SECTION 04 4316 - STONE FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabricated granite items.

B. Metal anchors and supports.

C. Sealing exterior joints.

D. Pointing interior joints.

1.2 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing perimeter and expansion joints in interior stone work.

1.3 REFERENCE STANDARDS

A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2023a.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

C. ASTM C119 - Standard Terminology Relating to Dimension Stone; 2022.

D. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.

E. ASTM C615/C615M - Standard Specification for Granite Dimension Stone; 2023.

F. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

G. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

H. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

I. ASTM C1528/C1528M - Standard Guide for Selection of Dimension Stone; 2020.

J. ILI (HB) - Indiana Limestone Handbook; 2007.

K. NBGQA (SPEC) - Specifications for Architectural Granite, Version 20-1; 2020.

1.4 SUBMITTALS

A. See construction manager for submittal procedures.

B. Product Data: Provide data on each stone type, mortar products, and sealant products.

C. Shop Drawings: Indicate fabrication details, layout, pertinent dimensions, anchorages, and jointing methods.

1. Include large scale details of decorative surfaces and inscriptions.

D. Samples: Submit two stone sample6" x 6" x 1" in size, indicating color range and texture, markings, surface finish, and _____.

E. Installation Instructions: Submit stone fabricator's installation instructions and field erection or setting drawings; indicate stone identifying marks and locations on setting drawings.

F. Designer's qualification statement.

G. Stone fabricator's qualification statement.

H. Installer's qualification statement.

I. NSI Installer Qualification: Documentation of Natural Stone Institute Accreditation.

1.5 QUALITY ASSURANCE

A. Design monument and foundation under direct supervision of a Professional Structural Engineer, registered in the State in which the Project is located.

1. Design anchors to resist positive and negative wind pressures and other loads as required by applicable code.

2. Design anchor attachment to stone with a factor of safety of 5:1.

3. Design each individual anchor with a factor of safety in the vertical dead-load-bearing direction of 4:1 and in the horizontal lateral-load-bearing direction of 2:1.

B. Granite: Perform work in accordance with NBGQA (SPEC).

PART 2 PRODUCTS

2.1 FABRICATED ITEMS

A. Stone Fabricators:

1. Substitutions: Must be approved by the Landscape Architect and owner.

B. Monument: Granite.

1. Size, Shape, and Configuration: As indicated on drawings.

2.2 STONE

A. Stone, General: See recommendations in ASTM C1528/C1528M.

B. Granite: Gray variety; complying with ASTM C615/C615M.

1. Surface Finish: Polished; as described in ASTM C119 and ASTM C1528/C1528M.

2.3 MORTAR

A. Mortar: ASTM C270, Type N, Proportion specification, using Portland cement of white color.

2.4 ANCHORS AND ACCESSORIES

A. Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666 Type 304.

1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.

2. Wire ties are not permitted.

B. Support Components not in Contact with Stone: Stainless steel, ASTM A240/A240M Type 304.

C. Setting Buttons and Shims: Lead type.

D. Joint Sealant: ASTM C920 silicone sealant with movement capability of at least plus/minus 25 percent and nonstaining to stone when tested in accordance with ASTM C1248.

E. Joint Backer Rod: ASTM C1330 open cell polyurethane of size 40 to 50 percent larger in diameter than joint width.

2.5 STONE FABRICATION

A. Fabricate stone elements in sizes and shapes as necessary and in compliance with requirements indicated on drawings and in specifications.

B. Cut and drill depressed areas and holes in stones for anchors, fasteners, supports, and lifting devices as indicated or as necessary to set stonework securely in place; shape beds to fit supports. Allow room for expansion of the anchoring devices where necessary.

C. Fabricate profiled stone work, including washes and drips, to produce stone shapes with uniform profile throughout their entire length and with precisely formed arises slightly eased to prevent snipping, and matched at joints between units.

D. Finish exposed faces and edges of stones in compliance with indicated requirements for finish under each type and application of stone required and to match approved samples and mock-ups.

