sign types and quantities indicated in the final approved Copy List and Sign Location Plan. Installation of signs may be completed by the Fabricator or the General Contractor. Fabricator to verify the sign quantities from the Copy List and Sign Location Plans and if discrepancies exist, notify the Designer of any such discrepancies. Work shall include all support structures and fasteners required for installation. Work shall include all design engineering needed to produce the project to comply with all applicable municipal, state and federal code, and structural soundness. Fabricator is responsible for submitting engineered drawings signed and sealed by structural engineer. Fabricator to provide all services, subcontractors, labor, materials and equipment needed to complete the work described in this design drawings and specifications document. It is the Fabricator's responsibility to have all drawings signed and sealed by a Structural Engineer. Fabricator shall visit site before construction begins and inspect each proposed sign location. Any issues or concerns shall be communicated to the Designer in writing within twenty-four (24) hours. Upon award of the bid, the selected Fabricator shall arrange a meeting with the Designer to review the scope of work. Fabricator will be responsible for generating evacuation maps at all programmed locations based on template provided by Designer. Fabricator will be responsible for providing the Designer and Owner a project schedule that outlines durations for all work including delivery dates for submittals and Designer and Owner review time. Sign Contractor shall update and reissue the schedule throughout the project and communicate all changes/impacts on the schedule to Designer and Owner. Prior to installation, the

Fabricator shall conduct a pre-install walk through with the Designer and Owner to address any potential issues/questions. At the substantial completion of the project the Fabricator shall perform a walk-through with the Designer and Owner to inspect the installation and create a punch list of all unsatisfactory items. Fabricator is required to complete all punch list items within 3-4 weeks of receipt of punch list.

2.2 WORK QUALITY

A. All work to be done in a professional manner and to the highest trade standards. Fabricator is responsible for insuring the quality standards above for all related professional and trade subcontracted work including: general carpentry, masonry, electrical, landscaping, or utilities required for the installation of all sign types as described, unless otherwise agreed to by Owner. All subcontracted work must meet the general accepted professional standards.

2.3 REFERENCE STANDARD

A. The following materials reference standards will apply to the work materials (use most current version of reference standards):
   1. ASTM A36 Structural Steel
   2. ASTM A123 Zinc (Hot Galvanized) coatings on products fabricated from rodded, pressed, and forged steel shape, plates and bars.
   3. ASTM B221 Aluminum-alloy extruded bars, rods, wire, shapes and tubes.
   4. ASTM D822 Light and Water exposure apparatus (Carbon-arc type) for testing paint, varnish, lacquer, and related products.
   5. ASTM E84 Surface-burning characteristics of building materials, lacquer and related products.
   6. AWI Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute.
   7. CDA Copper Development Association, Inc.
   8. FS L-P-391 Plastic sheet, rods and tubing, rigid, cast materials
   9. FS L-P-387 Plastic sheet, laminated, thermosetting
   10. PS-1 Construction and industrial plywood
   11. PEI Porcelain Enamel Institute
   12. TM 8135 QQ-B-613 (Fed Spec) Brass, Muntz 280
   13. UL-943 Fluorescent lamp ballasts quality

2.4 WARRANTIES

A. Warrant all products (including, but not limited to: materials, hardware and finishes) against any and all defects based on manufacturers' supplied warranties from date of installation. All manufacturer warranties should be submitted to the Designer and Owner for review.

   1. Vinyl die-cut letters: warranted against delimitation from substrate.
   2. Paint finishes: warranted against fading or chalking, corrosion developing beneath paint surfaces of the support systems (except for obvious vandalism or other external damage to the paint surfaces).
   3. Corrosion of the fastenings.

4. The signs not remaining true and plumb on their supports during normal wear.
5. Fading of the colors when matched against a sample of the original color and material.
6. Discoloration of metal finishes.
7. Adhesives, e.g. tape and epoxy
8. Paneling not remaining true and plumb on their supports during normal wear.

B. The Fabricator shall correct any and all material and/ or workmanship defects which may appear during the warranty period by restoring defective work to the standard of the contract documents at no cost to the Owner and to the Owner's satisfaction. Corrections include, but are not limited to: disfiguring of any surface due to chalking, rusting, bubbling, or other disintegration of the sign face or of the messages or of the edge finish of the sign inserts or panel.

C. Manufacturer warrants that under normal wear and use the installation and sign posts will not crack or fail for a period of one (10) years from the date of substantial completion.

D. Installer shall provide labor and material warranty for a period of (1) full year from the date of substantial completion.

2.5 CHPL SAMPLES

A. Manufacturer warrants that under normal wear and use the workmanship and materials used in the CHPL product purchased from the Manufacturer will meet t he standards set forth on the applicable specification materials and that the product will not delaminate, peel, blister, crack or fade for a period ten (10) full years from the date of purchase.

B. In the event that the product does not perform as warranted:

1. Manufacturer shall be allowed to conduct an on-site inspection and investigation, or be provided digital images of defects
2. Manufacturer shall work directly with the end-user to resolve any warranty matter,
3. The sole remedy will be the repair or replacement of the defective product at the sole discretion of t he Manufacturer, and/ or
4. The repair or replacement by Manufacturer shall be limited to the re-manufacture and shipment of the replacement or repaired product to the site of the end-user's product.

C. This warranty only applies to the manufacture and material used in the manufacture of t he product. Manufacturer shall not be liable for any other costs, including but not limited to installation, labor or other costs or expenses. Any repair or replacement shall be warranted for a period up to the remaining life of the original warranty. Further the repair or replacement costs incurred by Manufacturer shall not exceed the purchase price paid for the product.

2.6 QUALITY ASSURANCE

A. Work done and materials furnished shall meet the highest industry standards in every respect and, unless otherwise specified, materials and equipment shall be new and of t he latest design.
B. The Design Intent Package should provide everything necessary for a complete contract.
C. In the event of conflict or omission, the Fabricator shall consult the Designer for resolution. All clarifications are to be made in writing in the form of an RFI from the Fabricator to the Designer.
D. Use only personnel thoroughly skilled and experienced with the products and method for fabrication and installation of signage specified.
E. The Owner shall reserve the right to reject any shop drawings, samples or other submittals, as well as any finished product or installation, that cannot meet the standard of quality established. Any such decision will be considered final and not subject to recourse.
F. Materials and hardware not specified, but necessary to the complete functioning of the sign, shall conform to the quality level established.
G. Substitutions of items specifically indicated in this specifications package that serve the same function with equal performance will be considered upon submission of substitution.

2.7 PROTECTION AND STORAGE

A. Fabricator is responsible for storage of signs and assemblies and protection from damage at the shop, in transit and until erected in place, complete, inspected and accepted by Owner.
B. Fabricator is responsible for the replacement pilferage both prior to and until inspection and acceptance of installation by the Owner.

2.8 INSPECTION

A. All production materials, color samples and paints, fabricated or partially fabricated items shall be available for inspection, on-site or in the shop, by the Owner or Designer during the manufacturing process and until final delivery, installation and acceptance, to determine compliance with the requirements of these specifications. Shop inspection approvals do not guarantee final acceptance of installed work.

2.9 INSTALLATION

A. Install sign units and components with concealed fasteners unless otherwise shown. Refer to drawings for general method of installation. Verify each surface in field to determine appropriate mounting hardware. Fabricator is responsible for determining where below ground or in-wall structural tie-ins may be required. All elements should be installed true and plumb in accordance with the design intent of this document. Sign location drawings show approximate locations of signs. Fabricator, Designer and Owner shall conduct a pre-install mark out walk through to confirm all locations and identify areas of conflict. Fabricator is responsible for determining the location of underground structures and utilities on ground-mounted signs. Any conflicts should be brought to the attention of the Owner and Designer.

2.10 REGULATORY REQUIREMENTS

A. All installation work shall comply with applicable municipal, state and federal codes, sign ordinances and ADA guidelines for handicapped and fire/life safety signing.

B. All OSHA safety requirements will be implemented during fabrication and installation as needed or required to comply with safety regulations.

C. All field/site work shall be conducted in compliance with the Owner/Construction Manager's requirements/ regulations for the site, particularly areas open and accessible to the public. Work area protection shall be required as needed and all site-specific rules should be reviewed and outlined during the project kick-off meeting.

2.11 CLEAN UP

A. Daily and upon completion of installation remove all waste, dirt, wrappings and excess materials, tools and equipment, and thoroughly clean all surfaces to the satisfaction of the Owner.

2.12 REORDERING

A. Reordering all items specified in this package shall be available to t he Owner in additional quantities for a period of 10 years after completion of all work called for in this specification.

PART 3 QUALITY OF MATERIALS

3.1 ALUMINIUM

A. Aluminum shall be of best commercial quality and the various forms shall be straight and true. There shall be no scratches, scars or buckles. Size thickness and finish of aluminum shall be per NAAMM "Metal Finishes Manual". Comply with the following industry standards.

B. Aluminum sheets shall conform to ASTM B209 6061-T6

C. Aluminum extrusions shall conform to ASTM B241 6063 T6. Wall thickness shall be a minimum of 1/8" thick unless otherwise shown.

D. Brushed Finishes-Brush with abrasive of increasing grit# in a linear directional pattern.

E. Final surface shall have visible grain pattern to match sample approved by Designer. Spray with clear protective finish.

F. Polished Finish-Brush with abrasive of increasing grit #. Buff to a mirror finish with no visible grain. Match sample approved by Designer. Spray with clear protective finish.

G. Non-Directional Finish-Brush with abrasive mounted in a random orbital sander. Match sample approved by Designer. Spray with clear protective finish.

3.2 STAINLESS STEEL

A. Structural Stainless steel shapes to be rolled or laser fused, as manufactured by Stainless Structurals, LLC. (936-538- 7600, www.stainless-structurals.com)

B. Chromium stainless steel sheet. Use type 304 or type 316 stainless steel with 16% chromium and 10% nickel.

C. For steel exposed to view on completion, provide materials having flat, smooth surfaces without blemishes. Do not use materials whose surfaces exhibit pitting, seam marks, roller marks, rolled trade names, or roughness. Stainless Steel Plate, Sheet and Strip: Provide stainless steel plate, sheet, or strip, AISI Type 302, complying with requirements of ASTM A 167.

D. Stainless Steel Finishes: Finish designations prefixed by "AISI" conform to the system established by the American Iron and Steel Institute for designating finishes.

E. Finish: Bead blasted & Pickled.

3.3 CUSTOM HIGH PRESSURE LAMINATE

A. Provide Custom High pressure laminate as manufacturer by iZone or an approved equal.

B. Custom High Pressure Laminate material composed of required layers of phenolic resin impregnated brown kraft filler paper to produce specified thicknesses, surfaced by a layers of melamine overlay, graphics imaged on saturation grade paper with UV resistant pigment based process color inks, and with an optically clear UV overlay that will resist no less that 99% of all sunlight and UV rays, as well as provide a graffiti resistant surface that allows for removal with standard cleaners.

C. Layers of material are to be assembled, and heat/ pressure consolidated at approximately 1200 PSI at temperatures exceeding 275° Fahrenheit at manufacturer's prescribed time frames.

D. All manufacturing processes of printing, pressing, machining, finishing and crating to be accomplished within a single standalone manufacturing facility to ensure consistent quality control and providing standard product delivery times of three weeks.

3.4 WOOD

A. #1 grade black locust lumber. Sustainably harvested. Eased edges. Apply a UV clear coat to enhance the wood grain and provide additional protection.

3.5 REFLECTIVE GRAPHICS

A. Provide 3M Scotchlite enclosed lens reflective sheeting or approved equal.

3.6 CONCRETE

A. All concrete footers are to be poured in place.

B. All concrete footers are to be poured from thoroughly mixed and agitated concrete in order prevent unreasonable voids in the finished casting.

C. Concrete to meet specified "PSI Test" for strength: 3,500 psi minimum. Concrete to meet specified "Slump test" before pouring footing. All footings to extend past the frost line.

D. Any footers or posts for signs will be placed in wet concrete and allowed to fully cure in place before any signage is attached or mounted to it in any way. All exposed faces of concrete shall receive a finish to match existing, adjacent surfaces.

3.7 VHB FOAM TAPES

A. Provide 3M Scotch VHB 4930

B. Adhesive shall be Acrylic VHB

C. Carrier shall be closed cell foam

3.8 ACCESSORIES ANCHORS AND FASTENINGS

A. Provide anchors and fasteners required to secure work in place. Do not expose fastenings on surface of sign panels unless specifically noted otherwise. Do not deform, distort or discolor sign face surfaces by attachment of concealed fastenings.

B. All fastenings shall be non-corrosive and resistant to oxidation or other corrosive action, of the same composition completely through their cross sections, particularly when used below grade. Use highest quality stainless steel hardware and fasteners.

C. Anchors, inserts or fasteners shall be compatible with sign materials, shall not result in galvanic action or chemical interaction of adhesives and shall have demonstrable and sufficient strength for intended use.

D. Steel anchors and fastenings for exterior use shall be galvanized in accordance with ASTM A153.

E. Fabricate and install signs with fastenings to withstand all actions imposed by use; 30 psf wind perpendicular to surfaces, water, ice, snow loads and similar forces.

F. Anchor bolts in concrete shall be cast in place. Fabricator shall furnish instructions for the setting of anchors and bearing plates. Fabricator shall ascertain that the items are properly set during the process of the work.

G. Secure work with fastenings of same color and finish as the components they secure where they are exposed to view, unless noted otherwise. All exposed fasteners must be vandal resistant and have vandal-proof "spanner" type slots to be removed only with a special driver head.

3.9 DISPLAY CASES

A. Provide Display Cases as manufacturer by Allen Display (allendisplay.com) or an approved equal.

1. **24wx36h,** 1 Door Enclosed Bulletin Board, Outdoor Usage, Frame Finish: Sat in Aluminum, hinged, shatter-resistant acrylic door with lock, weatherized rear panel, thick rubber door seal, interior back with tackable vinyl, self healing to withstand repeated tacking, exterior case depth is 2"

2. **36wx48h,** 1 Door Enclosed Bulletin Board, Outdoor Usage, Frame Finish: Satin Aluminum, hinged, shatter-resistant acrylic door with lock, weatherized rear panel, thick rubber door seal, interior back with tackable vinyl, self healing to withstand repeated tacking, exterior case depth is 2"

3. **48wx36h,** 2 Door Enclosed Bulletin Board, Outdoor Usage, Frame Finish: Satin Aluminum, hinged, shatter-resistant acrylic door with lock, weatherized rear panel, thick rubber door seal, interior back with tackable vinyl, self healing to withstand repeated tacking, exterior case depth is 2"

B. Self-healing Tack Surface Provide Tack Surface as manufacturer by Rubber Flooring Inc. (rubberflooringinc.com) or an approved equal.

1. Tough Rubber Roll - 3' or 4' widths and custom lengths - 5mm thick recycled rubber buffings are the cleanest, strongest, and most consistent raw material as compared to some of the cheap recycled crumb rubber alternatives available. Product is made in the U.S.A.

END OF SECTION 100610

SECTION 311313 - SELECTIVE LANDSCAPE PRESERVATION & PLANT REMOVAL

PART 1 GENERAL

1.01 STIPULATIONS

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

1.02 GENERAL REQUIREMENTS

A. This Section includes the protection and stress reduction of existing trees and vegetation that interfere with, or are affected by, execution of the Work, whether temporary or permanent. Work is to be coordinated with the Project Plans.

B. Coordinate Work with that of other trades affecting or affected by Work of this Section and cooperate to assure the steady progress of Work.

