

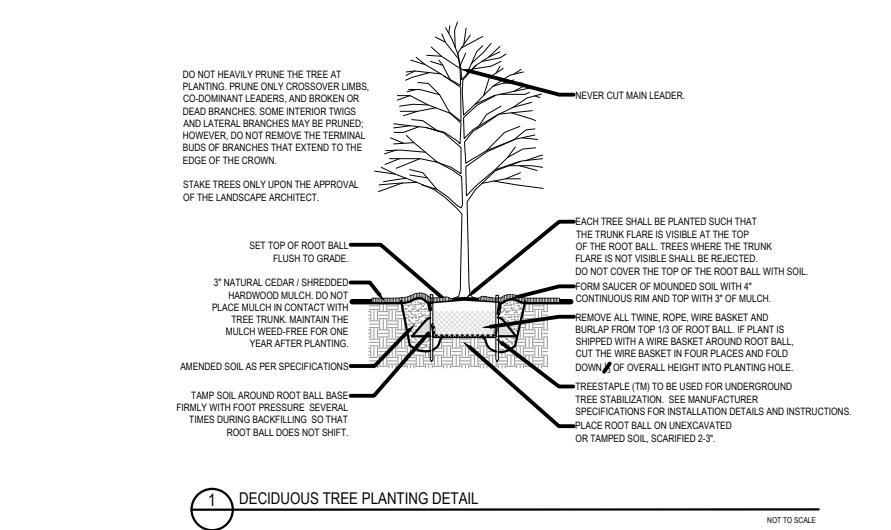
BEHAN PLANNING AND DESIGN

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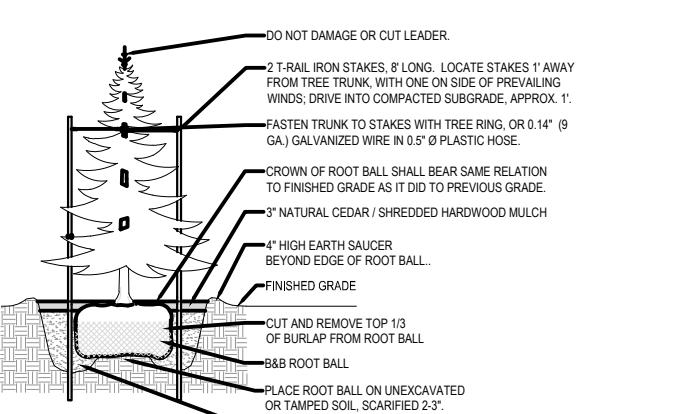




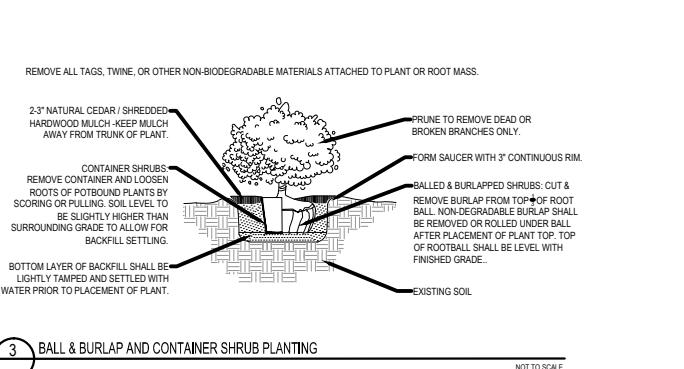
PLANT LIST				
Symbol	Type	#	BOTAN_NAME	COMMON_NAME
CnG	Ever. Tree	18	Chamaecyparis Nootkatensis 'Glauca Compacta'	Alaskan Cedar Nootka Compacta
Cf	Tree	8	Cornus florida	Flowering Dogwood
Lt	Tree	5	Liriodendron tulipifera	Tulip Tree
Ra	Shrub	121	Rhus aromatica 'Gro-lo'	Fragrant Sumac
Ro	Shrub	31	Rosa 'Flower Carpet Amber'	Amber Flower Carpet Rose
Nr	Perennial	37	Nepeta racemosa 'Blue Wonder'	Blue Wonder Catmint



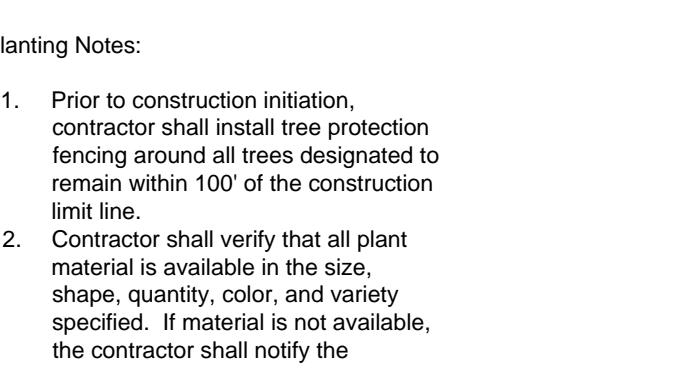
DECIDUOUS TREE PLANTING DETAIL



CONIFEROUS TREE PLANTING DETAIL



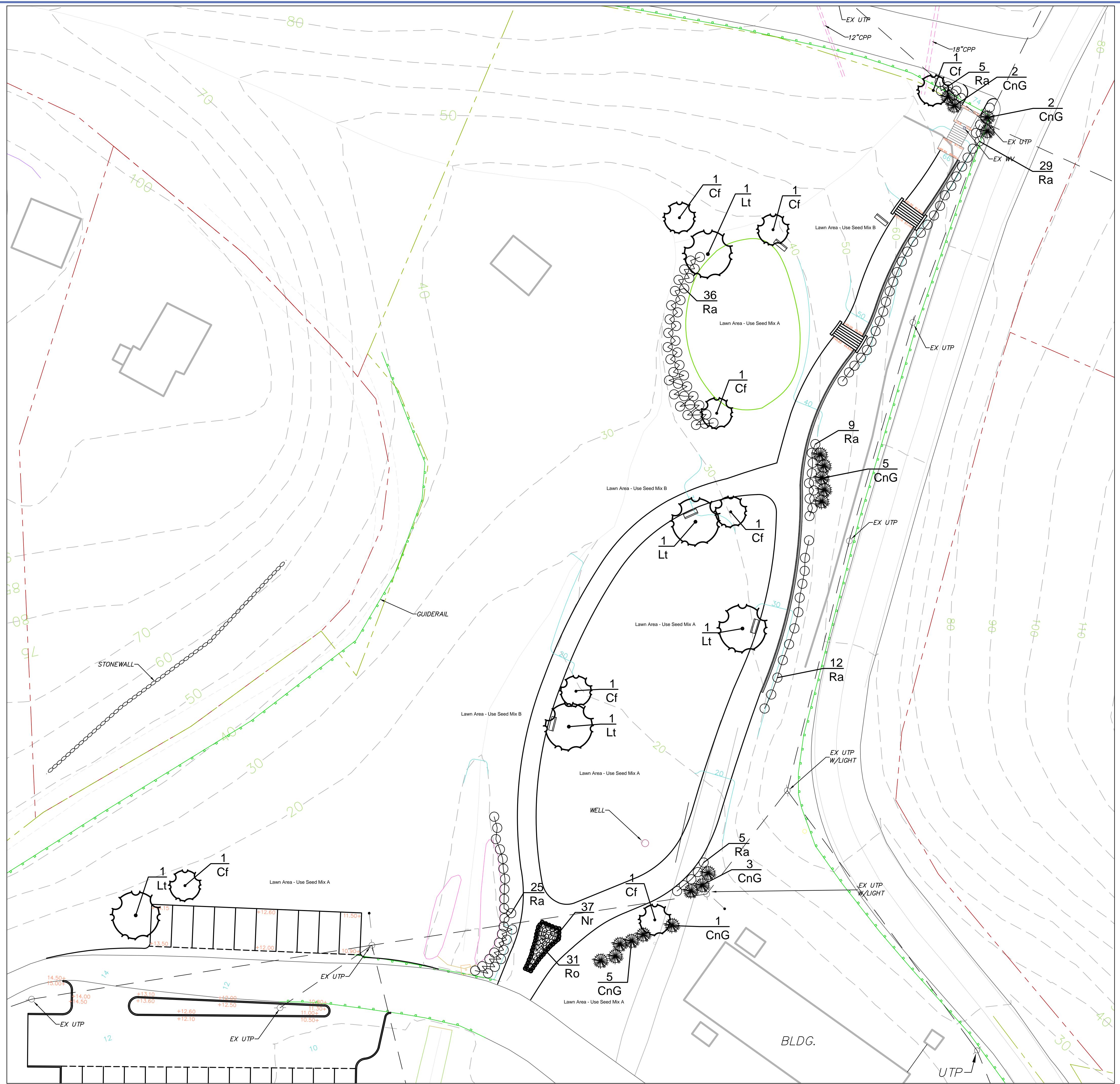
BALL & BURLAP AND CONTAINER SHRUB PLANTING