E. Cut stones to fabricate pieces of thickness, size, and shape as indicated or required for this work within fabrication tolerances recommended by ILI (HB).

F. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.

G. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify that built-in items are properly located and sized.

3.2 PREPARATION

A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.

3.3 INSTALLATION

A. Erect stone in accordance with stone supplier's instructions and erection drawings.

B. Set stone with a consistent joint width of 3/8 inch.

C. Joints in Exterior Work: Seal joints with joint sealant over backer rod, following sealant manufacturer's instructions; tool sealant surface to concave profile.

D. Joints in Interior Work: Leave perimeter joints and expansion joints open for sealant; fill other joints with pointing mortar; pack and work into voids; tool surface to concave joint.

3.4 TOLERANCES

A. Positioning of Elements: Maximum 1/8" inch from true position.

B. Length/Width/Height 1/8" maximum

C. Thickness 1/8" maximum

D. Diagonal Squareness 1/8"maximum.

3.5 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting any item not so indicated on drawings.

B. Do not impair appearance or strength of stone work by cutting.

3.6 CLEANING

A. Remove excess joint material upon completion of work.

B. Clean soiled surfaces with cleaning solution.

C. Use nonmetallic tools in cleaning operations.

END OF SECTION

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated aluminum items.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

E. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.

F. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.

G. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.

H. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2018, with Editorial Revision.

I. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

M. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).

1.4 SUBMITTALS

A. See Bid Documents for Submittal Process

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. For items indicated to be designed, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

3. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.

a. Include the following, as applicable:

1) Design criteria.

2) Engineering analysis depicting stresses and deflections.

3) Member sizes and gauges.

4) Details of connections.

5) Support reactions.

6) Bracing requirements.

1.5 QUALITY ASSURANCE

A. Design all structures under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

F. Aluminum-Alloy Die Castings: ASTM B85/B85M.

G. Bolts, Nuts, and Washers: Stainless steel.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

G. Basis of Design:

1. Vizor; https://vizorshadesystems.com/

2. Structural Pergola Systems;

a. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

2.3 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 7000 - DECORATIVE METAL FENCES AND SCREENS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

C. ASTM D523 - Standard Test Method for Specular Gloss; 2014 (Reapproved 2018).

D. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2015 (Reapproved 2020).

E. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact); 1993 (Reapproved 2024).

F. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test; 2023.

G. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test; 2022.

1.2 WORK INCLUDED

A. Section Includes: Panel Trellis with options for materials, finishes, configurations, and accessories.

1.3 REFERENCES

A. Powder Coat

1. ASTM B117 – Standard Practice for Operating Salt Spray (Fog) Apparatus (corrosion resistance).

2. ASTM D523 – Standard Test Method for Specular Gloss (coating gloss measurement).

3. ASTM D2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

4. ASTM D2794 – Standard Test Method for Resistance of Organic Coatings to Rapid Deformation (Impact Testing).

5. ASTM D3359 – Standard Test Methods for Measuring Adhesion by Tape Test.

6. ASTM D3363 – Standard Test Method for Film Hardness by Pencil Test.

B. Frame Materials

1. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

2. ASTM A 588 – Standard Specification for High-Strength Low-Alloy Structural Steel with Improved Atmospheric Corrosion Resistance (Corten steel).

Specifier Note: ASTM Testing Standards, delete configuration options as required by the project.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s product data, installation methods, available colors, finishes, and options.

B. Shop Drawings: Submit plans, elevations, dimensions, and installation details.

C. Samples: Submit samples of materials, finishes, colors, and optional accessories.

D. Warranty: Reference Green Theory Design Inc. warranty documentation for details on structural and finish warranty terms.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with a minimum of five years' experience in producing site furnishings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in original, unopened packaging with product and manufacturer identification.