1.03 SECTION SUMMARY

Work Included: Provide labor and materials as indicated on drawings and specified to implement basic arboriculture activities for existing plants, as well as construction observation of activities within the Tree Protection Areas. Scope to include but not limited to:

A. Temporary Site and Tree protection Fencing and Temporary Sign Installation

B. Selective Crown and Root Pruning and Tree Removals

C. Coordination of Temporary Tree and Plant Protection

D. Diagnosis and Treatment Recommendations

E. Temporary Limb Guying or Clearance Pruning for construction access

F. Supplemental Watering

G. Monitor Excavation & Construction within Tree Preservation Area.

H. Disposal and Cleanup

1.04 RELATED SECTIONS

A. 330110 – Protection of Existing Utilities

B. 022113 – Project Survey and Layout

C. 024116 – Site and Structure Demolition

D. 129300 – Site Furnishing

E. 312000 – Earth Moving

F. 312500 – Soil Erosion and Sediment Control

G. 321216 – Asphalt Paving

H. 321313 – Plain Cement Concrete Paving

I. 329200 – Turf Grass Lawn

1.05 REFERENCE STANDARDS

A. ASTM A 300 – Tree Care Operations

B. National Arborist Association (N.A.A.) Standards

C. American Society of Consulting Arborists

D. American National Standard for Tree Care Operations

1. ANSI Z133.1—1994
2. ANSI A300—1995

E. American Nurseryman Association Standards

F. Pennsylvania Seed Act of 1965(Act No. 187) as amended

G. Pennsylvania Agricultural Liming Materials Act of 1978 (P.L.15,No.9, as amended)

H. Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No.86 (3P.S.68.2) as amended

I. Regulations of the Pennsylvania Department of Agriculture Bureau of Plant Industry

1.06 QUALITY ASSURANCE

A. Arboriculture: comply with all applicable standards of the National Arborist Association (NAA) for pruning, guying, fertilizing and installation of lightning protection systems. Arborist shall have current certification by the International Society of Arboriculture (ISA).

1. All arboricultural work under this section shall be performed by personnel totally familiar with arboricultural work and under the supervision of an experienced foreman and ISA certified arborist.

2. Pruning shall be performed by tree workers who, through a minimum of five years related training and on-the-job experience, are familiar with the techniques and hazards of this work.

B. Analysis and testing of materials required under these specifications shall be in accordance with the current methods of the Association of Official Agricultural Chemists (AOCA) and ASTM.

C. Equipment and Safety

1. Equipment shall be modern and well maintained. Adhere to all applicable state and federal regulations. Contractor shall be responsible for damage to property resulting from equipment, including fluid leakage or damage resulting from equipment failure. Report incidents of this type immediately to Department of General Services' representative.

2. Safety shall be a primary concern while working on the Site. Contractor shall have an established safety program and adhere to NAA, OSHA and ANSI standards applicable to the tree care industry, including electrical and utility requirements as well as personal equipment and safe work procedures.

D. Pesticide Applications

1. Certified Pesticide Applicator shall be responsible for supervision of all applications of fertilizer or pesticides on the site.

2. Pesticides shall be applied in strict compliance with label instructions and all applicable federal, state and local requirements. Material Safety Data sheets shall be available for pesticides in the Contractor's possession while on the site.

E. Arrange a pre-construction meeting between the Landscape Architect, General Contractor and Arboriculture Subcontractor. Such meeting shall seek to review the proposed arboriculture procedures, schedule, consideration of substitutions, and general review of specifications. Note that pruning, fertilization, vertical mulching and mulching activities should be performed prior to the start of construction activities, to improve the vigor of the existing trees to be preserved and to help mitigate the effects of construction stress.

1.07 DEFINITIONS

A. Diameter shall be defined as diameter at breast height (dbh) which is the average tree diameter at 4.5 feet from the ground on the uphill side of the tree.

B. Caliper shall be defined as the diameter of the trunk at 6" above the soil for trees up to 4" in caliper and as the diameter of the trunk at 12" above the soil for trees up to 12" caliper.

C. Root zone shall be defined as 1 (one) foot of radius around trunk for every inch of trunk diameter (at 4.5 feet above the ground level on the uphill side of the tree).

D. Root zone shall be defined as 1 (one) foot of radius around trunk for every inch of trunk diameter (at 4.5 feet above the ground level on the uphill side of the tree).

1.08 SUBMITTALS

A. General: Make submittals in accordance with the general contract provisions and procedures of Section 1, Submittals Specification. Render submittals and receive approval prior to delivery or installation.

1. Approval by the Landscape Architect of submitted product data, samples, test reports, and certificates, or material inspected at source of supply, does not constitute final acceptance.

B. Product Data: Submit producers/manufacturers specifications, quality control, product data, and test reports for the following: Include instructions for handling, storage, installation and protection.

1. All Pesticides, Insecticides, Herbicides, and other chemicals

C. Arboricultural Program: Submit detailed program of Arboriculture work and proposed schedule at the pre-construction meeting.

D. Arborist Qualifications

1. Include evidence of experience, including project list.

2. Verification of membership in the National Arborist Association (NAA).

1.09 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1.10 PERMITS AND CODES

A. All work shall comply with applicable codes, ordinances, rules, regulations, and laws of all local, municipal, and state authorities having jurisdiction. All work necessary to make site preparation comply with such requirements shall be provided without additional cost to Department of General Services.

1.11 REGULATORY REQUIREMENTS

A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor materials, equipment and services necessary to make Work comply with such requirements without additional cost to Department of General Services.

B. Investigate the conditions of public thoroughfares and roads as to availability, clearances, loads, limits, restrictions, and other limitations affecting transportation to and ingress and egress at the site. Conform to all governmental regulations regarding the transportation of materials and secure, in advance, any necessary permits. C. Procure and pay for permits and licenses required for Work.

1.12 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in clearly marked containers showing net weight, guaranteed analysis and name of manufacturer. Specified requirements for packaged materials apply to bulk shipments. Protect materials from deterioration during delivery and during storage at site.

1.13 PROJECT CONDITIONS

A. Existing Conditions

1. Carefully examine the site before submitting a bid. Be informed as to the nature and location of the Work, general and local conditions including climate, adjacent properties and utilities, conformation of the ground, the nature of subsurface conditions, the character of equipment and facilities needed prior to and during execution of the Work. Be aware of and comply with restrictions regarding subsurface utilities and subterranean structures, including excavation and loading parameters.

2. Should the Contractor, in the course of Work, find any discrepancies between Drawings and physical conditions or any omissions or errors in Drawings, or in layout as furnished by the Landscape Architect, it will be his duty to inform the Landscape Architect immediately in writing for clarification. Work done after such discovery unless authorized by the Landscape Architect, shall be done at the Contractor's risk.

B. Environmental Conditions—Arboriculture

1. Pruning: Pruning is preferred, between October 1 and April 1st, prior to the leafing out of the trees. Pruning shall only occur when weather conditions are favorable; pruning shall not occur when branches are wet with snow or rain or when covered by ice.

2. Fertilization: Spring fertilization shall occur in early spring, before bud break. When leaves have fully expanded, fertilizing can continue until early July Fall fertilization shall occur after October 1st or after the first hard freeze, whichever comes first, when all possibility of top growth in past and before the moisture in the soil freezes casing root activity. Avoid fertilizing between July and September 1.

3. Pest control: Avoid use of herbicides within planting bed. Avoid use of fertilizer/herbicide combinations within the dripline of trees in plant beds.

PART 2 PRODUCTS

2.01 SOIL AMENDMENT MATERIAL

A. Sand: Natural, medium to coarse grained in texture, free from decomposed organic matter like roots, sticks, leaves, paper and of any other undesirable trash-like glass, plastic or metal fragments that could interfere with soil drainage and planting operations. Sand shall be salt-free.

B. Ground Limestone: Natural dolomitic limestone containing a minimum of 88% of calcium and magnesium carbonates. Total of 100% passing the 10 mesh sieve; minimum of 90% passing the 20 mesh sieve; minimum of 60% passing the 100 mesh sieve.

C. Water: Potable, clean, fresh and free from harmful materials. Water shall be furnished by the Contractor. All hoses and other irrigation equipment required for the Work shall be furnished by the Contractor.

2.02 FERTILIZERS

A. General: As specified below, all fertilizer shall conform to applicable state fertilizer laws. It shall be uniform in composition, free-flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which is unsuitable for use will be rejected. B. Fertilizer: To be determined based on testing.

2.03 MULCH

A. Mulch shall be double shredded hardwood bark.

PART 3 EXECUTION

3.01 GENERAL

A. Basic arboriculture shall include all activities as noted in drawings, and shall include other arboriculture activities as described herein. Note that pruning and mulching activities should be performed prior to the start of construction activities, to improve the vigor of the existing trees to be preserved and to help mitigate the effects of construction stress.

B. The Arborist shall monitor excavations and construction within the Tree Preservation Area, including: being on site during all excavations within the Tree Preservation Area to ensure that hand or approved mechanical excavations does not damage existing root systems, and to perform compensatory pruning. The construction that would occur within the Tree Preservation Area would include but not be limited to removal of existing pavements, pavements, and utility trenching.

3.02 PRUNING

A. Pruning – General: Pruning shall conform to ANSI A300 – 1995 standards as specified. Stripping of interior growth on trees is not acceptable. Interior growth may be selectively thinned when appropriate to type of prune. Thinning in general shall be accomplished from the tips of branches by removing diseased, crossing, and/or conflicting branch structure. Target pruning shall be the preferred method of branch removal. Equipment shall be sharp and well maintained. Proper equipment shall be used for all pruning procedures (i.e., handsaw, chainsaw, polesaw, or pole pruner). Employees pruning trees shall have adequate training as to the proper methods and procedures for tree pruning. Refer to ANSI A300 standards for other pruning requirements.

1. On trees known or suspected of being diseased, tools are to be disinfected with methyl alcohol at 70% (denatured wood alcohol diluted appropriately with water) or Clorox solution after each cut and between trees where there is known to be a danger of transmitting the diseased on tools.

2. The presence of any structural weakness, disease conditions, decayed trunk or branches, split crotches or branches, should be reported in writing to the Professional and PPR, and corrective measures recommended.

B. All Trees shall receive a crown cleaning to remove all dead, weak, and conflicting branches 1 (one) inch and larger at the point of attachment. Trees with root zone affected by

construction shall receive a slight reduction in the meristematic regions at the branch tips in the crown.

3.03 ROOT PRUNING

A. Root pruning shall be performed in conjunction with Tree Preservation Fencing. Root pruning shall be performed as indicated on Drawings or as required, including: trenching for utilities, excavations for foundations, or wherever grades will be changed within the root zone of the tree to be preserved. Root pruning shall be to the depth of excavation or 24 inches, whichever is less. A trencher or vibratory plow shall be used to prune roots. Roots over 2" in diameter shall have a clean cut made on the surface of the root which is still attached to the tree. This cut shall be made with a hand saw or chain saw as soon as larger root is severed. Where fill is to be placed, root pruning shall be to the depth of top soil.

B. The Arborist must verify exact layout with General Contractor, to ensure root pruning in appropriate location.

C. When root pruning in conjunction with excavation and installation of utilities, the Arborist shall endeavor to work around and preserve the existing tree roots. Make all effort to preserve roots greater than 2" in diameter.

3.04 FERTILIZATION

A. Trees shall receive a liquid fertilization within three months prior to construction activities. Fertilizer shall be applied at a rate of 1.5 pounds of nitrogen per 1,000 square feet of root zone treated. A root stimulant shall be added for trees with root loss or disturbance or otherwise affected by construction. Fertilizer shall be injected using a soil probe at a depth of six inches. Fertilizer shall be applied in three foot grid pattern evenly distributed throughout the root zone.

3.05 TREE WOUND CARE

A. Tree wounds shall be treated according to standard practices, by a professional arborist. Wounds shall not be covered with dressings.

3.06 DISPOSAL AND CLEAN UP

A. All refuse and debris from these operations shall be legally disposed of off-site. Material shall be removed or neatly stored at the end of each day's work. Dumping on the site shall not be permitted. Burning of material on the site shall not be permitted.

B. All diseased, infected or infested vegetation that has been pruned/cut shall be removed immediately (at end of day pruning operations are performed) from the site.

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C. Maintain the site in an orderly condition during the progress of Work. Continuously and promptly remove excess and waste materials; keep lawn areas, walks and roads clear. Store materials and equipment where directed. Immediately remove rejected materials from the property. Promptly remove equipment, surplus material, and debris and trash resulting from operations under this Contract upon completion and prior to initial acceptance of Work. Lave the site in a neat, orderly condition, “broom clean”.

D. Maintain the site in an orderly condition during the progress of Work. Continuously and promptly remove excess and waste materials; keep lawn areas, walks and roads clear. Store materials and equipment where directed. Immediately remove rejected materials from the property. Promptly remove equipment, surplus material, and debris and trash
resulting from operations under this Contract upon completion and prior to initial acceptance of Work. Lave the site in a neat, orderly condition, “broom clean”.

END OF SECTION 31 13 13

SECTION 312000 - EARTH MOVING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Earthwork, excavation, fill placement and grading to required lines, dimensions, contours and elevations for proposed improvements.

B. Scarifying, compaction, moisture content control and removal of unsuitable material to ensure proper preparation of areas for the proposed improvements.

1.02 RELATED SECTIONS AND DOCUMENTS

A. Section 33 01 10– Protection of Existing Utilities
B. Section 31 25 00 – Soil Erosion and Sedimentation Controls

1.03 REFERENCE STANDARDS

A. ASTM International - latest edition

1. ASTM Standard D422, "Standard Test Method for Particle Size Analysis of Soils," ASTM International West Conshohocken, PA, www.astm.org.

2. ASTM Standard D698, "Standard Test Methods for Laboratory Compaction

Characteristics of Soils using Standard Effort (12,400 ft-lb/ft3 (600 kN-m/m3))," ASTM International, West Conshohocken, PA, www.astm.org.

3. ASTM Standard D1557 "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700kNm/m3))," ASTM International, West Conshohocken, PA, www.astm.org.

4. ASTM Standard D2216 "Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," ASTM International, West Conshohocken, PA, www.astm.org.

5. ASTM Standard D2487 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)," ASTM International, West Conshohocken, PA, www.astm.org.

6. ASTM Standard D4253 "Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table," ASTM International, West Conshohocken, PA, www.astm.org.

7. ASTM Standard D4254 "Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density," ASTM International, West Conshohocken, PA, www.astm.org.

8. ASTM Standard D4318 "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils," ASTM International, West Conshohocken, PA, www.astm.org.

9. ASTM Standard D6938 “Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth),” ASTM International, West Conshohocken, PA, www.astm.org.

1.04 QUALITY ASSURANCE

A. The Contractor shall provide at least one supervisory person who shall be present at all times during execution of the work and who is thoroughly familiar with the type of work being performed and its best methods for completion. This person shall have the authority act on behalf of the Contractor.

B. The Contractor shall comply with any provisions of all applicable codes, regulations and standards.

C. A Geotechnical Engineer, selected and paid by the Owner, shall be retained to perform construction inspection on site based on field testing, visual observation, and judgment. This inspection will not relieve the Contractor from his responsibility to complete the work in accordance with the plans, specifications and recommendations presented in the geotechnical engineering study.

D. Visual field confirmation and density testing of subgrade preparation and fill placement procedures shall be performed by the field Geotechnical Engineer as part of the construction testing requirements.

E. The Geotechnical Engineer shall prepare field reports that indicate compaction test location, elevation data, testing results and acceptability. The Owner, Architect, and Contractor shall be provided with copies of reports within 96 hours of time test was performed.

F. All costs related to re-inspection due to failures shall be paid for by the Contractor at no additional expense to Owner. The Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

1.05 SUBMITTALS

A. Within ten days after award of the contract, the Contractor shall submit to the Owner and Engineer a schedule detailing the sequence, and time of completion of all phases of work under this section.

B. At least two weeks in advance of imported fill use, the Contractor shall submit either the following laboratory test data or a 50-pound soil sample to the Geotechnical Engineer for each type of imported soil/gravel material to be used as compacted fill.

1. Moisture and Density Relationship: ASTM D1557.

2. Mechanical Analysis: ASTM D422

3. Plasticity Index: ASTM D 4318

C. Together with the above test data, the Contractor shall submit a 5-pound sample of each type of off-site fill material in an air tight container for the approval of the Geotechnical Engineer.

D. Submit the name of each material supplier and specific type and source of each material. The intended use of each material submitted shall be clearly identified on the Contractor submittal record (i.e. structural fill for building pads, drainage fill for site, general fill for landscaping, etc.). Any change in source or soil type throughout the job requires approval of the Owner and the Geotechnical Engineer.