PERENNIAL AND GROUNDCOVER PLANTING

Planting Notes:

- Prior to construction initiation, contractor shall install tree protection fencing around all trees designated to remain within 100' of the construction limit line.
- Contractor shall verify that all plant material is available in the size, shape, quantity, color and variety specified. If material is not available, the contractor shall notify the Landscape Architect immediately for acceptable substitutions. Cynthia Behan of Behan Planning and Design, 518-583-4335. LA may reject any unacceptable plant materials brought to the site which shall be immediately removed.
- Plants shall be laid out under the direction of the LA. Contractor shall notify the LA seven days prior to planting date to allow for scheduling.
- All plants and workmanship shall be guaranteed for one year from the date of construction.
- Mulch, where specified, shall be a dark shredded natural cedar mulch and shall be placed to achieve a 3" depth.
- All disturbed areas not planted shall be seeded with mixes as specified. Any areas not noted for a particular seed mix shall be planted with Seed Mix B.



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DRAFT
NOT FOR CONSTRUCTION

DATE: July 16th, 2018 DRAWN BY: J.B. CHECK BY: J.P.

PROJECT #: 189001 PROJECT NAME: -

SCALE: 1" = 20'

BEHAN PLANNING & DESIGN
Saratoga Springs Office
112 Spring Street, Suite 305
Saratoga Springs, NY 12866
info@behanplanning.com
518-583-4335

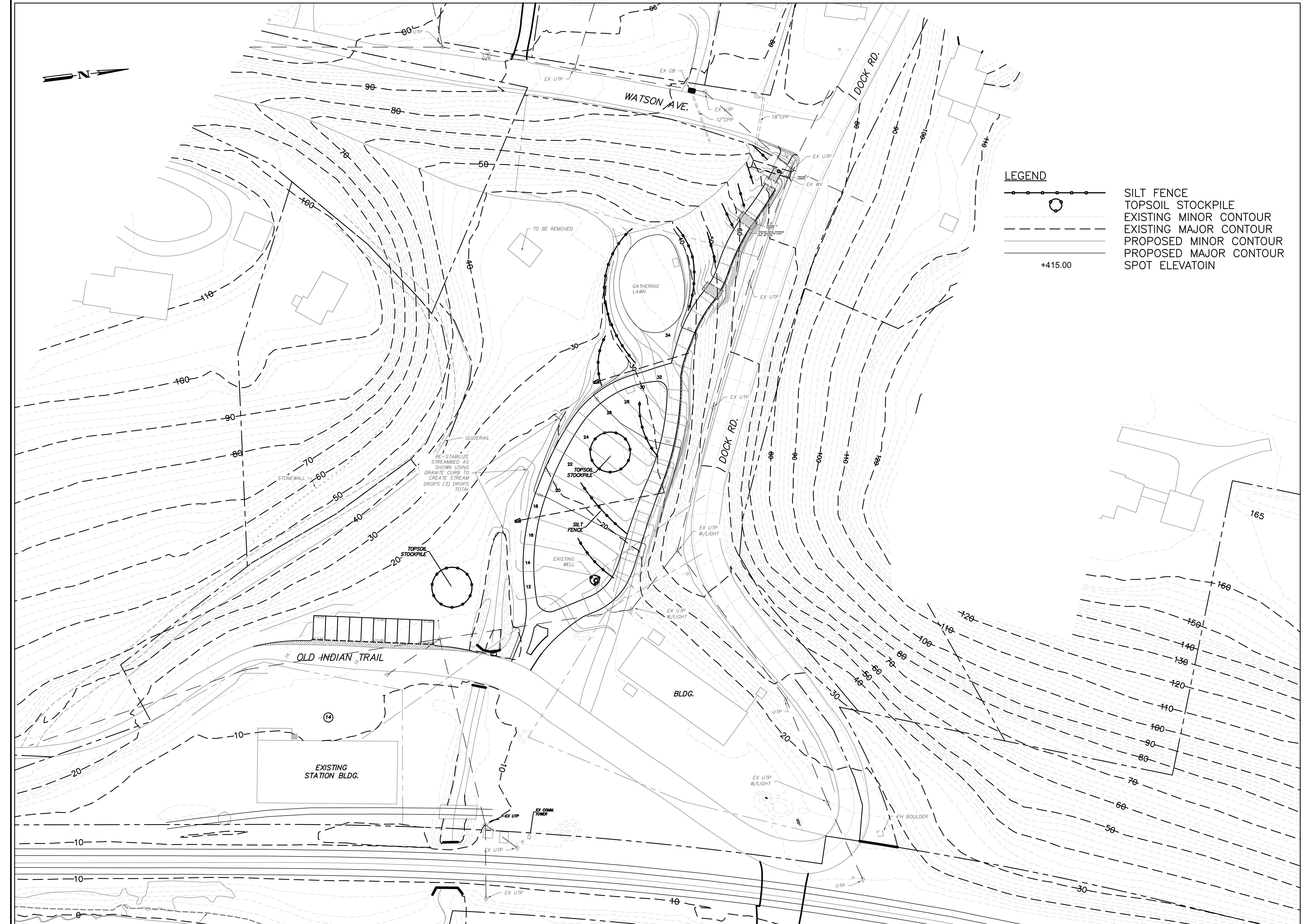
Milton Railroad
Station Park

for
Town of
Marlborough

Marlborough
Ulster County
New York

SHEET TITLE:
Planting Plan

SHEET NO:
3 of 11



SHEET NO: 4 of 11

CAST-IN-PLACE CONCRETE

1. Steel Reinforcement
 - a. Select steel reinforcement from subparagraphs below.
 - a. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, Deformed
 - b. Plain-Steel Wire: ASTM A 82, as drawn
 - c. Plain-Steel Welded Wire Fabric: ASTM A 185, Flat Sheets
 - d. Deformed-Steel Welded Wire Fabric: ASTM A 497, Flat Sheet
2. Concrete Materials
 - a. Select concrete materials from subparagraphs below or revise to suit Project.
 - a. Portland Cement: ASTM C 150, Type I or II
 - b. Aggregate: ASTM C 33, Uniformly Graded, from a Single Source
 - c. Water: ASTM C 94
 - d. Air-Entraining Admixture: ASTM C 260
 - e. Water-Reducing Admixture: ASTM C 494, Type A
 - f. High-Range, Water-Reducing Admixture: ASTM C 494, Type F
 - g. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E
 - h. Water-Reducing and Retarding Admixture: ASTM C 494, Type D
 - i. Synthetic Fiber: Fibrillated or Monofilament Polypropylene Fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

3. Curing Materials

- a. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- b. Moisture-Retaining Cover: ASTM C 171, Polyethylene Film or White Burlap-Polyethylene Sheet.

- c. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B
- d. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B

4. Concrete Mixes: Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, with the following properties:

- a. Compressive Strength (28 Days): 4,000 psi (27.6 MPa)

- b. Slump: 4 inches

- c. Air Content: 3 to 6 percent

5. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1 lb/cu. yd.

6. Design, construct, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

7. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643.

8. Steel Reinforcement: Comply with CRSIs "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

- a. Do not cut or puncture vapor retarder. Repair damage and resel vapor retarder before placing concrete.

9. Joints: Locate and install construction, isolation, and contraction joints.

10. Concrete Placement: Deposit concrete continuously and avoid segregation. Deposit concrete in forms in horizontal layers no deeper than 24 inches, avoiding cold joints.

- a. Consolidate concrete with mechanical vibrating equipment.

- b. Scree and initial-float concrete floors and slabs using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

- c. Comply with ACI 306.1 for cold-weather concrete placement.