B. Storage: Store materials in a dry, clean area per manufacturer’s guidelines.

C. Handling: Protect materials and finishes to prevent damage.

1.7 WARRANTY

A. Manufacturer’s Standard Warranty:

1. Structure: 10-year limited warranty covering structural integrity.

2. Finish: 2-year warranty on powder coat finishes against manufacturing defects.

3. The warranty excludes normal wear and tear, misuse, acts of nature, or damage due to improper storage.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Division 32, div32.com.

B. Alternative Manufactures: To be approved by Landscape Architect and Owner.

2.2 SCREED WALL AND CONFIGURATION OPTIONS

A. See plans for sizes and orentations.

2.3 MATERIALS

A. Trellis Panel and Frame:

1. Aluminum: Marine-grade 5052 aluminum with 30-50% recycled content.

2.4 FINISH OPTIONS:

A. Frame with AAMA 2604-compliant powder coating, available in custom colors or the following standard colors: Color T.B.D

1. Matte Black
2. Suede Bronze
3. Pewter
4. Smokey Beige
5. Metallic Silver
6. Gloss White
7. Matt White
8. Rust
9. Aged Copper
10. Almond

2.5 ENVIRONMENTAL CONSIDERATIONS:

A. Recycled Content

1. Aluminum manufactured from 30-50% recycled material.
2. Aluminum and steel are fully recyclable at end-of-life, aligning with ASLA’s decarbonization guidelines.

B. Low-Impact Coating

1. Powder coating process reduces VOCs and CO2 emissions by 25-60% compared to conventional solvent-based coatings.

2.6 FABRICATION

A. Construction

1. Shop-assembled for durability and consistency.
2. Fully welded using Cold Metal Transfer (CMT) technology for enhanced precision and sustainability.
    a. Reversing weld frequency: 170 Hertz.
    b. Average weld temperature: 170°C (340°F).

B. Material Preparation

1. All pieces deburred and edge-rounded to a 1mm radius for safety, precision, and consistency.

2.7 ACCESSORIES

A. Mounting: Surface-mount installation; generic hardware recommended to accommodate regional and foundation requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Site Conditions: Confirm substrate suitability and stability.

B. Notification: Report any conditions that may interfere with installation.

3.2 INSTALLATION

A. Installation Requirements: Install in accordance with the manufacturer’s guidelines.

B. Anchoring: Secure panels using appropriate mounting hardware based on installation type; ensure the installation surface is plumb and level.

3.3 ADJUSTING AND CLEANING

A. Adjustments: Ensure panels are properly installed and aligned.

B. Cleaning: Clean panels post-installation per manufacturer’s care recommendations.

3.4 PROTECTION

A. Protect installed panels from damage throughout the remaining construction. Remove protective measures only upon Substantial Completion.

END OF SECTION

SECTION 32 1416 - BRICK UNIT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Brick Pavers.

B. Sand Materials.

C. Bituminous Materials.

D. Reinforcement.

E. Accessories.

F. Mixes.

1.2 REFERENCE STANDARDS

A. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

B. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.

C. ASTM C902 - Standard Specification for Pedestrian and Light Traffic Paving Brick; 2022.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

F. ASTM D946/D946M - Standard Specification for Penetration-Graded Asphalt Binder for Use in Pavement Construction; 2020.

G. ASTM D1073 - Standard Specification for Fine Aggregate for Asphalt Paving Mixtures; 2016 (Reapproved 2022).

1.3 SUBMITTALS

A. See Construction Manager's Instructions for Submittals

1.4 QUALITY ASSURANCE

A. Paver Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with 10 years documented experience.

1.5 MOCK-UP

A. Size: 100 sq ft.

B. Install setting bed, brick pavers, and accessories to pattern indicated.

1. Show range of shades, color, and texture of pavers.

C. Mock-up may remain as part of the Work.

1.6 FIELD CONDITIONS

A. Do not install in freezing conditions

B. Do not istall in wet conditions. Allow site to dry 24hrs minimum after rain event to start or continue work.

C. At end of working day, or during rainy weather, cover work exposed to weather with waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Brick Pavers:

1. Belden Brick; https://www.beldenbrick.com/

2. Substitutions: See instruction to bidders document.

2.2 APPLICATIONS

A. Sidewalks: Pavers for pedestrian traffic.

1. Setting Bed: Asphalt.

2. Subbase: See drawings.

2.3 BRICK PAVERS

A. Pavers for Pedestrian Traffic: Extruded fire clay.

1. Basis of Design: Belden, Crestline

2. Grade: ASTM C902 Weather Class SX Traffic Type I, with dimensional tolerances complying with Application PS.

3. Face Size: 4 by 8 inches.

4. Thickness: 2-1/4 inches.

5. Exposed Surface Texture: Wirecut.

6. Edges: Chamfered.

7. Lugged Pavers: 1/8 inch lugs within nominal face size.

8. Color: 470-479 Dark Range Smooth Pavers

B. Pavers for Pedestrian Traffic: Extruded fire clay.

1. Basis of Design: Belden, Beehive
2. Grade: ASTM C902 Weather Class SX Traffic Type I, with dimensional tolerances complying with Application PS.
3. Face Size: 8 by 8 inches.
4. Thickness: 2-1/4 inches.
5. Exposed Surface Texture: Wirecut.
6. Edges: [Chamfered].
7. Lugged Pavers: 1/8 inch lugs within nominal face size.
8. Color: Sandhills

2.4 PAVER RESTRAINT EDGING

A. A. Product: Permaloc StructurEdge, or approved equal.

1. 3/16" (4.8mm) x 2-1/4" (57mm) high, extruded aluminum, 6063 alloy, T6 hardness, paver restraint edging for straight-line and curvilinear applications in corrugated L-shaped profile, as manufactured by Permaloc Corporation, Holland MI 49424, telephone (800) 356-9660 or (616) 399-9600.
2. Horizontal base shall have holes spaced 4 inches (102 mm) apart along its length to receive spikes.
3. Thickness: 3/32 inch (2.4 mm) gage section shall have 0.170 inch (4.32 mm) thick exposed top lip, 1/8 inch (3.2 mm) gage section shall have 0.190 inch (4.83 mm) thick exposed top lip, and 3/16 inch (4.8 mm) gage section shall have 0.210 inch (5.33 mm) thick exposed top lip.
4. Length: 8' (2.44m).
5. Connection Method: Section ends shall splice together with horizontal 0.060 inch (1.52 mm) thick x 1 inch (25 mm) wide x 4 inches (102 mm) long aluminum sliding connector.
6. Anchoring: 3/8 inch x 10 inches (9.5 mm x 254 mm) bright spiral steel spike. Use plastic washers if desired. For hardened surfaces (i.e. concrete, masonry, etc.) use 3/16 inch x 1-1/2 inches (4.8 mm x 38 mm) or longer Ardox concrete nail or drive pin fastener equal to Hilti DX 40 powder actuated pin, Ramset Trakfast Automatic Fastening System pin, or Tapcon.
7. Finish: Mill Finish.

2.5 SAND MATERIALS

A. Polymeric Sand: Fine sand complying with ASTM C144 combined with polymer binders for creating semi-solid joints between pavers.

1. Material: Granite.

2. Additive(s): Portland Cement.

3. Compressive Strength: 750 pounds per square inch.

4. Adhesion by Tensile Load: 100 pounds per square inch.

5. Color: To be selected.

2.6 BITUMINOUS MATERIALS

A. Asphalt Cement: Complying with ASTM D946.

B. Fine Aggregate: Sand complying with ASTM D1073, sharp, clean, free from deleterious material.

2.7 REINFORCEMENT

A. Welded Wire Reinforcement: ASTM A1064/A1064M; 2 x 2, 16/16 wire; galvanized steel.

2.8 ACCESSORIES

A. Cleaning Solution: Type recommended by paver manufacturer.

B. Sealant: ASTM C920, self-leveling or nonsag polyurethane or silyl-terminated polyether/polyurethane (STPE/STPU) sealant approved by manufacturer for traffic exposure without being recessed below the top of substrate surface.