1.06 ENVIRONMENTAL CONSIDERATIONS

A. Install erosion control measures in the sequence shown on the plans or as directed by either the engineer or regulatory agencies to protect adjacent properties and water resources from erosion and sediment damage. Erosion and control measures shall also comply with both the technical specifications and the Construction Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. On-site fill

1. On-site materials for use as fill may consist of excavated soil from other portions of the site. Refer to the geotechnical engineering study for appropriate uses of on-site materials for fill during construction.

2. Excavated material containing rock or stone greater than 4 inches in largest dimension is unacceptable as fill within the proposed building area.

3. Rock or stone greater than 2 inches in its largest dimension may be mixed with suitable material and used as fill up to 2 feet below beneath the proposed pavement subgrade elevation at the discretion of the Geotechnical Engineer. The fill must be mixed, placed and compacted such that voids will be minimized. All structural fill placed in the final 2 feet of building pads and roadways shall not contain any materials larger than 2 inches in its largest dimension.

4. Particle-size distribution, maximum dry density, plasticity index, and optimum water content soils' laboratory testing should be made on representative samples of all onsite materials proposed for use as structural, drainage and general fill onsite by the Contractor. All onsite fill is subject to inspection and approval by the on-site geotechnical engineer prior to reuse onsite. Components of the native soils deemed unsuitable by the on-site geotechnical engineer should only be used as directed by the geotechnical engineer.

5. Rock may be broken and/or crushed on-site to meet the above size requirements.

6. Prior to placement, on-site fill shall not contain:

a. Debris other than crushed concrete and brick meeting the above requirements.

b. Timber or Railroad Ties.

c. Organic Soils.

d. Hazardous substances, pollutants, and contaminants.

e. Other deleterious materials such as steel rails, rebar, trash, etc.

7. Unsuitable and deleterious materials and debris shall be disposed of off-site in accordance with all applicable regulations, at no cost to the Owner.

B. Off-site imported fill

1. If necessary, off-site fill shall be obtained and provided by the Contractor. Particle-size distribution, maximum dry density, plasticity index, and optimum water content soils' laboratory testing should be made on representative samples of all imported fill materials proposed by the Contractor. The Contractor should provide the Owner with proper certification that all imported fill is environmentally clean in accordance with appropriate and applicable local, state, and Federal statutes.

2. Material imported for use as "structural fill" should consist of a well-graded sand and/or gravel having less than 15% by dry weight passing the No. 200 sieve, have a maximum particle size of 2 inches, and be free of clay clods, organic materials, waste debris, or other deleterious material.

3. Materials imported for use as "general fill" should be granular soils with less than 25% by dry weight passing the No. 200 sieve, have a maximum particle size of 4 inches, and be free of clay clods, organic materials, waste debris, or other deleterious material.

4. "Drainage fill" should consist of clean ¾-inch crushed stone and be free of other deleterious materials. Excavated rock which has been crushed and processed onsite is not permitted for use as drainage fill.

5. A sample of any off-site fill material shall be provided to the Owner or his representative along with laboratory testing results and the Contractor shall obtain approval prior to moving material on-site.

6. Imported fill shall be free of all hazardous substances as listed by the Pennsylvania Department of Environmental Protection. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the Owner and Geotechnical Engineer by the Contractor not less than one week prior to its intended use.

7. The Owner reserves the right to test off-site imported fill material for conformance with these specifications.

C. Topsoil fill as specified in Section 31 22 10: Topsoiling and Finish Grading

2.02 EQUIPMENT

A. Compactor - Minimum 5 ton static drum weight vibratory roller (Hypac C830C, Caterpillar CS-54, Bomag BW177D-40, or approved equal).

B. Compactor – Smaller compaction equipment may be used where access or maneuverability is limited. However, the loose lift thickness of the fill must be reduced commensurate to the type and size of the compactor. The final lift thickness shall be determined by the on-site geotechnical engineer.

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, site conditions, and all portions of the work falling within this section.

B. The Contractor shall refer to the soil erosion and sediment control plans for staging of earthwork operations and for erosion control measures to be implemented prior to commencement of earthwork.

C. Identify existing utilities that are to remain and protect them from damage.

D. Notify utility companies to permit removal and/or relocation of any utilities that are in conflict with the proposed improvements.

E. Protect fences, structures, sidewalks, paving, curbs, etc. to remain from equipment and vehicular traffic.

F. Protect benchmarks, property corners and all other survey monuments from damage. If a marker needs to be relocated it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same licensed land surveyor at no additional cost to the Owner.

G. Remove from the site, material encountered in grading operations that, in opinion of Owner or Owners Site/Civil Engineer, is unsuitable or undesirable for backfilling in subgrade or foundation purposes. Dispose of in a manner satisfactory to Owner and in accordance with all applicable regulations. Backfill areas with layers of suitable material and compact as specified.

3.02 GENERAL

A. Identify required lines, levels, contours and datum to bring site grades to the proposed subgrade conditions indicated on the drawings.

B. Do not allow or cause any of the work performed or installed to be covered by work of this section prior to all inspections, tests and approvals.

C. By submitting his bid, the Contractor represents that he has reviewed the information provided and investigated the site to determine type, quantity, quality, and character of excavation work to be performed. All excavation shall be considered unclassified excavation.

D. Perform excavation using capable, well maintained machinery and equipment using methods acceptable to the Owner and governing agencies.

E. The Contractor shall provide adequate soil moisture to properly compact the soil. This may require either adding moisture if the soil is deficient or discing the soil if moisture is excessive.

F. Protect persons and property from damage and discomfort caused by dust. Water as necessary to subdue dust.

G. Allow no debris to accumulate on-site. Haul debris away from the site and dispose of at no cost to the Owner.

H. Dispose of excess earth material from the site at no cost to the Owner.

3.03 COMPACTION OF SUBGRADE SURFACES

A. All existing grades below building areas shall be proof-rolled and compacted with a minimum of 2 passes using a fully-loaded tri-axle dump truck with a carrying capacity of 12 to 15 cubic yards roller prior to placement of any subgrade fill, concrete footings, or slab-on-grade. Existing areas which exhibit "pumping" or "rutting" under the action of the dump truck shall be removed and replaced with suitable fill material, as directed by the Geotechnical Engineer.

B. Prior to preparing the subgrade in low-lying areas or deep excavations, perform the following procedures:

1. Drain standing water by gravity or with a pump. Drainage using wells/well points may be required where the water table is high. Water should not be discharged directly to a storm drain system.

2. After drainage of low area is complete, remove muck, mud, debris, and other unsuitable material using equipment and methods that will minimize disturbance to the underlying soils.

3. Thoroughly compact subgrade as described above.

4. If proposed for re-use as on-site fill, all muck, mud and other materials removed from above low areas shall be dried on-site by spreading in thin layers for observation by Owner or Owner's representative. Material shall be inspected and, if found to be suitable for use as fill material, shall be incorporated into lowest elevation of site filling operation, but not under the building area, within 30 feet of the perimeter of the building pad, or within 3 feet of the

paving subgrade elevation. If, after observation by Owner or Site/Civil Engineer, material is found to be unsuitable, it shall be removed from the site at no cost to the Owner.

3.04 FILL PLACEMENT AND COMPACTION

A. No fill materials shall be placed during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until all saturated surficial soils are returned to satisfactory moisture content as determined by the Geotechnical Engineer.

B. Place and compact approved fill materials in 12-inch thick maximum loose lifts using a minimum of 6 passes with the previously specified 5-ton static drum weight compactor and achieve the minimum in-place density specified above. Smaller compaction equipment, together with thinner lifts, may be necessary at areas of limited maneuverability.

C. Visual confirmation of fill quality, lift thickness and compaction procedures, together with in-place density testing, shall determine the acceptability of fill. Any unsatisfactory material or soft areas exhibiting excessive weaving shall be immediately removed, replaced and re-compacted as stated above to the satisfaction of the Geotechnical Engineer.

D. No fill material shall be placed in areas that have not been approved by the Geotechnical Engineer.

3.05 MAINTENANCE OF SUBGRADE

A. Finished subgrades shall be verified by the Contractor to ensure proper elevation and conditions for construction above subgrade. Grade lawns, walks, and unpaved subgrades to tolerances of plus or minus 1 inch and pavements to plus or minus ½ inch.

B. Protect subgrade from excessive construction traffic and wheel loading. Protect subgrade from unfavorable weather such as precipitation or cold temperatures that will soften or freeze subgrades.

C. Remove areas of finished subgrade judged to be unsatisfactory to the depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than the best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section. See section 02920 Soil Preparation and Mixes for subgrade scarifying requirements in planting areas

3.06 FINISH GRADING

A. For setting and establishing finish elevations and lines, the Contractor will secure the services of a licensed land surveyor acceptable to the Owner and Engineer.

B. Provide elevation grade stakes and any other surveying necessary for the layout of the work. The Contractor shall conduct his work in such a manner that survey stakes will be protected as long as their need exists. Grade stakes, which are damaged or stolen, shall be replaced by the Contractor's surveyor at the Contractor's expense.

C. Graded areas shall be uniform, hard and smooth, free from rock, debris, or irregular surface changes. Finished subgrade surface shall not be more than ½-inch above or below the design finished subgrade elevation; any deviation shall not result in changes in drainage areas or ponding. All ground surfaces shall vary uniformly between indicated elevations. Finish drainage ditches shall be graded to allow for proper drainage without ponding and in a manner that will minimize the potential for erosion.

C. Areas having drainage slopes of one-quarter inch per foot or more shall have grade stakes, set with an instrument, at grid intervals of fifty (50) feet.

D. Areas having drainage slopes of one-quarter inch per foot or less shall have grade stakes, set with an instrument, at grid intervals of twenty-five (25) feet

E. Correct all settlement and eroded areas for one year after date of project completion at no additional expense to Owner. Bring paved and landscaped areas to proper elevation. Replant or replace any grass, shrubs, bushes, or other vegetation disturbed by construction using corrective measures.

END OF SECTION 31 20 00

SECTION 312310 - EXCAVATION, BACKFILL & SUBGRADE PREPARATION FOR PAVEMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Excavate and backfill to line, grade and configuration as shown in the plans and as described in these specifications for proposed pavement areas.

B. Proof rolling and removal of unsuitable material beneath proposed paved areas.

C. Remove existing pavement when necessary within the Work Area.

D. Proper compaction of subgrade materials as in accordance with Section 312000 – Earth Moving.

1.02 RELATED SECTIONS AND DOCUMENTS

A. Section 31 25 00 - Soil Erosion and Sediment Control

B. Section 33 01 10 – Protection of Existing Utilities

C. Section 31 20 00 – Earth Moving

D. Section 32 13 13 – Plain Cement Concrete Paving

E. Construction Drawings.

1.03 REFERENCE STANDARDS

A. ASTM International - latest edition

1. ASTM Standard D422, “Standard Test Method for Particle Size Analysis of Soils,” ASTM International West Conshohocken, PA, www.astm.org.

2. ASTM Standard D698, “Standard Test Methods for Laboratory Compaction Characteristics of Soils using Standard Effort (12,400 ft-lb/ft3 (600 kN-m/m3)),” ASTM International, West Conshohocken, PA, www.astm.org.

3. ASTM Standard D1557 “Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700kNm/m3)),” ASTM International, West Conshohocken, PA, www.astm.org.

4. ASTM Standard D2216 “Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass,” ASTM International, West Conshohocken, PA, www.astm.org.

5. ASTM Standard D2487 “Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System),” ASTM International, West Conshohocken, PA, www.astm.org.

6. ASTM Standard D4253 “Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table,” ASTM International, West Conshohocken, PA, www.astm.org.

7. ASTM Standard D4254 “Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density,” ASTM International, West Conshohocken, PA, www.astm.org.

8. ASTM Standard D4318 “Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils,” ASTM International, West Conshohocken, PA, www.astm.org.

9. ASTM Standard D6938 “Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth),” ASTM International, West Conshohocken, PA, www.astm.org.

1.04 QUALITY ASSURANCE

A. An Owner's Geotechnical Engineer may perform construction testing on filling operations and subgrade preparation as specified in Section 31 20 00 and described herein. Refer to Item 1.04 of Section 31 20 00 for specific quality assurance requirements. This inspection will not relieve the Contractor from his responsibility to complete the work in accordance with the plans and specifications.

1.05 SUBMITTALS

A. Shop drawings or details pertaining to excavating and filling for structures are not required unless procedures contrary to the project documents are proposed.

B. Submit soil sample or laboratory test information of each type of off-site fill material that is to be used in backfilling as specified in Section 31 20 00 – Earth Moving.

PART 2 PRODUCTS

2.01 MATERIALS

A. The fill material must meet the requirements of Section 31 20 00 – Earth Moving and be approved by the Geotechnical Engineer.

2.02 EQUIPMENT

A. Excavation is to be performed using capable, well maintained equipment and methods acceptable to the Owner and the Contract Document requirements and schedule.

B. Compactor – Minimum 5 ton static drum weight vibratory (Hypac C830C, Caterpillar CS-54, Bomag BW177D-40, or approved equal).

C. Smaller compaction equipment may be used where access or maneuverability is limited. However, the loose lift thickness of the fill must be reduced commensurate to the type and size of the compactor. The final lift thickness shall be determined by the on-site Geotechnical Engineer.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall cut or fill to the proposed subgrade elevations based on finished grades and the pavement thicknesses as shown on the Contract Drawings. Subgrade elevations shall be constructed to within ±0.1 feet of the proposed grades specified. Any deviation shall not result in changes to drainage areas or ponding.

3.02 EXCAVATION

A. Where existing grades are above proposed subgrade elevation, excavate materials in the pavement areas to line and grade as shown in the plans being careful not to over excavate beyond the elevations needed.

B. Excavated on-site organic soils shall be disposed of off-site in accordance with all Division 1 Specifications and jurisdictional regulations.

C. Excavated on-site soils, which meet the requirements of specification Section 31 20 00 of these Specifications and approved by the Owner's Geotechnical Engineer may be used as fill on-site.

D. Unsuitable material, such as wood and any other deleterious materials determined to be unsuitable by the Owner or Engineer for use as on-site fill shall be disposed of in accordance with all Division 1 Specifications and jurisdictional regulations

3.03 SUBGRADE PREPARATION

A. Existing grades below areas of proposed pavement shall be leveled prior to fill placement. The Contractor shall remove existing lawn and top soil in these areas prior to placement of any fill and stockpile or dispose of this material off-site as noted on drawings in accordance with all Division 1 Specifications and jurisdictional regulations.

B. All existing grades below areas of proposed pavement shall be proof rolled and compacted with a minimum of 6 passes using the vibratory drum roller specified in part 2.02 of this Section prior to placement of pavement subbase. Refer to Section 31 20 00 – Earth Moving, for specific pavement subgrade preparation requirements. Existing areas which exhibit "pumping" or "rutting" under the action of the roller shall be removed and replaced with suitable fill material as specified in Section 31 20 00 of these Specifications, or as directed by the Engineer

3.04 SUBGRADE FILL PLACEMENT AND COMPACTION

A. Rock larger than two inches (2") in any dimension shall not be part of pavement subgrade fill within 3 feet of pavement subgrade.

B. Fill material shall not be placed in areas that have not been approved by the Geotechnical Engineer.

C. Fill materials shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until all saturated surficial soils are returned to satisfactory moisture content as determined by the Geotechnical Engineer.

D. Moisture content of the fill material during placement shall be as specified by Section 31 20 00.

E. When significant precipitation is forecast, fill lift surfaces shall be made smooth and free from ruts or indentations at the end of any work day to prevent saturation of surficial fill material. Fill surfaces shall be graded to drain and sealed with a smooth drum roller at the completion of each work day.

F. Subgrade fill in paved areas shall be placed in uniform loose lifts and compacted in accordance with Section 31 20 00.

G. Wet, saturated material shall be removed and replaced or scarified and air dried as necessary to achieve the field densities specified in this Section. Drying may be assisted by discing, harrowing, or pulverizing until moisture content is reduced.

H. Prior to paving, the subgrade shall be proof rolled with a minimum of 6 overlapping coverages using a 5-ton static drum weight vibratory roller.

I. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace with suitable compacted fill as approved by the Owner or Owner's Geotechnical Engineer. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

3.05 QUALITY CONTROL

A. Compaction tests shall be performed as specified in Section 31 20 00 together with the following for areas of proposed pavement:

1. In cut areas, not less than one compaction test for every 10,000 square feet.

2. In fill areas, two tests for every 4,500 square feet for each lift.

B. Prior to paving, the finished subgrades shall be verified by the Contractor to ensure proper elevation and conditions for construction above subgrade.

C. Grading of paving areas shall be checked by string line from grade stakes set at not more than 50 feet, center to center. The subgrade tolerance is plus or minus 0.10 feet. Any

deviation from the design grades shall not result in changes in drainage areas or ponding. The Contractor shall provide engineering and field staking necessary for verification of lines, grades, and elevations.

END OF SECTION 31 23 10

SECTION 312500 - SOIL EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Temporary and permanent soil erosion control systems.

B. Slope Protection Systems.

1.02 RELATED SECTIONS

A. Section 31 20 00 – Earth Moving

B. Section 32 93 00 – Landscape Planting

C. Section 32 92 00 – Turf Grass Lawn

D. Construction Drawings

1.03 REFERENCE STANDARDS

A. The PADEP, Erosion Sediment and Pollution Control, April 2000.

B. Philadelphia Water Department (PWD), Stormwater Management Guidance Manual, Version 2.0

1.04 QUALITY ASSURANCE

A. The Contractor shall implement soil erosion controls in a timely manner.

B. The Contractor shall carefully adhere to the construction sequence that is shown on the construction drawings.

C. The Contractor shall follow Soil Erosion and Sediment Control Notes that are shown on the construction drawings and which are dictated by the PADEP and/or the PWD.

D. The Contractor shall make frequent inspection of temporary soil erosion controls and maintain them in working order until permanent soil erosion controls are established.

1.05 ENVIRONMENTAL REQUIREMENTS

A. The contractor shall protect adjacent properties and water resources from soil erosion and sediment damage throughout construction.

B. Discharge from dewatering operations shall not be directed to surface waters.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tree protection fencing as specified on Construction Drawings

B. Fibrous blankets by North American Green SC150BN, biodegradable (unless noted otherwise on Construction Drawings) or approved equal

C. Silt fence, Filtrexx Siltsoxx or Straw bale barrier siltation control as specified on the Construction Drawings

D. Filter fabric as specified on the Construction Drawings

PART 3 EXECUTION

3.01 PREPARATION

A. Review site conditions and sediment control plans.

B. Review the soil erosion and sediment control plans as they apply to current conditions. Any proposed deviation from the plans must be submitted to the engineer in writing 72 hours prior to commencing that work.

C. Notify the PADEP and the PWD by mail at least 48 hours prior to initial land disturbance.

3.02 SOIL EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION
A. Place soil erosion control systems in accordance with the staging and features shown on the sediment control plans prior to any earthwork construction and immediately following the construction of any storm drainage devices.

B. Limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations by following construction phasing in the sediment control plans.

C. The Contractor will be required to incorporate all permanent soil erosion control features into the project at the earliest practical time to minimize the need for temporary controls. Cut slopes shall be permanently seeded and mulched as the excavation proceeds to the extent considered desirable and practical. Equip catch basins with filter fabric inlet protection immediately upon construction.

D. The temporary soil erosion control systems installed by the Contractor shall be maintained as directed by the engineer to control siltation at all times during the life of the contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48 hour period.

E. Slopes that erode easily shall be temporary seeded as the work progresses with quick growing grass grains of wheat, rye or oats (See Section 32 92 00) unless otherwise specified.

F. All soil erosion control measures shall be maintained until all permanent improvements to the site are complete unless otherwise directed by the Engineer.

END OF SECTION 312500

SECTION 320116.71 - MILLING OF ASPHALT PAVEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Milling of asphalt paving.

1.02 DESCRIPTION OF WORK

A. This work is the milling of an existing bituminous pavement surface, with specified equipment, to a depth of two (2") inches, or depth of existing wearing course, whichever is greater.

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

3.01 EQUIPMENT

A. Use a milling machine designed and built for this type of work. Provide a machine with an effective automatic grade and slope control system and having the capacity to mill concrete patches.

3.02 MILLING OPERATION

A. Mill so the finished surface is free from gouges, grooves, and ridges and is in accordance with the specified surface tolerance requirements, or as directed.

B. To facilitate traffic control, pick up and move milled material, as specified, immediately after the milling operations.

C. Use care to remove the existing bituminous material around all utility facilities within the work areas.

D. Repair or replace, to the satisfaction of the utility owner, utility facilities which are damaged by the milling operation.

E. Control the rate of milling to avoid tearing of the mat, resulting in chunky an nonuniformly milled material.

F. Separate oversize and chunky milled material as directed.

G. Keep the milled pavement surface free of all loose materials and dust.

3.03 SURACE TOLERANCE

A. Test the finished surface with a ten (10) foot straightedge whenever Engineer suspects an area is deficient or irregular.

B. Use the straightedge at transverse joints and paving notches.

C. Hold the straightedge in successive positions parallel to the road centerline, in contact with the surface, and check the whole area from one side to the other, as necessary.

D. Advance along the pavement in stages of not more than one-half the length of the straightedge.

E. Correct irregularities of more than 3/16 inch.

F. For irregularities which develop before completion of rolling, correct by loosening surface mixture and removing or adding material, as required.

G. If irregularities or defects that cannot be corrected remain after final compaction, the affected area will be considered defective.

3.04 DISPOSITION OF MILLED MATERIAL

A. Satisfactorily dispose of the milled material.

END OF SECTION 32 01 16.71

SECTION 321216 - ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphaltic concrete paving; surface course, binder course and base course.

1.02 RELATED SECTIONS

A. Section 31 23 10 - Excavation, Backfill and Subgrade Preparation for Paving

B. Section 32 13 73 - Concrete Paving Joint Sealants

C. PA Department of Transportation (PennDOT) Standard Specifications.

1.03 SUBMITTALS

A. Design Mix: Before any asphaltic concrete paving is constructed, submit actual design mix to the Owner's Civil Engineer for review and/or approval. Design mix submittal shall follow the format as indicated in the Asphalt Institute Manual MS-2, Marshall Stability Method; and shall include the type/name of the mix, gradation analysis, grade of asphalt cement used, Marshall Stability (lbs.), flow, effective asphalt content (percent), and direct references to the Standard Specifications sections for each material. The design shall be for a mixture listed in the current edition of the Standard Specifications. Mix designs over three years old will not be accepted by the owner.

B. Material Certificates: Submit materials certificate to the Owner & Design Professional which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein.

1.04 JOB CONDITIONS

A. Weather Limitations:

1. Apply prime and tack coats when ambient temperature is above 40F, and when temperature has been above 35F for 12 hours immediately prior to application. Do not apply when base is wet, contains excess moisture, or during rain.

2. Construct asphaltic paving when atmospheric temperature is above 40F.

1.05 REFERENCES

A. Pennsylvania Department of Transportation Standard Specifications (hereafter referred to as Standard Specifications).

B. MS-2-Mix design methods for asphaltic concrete and other hot mix types per The

Asphalt Institute (AI)

C. MS-3-Asphalt Plant Manual per The Asphalt Institute (AI)

D. Hot Mix Asphalt Paving Handbook per US Army Corp of Engineers, UN-13 (CE MPET)

E. MS-19-Basic Asphalt Emulsion Manual per The Asphalt Institute (AI)

F. ASTM D946 - Penetration - Graded Asphalt Cement for use in Pavement Construction

G. AASHTO M-226/ASTM D3381 Asphalt Cement

H. AASHTO M-140/ASTM D997 or AASHTO M-208/ASTM D-2397 Tack Coat

I. AASHTO M-117/ASTM D242 Mineral Filler

J. AASHTO T-245/ASTM D1559 Marshall Mix Design

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide asphalt-aggregate mixture as shown on drawings. Use locally available materials and gradations, which meet the Standard Specifications and exhibit satisfactory records of previous installations.

B. Asphalt Cement: Comply with AASHTO M-226/ASTM D 3381; Table 2 AC-10, AC20, or AC-30, viscosity grade, depending on local mean annual air temperature. (See chart below):

Temperature Condition	Asphalt Grades
Cold, mean annual air temperature at 7 degrees C (45 degrees F) or lower	AC-10 85/100 pen.
Warm, mean annual air temperature between 7 degrees C (45 degrees F) and 24 degrees C (75 degrees F)	AC-20 60/70 pen.
Hot, mean annual air temperature at 24 degrees C (75 degrees F) or higher	AC-30

F. Asphalt-Aggregate Mixture: Unless otherwise noted on the Drawings, the Design Mix shall have a minimum stability based on a 50-blow Marshall Mix Design Procedure complying with ASTM D 1559 of 1000 lb with a flow between 8 and 16. The Design Mix shall be within sieve analysis and bitumen ranges below:

SIEVE ANALYSIS OF MIX
Square Sieve
Total Percent Passing Percent Tolerance
3/4” 100 .....7%

1/2” 80 - 100%.....5%

3/8” 65 - 93%.....4%

#8 40 - 55%.....4%

#50 12 - 27%.....2%

#200 0 - 10%.....0%
Percent bitumen by weight of total mix: 5.0 - 8.5.
Air voids: 3-6%
Percent aggregate voids filled with asphalt cement: 70 - 82%.
Allowable variance of percent bitumen by weight of total mix = 0.4

2.02 EQUIPMENT

A. Maintain equipment in satisfactory operating condition and correct breakdowns in a manner that will not delay or be detrimental to progress of paving operations.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove loose material from compacted base material surface immediately before applying prime coat.
B. Proof roll prepared base material surface to check for areas requiring additional compaction and areas requiring removal and recompaction.
C. Do not begin paving work until deficient base material areas have been corrected and are ready to receive paving.

3.02 APPLICATIONS

A. Prime Coat:
1. Apply bituminous prime coat to all base material surfaces where asphaltic concrete paving will be constructed.
2. Apply bituminous prime coat in accordance with APWA Section 2204 and applicable Standard Specifications.

3. Apply at minimum rate of 0.25 gallon per square yard over compacted base material. Apply to penetrate and seal, but not flood surface.

4. Make necessary precautions to protect adjacent areas from overspray.

5. Cure and dry as long as necessary to attain penetration of compacted base and evaporation of volatile substances.

B. Tack Coat:

1. Apply to contact surfaces of previously constructed asphaltic concrete base courses or Portland cement concrete and surfaces abutting or projecting into asphaltic concrete or into asphaltic concrete pavement.

2. Apply tack coat to asphaltic concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat between each lift or layer of full depth asphaltic concrete and sand asphalt bases and on surface of all such bases where asphaltic concrete paving will be constructed.

3. Apply emulsified asphalt tack coat in accordance with APWA Section 2204 and Pennsylvania highway specifications.

4. Apply at minimum rate of 0.05 gallon per square yard of surface.

5. Allow to dry until at proper condition to receive paving.

3.03 ASPHALTIC CONCRETE PLACEMENT

A. Place asphaltic concrete mixtures on completed compacted subgrade surface, spread, and strike off. Spread mixture at following minimum temperatures:

1. When ambient temperature is between 40F and 50F, mixture temp. = 285F

2. When ambient temperature is between 50F and 60F, mixture temp. = 280F

3. When ambient temperature is higher than 60F, mixture temp. = 275F

B. Whenever possible, all pavement shall be spread by a finishing machine; however, inaccessible or irregular areas may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster that than can be properly spread. Workers shall not stand on the loose mixture while spreading.

C. Paving Machine Placement: Apply successive lifts of asphaltic concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10’-0” wide.

D. Joints: Make joints between old and new pavements, or between successive days and work in a manner that will provide a continuous bond between adjoining work. Construction joints shall have same texture, density, and smoothness as other sections of asphaltic concrete course. Clean contact surfaces of all joints and apply tack coat

3.04 ROLLING AND COMPACTION

A. The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement. The number, weight, and types of rollers and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in a workable condition.

B. The bituminous concrete pavement shall have a minimum thickness as specified on the contract drawings and should be compacted to a minimum of 96% of the maximum unit weight as determined by the Marshall Mix Design Procedures in accordance with ASTM D-1559.

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

D. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling with hot material.

E. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

F. 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.

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

H. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades and bi-lingual signage (English and Spanish) to protect paving from traffic until mixture has cooled enough not to become marked.

3.05 FIELD QUALITY CONTROL

A. The Owner’s Civil Engineer shall perform construction testing of in-place asphaltic concrete courses for compliance with requirements for thickness, compaction and surface smoothness.

Asphaltic surface and base courses shall be randomly cored at a minimum rate of one core for every 20,000 square feet of paving. However, no less than three cores in light duty areas and three cores in heavy-duty areas shall be obtained. Coring holes shall be immediately filled with full-depth asphalt or with concrete. Asphaltic Concrete pavement samples shall be tested for conformance with the mix design.

B. Grade Control: Establish and maintain required lines and elevations.

C. Temperature: The Owner & Design Professional shall monitor the asphaltic concrete mixture on the paver immediately prior to spreading asphalt mixture to certify that the minimum temperature requirements of this section are met. Temperature measurement shall be taken on the average of one test per 20 tons of material.

D. Thickness: In-place compacted thickness shall not be less than thickness specified on the drawings. Areas of deficient paving thickness shall receive a tack coat and a minimum 1" overlay; or shall be removed and replaced to the proper thickness, at the discretion of the Owner; until specified thickness of the course is met or exceeded at no additional expense to the Owner.

E. Surface Smoothness: The Contractor shall perform testing on the finished surface of each asphalt concrete course for smoothness, using 10'-0" straightedge applied parallel with, and at right angles to centerline of paved area. These tests shall be performed under the observation of the Owner's Civil Engineer. Surfaces will not be acceptable if the following 10' straightedge tolerances for smoothness are exceeded.
Base Course Surface: 1/4"
Wearing Course Surface: 3/16"

F. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Owner.

G. Compaction: The Owner's Civil Engineer shall perform in place density tests as part of the construction testing requirements using the Nuclear Method in accordance with ASTM D-2922 Method B direct transmission. Field density tests shall be performed at the rate of one test per 20,000 square feet of pavement.

H. Laboratory Confirmation of Field Compaction: Density tests for in place materials shall be performed by examination of field cores in accordance with one of the following standards:

1. Bulk specific gravity of paraffin-coated specimens: ASTM D-1188.

2. Bulk specific gravity using saturated surface-dry specimens: ASTM D-2726.

Rate of testing shall be one core per 20,000 square feet of pavement, with a minimum of 3 cores from heavy-duty areas and 3 cores from standard-duty areas. Cores shall be cut from areas representative of the project.
Areas of insufficient compaction shall be delineated, removed, and replaced in compliance with the specifications at no expense to the Owner.

END OF SECTION 32 12 16

SECTION 321313- PLAIN CEMENT CONCRETE PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide labor, materials, equipment and services, and perform operations required for installation of sealants/site and related work as indicated on the drawings or specified herein.

B. Work Included: The work of this Section shall include, but not be limited to, the following:

1 Exterior weather joints between similar and dissimilar materials.

2 Exterior horizontal traffic joints.

C. The words ‘caulking” and ‘sealant” shall be considered synonymous on the Contract Documents. It shall be understood that both words define materials for sealing joints or seams watertight.

1.02 QUALITY ASSURANCE

A. Materials shall conform to the latest edition of reference specifications listed below, specified herein and to applicable codes and requirements of local authorities having jurisdiction. Work and installation shall conform to ASTM C962.

B. Qualifications: Installer of sealants shall have a minimum of five (5) years of successful experience in the application of the type of materials specified in this section and only skilled workmen shall be used for the work.

1.03 SUBMITTALS

A. Product Data: Copies of manufacturer’s latest published literature for all materials specified herein shall be submitted before materials are delivered to the site.

B. Schedule of Sealant Usage: Submit a detailed schedule of all locations of sealant usage. List each sealant material, joint filler(s), color(s) and related data for each location of use.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the site, in original unopened containers, clearly indicating manufacturer’s name, brand name, and other identifying information.