11. Place concrete according to recommendations in ACI 305R when hot-weather conditions exist.

11. Finish Formed Surfaces as follows:

- a. Apply rough-formed finish, defined in ACI 301, to concrete surfaces indicated or not exposed to public view.

- b. Apply smooth-formed finish, defined in ACI 301, to concrete surfaces indicated and exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, or painting. Do not apply rubbed finish to smooth-formed finish.

- c. Apply smooth-rubbed finish to smooth-formed finished concrete surfaces indicated or exposed to public view.

12. Finishing Floors and Slabs: Comply with recommendations in ACI 302.1R for screeding, restraining, and finishing operations for concrete surfaces.

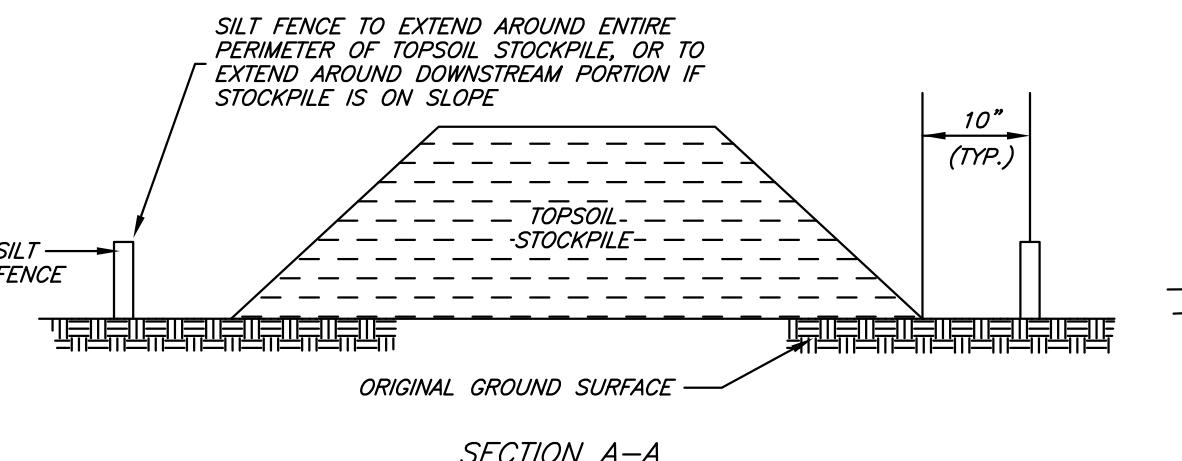
- a. Broom Finish: Apply a broom finish to exterior concrete, brooming with fiber-bristle broom perpendicular to main traffic route, to platforms, steps, and ramps, and elsewhere as indicated.

13. Concrete Protection and Curing: Protect concrete from excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

- a. Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause excessive moisture loss.

- b. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

- c. Cure formed and unformed concrete for at least seven days by moisture curing, moisture-retaining-cover curing, or curing compound.



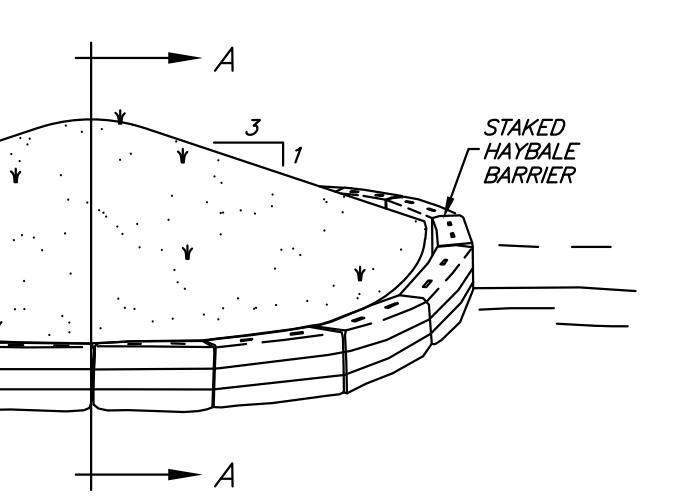
SECTION A-A

NOT TO SCALE

TEMPORARY TOPSOIL STOCKPILE

NOTES:

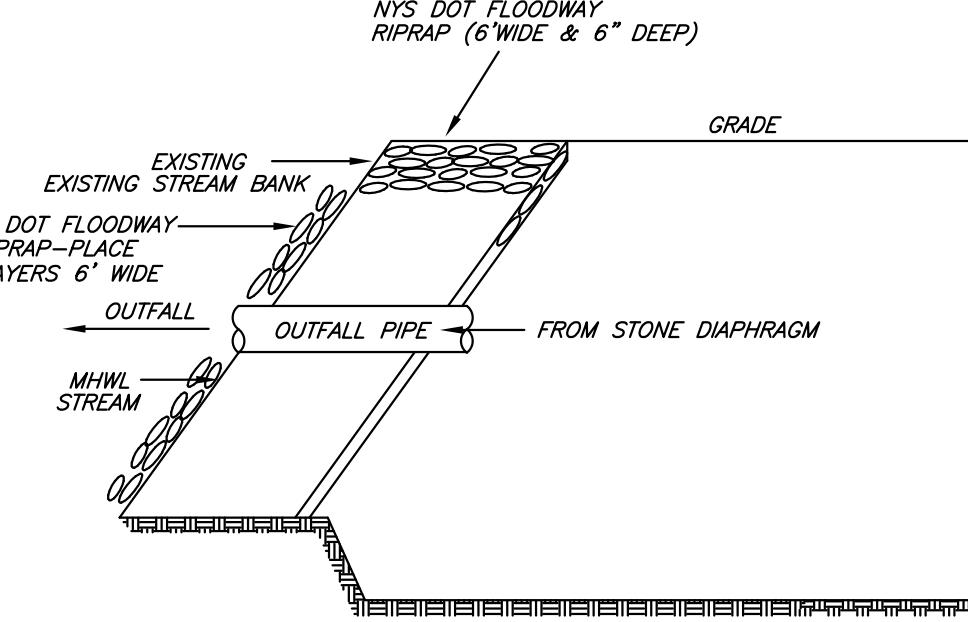
1. AN ON-SITE DRAINAGE SWALE SHALL BE LOCATED BETWEEN THE TOPSOIL STOCKPILE AND OFF-SITE PROPERTY.
2. REFER TO THE SILT FENCE DETAIL FOR MATERIALS AND INSTALLATION METHODS.
3. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS, IT SHALL BE STABILIZED WITH BURLAP MATTING OR SEEDED TO MINIMIZE EROSION.
4. INSPECT AND REPAIR SILT FENCES SHALL BE AT LEAST ONCE PER WEEK AND AFTER RAIN EVENTS IN EXCESS OF 1/2". REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. SEDIMENT TRAPPED BY THE FENCES SHALL BE REMOVED AND PROPERLY DISPOSED OF WHENEVER SIGNIFICANT ACCUMULATION OCCURS.
6. SILT FENCES SHALL BE MAINTAINED IN PLACE UNTIL TOPSOIL STOCKPILE HAS BEEN ELIMINATED AND SHALL BE REMOVED ONLY WHEN DIRECTED BY THE TOWN/VILLAGE ENGINEER.