1. Color: As selected by Architect from manufacturer's full color range.

C. Backer Rod: ASTM C1330, closed-cell polyethylene, 25 to 33 percent larger in diameter than joint width.

D. Neoprene Modified Asphalt Adhesive: 2 percent neoprene in oxidized asphalt, 10 percent long fibered inert reinforcement material.

2.9 MIXES

A. Bituminous Bed: Bituminous mixture of dry fine aggregate and hot asphalt cement, proportioned to 7 percent asphalt and 93 percent aggregate.

B. Add admixtures in accordance with manufacturer's instructions.

C. Thoroughly mix ingredients in quantities required for immediate use.

D. Use within two hours after mixing. Do not re-temper thereafter.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate is ready to support pavers and imposed loads.

B. Verify gradients and elevations of substrate are correct.

C. Verify dry weather forecast without rain for a minimum of 24 hours with temperatures above 55 degrees Fahrenheit.

D. Verify that pavers are completely dry prior to polymeric sand installation.

3.2 INSTALLATION - BITUMINOUS SETTING BED

A. Place bituminous setting bed over prepared firm substrate to a thickness of 3/4 inches.

B. Apply bonding adhesive over paved surface with notched trowel.

C. Place paver units per drawings.

D. Sprinkle sand over surface and sweep into joints. Moisten joints and recover with additional sand until firm joints are achieved. Remove excess sand.

3.3 CLEANING

A. Do not clean pavers until polymeric sand is set.

B. Clean soiled surfaces using cleaning solution. Do not harm pavers, joint materials, or adjacent surfaces.

C. Use non-metallic tools in cleaning operations.

D. Rinse surfaces with clean water.

E. Broom clean paving surfaces. Dispose of excess sand.

3.4 PROTECTION

A. Do not permit traffic over unprotected paver surface.

B. Protect paver surface with sheets of plywood.

C. Do not permit traffic for 48 hours after pavement placement.

END OF SECTION

SECTION 32 3300 - SITE FURNISHINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Benches.

B. Bollards.

C. Swing benches

D. Tables.

E. Waste receptacles.

1.2 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

E. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984, with Editorial Revision (2019).

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

G. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.

H. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.

1.3 SUBMITTALS

A. See Construction Manager for Submittal Process

B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.

C. Shop Drawings: Indicate plans for each unit or group of units, elevations with model number, overall dimensions, construction, and anchorage details.

D. Samples: Submit two sets of manufacturer's available colors for metal furnishings.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

B. Installer Qualifications: Natural Stone Institute (NSI) Accredited Commercial B Contractor (light commercial); www.naturalstoneinstitute.org/#sle.

1.5 WARRANTY

A. See Construction Manager for additional warranty requirements.

B. Provide manufacturer’s warranty against defects in materials or workmanship for a period of 10 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Furnishings:

1. Adam Trakinskas

2. Maglin Site Furniture; 468 Innovation Way #3, Woodstock, ON N4V 0B9, CanadaT: 1 800 716 5506 x 1193 | E: adam.trakinskas@maglin.com | F: 877 260 9393

3. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

a. Maglin Site Furnishings. basis of design.

b. Substitutions: must be approved by the landscape architect and owner.

B. Steel Pipe Bollards:

1. Manufactures

a. Calpipe

b. ULINE

c. Dawn Enterprises

d. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

2.2 METAL FURNISHINGS

A. Metal Furnishings, General:

1. Cast iron components: Ductile iron castings complying with ASTM A536; cleaned, treated, and powder-coated.

a. Color: As selected by Architect from manufacturer's standard range.

2. Steel components: Plates, bars, and shapes complying with ASTM A36/A36M and tubing complying with ASTM A500/A500M; cleaned, treated, and powder-coated.

a. Color: As selected by Architect from manufacturer's standard range.