B. Materials shall be stored in a dry location, off the ground and in such a manner as to prevent freezing, damage and the intrusion of foreign matter.

C. Materials which have become damaged or otherwise unfit for use during delivery, or storage, shall be replaced at the expense of the Contractor.

1.05 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

2. When joint substrates are wet due to rain, frost, condensation, or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less or more than allowed by the joint sealant manufacturer for the application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Joint Design: Joint widths indicated within the Contract Documents are detailed at their "Designed Width", which is when the joint would be at the average air temperature of 70 degrees F. Installation shall take into account the ambient temperature range at the time of respective installation and operation.

1. Joint materials shall perform over an ambient air temperature range of 120 degrees F. and a surface temperature range of 180 degrees F.

1.06 WARRANTY

A. The Contractor shall execute and deliver to the Owner before final payment is made, a written warranty in a satisfactory form, stating that labor and materials furnished, and work performed by the Contractor are in accordance with the Contract Documents and authorized alterations and additions thereto; and that, should any defects develop during the warranty period, the Contractor shall upon written notice from the Architect or Owner, replace or satisfactorily repair such defects, including adjustments to adjacent work, as required; at the convenience of, and without expense to the Owner. Contractor shall warranty work for Five *(5)* years from date of final acceptance.

PART 2 PRODUCTS

2.01 SEALANT MATERIALS

A. General: Provide a complete system of cleaners, primers, fillers, tapes, backer rods and tapes and sealants in accordance with the manufacturer's requirements and the standards specified herein.

1. Color of Sealants: For concealed joints provide manufacturer's standard color which has the best overall performance qualities for the application shown. For exposed joints the Architect will select colors from the manufacturer's standard colors or special colors as specified elsewhere.
B. Elastomeric Compounds

1. Multi-Component Polyurethane (Sealant Type 1): ASTM C920, class and use as best suited for the intended purpose. Products meeting these requirements are

a. “Dymeric” by Tremco.

b. “Dynatrol II by Pecora Corp.

c. “Sonolastic NP II” by Sonneborn Building Products.

2. Self-Leveling Traffic Bearing (Sealant Type 2): ASTM C920, self-leveling, twopart polyurethane compound, with a Shore A cured hardness of 35 plus or minus *5,* Sealant shall have a joint movement capability of plus/minus 50 percent.

a. “Sonolastic 2C SL” by Sonneborn Building Products

b. “Sikaflex 12SL” by Sika Corp.

c. “Urexpan NR-20 1’ by Pecora Corp.

2.02 JOINT FILLER MATERIALS

A. Compressible Rod (Filler Type 1): Types as shown, or as required for proper performance of the sealant in the specific joint, which is compatible with sealant, as recommended by sealant manufacturer. One of the following:

1. Closed Cell Polyethylene Foam Rod: One of the following:

a. “Tremco Joint Backing” (Tremco).

b. “Green-Rod Polyethylene Backer Rod” (Nomaco, Inc.).

c. “HBR Backer Rod” (Hercules, Inc.).

d. “Sonofoam Back Rod” (Sonneborn Building Products).

2. Open Cell Polyurethane Rod: “Denver Foam” as distributed by Pecora Chemical Corp. or Woodmont Products Inc.

B. Preformed Sponge Rubber or Cork (Filler Type 2): ASTM Dl752, Type I, II or Ill; type best suited for joint condition.

C. Closed Cell Neoprene (Filler Type 3): ASTM D1056, Type S, Class SCE.

D. Closed Cell Polyethylene (Filler Type 5): Not less than 3 psi for 25% compression resistance, highly resistant to petroleum oils and solvents, one of the following:

1. “Expand-O-Foam” (Williams Products, Inc.).

2. “Filler Foam Gasket FF4” (Progress Unlimited Inc.)

3. “Tremco Joint Backing” (Tremco)

E. Select shape and size of joint filler in consultation with the manufacturer for proper performance in the specific condition of use in each case.

2.03 MISCELLANEOUS MATERIALS

A. Joint Cleaner: Provide non-staining cleaner recommended by the manufacturer of the sealant for the specific joint surface and condition.

B. Joint Primer and Sealer: Provide non-staining compounds recommended by the manufacturer of the sealant for the specific joint surface and condition. Primers and cleaners shall not damage applied metal finishes

C. Bond Breaker Tape: Pressure sensitive polyethylene tape.

D. Vent Tubes: Vent tubes (weep holes) shall be heat-bendable acrylic tubes with stainless steel mesh screens.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Comply with the sealant manufacturers requirements for all preparations.

1. Comply with conditions specified herein before in Paragraph “Project Conditions”.

B. Clean out joints to receive sealant, backup material or preformed joint filler to comply with recommendations of approved manufacturer and as specified herein.

1. Thoroughly clean joints, removing foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint, film sealers, or coatings shall be entirely removed unless tested and approved by the sealant manufacturer for adhesion.

2. Porous materials such as concrete and masonry shall be cleaned where necessary by grinding, water blast-cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.

a. Clean masonry surfaces with water and air; do not use any acid or other material which might stain surfaces.

b. Remove laitance and form release agents from concrete.

c. Remove loose particles present or resulting from grinding, abrading or blast-cleaning by blowing out joints with compressed air, oil free, or vacuuming joints prior to application of primer or sealant.

3. Clean and remove protective coatings on metallic surfaces as recommended by sealant manufacturer. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.

3.03 INSTALLATION

A. Comply with the sealant manufacturers requirements for all preparations.

1. Comply with conditions specified herein before in Paragraph “Project Conditions”

2. Do not begin sealant operations if the work does not in comply with Contract Documents and the sealant manufacturer’s recommendations.

B. Joint Fillers: Install joint fillers beneath all sealants.

1. Perform work in strict accordance with manufacturer’s instructions.

2. Employ mechanics skilled in this trade and proficient in the installation of specified sealant materials.

3. Install joint filler materials when temperature is between 25 degrees F and 95 degrees F.

4. For facade and traffic bearing conditions, foam sealant shall be at compression of 25 percent of uncompressed dimension. Depth of joint seal shall be in accordance with manufacturer’s requirements. Prior to installation, size of joint and sizing of seal shall be reviewed having regard to ambient temperature and expected thermal movement.

C. Sealants

1. Prime joint substrates where recommended by joint sealer manufacturer based upon the completion of a preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer’s recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces or exposed surfaces.

2. Use masking tape or other materials to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove as soon as possible after tooling sealant without disturbing joint seal.

3. In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately 30 percent compression. Do not stretch, twist, braid, puncture, or tear joint backing: Butt joint backing at intersections.

4. Install bond breaker smoothly over surfaces that would bond to sealant and at back of joints where joint backing is not required, so that sealant adheres only to the sides of the joint and not back surfaces or backing.

5. It is recommended that sealant be installed when the average daily air temperature is 70 degrees F (plus/minus 5 degrees F), when joint should be at its Designed Width. When average daily temperature is lower or higher than this range

Contractor shall perform work in strict accordance with sealant manufacturer's recommendations.

6. Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates. Sealant application shall be such to ensure complete contact and adhesion to sides of joints. Temperature of sealant, as well as of substrates, at time of sealant application, shall be as recommended by sealant manufacturers. Refer to Paragraph "Job Conditions". Force sealant into joint in front of the tip of the "caulking gun" (not pulled over it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.

7. Tool exposed joints to form smooth and uniform beds, with slightly concave surface. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.

3.04 LOCATIONS OF USE

A. Sealants: Provide sealants in accordance with the following locations of use:

1. Provide Sealant (Type 1) for all exterior weather seals and movement joints.

2. Provide Sealant (Type 2) for all exterior paving joints.

B. Joint Filler Materials: Provide joint fillers or tapes at all locations of sealant use as follows:

1. Provide backer rods (Filler Type 1) at all joints to be sealed.

2. Provide backer rods and joint fillers behind all horizontal joints and horizontal lengths of joints.

3. Provide bond breaker tape at all joints indicated on the Drawings to have no backer rod and at joints as required by the sealant manufacturer.

3.05 FIELD QUALITY CONTROL

A. Work under this section shall be subject to detailed inspection. Any sealants found out of plumb or cracking or backer rod or joint fillers found out of plumb or displaced by caulking operations or any work otherwise defective, or work not in accordance with specifications and details, shall be taken out and replaced to the complete satisfaction of the Architect, at no additional cost to the Owner.

3.06 CLEANING AND PROTECTION

A. Upon completion of the work, unused materials, containers, equipment, masking tape or protective measures, etc., shall be removed from the site. Floors, walls and other adjacent surfaces, that are stained or damaged by work of this section, shall be repaired and adjacent surfaces shall be left in a clean and undamaged condition.

B. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION 32 13 73

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide labor, materials, equipment and services, and perform operations required for installation of sealants/site and related work as indicated on the drawings or specified herein.

B. Work Included: The work of this Section shall include, but not be limited to, the following:

1 Exterior weather joints between similar and dissimilar materials.

2 Exterior horizontal traffic joints.

C. The words ‘caulking” and ‘sealant” shall be considered synonymous on the Contract Documents. It shall be understood that both words define materials for sealing joints or seams watertight.

1.02 QUALITY ASSURANCE

A. Materials shall conform to the latest edition of reference specifications listed below, specified herein and to applicable codes and requirements of local authorities having jurisdiction. Work and installation shall conform to ASTM C962.

B. Qualifications: Installer of sealants shall have a minimum of five (5) years of successful experience in the application of the type of materials specified in this section and only skilled workmen shall be used for the work.

1.03 SUBMITTALS

A. Product Data: Copies of manufacturer’s latest published literature for all materials specified herein shall be submitted before materials are delivered to the site.

B. Schedule of Sealant Usage: Submit a detailed schedule of all locations of sealant usage. List each sealant material, joint filler(s), color(s) and related data for each location of use.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the site, in original unopened containers, clearly indicating manufacturer’s name, brand name, and other identifying information.

B. Materials shall be stored in a dry location, off the ground and in such a manner as to prevent freezing, damage and the intrusion of foreign matter.

C. Materials which have become damaged or otherwise unfit for use during delivery, or storage, shall be replaced at the expense of the Contractor.

1.05 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

2. When joint substrates are wet due to rain, frost, condensation, or other causes.
B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less or more than allowed by the joint sealant manufacturer for the application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Joint Design: Joint widths indicated within the Contract Documents are detailed at their "Designed Width", which is when the joint would be at the average air temperature of 70 degrees F. Installation shall take into account the ambient temperature range at the time of respective installation and operation.

1. Joint materials shall perform over an ambient air temperature range of 120 degrees F. and a surface temperature range of 180 degrees F.

1.06 WARRANTY

A. The Contractor shall execute and deliver to the Owner before final payment is made, a written warranty in a satisfactory form, stating that labor and materials furnished, and work performed by the Contractor are in accordance with the Contract Documents and authorized alterations and additions thereto; and that, should any defects develop during the warranty period, the Contractor shall upon written notice from the Architect or Owner, replace or satisfactorily repair such defects, including adjustments to adjacent work, as required; at the convenience of, and without expense to the Owner. Contractor shall warranty work for Five *(5)* years from date of final acceptance.

PART 2 PRODUCTS

2.01 SEALANT MATERIALS

A. General: Provide a complete system of cleaners, primers, fillers, tapes, backer rods and tapes and sealants in accordance with the manufacturer's requirements and the standards specified herein.

1. Color of Sealants: For concealed joints provide manufacturer's standard color which has the best overall performance qualities for the application shown. For exposed joints the Architect will select colors from the manufacturer's standard colors or special colors as specified elsewhere.

B. Elastomeric Compounds

1. Multi-Component Polyurethane (Sealant Type 1): ASTM C920, class and use as best suited for the intended purpose. Products meeting these requirements are:

a. "Dymeric" by Tremco.

b. “Dynatrol II by Pecora Corp.

c. “Sonolastic NP II” by Sonneborn Building Products.

2. Self-Leveling Traffic Bearing (Sealant Type 2): ASTM C920, self-leveling, twopart polyurethane compound, with a Shore A cured hardness of 35 plus or minus *5,* Sealant shall have a joint movement capability of plus/minus 50 percent.

a. “Sonolastic 2C SL” by Sonneborn Building Products

b. “Sikaflex 12SL” by Sika Corp.

c. “Urexpan NR-20 1’ by Pecora Corp.

2.02 JOINT FILLER MATERIALS

A. Compressible Rod (Filler Type 1): Types as shown, or as required for proper performance of the sealant in the specific joint, which is compatible with sealant, as recommended by sealant manufacturer. One of the following:

1. Closed Cell Polyethylene Foam Rod: One of the following:

a. “Tremco Joint Backing” (Tremco).

b. “Green-Rod Polyethylene Backer Rod” (Nomaco, Inc.).

c. “HBR Backer Rod” (Hercules, Inc.).

d. “Sonofoam Back Rod” (Sonneborn Building Products).

2. Open Cell Polyurethane Rod: “Denver Foam” as distributed by Pecora Chemical Corp. or Woodmont Products Inc.
B. Preformed Sponge Rubber or Cork (Filler Type 2): ASTM Dl752, Type I, II or Ill; type best suited for joint condition.

C. Closed Cell Neoprene (Filler Type 3): ASTM D1056, Type S, Class SCE.

D. Closed Cell Polyethylene (Filler Type 5): Not less than 3 psi for 25% compression resistance, highly resistant to petroleum oils and solvents, one of the following:

1. “Expand-O-Foam” (Williams Products, Inc.).

2. “Filler Foam Gasket FF4” (Progress Unlimited Inc.)

3. “Tremco Joint Backing” (Tremco)
E. Select shape and size of joint filler in consultation with the manufacturer for proper performance in the specific condition of use in each case.

2.03 MISCELLANEOUS MATERIALS

A. Joint Cleaner: Provide non-staining cleaner recommended by the manufacturer of the sealant for the specific joint surface and condition.

B. Joint Primer and Sealer: Provide non-staining compounds recommended by the manufacturer of the sealant for the specific joint surface and condition. Primers and cleaners shall not damage applied metal finishes

C. Bond Breaker Tape: Pressure sensitive polyethylene tape.

D. Vent Tubes: Vent tubes (weep holes) shall be heat-bendable acrylic tubes with stainless steel mesh screens.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions at the job site where work of this section is to be performed to insure proper arrangement and fit of the work. Start of work implies acceptance of job site conditions.

3.02 PREPARATION

A. Comply with the sealant manufacturers requirements for all preparations.

1. Comply with conditions specified herein before in Paragraph “Project Conditions”.

B. Clean out joints to receive sealant, backup material or preformed joint filler to comply with recommendations of approved manufacturer and as specified herein.

1. Thoroughly clean joints, removing foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint, film sealers, or coatings shall be entirely removed unless tested and approved by the sealant manufacturer for adhesion.

2. Porous materials such as concrete and masonry shall be cleaned where necessary by grinding, water blast-cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.

a. Clean masonry surfaces with water and air; do not use any acid or other material which might stain surfaces.

b. Remove laitance and form release agents from concrete.

c. Remove loose particles present or resulting from grinding, abrading or blast-cleaning by blowing out joints with compressed air, oil free, or vacuuming joints prior to application of primer or sealant.

3. Clean and remove protective coatings on metallic surfaces as recommended by sealant manufacturer. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.

3.03 INSTALLATION

A. Comply with the sealant manufacturers requirements for all preparations.

1. Comply with conditions specified herein before in Paragraph “Project Conditions”

2. Do not begin sealant operations if the work does not in comply with Contract Documents and the sealant manufacturer’s recommendations.

B. Joint Fillers: Install joint fillers beneath all sealants.

1. Perform work in strict accordance with manufacturer’s instructions.

2. Employ mechanics skilled in this trade and proficient in the installation of specified sealant materials.

3. Install joint filler materials when temperature is between 25 degrees F and 95 degrees F.

4. For facade and traffic bearing conditions, foam sealant shall be at compression of 25 percent of uncompressed dimension. Depth of joint seal shall be in accordance with manufacturer’s requirements. Prior to installation, size of joint and sizing of seal shall be reviewed having regard to ambient temperature and expected thermal movement.

C. Sealants

1. Prime joint substrates where recommended by joint sealer manufacturer based upon the completion of a preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer’s recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces or exposed surfaces.