SECTION A-A

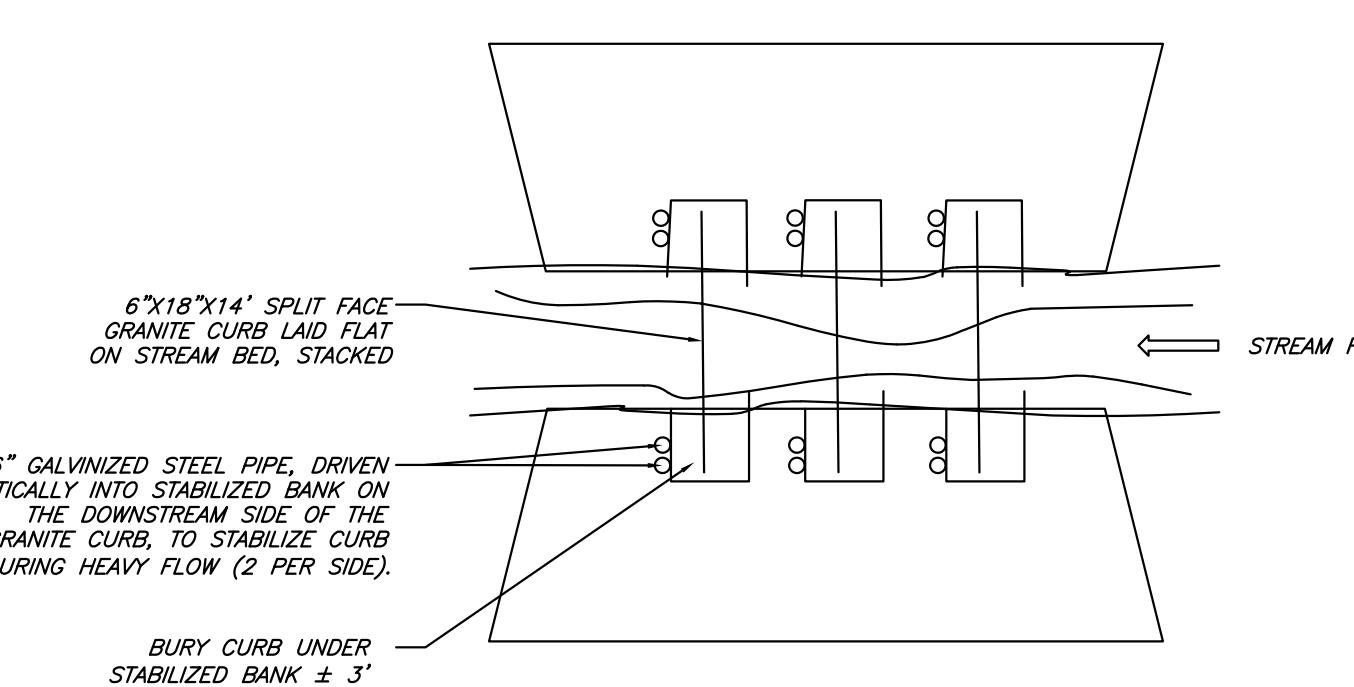
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HAYBALE BARRIER



STORMWATER MANAGEMENT BASIN OUTFALL SECTION

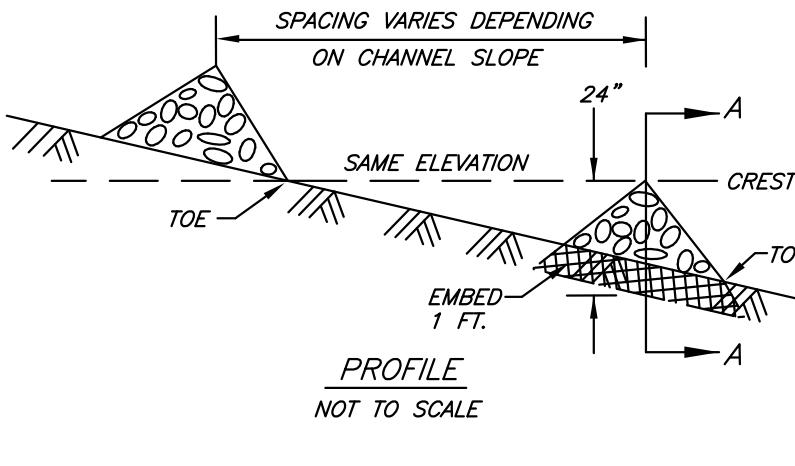
NOT TO SCALE



SECTION A-A

NOT TO SCALE

STREAM DROP DETAIL



NOT TO SCALE

SECTION A-A

NOT TO SCALE

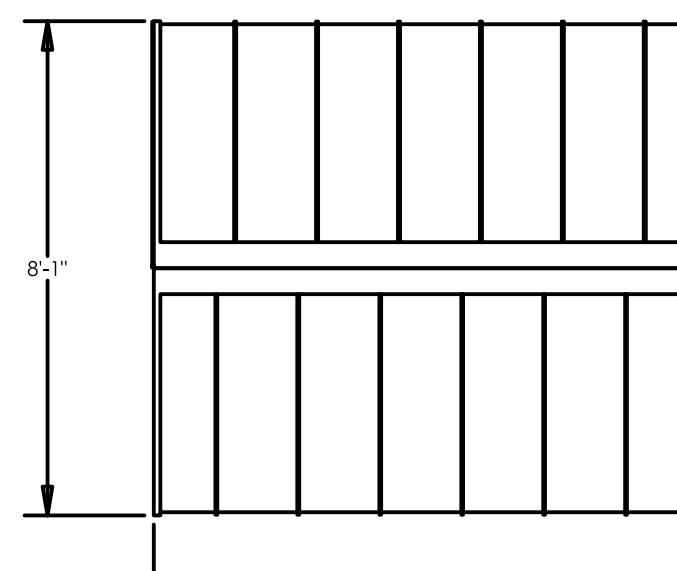
SECTION B-B

NOT TO SCALE

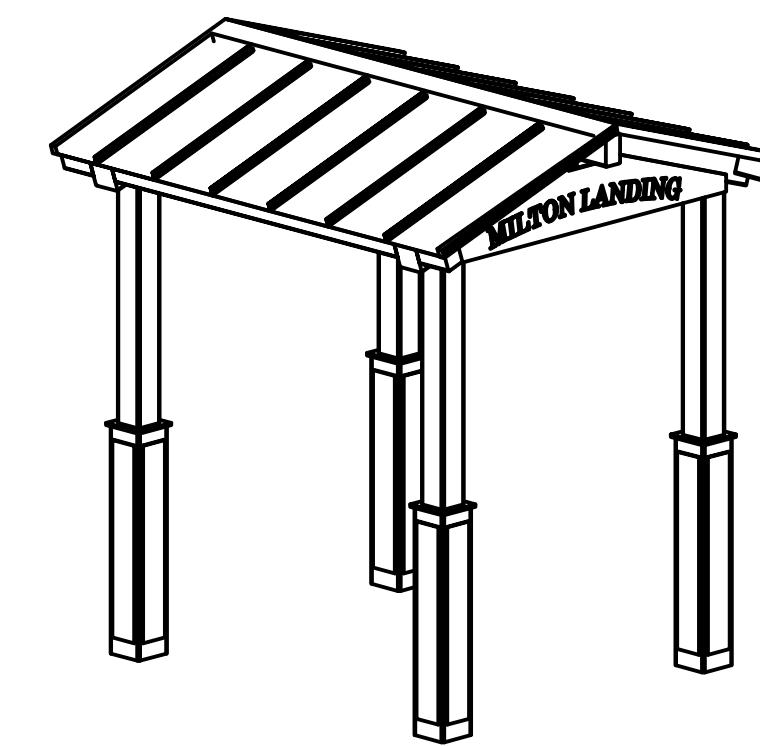


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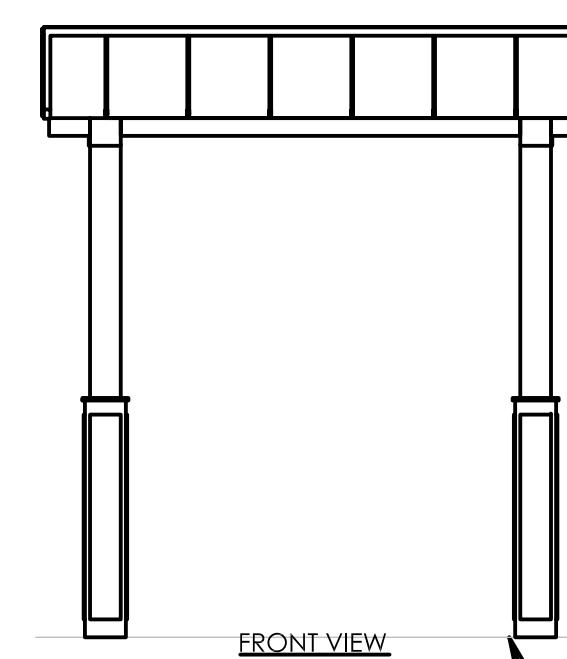