3. Wood components: Thermally modified ash with eased edges, and clear wood preservative coating.

4. Hardware: Stainless steel.

5. Products:

B. Benches: Maglin; MBE-0720-00137

1. Maglin Site Furnishings. basis of design.

2. 700 Series - 720 Backed Bench: 70.50in L,

3. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

C. Tables: Maglin; MTB-0400-00065, MTB-0400-00062

1. Maglin Site Furnishings. basis of design

2. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

D. Swings: Maglin; MOP-9000-00388

1. Maglin Site Furnishings. basis of design

2. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

E. Bike Rack: Maglin; MBR-0350-00001

1. Maglin Site Furnishings. basis of design

2. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

F. Waste Receptacles: Maglin; MTR-0200-00020

1. Maglin Site Furnishings. basis of design

2. Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.

B. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

B. When site furnishings are mounted to clay pavers mounting to penetrate concrete substrate by a minimum of 3"

C. Provide level mounting surfaces for site furnishing items.

END OF SECTION

SECTION 32 9223 - SODDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Fertilizing.

D. Sod installation.

E. Maintenance.

1.2 PRICE AND PAYMENT PROCEDURES

A. See General Contractors procedures for bidding and payment.

B. Topsoil:

1. Basis of Measurement: By the cubic yard.

2. Basis of Payment: Includes topsoil, placing topsoil.

C. Sodded Areas:

1. Basis of Measurement: By the square yard.

2. Basis of Payment: Includes preparation of subsoil, placing topsoil, sodding, watering and maintenance to specified time limit.

1.3 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, Perennial Sorrel, and Brome Grass.

1.4 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

1.5 SUBMITTALS

A. See general contractor for submittal proceedures. .

B. Certificate: Certify grass species and location of sod source.

C. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.

D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer

E. Maintenance Contract.

1.6 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of OH.

B. Installer Qualifications: Company approved by the sod producer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

1.8 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Provide a separate maintenance contract for the service and maintenance of work specified in this section for 1 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

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

B. Provide certificate of compliance from authority having jurisdiction indicating approval of fertilizer and herbicide mixture.

2.2 MATERIALS

A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated in plant schedule on Drawings; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

1. Basis of Design: GridIron, Seed Center

a. Titan RX Tall Fescue: [40] percent.

b. Rendition Tall Fescue: [40] percent.

c. Shield Perennial Ryegrass: [10] percent.

d. Shamrock Kentucky Bluegrass: [10] percent.

1) Or approved equal; contractor to submit products for review by the Owner/Landscape Architect.

B. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay, or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

C. Fertilizer: recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.3 ACCESSORIES

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

B. Wire Mesh: Interwoven hexagonal metal wire mesh of 2 inch size.

2.4 SOURCE QUALITY CONTROL

A. Submit minimum 10 oz sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.

B. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.2 PREPARATION

A. Prepare subgrade in accordance with Section 31 2200.

3.3 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.4 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Where new sod adjoins existing grass areas, align top surfaces.

E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.

F. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

G. Prior to placing sod, on slopes exceeding 8 inches per foot or where indicated, place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into the ground.

H. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

I. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities. Roll sodded areas with roller not exceeding 120 lbs.

3.5 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water. Until final acceptance.

B. Provide a separate maintenance contract for specified maintenance service.

C. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

D. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

E. Neatly trim edges and hand clip where necessary.

F. Immediately remove clippings after mowing and trimming.

G. Water to prevent grass and soil from drying out.

H. Roll surface to remove irregularities.

I. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

J. Immediately replace sod to areas that show deterioration or bare spots.

K. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 32 9300 - PLANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. New trees, plants, and ground cover.