2. Use masking tape or other materials to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove as soon as possible after tooling sealant without disturbing joint seal.

3. In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately 30 percent compression. Do not stretch, twist, braid, puncture, or tear joint backing: Butt joint backing at intersections.

4. Install bond breaker smoothly over surfaces that would bond to sealant and at back of joints where joint backing is not required, so that sealant adheres only to the sides of the joint and not back surfaces or backing.

5. It is recommended that sealant be installed when the average daily air temperature is 70 degrees F (plus/minus 5 degrees F), when joint should be at its Designed Width. When average daily temperature is lower or higher than this range

Contractor shall perform work in strict accordance with sealant manufacturer's recommendations.

6. Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates. Sealant application shall be such to ensure complete contact and adhesion to sides of joints. Temperature of sealant, as well as of substrates, at time of sealant application, shall be as recommended by sealant manufacturers. Refer to Paragraph "Job Conditions". Force sealant into joint in front of the tip of the "caulking gun" (not pulled over it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.

7. Tool exposed joints to form smooth and uniform beds, with slightly concave surface. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.

3.04 LOCATIONS OF USE

A. Sealants: Provide sealants in accordance with the following locations of use:

1. Provide Sealant (Type 1) for all exterior weather seals and movement joints.

2. Provide Sealant (Type 2) for all exterior paving joints.

B. Joint Filler Materials: Provide joint fillers or tapes at all locations of sealant use as follows:

1. Provide backer rods (Filler Type 1) at all joints to be sealed.

2. Provide backer rods and joint fillers behind all horizontal joints and horizontal lengths of joints.

3. Provide bond breaker tape at all joints indicated on the Drawings to have no backer rod and at joints as required by the sealant manufacturer.

3.05 FIELD QUALITY CONTROL

A. Work under this section shall be subject to detailed inspection. Any sealants found out of plumb or cracking or backer rod or joint fillers found out of plumb or displaced by caulking operations or any work otherwise defective, or work not in accordance with specifications and details, shall be taken out and replaced to the complete satisfaction of the Architect, at no additional cost to the Owner.

3.06 CLEANING AND PROTECTION

A. Upon completion of the work, unused materials, containers, equipment, masking tape or protective measures, etc., shall be removed from the site. Floors, walls and other adjacent surfaces, that are stained or damaged by work of this section, shall be repaired and adjacent surfaces shall be left in a clean and undamaged condition.

B. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION 32 13 73

SECTION 321600 - CONCRETE CURBING AND SIDEWALKS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section includes concrete paving work for the project.

1.02 RELATED SECTIONS AND DOCUMENTS

A. Applicable Sections: Division 1

B. Section 02 41 16 – Site and Structure Demolition

C. Section 31 20 00 – Earth Moving

D. Section 31 23 10 – Excavation, Backfill & Subgrade Preparation for Pavement

E. Section 03 30 00 – Cast-In-Place Concrete

F. Section 32 13 73 – Concrete Paving Joint Sealants

1.03 REFERENCE STANDARDS

A. Standard for Concrete Work: As indicated in Division 3.

B. Municipal Specifications: Standard Specifications for Paving and Repaving, Department of Streets, City of Philadelphia.

C. Pennsylvania Department of Transportation (PennDOT) – Publication 408 – Standard Specifications for Roads and Bridges, latest edition.

1.04 PERFORMANCE REQUIREMENTS

A. The contractor shall maintain access for pedestrian traffic as required for other access to the existing buildings and facilities remaining in use and for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

1.05 SUBMITTALS

A. Submit per the requirements of Division 1.

B. The contractor shall submit the required submittals to Owner or Design Professional at least two weeks prior to the start of construction for approval.

C. Comply with Cast-In-Place Concrete: Division 3

1.06 QUALITY ASSURANCE

A. Owner will retain an independent testing agency to perform the required tests. The contractor shall provide any necessary assistance to the testing agency and provide the testing agency with the intended construction schedule at least one week prior to the start of construction.

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

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.

PART 2 PRODUCTS

2.01 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. Use flexible spring steel forms or laminated boards to form radius bends as required. The forms shall be of a depth equal to the depth of curbing or sidewalk, and so designed as to permit secure fastening together at the tops. Coat forms with non-staining type coating that will not discolor or deface surface of concrete.

B. Concrete Materials: Comply with requirements of the PennDOT Standard Specifications or as referenced in the Contract Documents for concrete materials, admixtures, bonding materials, curing materials, and others as required. Concrete shall have a minimum 28day compressive strength of 4,500 psi.

C. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM

D 1751 FS HH-F-341, Type II, Class A; or AASHTO M 153, Type I. D. Welded wire fabric as indicated on Contract Drawings.

2.02 MIX DESIGN AND TESTING

A. Concrete mix design and testing shall comply with requirements of the PennDOT Standard Specifications or as referenced in the Contract Documents.

B. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce the following properties:

1. Compressive Strength: 4,500 psi, minimum at 28 days, unless otherwise indicated on the Drawings.

2. Slump Range: 4" maximum.

3. Air Entrainment: 4% to 7%.

2.03 SUBMITTALS

A. Unless otherwise specified, Design/Builder shall submit any required submittals at least two weeks prior to the start of construction for review and approval.

PART 3 EXECUTION

3.01 PREPARATION

A. Proof-roll prepared base material surface to check for unstable areas. The paving work shall begin after any unsuitable areas have been corrected and are ready to receive paving. Compaction testing for the base material shall be completed prior to the placement of the paving.

B. Surface Preparation: Remove loose material from compacted base material surface to produce a firm, smooth surface immediately before placing concrete.

3.02 INSTALLATION

A. Form Construction

1. Set forms to required grades and lines, rigidly braced and secured.

2. Install sufficient quantity of forms to allow continuance of Work and so that forms remain in place a minimum of 24 hours after concrete placement.

3. Check completed formwork for grade and alignment to following tolerances:

a. Top of forms not more than 1/8" in 10'-0".

b. Vertical face on longitudinal axis, not more than 1/4" in 10'-0".

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

5. Install 6"x6" welded wire fabric unless otherwise indicated on the Drawings. Support wire on metal wire chairs to ensure that wire stays mid-depth of sidewalk section during concrete pour.

B. Concrete Placement

1. Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Concrete shall not be placed around manholes or other structures until they are at the required finish elevation and alignment.

A. After striking off and consolidating concrete, smooth surface by screening and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.

B. Work edges of sidewalks, gutters, back top edge of integral curb, and formed joints with an edging tool, and round to ½" radius. Eliminate tool marks on concrete surface. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

1. Inclined Slab Surfaces: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.

2. Curbs, gutters, and sidewalks: Broom finish by drawing fine-hair broom across surface perpendicular to line of traffic. Repeat operation as necessary to produce a fine line texture.

3. Do not create “picture frame” appearance on concrete by use of trowel around perimeter. Such appearance shall result in rejection by Owner & Design Professional.

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

D. Protect and cure finished concrete paving using acceptable moist-curing methods, more particularly described in the "water-curing" section of ACI 308-81.

3.04 BACKFILL

A. After the concrete has set sufficiently, the spaces in front and back of the curb and gutter or sidewalk shall be refilled to the required elevation with suitable material in accordance with the contract drawings, which shall be compacted until firm and solid and neatly graded.

3.05 CLEANING AND ADJUSTING

A. Sweep and wash curb and sidewalks so that they are free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

B. Protect concrete from damage until acceptance of Work.

END OF SECTION 32 16 00

SECTION 321816.13 - POURED-IN-PLACE SAFETY SURFACE

PART 1 GENERAL

1.01 SUMMARY

A. Poured-in-place safety surface shall consist of a polyurethane binder mixed with 100% recycled, shredded buffing which will make up the cushion layer. The cushion layer is capped with a TPV or Thermoplastic Aliphatic Urethane (TAU) rubber granules mixed with a polyurethane binder creating the wear course.

B. Provide labor, materials, equipment, services to install poured in place safety surface on aggregate base as indicated on the drawings and specified herein.

1.02 RELATED SECTIONS

A. Section 31 23 10 – Excavation, Backfill & Subgrade Preparation for Paving

B. Section 32 12 16 – Asphalt Paving

C. Section 32 13 73 – Concrete Paving Joint Sealants

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM-F1292 (Latest Edition) - Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment

2. ASTM-F2223 (Latest Edition) – Standard Guide for ASTM Standards on Playground Surfacing

3. ASTM-F1951 (Latest Edition) – Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

4. ASTM-D2047 (Latest Edition) – Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

5. ASTM E303 (Latest Edition) – Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

6. ASTM D2859 (Latest Edition) – Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials

7. ASTM D412 (Latest Edition) – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

8. ASTM D624 (Latest Edition) – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

9. ASTM C67 (Latest Edition) – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile

10. ASTM D573 (Latest Edition) – Standard Test Method for Rubber—Deterioration in an Air Oven

B. U.S. Consumer Product Safety Commission (CPSC):

1. CPSC Handbook for Public Playground Safety

2. CPSC Document # 1005 – Playground Surfacing Materials

C. Americans With Disabilities Act (ADA)

1. Americans with Disabilities Act Accessibility Guidelines (ADAAG)

D. American National Standards Institute (ANSI)

E. International Play Equipment Manufacturers Association (IPEMA)

F. Pennsylvania Department of Transportation (PennDOT)

1. Publication 408 – Standard Specifications

1.04 PERFORMANCE REQUIREMENTS

A. Area Safety: Poured in place surfaces within playground equipment use zones shall meet, or exceed, the performance requirements of the CPSC, ADA and, where applicable, Fall Height Test ASTM F 1292. The surface must yield both peak deceleration of no more than 200 G-max and a Head Injury Criteria (HIC) value of no more than 1,000 for a headfirst fall from the highest accessible point of play equipment being installed, as shown on the drawings.

B. Accessibility: NOTE: Children's outdoor play areas shall be in compliance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Poured in place surfaces intended to serve as accessible paths of travel for persons with disabilities shall be firm, stable and slip resistant, and shall meet the requirements of ASTM F 1951 and ASTM F 1292.

D. The finished Poured-In-Place Rubber surface shall meet the following ASTM requirements:

1. Dry Static Coefficient of Friction (ASTM D2047): 1.0

2. Wet Static Coefficient of Friction (ASTM D2047): 0.9

3. Dry Skid Resistance (ASTM E303): 89

4. Wet Skid Resistance (ASTM E303): 57

5. Flammability (ASTM D2859): Pass

6. Tensile Strength (ASTM D412): 60 psi

7. Tear Resistance (ASTM D624): 40% Elongation at break point (140% Original Size)

8. Weathering criteria - After being subject to a freeze/thaw cycle in accordance with ASTM C67 and after being subject to 200 degrees Fahrenheit for 7 days in accordance with ASTM D573, the same sample shall be retested in accordance with ASTM F1292 at 72 degrees Fahrenhiet only. Test values shall not exceed 200 g-max and 1000 HIC.

1.05 QUALITY ASSURANCE

A. Installers/Applicators: Minimum of 3 years successful experience in the installation of the type of equipment specified.

B. Safety surface shall be warranted by the manufacturer for a period of 5 years from the date of final acceptance by the Owner. Safety surface shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship and material. Warranty will be specific to maintenance requirements and performance standards of completed product.

C. Conditions of all substrates with respect to structural performance shall be evaluated and approved by the applicator prior to applying the system.

D. Contractor/applicator shall provide a minimum of one Fall Height Test per ASTM F 1292 from the highest accessible point of each piece of play equipment being installed.

1.06 SUBMITTALS

A. Three (3) original hard copies of the submittal package will be provided (Additional hard copies shall be made available upon request). This package shall include, but not be limited to, all specifications, manufacturer’s name and product code for all materials (Cushion Layer, Binders and Wear Course), MSDS sheets for all products, details and testing data.

B. Certificate of Material Compliance should be provided to the owner before delivery and installation of the safety surface. Certificate should be sent to Owner directly by the manufacturer. See sample of Certificate at end of this Section.

C. Manufacturer’s details showing depths of Wear Course and Cushion Layer together with sub-base materials, anchoring systems and edge details.

D. Upon request, a listing of at least five installations where products similar to those proposed for use have been installed and have been in service for a minimum period of 2 years. The list shall include owners and/or purchaser's name, address of installation, date of installation, contact person and contact information.

E. A signed statement from the manufacturer of the poured-in-place surfacing attesting that all materials under this section shall be installed only by the Manufacturer's Trained Installers.

F. A certificate of Insurance shall be provided by the manufacturer for poured in place surfacing for uses as a playground safety surfacing, with the limits equal to, or exceeding, levels as indicated in the specifications.

G. Three (3) 4-inch x 4-inch samples of the each color combination of the Wear Course as specified on the plan for approval.

H. Test report, from an independent testing laboratory, showing that the safety surfacing system meets or exceeds the test requirements and standards specified herein.

I. Certification by manufacturer's authorized representative that safety surfacing has been properly furnished and installed.

J. Maintenance Literature for all products used.

K. Installation instructions for all products used.

L. Technical data and product literature for all items used.

M. Product Warranties.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products of this Section as recommended by the Manufacturer, to prevent damage.

B. All materials shall be delivered in good conditions in original unopened packages with labels intact.

C. All materials shall be protected from weather and the binder shall be stored in temperatures 40°F (4°C) or higher.

1.08 SEQUENCING AND SCHEDULING

A. Poured in place surfacing must be installed after all playground equipment and other structural elements, such shade structures, signs and barriers. Surface installation shall be coordination by a manufacturer's representative.

1.09 PROJECT SITE/JOB CONDITIONS

A. Poured in place surfacing must be installed on a dry sub-surface, with no prospect of rain within the initial drying period, and within the recommended temperature range of the manufacturer.

B. Installation in weather conditions where the temperature is less than 55 degrees

Fahrenheit, and/or high humidity, may affect cure time, and the structural integrity of the final product. Contractor shall consult manufacturer for recommendations on installation during these conditions and adjust types and/or quantities of binding agents to compensate for weather conditions. At no time during the installation/application and curing period shall be less than 40 degrees Fahrenheit and shall remain above 40 degrees Fahrenheit for at least 72 hours after completion.

C. Immediate surrounding sites must be reasonably free of dust conditions or this could affect the final look.

D. All materials shall be protected from weather and other damage prior to application, during application and while curing.

E. Barricade area to prohibit foot traffic on surface for the time specified by manufacturer, minimum of 48 hours after placement.

PART 2 PRODUCTS

2.01 GENERAL

A. Poured in Place Surface: The poured in place surface shall consist of 100% recycled shredded tire material mixed with a polyurethane and capped with either a TPV or Thermoplastic Aliphatic Urethane (TAU) granule and mixed with polyurethane.

B. It shall consist of a uniform material manufactured in such a way that the top portion meets the requirements specified herein for wear surface.

C. The type of safety surfacing shall be a poured-in-place system and shall be as indicated on the drawings.

D. Finished surface shall have been tested for shock attenuation under ASTM F 1292 GMax and HIC

E. Finished surface shall be non-slip and porous.

2.02 CUSHION LAYER

A. Impact Attenuating Cushion Layer: Cushion layer consists of shredded styrene butadiene rubber (SBR) adhered with a 100% solids polyurethane binder to form a resilient porous surface.

B. Strands of SBR may vary from 0.5mm – 2.00mm in thickness and 3.0mm – 20mm in length. Binder will be 16% of the total weight of the granules used in the Cushion Layer and shall provide 100% coating of the particles.

C. Substitution of SBR Cushion Layer is noted to be a standard but must be pre-approved.

D. The Cushion Layer must be compatible with the Wear Course and must meet requirements herein for impact attenuation.

E. Cushion Layer must be guaranteed to be 100% metal free.

F. Depth of Cushion Layer shall be per the requirements of ASTM F1292.

2.03 WEARING COURSE

A. Wear Course shall consist of Colored Thermoplastic Plastic Vulcanized (TPV) or Thermo Plastic Aliphatic Urethane (TAU) granules with polyurethane binder formulated to produce an even, uniform, seamless surface. Approved TPV/TAU manufacturer(s):

1. Rosehill Polymers Ltd. – licensed United States manufacturer is American

Recycling Center, Inc. - 655 Wabassee Drive, Owosso, MI 48867, Phone: (989) 725-5100, Fax: (989) 725-5122, Web: http://www.americanrecycling.com.