TOP VIEW

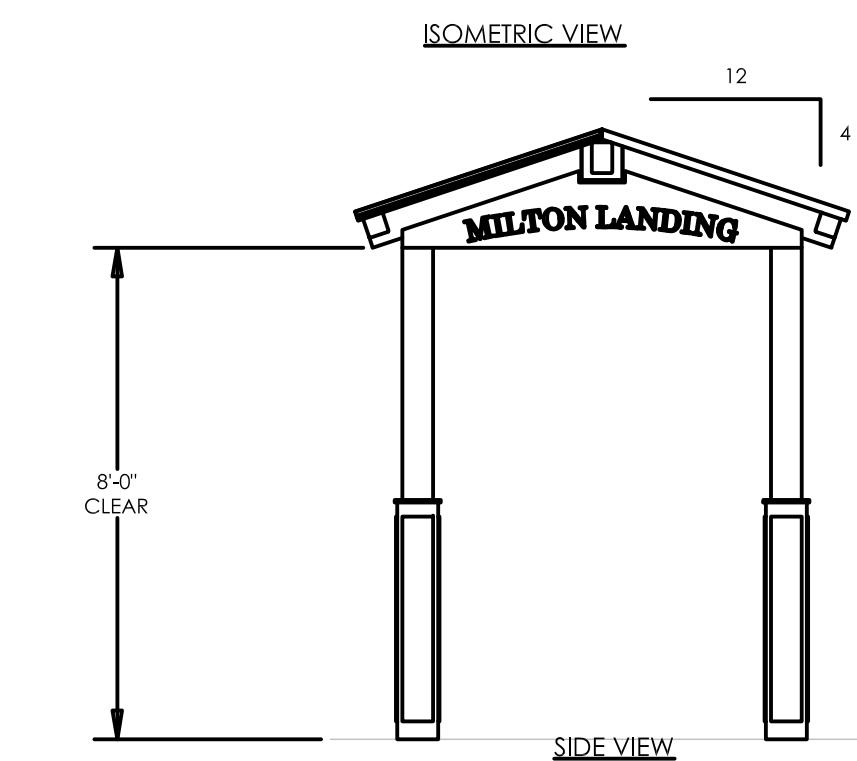


GENERAL ROOF NOTES:

1. METAL ROOFING:
 - 24 GAUGE
 - GALVALUME COATED
 - KYNAR 500 PAINTED
2. TRIM COLOR MATCHES ROOF
3. SEE POLYGON.COM FOR COLOR OPTIONS



FRONT VIEW

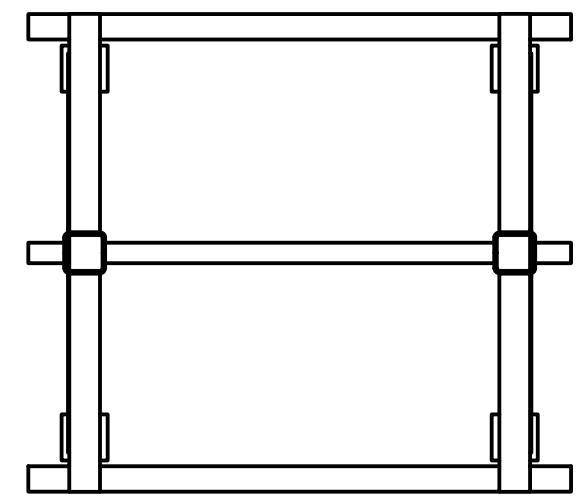


SIDE VIEW

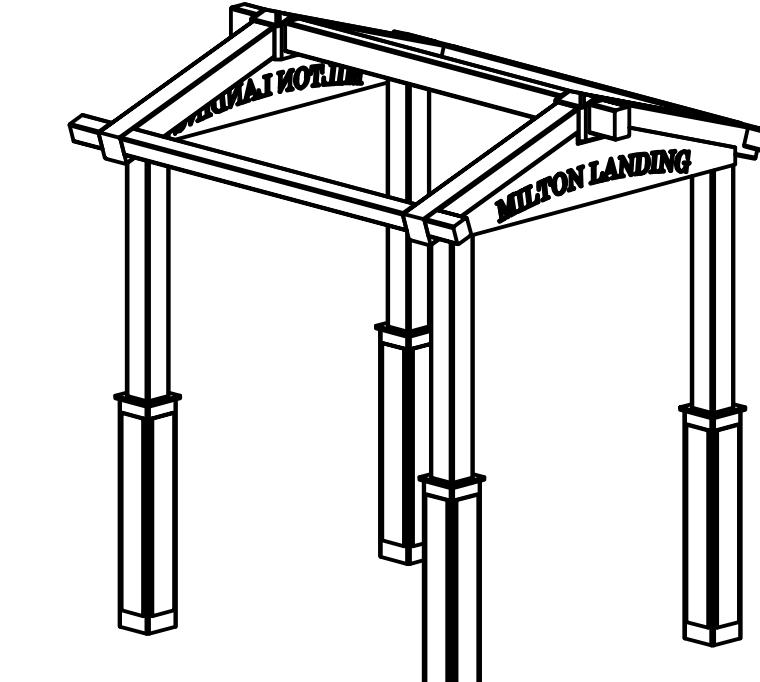
ARCHITECTURAL ELEVATION

NOT TO SCALE

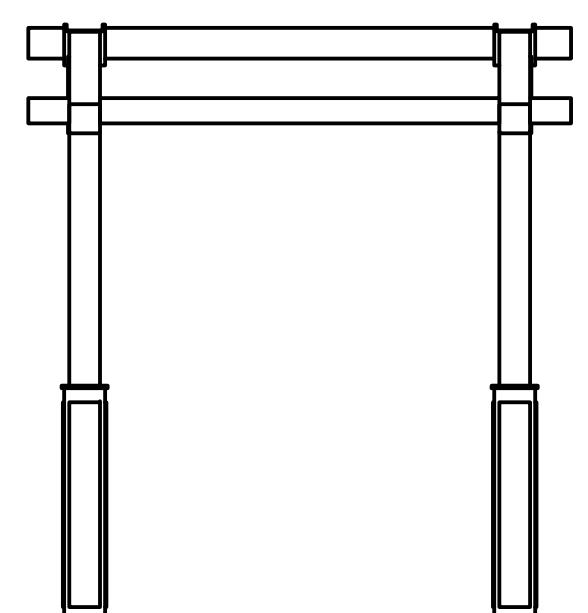
TOP VIEW



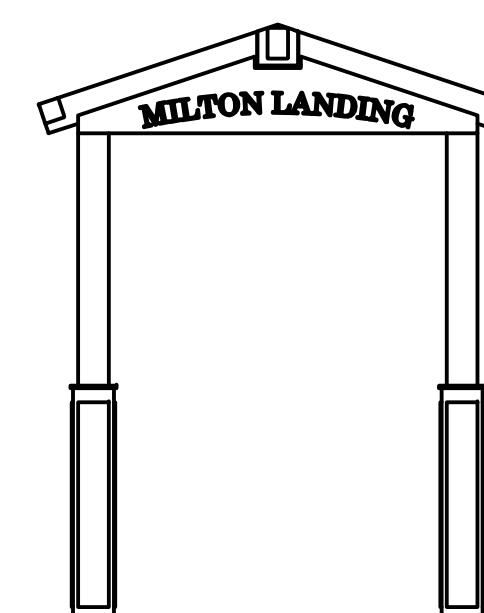
TOP VIEW



ISOMETRIC VIEW



FRONT VIEW



SIDE VIEW

STRUCTURAL FRAMING PLAN

NOT TO SCALE

REV. NO.: _____

DATE: _____

DRAWN BY: _____

CHECK BY: _____

DATE: _____

J.B.

J.P.