B. Mulch and Fertilizer.

C. Maintenance.

D. Tree Pruning.

1.2 PRICE AND PAYMENT PROCEDURES

A. Refer to Construction Manager's Instructions for Project Administrative Requirements, limitations to Contractor's use of Site and premises, Temporary Facilities and Controls, Project conditions, and Closeout Requirements

1.3 DEFINITIONS

A. Weeds: Include 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, Perennial Sorrel, and Brome Grass.

B. Weeds: Any plant life not specified or scheduled.

C. Plants: Living trees, plants, and ground cover specified in this Section , and described in ANSI Z60.1.

1.4 REFERENCE STANDARDS

A. ANSI/AHIA Z60.2 - American Standard for Nursery Stock; 2025.

B. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning); 2017.

1.5 SUBMITTALS

A. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.

B. Certificate: Submit certificate for plants free of disease or hazardous insects; certified by federal department of agriculture; free of disease or hazardous insects.

C. Submit a list of nurseries supplying plant material.

1.6 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.

B. Tree Pruner Qualifications: Company specializing in pruning trees with proof of Arborist Certification.

C. Tree Pruning: Comply with ANSI A300 Part 1.

D. Maintenance Services: Performed by installer untill acceptance.

E. Non-native, Invasive Plant Species: Do not introduce, grow, or cultivate plant species that are non-native to the ecosystem of the project site, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

1. Comply with laws regulating non-native and invasive plant species in the State in which the Project is located.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.8 FIELD CONDITIONS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

B. Do not install plant life when wind velocity exceeds 30 mph.

1.9 WARRANTY

A. Provide one year warranty.

B. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.

C. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.10 MAINTENANCE (SEE END OF SECTION)

A. Provide a separate maintenance contract for the service and maintenance of work specified in this section for 1 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

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

B. Provide certificate of compliance from authority having jurisdiction indicating approval of plants, fertilizer and herbicide mixture.

C. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

2.2 PLANTS

A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.3 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

2.4 SOIL AMENDMENT MATERIALS

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis.

B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.

C. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

E. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

2.5 MULCH MATERIALS

A. Mulching Material: Triple shredded hardwood; dark brown, free of growth or germination inhibiting ingredients.

2.6 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Stakes: Softwood lumber, pointed end.

C. Cable, Wire, Eye Bolts and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

E. Tree Trunk protection. 4" corregated drain split and wrapped around trunk from root flare to a height of 6' or first major branches.

2.7 SOURCE QUALITY CONTROL

A. Provide testing of imported topsoil.

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter; pH value.

C. Submit minimum 10 oz sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination.

D. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared subsoil and planters are ready to receive work.

B. Saturate soil with water to test drainage.

3.2 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to a depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds 6 inches larger than plant root system.

3.3 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 4 inches over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches.

3.4 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

3.5 PLANTING

A. Place plants for best appearance.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from the root ball. For trees remove upper half of wire basket only.

E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.6 PLANT RELOCATION AND RE-PLANTING

A. Relocate plants as indicated by Landscape Architect.

B. Replant plants in pits or beds, partly filled with prepared topsoil mixture, at a minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from the root ball.

C. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch layers. Maintain plant materials in vertical position.

D. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.7 PLANT SUPPORT

A. Brace plants vertically with plant protector wrapped guy wires and stakes to the following:

1. Tree Caliper: 1 inch; Tree Support Method: 1 stake with one tie

2. Tree Caliper: 1 to 2 inches; Tree Support Method: 2 stakes with two ties

3. Tree Caliper: 2 to 4 inches; Tree Support Method: 3 guy wires with eye bolts and turn buckles

3.8 TREE PRUNING

A. Prune trees as recommended in ANSI A300 Part 1.

B. Prune newly planted trees as required to remove dead, broken, and split branches.

3.9 FIELD QUALITY CONTROL

A. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.10 MAINTENANCE

A. Provide maintenance until final acceptance at no extra cost to Owner; Owner will pay for water.

B. Irrigate sufficiently to saturate root system and prevent soil from drying out.

C. Cultivate and weed plant beds and tree pits.

D. Remove dead or broken branches and treat pruned areas or other wounds.

E. Neatly trim plants where necessary.

F. Immediately remove clippings after trimming.

G. Replace mulch when deteriorated.

END OF SECTION