2. Approved equal.

B. TPV and TUA granules shall be angular or round in shape with a particle size of 1 – 4mm. Binder shall be not less than 19% of total weight of granules used in the wear surface, and shall provide 100% coating of the particles.

C. Thickness of Wearing Course shall be a minimum of ½ inch under all areas of the playground, except for the following:

1. Under swing zone for swing sets: ¾ inch minimum.

2. Under safety zone for all non-stationary or spinning play equipment: 3/4 inch minimum.

D. Color Mixtures:

1. As specified on the plans.

2.04 POLYURETHANE PRIMER AND BINDER

A. Primer and Binder shall be a single component Polyurethane pre-polymer formulated using a polymeric foam of Dephenylmethane Diisocyanate (MDI).

B. No Toluene Diphenel Isocyanate (TDI) shall be used.

C. No filler materials shall be used in urethane such as plasticizers and the catalyzing agent shall contain no heavy metals.

D. Approved manufacturer's and products:

1. Dow Chemical Company - Polyurethane Systems - North American

Headquarters, 1881 West Oak Parkway, Marietta, Georgia 30062, Phone: (770) 428-2684, Fax: (770) 421-3216.

a. VORAMER® MDI Polyurethane Binders.

2. Stockmeier Urethanes USA, Inc., 20 Columbia Boulevard, Clarksburg, WV 26302 - 1456, USA, Phone: (304) 624 7002, Fax: (304) 624 7020, Web: www.stockmeier.com.

a. Stobielast®MDI Polyurethane Binders.

3. Rosehill Polymers Ltd. – licensed United States manufacturer is American Recycling Center, Inc. - 655 Wabassee Drive, Owosso, MI 48867, Phone: (989) 725-5100, Fax: (989) 725-5122, Web: http://www.americanrecycling.com.

a. FLEXILON MDI Polyurethane Binders.

4. Approved equal.

E. Weight of polyurethane shall be no less than 8.5 pounds/gallon and no more than 9.5 pounds/gallon.

F. Manufacturer is permitted to modify the type of urethane required to match the weather conditions, Substitutions must be equal to, or exceed, Voramer quality as manufactured by DOW Chemical. Substitutions will not be accepted unless pre-approved by the Owner.

2.05 GRAVEL SUBBASE

A. PennDOT 2A Modified Gravel compacted to 95%

PART 3 EXECUTION

3.01 INSPECTION

A. Prior to application of the system, the substrate's structural performance shall be evaluated. Notify all contractors and architect of all discrepancies. Work shall not proceed until unsatisfactory conditions are corrected.

B. Finished grade: Verify that finished elevations of adjacent areas are as indicated on the drawings, that the appropriate sub-grade elevation has been established for the particular safety surface to be installed, and that the subsurface has been installed in a true, even plane, and sloped to drain as indicated in drawings.

C. Sub Base: Tolerance of concrete or bituminous sub base shall be within 1/8 inch in 10 feet. Tolerance of aggregate sub base shall be within 3/8 inch in 10 feet. Verify that aggregate sub base has been fully compacted in 2" watered lifts to 95% or greater.

D. Curing of Asphalt and Concrete: If poured in place surfacing is installed, verify that concrete sub base has cured and that all concrete curing compounds and other deleterious substances that might adversely affect adhesion have been removed. Surface shall be clean and dry.

E. Drainage: Verify that subsurface drainage, if required, has been installed to provide positive drainage.

3.02 INSTALLATION

A. Perimeter of Safety Surfacing area shall meet flush with adjacent curbs and paving.

B. Safety Surfacing shall extend a minimum distance of 6'-0" in all directions from perimeter of playground equipment, and additional distance as indicated on the Drawings and as required to conform with specified standards, including guidelines contained in the CPSC Handbook for Public Playground Safety.

C. Poured in Place Surfacing: Components of the poured in place surfacing shall be mixed on site in a rotating tumbler to ensure components are thoroughly mixed and are in accordance with the manufacturer's recommendations and meet with the ratios indicated in section 2.07 above. Whenever practical, Installation of the surfacing shall be seamless up to 1,200 square feet per day and completely bonded to concrete of sub base. Material shall cover all foundations and fill around all elements penetrating the surface.

D. Cushion Layer: Whenever practical, cushion layer of surfacing material shall be installed in one continuous pour on the same day of up to 2,000 square feet. When the second pour is required, step the seam and fully coat the step of the previous work with polyurethane binder primer to ensure 100% bond with new work. Apply adhesive in small quantities so that new cushion layer can be placed before adhesive dries

E. Wear Course: Wear course must be either high quality peroxide cured TPV or TAU granules. Wear surface should be bonded to Cushion Layer. Additional primer will be used between the Cushion Layer and Wear Course. Apply adhesive to Cushion Layer in small quantities allowing the Wear Course to be applied before the adhesive dries. Surface shall be hand troweled to a smooth, even finish. Except where the Wear Course is

composed of differing color patterns, pour shall be continuous and seamless whenever practical up to 1,200 square feet per day. Where seams are required due to color change, size or adverse weather, a step configuration will be constructed to maintain Wear Course integrity. The edge of the initial pour shall be coated with adhesive primer and wearing surface mixture immediately applied. Pads with multiple seams are encouraged to include a top cost of urethane before being placed into use. Butt joint seams are not acceptable except for repairs. Under special conditions and with the owner's written approval, seams may be permitted in same color pad.

F. Perimeter: Concrete/asphalt perimeter must be saw-cut to size indicated on plans, or formed during pour, with surfacing rolled down inside void. Primer adhesive must be applied to all sides of the void. When connecting to a concrete curb or border, the hardened edge shall be primed with adhesive and the final 2" shall be tapered to allow the Wear Surface material to be a minimum of 1" thick where it joins the concrete edge.

G. Thickness: Construction methods, such as the use of measured screeds thicker than the required surfacing depth, shall be employed to ensure that full depth of specified surfacing material is installed. Surfacing system thickness throughout the playground area shall be as required to meet the impact attenuation requirements specified herein.

H. Manufacturer's installers shall work to minimize excessive adhesive on adjacent surfaces or play equipment. Spills of excess adhesive shall be promptly cleaned.

I. Manufacturers/Installers Services: For poured in place safety surfacing, a manufacturer's and/or installer's representative who is experienced in the installation of playground safety surfacing shall be provided. The representative shall supervise the installation to ensure that the system meets impact attenuation requirements and has been installed using specified materials in the ratios indicated herein

3.03 CLEANING

A. Upon completion of installation of safety surfacing, clean all work thoroughly.

B. Remove debris and excess soil and pavement removals from site.

3.04 PROTECTION

A. The synthetic safety surface shall be allowed to fully cure in accordance with the manufacturer's recommendations.

B. The surface shall be protected by the General Contractor from all traffic during the curing period of 48 hours or as instructed by the manufacturer. Barricade area to prohibit foot traffic on surface for the time specified by manufacturer, minimum of 48 hours after placement.

3.05 FIELD TESTING

A. General Contractor to submit written Audit of the completed installed safety surface by an independent Certified Playground Safety Inspector (CPSI), after safety surface is completely installed. No additional compensation will be given for any necessary corrective work.

B. Audit parameters: The surface must yield both peak deceleration of no more than 200 Gmax and a Head Injury Criteria (HIC) value of no more than 1,000 for a head-first fall from the highest accessible point of play equipment being installed, as shown on the drawings. Provide a minimum of three (3) drop tests in the safety zone of each play equipment.

END OF SECTION 32 18 16.13

SECTION 323113 – CHAIN-LINK FENCING AND GATES

1.1 Chain-Link Fencing shall conform to the following minimum standards:

A. General Site Fencing Standards (Chain-link):

1. Height: All chain-link fencing will either measure 6' tall (72") or 8' tall (96") in height from the finished grade, unless otherwise requested or approved by Philadelphia Parks and Recreation.

2. Gates: All gates are to match the height of the new fencing that they are linked to. Gate widths will either be 4' (48") for single man gates or 8' (96") for double man gates. Fabric will match the specifications of the new fence that it is linked to.

3. Fabric: All chain-link fabric will be vinyl coated and have a minimum weave of 2"x2" with 9GA tie wire, knuckled on both top and bottom. Cut ends of fence fabric shall be turned or knuckled over in the field to sharp wire ends are not exposed. Tie wires will be 24" on center, unless otherwise approved by Philadelphia Parks and Recreation. The color will be black, unless otherwise stated/approved by Philadelphia Parks and Recreation.

    a. For fencing along the perimeter of athletic fields, baseball/softball fields, and sport courts that fabric shall be installed on the field or court side facing the field or court.

4. Posts: Minimum 2" (outside diameter) galvanized steel, painted black. Posts should have a maximum spacing of 8'(96") on center per section of chain-link fencing. All Terminal posts will have caps and tension bar. All line posts will have top and bottom connectors.

5. Rails: Minimum 1-5/8" (outside diameter) galvanized steel, painted black. The bottom rail will be a 2" from finished grade.

6. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.

7. Approved Manufacturers:

    a. Northeast Fence and Iron Works – 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, Phone: (215) 335-1681, Web: http://www.northeastfence.net/

    b. Stephens Pipe and Steel, LLC – 300 Streibeigh Lane, Montoursville, Pennsylvania 17754, Phone: (888) 275-1638, Web: http://www.spsfence.com

    c. Master Halco – 3010 Lyndon B Johnson Freeway, Suite 800, Dallas, Texas 75234, Phone: (800) 883-8384, Web: www.masterhalco.com

d. Equal approved Philadelphia Parks and Recreation.

B. Dog Park Fencing Standards (Chain-link):

1. Height: The minimum height for all dog park enclosures is 72 inches (6 feet).

2. Gates: All gates are to match the height of the fence they are abutting. Gate widths will either be 4 feet (48 inches) wide for single man gates or 8 feet (96 inches) for double wide man gates. The fabric on the gate will match the specifications of the new fence they are linked to.

3. Fabric: All chain-link fabric will be coated vinyl with a maximum weave of 1"x1" for the safety of both dogs and pedestrians outside of the fenced in area. The color will be black, unless otherwise stated/approved by Philadelphia Parks and Recreation.

4. Posts: Minimum 2" (outside diameter) galvanized steel, painted black. Posts should have a maximum spacing of 8' (96") on center per section of chain-link fencing. All Terminal posts will have caps and tension bar. All line posts will have top and bottom connectors.

5. Rails: Minimum 1-5/8" (outside diameter) galvanized steel, painted black. The bottom rail will be a 2" from finished grade.

6. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.

7. Approved Manufacturers:

   a. Northeast Fence and Iron Works – 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, Phone: (215) 335-1681, Web: http://www.northeastfence.net/

   b. Stephens Pipe and Steel, LLC – 300 Streibeigh Lane, Montoursville, Pennsylvania 17754, Phone: (888) 275-1638, Web: http://www.spsfence.com

   c. Master Halco – 3010 Lyndon B Johnson Freeway, Suite 800, Dallas, Texas 75234, Phone: (800) 883-8384, Web: www.masterhalco.com

   d. Equal approved Philadelphia Parks and Recreation.

SECTION 323343 - SITE SEATING AND TABLES

SECTION-1 – GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Benches (Model 139) – modified existing benches with new slats

1.2 QUALITY ASSURANCE

A. Installer Qualification: An experienced installer who has completed installation of site furnishings and
whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: Experienced site furniture manufacturer since 1984.

1.3 SUBMITTALS

A. Product Data: Include physical characteristics such as shape, dimensions and finish for each bench.

B. Shop Drawings: Provide installation details for each product.

C. Samples for Verification: For the following product, show the color of the powder coat finish.

D. Maintenance Data: For each product.

1. Provide recommended methods for repairing damage and abrasions to the powder coat finish.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in original undamaged packaging in a dry location until ready for installation.

B. Handle powder coated products with carefully to prevent any damage to the finish.

1.5 WARRANTY

A. All products manufactured by DuMor, Inc., are warrantied against defect in materials and/or workmanship
and in accordance with our published specifications. DuMor, Inc. further warrants our products as follows:

1. Limited twenty-year warranty against structural failure of all steel bench frames or complete steel
bench assemblies, table frames, litter receptacle frames, steel planters and all cast iron and aluminum
bench supports.

2. Limited five-year warranty against structural failure of wood slats.
3. Limited ten-year warranty against structural failure of recycled plastic. It is further warrantied not to
degrade, split, crack or splinter during this period.
4. Limited one-year warranty on any item not specifically discussed above.

SECTION-2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Provide products from the following manufacturer: **1.** DuMor Inc.

138 Industrial Circle
Mifflintown, PA 17059
Phone: 800-598-4018
Fax: 717-436-9839
Email: sales@dumor.com
Website: www.dumor.com

2.2 BENCHES - DuMor Model 139 Series

A. Materials:
- **1.** Supports:
  - **a.** Supports shall be manufactured from 2” (2 3/8” OD)ASTM A513 schedule 40 steel tubing and 3/8” x 4 1/2” ASTM A36 carbon steel flat bar.
- **2.** Seat assembly:
  - **a.** Seat slats shall be manufactured from 2” x 4” nominal HDPE recycled plastic slats.
- **3.** Intermediate armrests (optional):
  - **a.** Intermediate armrests shall be manufactured from 1/4” x 1 1/2” ASTM A36 carbon steel flat bar.
- **4.** Anchoring:
  - **a.** Stainless steel expansion anchors (1/2” x 3 3/4”) provided.

B. Dimensions
- **1.** 6 foot bench
  - **a.** Overall: 71” long x 15 1/2” deep x 18” high
- **2.** 8 foot bench
  - **a.** Overall: 95” long x 15 1/2” deep x 18” high

C. Finish:
- **1.** Powder Coating
  - **a.** All parts are processed through an 8-stage iron phosphorous wash system.
  - **b.** Parts are coated with a zinc-rich epoxy primer to an AVERAGE of 4-5 mils.

c. Parts are then finished with a top coat of TGIC-polyester powder to an AVERAGE of 4-5 mils.
d. Powder is cured at the powder manufacturers specifications using combination of infrared and convection heat for approximately 20 minutes.
e. Finished parts shall comply with the following American Standard Test Method (ASTM) for coating and coating method: ASTM-D-523, ASTM-D-3363, ASTM-D-1737, ASTM-D-3359, ASTM-D- 2794, ASTM-B-117 and ASTM-D-3451.

SECTION-3 – EXECUTION

3.1 INSTALLATION

A. Handle and install benches according to manufacturer's recommendations and installation instructions.
B. Some assembly required.

END OF SECTION 32 33 43

SECTION 329000- LANDSCAPE PLANTING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: The furnishing and planting of trees, shrubs, ground covers, perennials, and ornamental grasses, with planting soil, topsoil, soil amendments, fertilizer, mulch, planting accessories and maintenance.

1.02 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Section, apply to the Section. B. Related Specification Sections include:

1. Applicable Sections of Division 01.

2. Section 31 20 00: Earth Moving

3. Section 31 22 10: Topsoiling and Finish Grading

4. Section 31 23 10: Excavation, Backfill & Subgrade Preparation for Pavement

5. Section 32 92 10: Turf Grass Seeding

1.03 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Ground Ivy, Perennial Sorrel, and Brome Grass.

B. Plants: Living trees, shrubs, perennials and ground cover specified in this Section.

C. Design Professional: Landscape Architect responsible for the design of the project.

1.04 REFERENCES

A. Comply with the following Reference Codes and Standards in accordance with Division 1:

1. American National Standards Institute (ANSI):

a. Z60.1—American Standards for Nursery Stock

b. A300—Standards for Tree Care Operations

2. United States Department of Agriculture (USDA):

a. Plant Hardiness Zone Map

1.05 REGULATORY REQUIREMENTS

A. Comply with Local, State, and Federal Codes.

B. Comply with regulatory agencies for fertilizer and herbicide composition.

1.06 QUALITY ASSURANCE

A. Nursery: Company specializing in growing and cultivating the plants specified in this Section with minimum six (6) years experience.