PROJECT #: _____

PROJECT NAME: _____

SCALE: _____

NTS

BEHAN PLANNING & DESIGN

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112 Spring Street, Suite 305
Saratoga Springs, NY 12866
info@behaplanning.com
518-583-4335

Milton Railroad Station Park

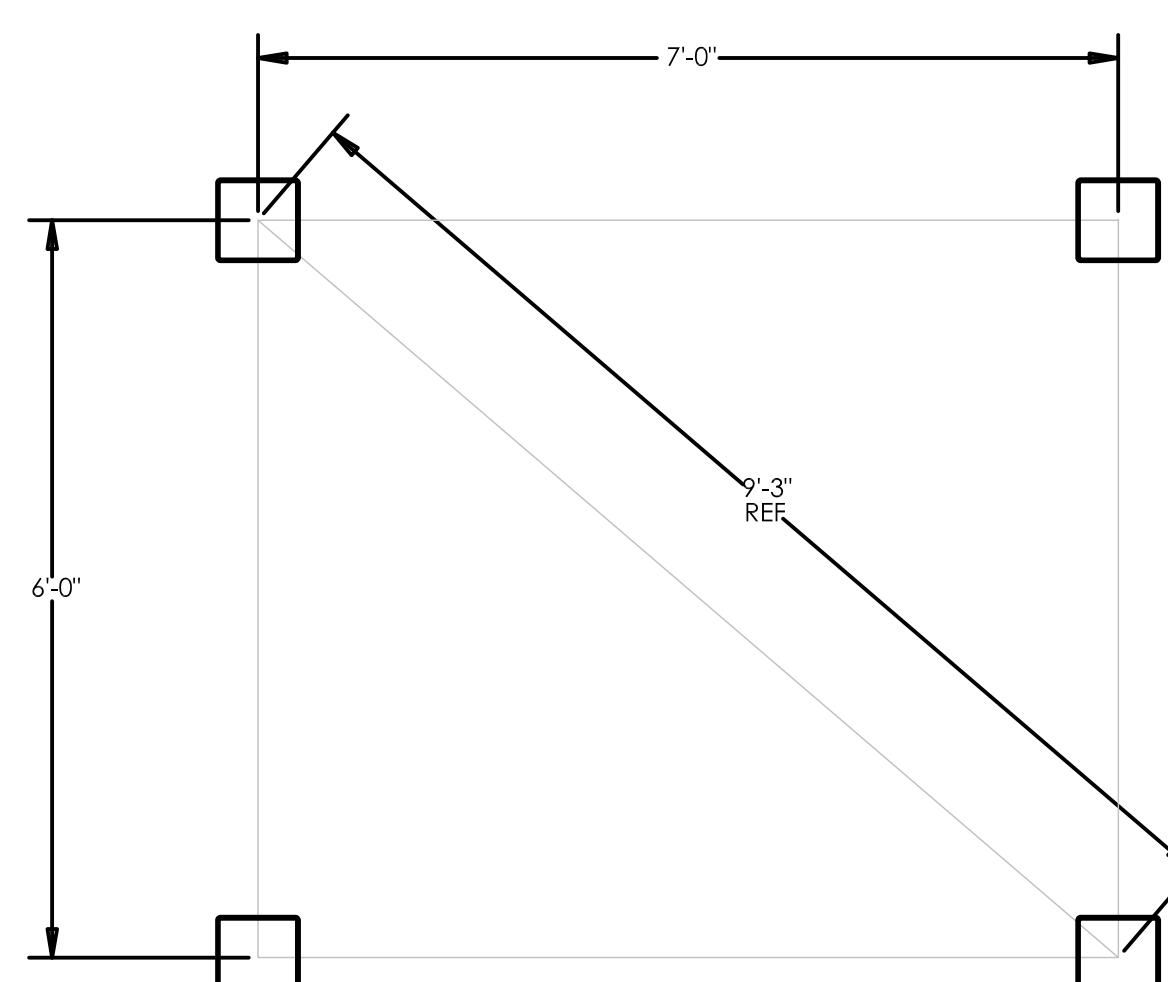
for
Town of
Marlborough

**Marlborough
Ulster County
New York**

**Construction
Details**

SHEET NO: _____

7 of 11

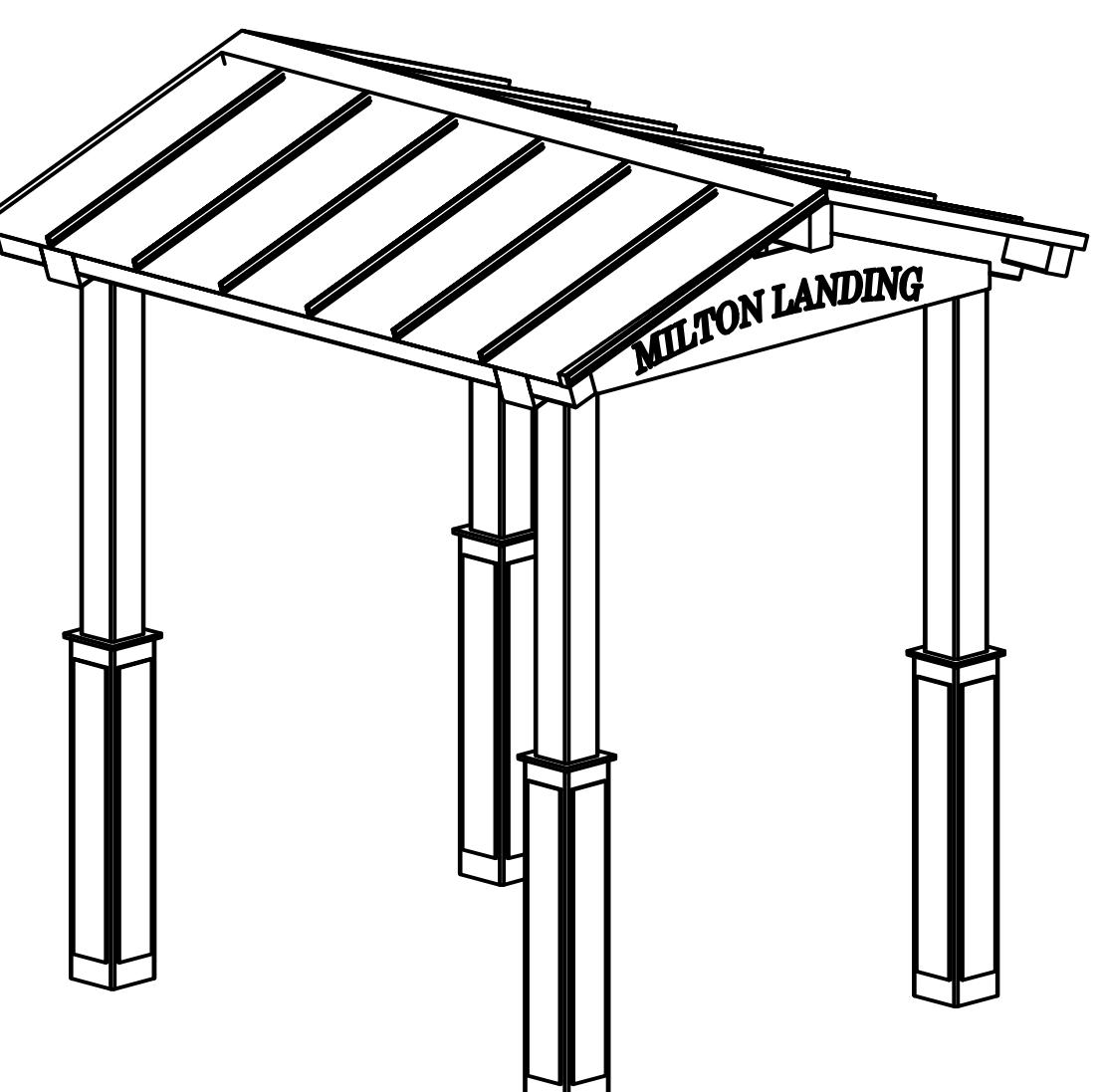
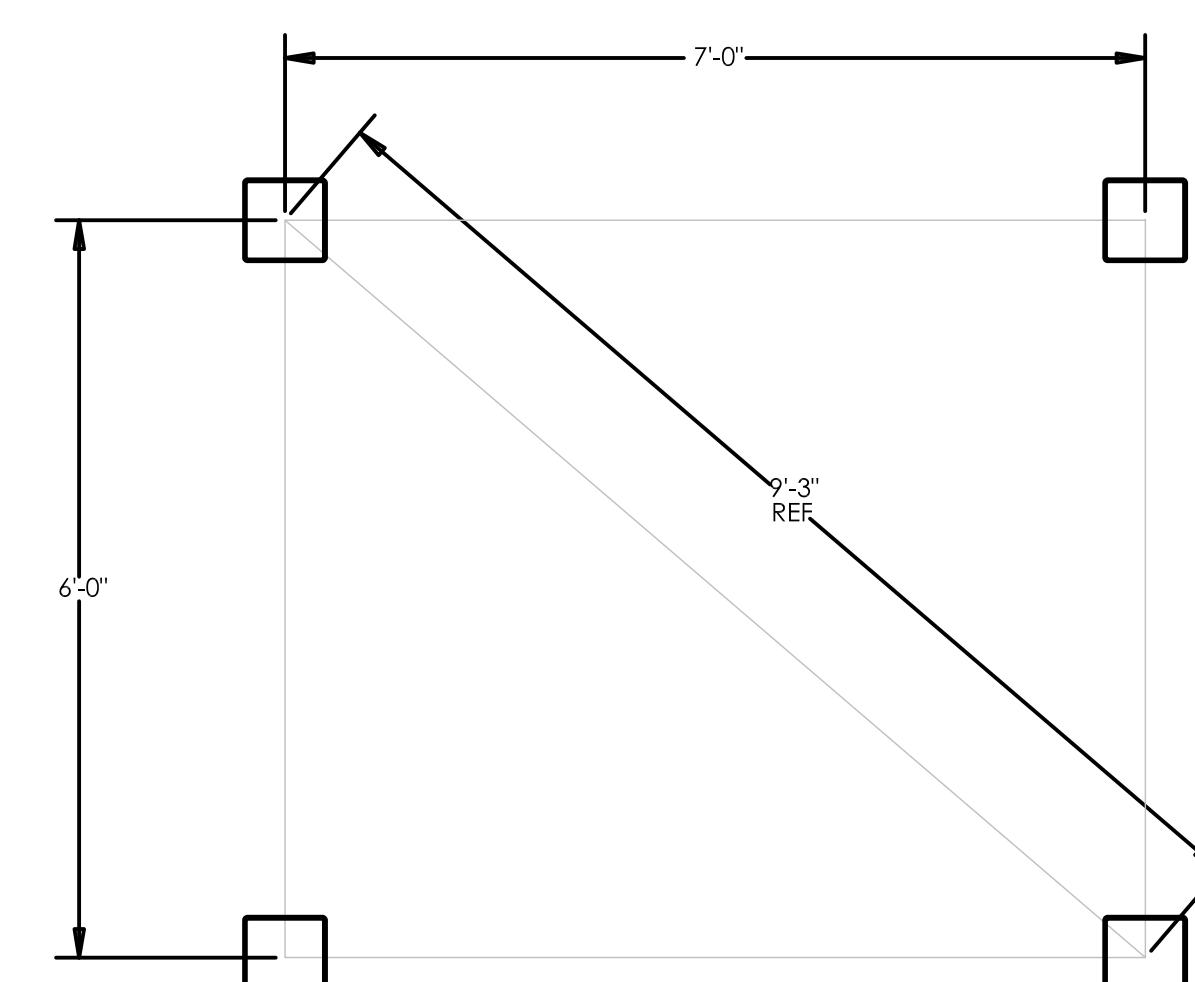


COLUMN LAYOUT

NOT TO SCALE

BASEPLATE NOTES:

1. POLYGON ENGINEERING WILL DETERMINE REQUIRED BASEPLATE DESIGN AFTER ENGINEERING PACKAGE IS ORDERED.
2. CUSTOMER MAY SUGGEST PREFERRED BASEPLATE DESIGN.



FABRICATOR APPROVALS:
CITY OF PHOENIX, AZ APPROVED FABRICATOR #C08-2010
CITY OF RIVERSIDE, CA APPROVED FABRICATOR #SP09-1986
CITY OF HOUSTON, TX APPROVED FABRICATOR #470
CITY OF NEW YORK APPROVED FABRICATOR #264
STATE OF UTAH APPROVED FABRICATOR #2009-14

CERTIFICATES:
MIAMI-DADE COUNTY CERTIFICATE OF COMPETENCY NO. 16-1025.01
PCI (POWDER COATING INSTITUTE) 4000 CERTIFIED

MATERIALS:

DESCRIPTION: TUBE STEEL, SCAFFOLD PIPE, RMT PIPE, LIGHT GAGE COLD FORMED STRUCTURAL STEEL, PLATE, ROOF PANELS (STEEL) **ASTM DESIGNATION:** A500 (GRADE B), A502 (GRADE B), A519, A103 (GRADE 50), A572, A583

GENERAL NOTES:
UNLESS NOTED OTHERWISE, THIS STRUCTURE WAS DESIGNED TO ASSUMING A 20' SEPARATION BETWEEN ANY ADJACENT STRUCTURE WITH AN EAVE HEIGHT EQUAL TO OR GREATER THAN THE EAVE HEIGHT. IF THE EAVE HEIGHTS ARE NOT EQUAL, POLYGON MUST BE CONTACTED IF ANYTHING ELSE IS TO BE ATTACHED TO THIS STRUCTURE (WALLS, COLUMN WRAPS, RAILINGS, ETC.) SO THE DESIGN OF THIS STRUCTURE CAN BE REVIEWED AND POSSIBLY REVISED.

PARTS SHOWN MAY BE UPGRADED DUE TO STANDARDIZED FABRICATION. REFER TO THE SHIPPING BILL OF MATERIALS FOR POSSIBLE SUBSTITUTIONS.

UNLESS NOTED OTHERWISE, THIS STRUCTURE WAS DESIGNED ASSUMING A 20' SEPARATION BETWEEN ANY ADJACENT STRUCTURE WITH AN EAVE HEIGHT EQUAL TO OR GREATER THAN THE EAVE HEIGHT. IF THE EAVE HEIGHTS ARE NOT EQUAL, POLYGON MUST BE CONTACTED SO THE DESIGN OF THIS STRUCTURE CAN BE REVIEWED AND POSSIBLY REVISED.

STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) SPECIFICATION MANUAL.

ALL WELDING IS PERFORMED BY AMERICAN WELDING SOCIETY CERTIFIED WELDERS AND CONFORMS TO THE LATEST EDITION OF AWS D.1 OR D.3 AS REQUIRED.

FOR PROPER FIELD INSTALLATION OF THE BUILDING IT IS RECOMMENDED THAT THE FABRICATOR, FRAMER, TALLER AND THE ROOF INSTALLER HAVE A MINIMUM OF 10 YEARS DOCUMENTED EXPERIENCE INSTALLING THIS TYPE OF PRODUCT.

FOR PROPER FIELD INSTALLATION OF THE BUILDING IT IS RECOMMENDED THAT ELECTRIC WIRING, IF REQUIRED, BE RUN THROUGH THE STRUCTURAL MEMBERS BEFORE THE BUILDING IS ERECTED.