B. Installer: Company specializing in installing and planting the plants specified in this Section with minimum six (6) years experience.

C. Plant Materials: Free of disease or hazardous insects.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit instructions for continuing maintenance under provisions of Section 01700.

B. Include cutting and trimming methods; types, application frequency and recommended coverage of fertilizer, mulching frequency, etc.

1.08 HARVESTING, DELIVERY, STORAGE, AND HANDLING

A. Landscape Architect shall accompany Contractor on selection trip(s) to nursery. Landscape Architect shall select plants for proper visual formation. Contractor shall inspect selected plants for disease and other requirements of Contract Documents. Prior to this trip, Contractor shall have preselected Nursery(s) to ascertain that sufficient plants in size and specie required are available for proper selection. The Landscape Architect shall tag all trees and at least five (5) shrubs of each specie as a representative Sample. Trees delivered without tags, and shrubs that do not equal quality of tagged Samples, shall be rejected.

B. For balled and burlapped and bare root plant material dig plants in a manner to retain as many fibrous roots as possible. Spray trunks, twigs and foliage at the nursery with antidesiccant in accordance with manufacturer's written recommendation.

C. Ball and burlap all plants, unless otherwise indicated, with firm natural ball of soil of sufficient breadth and depth to include roots. Minimum acceptable ball size shall be in accordance to sizes set forth in ANSI Z60.1 – American Standard For Nursery Stock for type and size indicated. Burlap and rope entire earth ball. Plants with mushy, badly cracked or frozen earth balls shall not be acceptable.

D. Container grown stock shall be grown in specified container long enough for root system to have developed sufficiently to hold soil together.

E. Prevent injury to plant material when digging, moving, transporting, and unloading.

F. Handle all balled and burlapped plants from root ball only.

G. Deliver fertilizer and soil fertility materials in waterproof bags showing weight, chemical analysis, and name of manufacturer.

H. During transport protect plants from wind by wrapping with plastic or tarpaulins. For transportation spray trees with anti-desiccant at the recommendation of the nurseryman.

I. Vehicles shall be adequately ventilated to prevent overheating of plants.

J. Protect plants until planted. Protection includes, but is not limited to:

1. Protecting plant stems and trunks from damage and/or injury.

2. During harvesting, transport, and planting processes the plant stem and trunks shall be wrapped with a pervious protective cover. The protective cover shall be removed once the plant is installed and complete. Plants with injured stems will not be accepted.

3. Protecting plant branches from damage and/or injury.

4. Protecting plants from injury due to wind burn.

5. Protecting plants from drying out, plants and root balls shall be kept moist.

K. Deliver plant materials immediately prior to placement. Keep plant ball moist.

L. Notify Design Professional at least three (3) working days in advance of start of Work.

M. The Design Professional reserves the right to reject plant materials not meeting the above requirements.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not install plants during freezing weather or when the ground is frozen.

B. Do not install plants during excessively wet conditions.

C. Do not install plants when wind velocity exceeds 30 mph.

D. Plants shall not be placed on any day in which temperatures are forecast to exceed 90 degrees unless the Design Professional approves otherwise.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate and schedule work with other contractors and with the municipality.

B. Comply with planting periods as specified in this specification.

C. Notify Landscape Architect at least three (3) business days in advance of start of Work.

1.11 WARRANTY

A. Provide a warranty on work of this Section for eighteen (18) months. Commence warranty on date when work is accepted by OWNER.

1. Warranty includes coverage of plants from death or unhealthy conditions.

2. Replacement plants must be plants of the same size and species as specified, planted in the next growing season, with a new warranty commencing on the date of replacement.

1.12 MAINTENANCE SERVICE

A. Maintenance Services: Performed by installer.

B. Maintain plant life immediately after placement until work is accepted by owner.

C. Maintenance to include:

1. Cultivation and weeding plant beds and tree pits.
2. Application of herbicides for weed control in accordance with manufacturer's instructions. Remedy damage resulting from use of herbicides.
3. Application of pesticides in accordance with manufacturer's instructions.
4. Remedy damage from use of pesticides.
5. Irrigating sufficient to saturate root system.
6. Trimming and pruning, including removal of clippings and dead or broken branches, and treatment of pruned areas or other wounds.
7. Disease control.
8. Maintaining guys, stakes, wire, hoses, turnbuckles, and/or strapping. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

PART 2 PRODUCTS

2.01 NURSERIES

A. Nursery shall be a member of American Association of Nurserymen and Pennsylvania Landscape and Nurserymen's Association (or other such State organization).
B. Plant nursery shall be within same plant hardiness zone and having similar climate conditions as Project Site. Zone shall be as defined on U.S. Department of Agriculture Plant Hardiness Zone Map.

2.02 TREES, SHRUBS, PERENNIALS & GROUND COVERS

A. Trees, Shrubs, Perennials and Ground Covers: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the work.

B. Plant Substitutions: If a plant is found not to be suitable or available, Contractor shall notify Landscape Architect before bidding. Design Professional shall then select a reasonable alternate or inform all Contractors of availability of specified plant.

2.03 TOPSOIL

A. Provide topsoil in compliance with Section 32 92 10 – Turf Grass Seeding.

2.04 EXISTING/IN-SITU SOIL

A. Existing/in-situ soil is soils found in tree planting hole if located outside of man-made planters.

2.05 ORGANIC SOIL AMENDMENT MATERIALS

A. Compost: A mixture of partially decomposed organic materials (chipped, shredded, or ground vegetation or waste or recycled wood products), mushroom soil/spent mushroom soil substrate (SMS), composted animal manure, well composted leaf mold, or exceptional quality (Class A) composted bio-solids.

B. Compost shall be processed or completed to reduce weed seeds, pathogens, and deleterious material, and shall not contain paint, petroleum products, herbicides, fungicides, or other chemical residues that would be harmful to plant or animal life. Other deleterious material, plastic, glass, metal, or rocks shall not exceed 0.1 percent by weight or volume.

C. Compost produced from bio-solids (sewage/waste water sludge) shall be “Class A Grade” (exceptional quality) and meet US EPA’s 40 CFR Part 503 regulations. D. Compost shall meet the following analysis:

1. Organic Matter Content: On dry weight basis, 40 to 75 percent.
2. Nitrogen Content: 1 to 2.5 percent.
3. Phosphorus Content: 1 to 2 percent.
4. Potassium Content: 0.5 to 1.5 percent.
5. Carbon – Nitrogen Ratio: 12 to 25:1
6. Moisture Content Range: 40 to 60 percent.
7. Moisture Absorbtion: 100 percent (Dry Weight Basis) Minimum

8. pH Range: 6.0 to 8.0.
9. Bulk Density Range: 800 to 1,000 lbs. per cubic yard.
10. soluble Salt Content: 5 dS (mmhos/cm) or less.
11. Trace Elements: Meet US EPA 40 CFR Part 503 requirements.
12. Particle Size: Must pass 1 inch sieve or smaller.
13. Stability Rating: Stable.

2.06 COURSE SAND

A. Provide clean washed sand complying with the following mechanical analysis:

SIEVE SIZE	PERCENT PASSING
4	100
10	95-100
18	90-100
35	50-100
60	0-50
140	0-20
270	0-5

2.07 PLANTING SOIL MIXTURE

A. Tree Planting Hole/Pit (Outside of Man-Made Planters): Thoroughly mix planting soil mixture prior to installation in planting hole/tree pit. Planting mix will consist of the following:

1. 3 Parts existing/in-situ soil from planting hole.

2. 1 Part selected organic soil amendment.

B. Shrub Planting Holes/Beds: Thoroughly mix planting soil mixture prior to installation in planting hole/tree pit. Planting mix will consist of the following:

1. 3 Parts topsoil as specified.

2. 1 Part selected organic soil amendment.

C. Groundcover, Perennial, & Ornamental Grass Planting Holes/Beds (Outside of Man-Made Planters): Install planting soil as described in Part 3.

1. 2 Parts topsoil as specified.
2. 1 Part selected organic soil amendment.

2.08 WATER

A. Water shall be clean, fresh, potable, and free of substances or matter which could inhibit vigorous growth of plants.

2.09 SOIL FERTILITY MATERIALS

A. Mycorrhizal Treatment for Trees & Shrubs: “Tree Saver” 3-Ounce packet manufactured by Plant Health Care, Inc, 440 William Pitt Way, Pittsburgh, PA 15238; Phone: (412) 826-5488; Web: www.planthealthcare.com, or approved equal. Install per manufacturer’s instructions. Apply at the following rates:

1. For single stem trees: 1 Packet per inch of tree caliper, minimum of 1 packet.
2. For multi-stem stem trees: 1 Packet per each 12 inches of rootball diameter, minimum of 1 packet.
3. For shrubs: 1/3 Packet for each gallon of container size or for each 12 inches of plant height or spread.

B. Mycorrhizal Treatment (Perennials, Groundcovers, & Ornamental Grasses): “Flower Saver” manufactured by Plant Health Care, Inc, 440 William Pitt Way, Pittsburgh, PA 15238; Phone: (412) 826-5488; Web: www.planthealthcare.com, or approved equal. Install per manufacturer’s instructions. Apply at the following rates:

1. 6 Pounds per 100 square feet of planting bed.

2.10 HERBICIDE & PESTICIDE

A. Herbicide: As may be required with approval of Landscape Architect.

B. Pesticide: As may be required with approval of Landscape Architect.

2.11 MULCH MATERIALS

A. Wood Mulching Material: Double ground hardwood bark, brown in color, and free of growth or germination inhibiting ingredients. Contractor shall submit sample to the Landscape Architect for approval.’

2.12 GUYING & STAKING MATERIALS

A. Stakes: Cedar, 2-inch square with pointed end.

B. Synthetic tree guy strapping: ArborTie® strapping as manufactured by Deep Root Partners, L.P. – 530 Washington Street, San Francisco, CA 94111; Phone: (800) 4587668; Web: www.deeproot.com, or approved equal.

1. Material: Flat, woven polypropylene

2. Size: ¾ Inch wide

3. Color: White

2.13 ANTI-DESICCANT

A. "Wilt-Pruf", manufactured by Nursery Specialty Products of New York, or approved equal.

2.13 VERIFICATION

A. Provide certification of inspection by the Landscape Architect for confirming approval of plants supplied.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that Project Site is ready for planting prior to delivery of materials

B. Beginning of installation means acceptance of existing conditions.

3.02 PLANTING PERIODS

A. Planting shall be performed within the following periods:

1. From March 15 to June 15.

2. From September 1 to November 15.

B. Only with the approval of the Landscape Architect can planting occur for the period of after November 15 to March 15.

C. Planting between June 16 to August 31 is not permitted.

3.03 PREPARATION FOR PLANTING AREAS

A. Contractor shall locate plants by staking with stakes and flags as indicated on the Drawings for approval by the Landscape Architect.

B. For mass groundcover, perennial, or ornamental grass plantings excavate planting areas to depths as indicated and install planting soil in six inch maximum lifts. Once soil depth is achieved incorporate specified Mycorrhizal treatment into the soil mixture and roto-till entire planting bed to a depth of 12 inches. Planting mix shall be installed during dry weather and on dry unfrozen subgrade.

C. Grade planting to eliminate rough, low, or soft areas, and to ensure positive drainage.

3.04 PLANTING

A. Excavate circular plant pits with scarified vertical sides, except for plants specifically indicated to be planted in beds, to depths as indicated on the drawings. Provide planting pits at least twice the diameter of the root system or container. Depth of pit shall accommodate the entire root system.

Scarify the bottom and sides of the pit to a depth of four inches. If groundwater is encountered upon excavation of planting holes, the Contractor shall promptly notify the Landscape Architect.

B. If plants are containerized, the containers shall be removed from the plants immediate prior to planting and in a manner that prevents damage to the root system. Containers may require vertical cuts down the full depth of the container to accommodate removal. All circling roots shall be loosened to ensure natural directional growth after planting.

C. Set plant material in the planting pit to proper grade and alignment. Set plant upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. Set crown of plant material at the finish grade. No filling will be permitted around trunks or stems or above grafts on grafted trees.

D. Once plant material is set correctly in planting pit begin to backfill with specified planting mixture. Do not use frozen or muddy mixtures for backfilling. When planting hole depth is ½ full with planting soil, water soil in and lightly firm to remove voids and/or air pockets. After planting soil is watered and firmed for balled and burlapped plants remove burlap, rope/twine, and/or wire baskets from top 1/3 of rootball and tuck into planting hole. If burlap has been chemically treated (green color) or rope materials are plastic or not natural material remove from the planting pit.

E. Install Mycorrhizal treatment packets as specified on firmed soil in planting pit. Tablets and packets shall be evenly distributed throughout the pit.

F. Continue backfilling planting hole to final grades as shown on the plans. Once backfilling is complete thoroughly water in planting soil and lightly firm to remove voids and/or air pockets.

G. Containerized shrubs shall follow same procedure as described above.

H. Containerized groundcover, perennials, and/or ornamental grasses shall be planted in a roto-tilled bed in holes same size as rootball. Once plant is placed lightly firm soil around rootball to ensure firmly placed in hole.

I. Space ground cover plants using triangular spacing in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within eighteen inches (18") of the trunks of trees and shrubs within planting bed and to within twelve inches (12") of edge of bed.

A.05 ULCHING

A. Mulch tree and shrub planting pits and shrub beds with required mulch two inches (2") deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

B. Mulch groundcover, perennial, and ornamental grass beds with required mulch two inches (2") deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

3.07 STAKING/GUYING

A. Stake all deciduous and coniferous trees immediately after planting.

3.08 PRUNING

A. Prune all trees only to remove broken or damaged branches, or for aesthetic purposes as directed by the Landscape Architect. Branches will be pruned at the branch collar. Neither stubs nor flush cuts will be acceptable.

3.09 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

3.10 MAINTENANCE

A. Begin specified maintenance until work is accepted by owner.

3.11 FINAL INSPECTION

A. Inspection to determine completion and acceptance of planted areas will be made by the Landscape Architect, upon Contractor's request. Provide notification at least ten (10) business days before requested inspection date. Inspection comments will be submitted to contractor in writing.

B. Planted areas will be accepted provided all requirements, including the maintenance period have been complied with and plant materials are alive and in a healthy, vigorous condition.

C. Upon acceptance the Owner will assume plant maintenance and the plant material warrantee period begins.

D. An additional inspection will be made near the end of the warrantee period to determine if plant materials need to be replaced. Plants shall be in a healthy, vigorous growing state and free of disease and insects.

END OF SECTION 32 90 00

SECTION 330110 - PROTECTION OF EXISTING UTILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Identification and field mark out of all on-site utility lines to remain in operation during construction.

B. Submission of procedures to be used to ensure the safety of the utility.

C. Repair of any damage during construction operations.

1.02 RELATED SECTIONS AND DOCUMENTS

A. Section 02 41 16 - Site and Structure Demolition

B. Section 31 20 00 – Earth Moving

C. Section 31 23 10 – Excavation, Backfill & Subgrade Preparation for Pavement

D. Contract Drawings

1.03 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of capped utilities and utility lines encountered during construction.

1.04 REGULATORY REQUIREMENTS

A. Contractor shall notify all affected utility companies, agencies, authorities, owners, etc. at least 48 hours prior to the commencement of work and shall comply with their requirements.

B. Contractor shall contact the PA ONE-CALL service for an official utility mark out.

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

3.01 IDENTIFICATION

A. Locate all existing utilities which are to remain in service during construction as shown on the Construction
Drawings.

3.02 PROTECTION

A. Flag, barricade or suitably protect existing utilities during construction operations and equipment movement.

B. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction.

3.03 LATERAL DISCONNECTION

A. Where a utility line is to be disconnected from portions to remain, the lateral pipes shall be cut and suitably plugged/capped in accordance with the Contract Drawings and applicable utility or agency requirements.

3.04 REPAIRS

A. Any damage to existing, operational utilities by the Contractor or his subcontractors during the on-going construction operation shall be immediately repaired to operational standards at the Contractor's expense. If the repairs are not immediately addressed by the Contractor, the utility owner and/or the Owner shall contract for the repair at the Contractor's expense.

END OF SECTION 33 01 10