MILTON STRUCTURE & NOTES

NOT TO SCALE



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PLANTS		PART 1 - GENERAL	
1.1 SUMMARY			
A. WORK INCLUDES:			
1. Plants; Trees, shrubs, perennials and bulbs.			
B. Related Work/Sections:			
1. Section 129300 "Site Furnishings" for benches, gateway structure.			
2. Section 311000 "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling and site clearing.			
3. Section 310000 "Earthwork" for excavation, filling, rough grading and for subsurface aggregate drainage and backfill materials.			
4. Section 329113 "Soil Preparation"			
5. Section 329200 "Turf and Grasses" for turf lawn, hydroseeding and erosion control materials.			
1.2 DEFINITIONS			
A. Backfill: The earth used to replace or the act of replacing earth in an excavation.			
B. Ballast and Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine at the surface of the ball as recommended by ANSI Z60.1.			
C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbundled, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.			
D. Container Grown: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.			
E. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.			
F. Finish Grade: Elevation of finished surface of planting soil.			
G. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.			
H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.			
I. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.			
J. Planting Area: Areas to be planted.			
K. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.			
L. Plant/Plants/Plant Material: These terms refer to vegetation in general, including trees, shrubs, perennials, ground covers, ornamental grasses, bulbs, corms, tubers, and herbaceous vegetation.			
M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.			
N. Stem Girdling Roots: Roots that encircle the stem (trunks) or trees below the soil surface.			
O. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.			
P. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.			
Q. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.			
1.4 SUBMITTALS:			
A. Product data/ certificates for each type of manufactured product.			
B. Bark mulch.			
C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.			
D. Warranty: Submittal warranties for all items including plantings.			
1.5 QUALITY ASSURANCE			
A. Maintain an experienced, full time supervising Landscape Foreperson on site during landscape installation.			
B. Provide quality, size, genus, species and variety of plants as indicated, complying with ANSI Z60.1.			
C. Plant Material: Information - Landscape Architect may observe plant material either at nursery and tag specific materials for this project or may observe plant material upon delivery to the project site. LA retains the right to reject unsatisfactory or defective plant material at any time during the progress of work. Rejected materials shall be removed immediately from the project site. Contractor shall notify the Landscape Architect seven days prior to the delivery of plant materials to the site to allow adequate time for review of materials.			
1.6 DELIVERY, STORAGE AND HANDLING			
A. Do not prune trees and shrubs prior to delivery. Protect bark, branches and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage.			
B. Do not bend or bind trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery.			
C. Handle planting stock by root ball.			
D. Store bulbs, corms and tubers in a dry place at 60 - 65 degrees F until planting.			
E. Deliver plants after preparations for planting have been completed and install plants immediately. If planting is delayed more than 6 hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun or shade), protect from weather and mechanical damage and keep roots moist.			
F. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.			
G. Do not remove container-grown stock from containers before time of planting.			
H. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.			
1.8 PROJECT CONDITIONS			
A. Field Measurements: Verify actual grade elevations, service and utility locations, and dimensions of plantings and construction contours with new plantings by field measurements before proceeding with planting work.			
B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:			
1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.			
2. Do not proceed with interruption of services or utilities without Owner's written permission.			
C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.			
1. Spring Planting: Deciduous - March 1 to May 1 / Evergreen - April 1 to May 15			
2. Fall Planting: Deciduous - Oct. 15 to December 1 / Evergreen - Sept. 1 to October 1.			
D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.			
E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.			
1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.			
1.9 WARRANTY			
A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.			
1. Failures include, but are not limited to, the following:			
a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.			
b. Structural failure, including plantings falling or blowing over.			
c. Faulty performance of tree stabilization.			
d. Deterioration of materials beyond normal weathering.			
2. Warranties Periods from Date of Substantial Completion:			
a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.			
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.			
c. Annuals: Growing season.			
3. Include the following remedial actions as a minimum:			
a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.			
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.			
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.			
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.			
1.10 MAINTENANCE SERVICE			
A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.			
1. Maintenance Period: 12 months from date of Substantial Completion.			
B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.			
1. Maintenance Period: 12 months from date of Substantial Completion.			
C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.			
PLANTS		PART 2 - PRODUCTS	
2.1 PLANT MATERIAL			
A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurements.			
1. Trees with multiple crooked, or multiple leaders; light, vertical branches where bark is stripped between two branches or between branch and trunk ("pinched back"); crossing trunks; cut-off limbs more than 3/4 inch (19 mm) in diameter; or with stem girdling roots will be rejected.			
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.			
B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Engineer, with a proportionate increase in size of roots or balls.			
C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.			
D. Labeling: Label each plant of each variety, size, and caliber with a securely attached, waterproof tag bearing legal designation of common name and full scientific name, including variety, if applicable. Indicate whether for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.			
E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.			
F. Annals: Provide healthy, disease-free plants of species and variety as listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.			
2.2 INORGANIC SOIL AMENDMENTS			
A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:			
1. Class T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.			
2. Class O, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.			
3. Provide lime in bags of 50 pounds (2.27 kg) and No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.			
B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.			
C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.			
D. Aluminum Sulfate: Commercial grade, unadulterated.			
E. Perlite: Horticultural perlite, soil amendment grade.			
F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.			
G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.			
H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.			
2.3 ORGANIC SOIL AMENDMENTS			
A. Compost: Well-composted, stable, and weed free organic matter, pH range of 5.5 to 8; moisture content 35 to 50 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content 5 to 10 decimoles/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings, and as follows:			
1. Organic Matter Content: 50 to 60 percent dry weight.			
2. Feedstock: Agricultural, food, or industrial residues; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.			
B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.			
C. Wood Chip Mulches: Dried, untempered treated sawdust, ground bark, or wood waste, of uniform texture and free of chips, stones, sticks, soil, or other materials.			
1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb./cu. ft. (2.4 kg/cu. M) of loose sawdust or ground bark.			
D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, seed weed, debris, and material harmful to plant growth.			
2.4 FERTILIZERS			
A. Biofertilizer: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.			
B. Superphosphate: Commercial, phosphate mineral, soluble; a minimum of 20 percent available phosphoric acid.			
C. Commercial Fertilizer: Commercial-grade complete fertilizer of natural character, consisting of fast- and slow-release nitrogen, 20 percent derived from natural organic sources of urea for slow release, phosphorus, and potassium in the following composition:			
1. Composition: 1 lb./1000 sq. ft. (0.45 kg/30.3 sq. m) of actual nitrogen, 4 percent phosphorus, and 2 percent potassium, by weight.			
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.			
D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:			
1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.			
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.			
E. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.			
1. Size: 21 gram tablets.			
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.			
F. Chelated Iron: Commercial-grade FeDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.			
2.5 MULCHES			
A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:			
1. Type: Shredded hardwood bark mulch.			
2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.			
3. Color: Natural.			
2.6 PESTICIDES			
A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of types recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.			
B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.			
C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.			
2.7 TREE STABILIZATION MATERIALS			
A. Upright Staking and Tying: Use a minimum of two stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and to extend to the dimension shown on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.			
2. Use two stakes for trees up to 12 feet (3.6 m) high and 2-1/2 inches (63 mm) or less in caliper; three stakes for trees less than 14 feet (4.2 m) high and up to 4 inches (100 mm) in caliper. Space stakes equally around trees.			
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.			
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.			
2.8 GROUND COVER AND PLANT PLANTING			
A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on drawings in even rows with triangular spacing.			
B. For rooted cuttings supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.			
C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.			
D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.			
E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.			
2.9 PLANTING AREA MULCHING			
A. Mulch backfilled surfaces of planting areas and other areas indicated.			
1. Trees in Turf Areas: Apply organic mulch ring to a 3-inch depth thickness, with 36-inch radius around trunks or stems. Do not place mulch within 6 inches of trunk root flare.			
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.			
2.10 PLANT MAINTENANCE			
A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades of vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.			
B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.			
C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.			
2.11 PESTICIDE APPLICATION - NOT APPLICABLE TO THIS PROJECT			
A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations.			
B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.			
C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written			

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PART 1 - GENERAL	PART 2 - PRODUCTS	PART 3 - EXECUTION																																																		
			1. RELATED DOCUMENTS	Type A Seed Mix: "Athletic Field Mix"	3.1 EXAMINATION	A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.	Supplier: Ernst Seeds https://www.ernstseed.com/product/athletic-field-mix/?anchor=4 Or approved equal. Mix Composition 30.0% Festuca arundinacea, 'Fawn' (Tall Fescue, 'Fawn') 30.0% Lolium perenne, 'Shining Star' (Perennial Ryegrass, 'Shining Star' (turf type)) 15.0% Poa pratensis, 'Volt' (Kentucky Bluegrass, 'Volt') 15.0% Poa pratensis, 'Shamrock' (Kentucky Bluegrass, 'Shamrock') 10.0% Lolium multiflorum (Annual Ryegrass)	A. Examine areas to be planted for compliance with requirements and other conditions affecting performance. 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area. 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions. 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results. 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty. B. Proceed with installation only after unsatisfactory conditions have been corrected. C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.	1.2 SUMMARY	Type B Seed Mix: "Wildflower Seeding (for Partially Shady Area planting)"	3.2 PREPARATION	A. Section Includes: 1. Seeding. 2. Hydroseeding. 3. Sodding. B. Related Sections: 1. Section 310000 "Site Clearing" for topsoil stripping and stockpiling. 2. Section 310000 "Earthwork" for excavation, filling and backfilling, and rough grading. 3. Section 329300 "Plants" for border edgings.	Seed mix shall be: Partially Shaded Area Roadside Mix by Ernst Conservation Seeds or approved equal. Mix Composition 39.8% Schizachyrium scoparium, 'Camper' (Little Bluestem, 'Camper') 19.0% Elymus virginicus, PA Ecotype (Virginia Wildrye, PA Ecotype) 4.0% Chamaecrista fasciata, PA Ecotype (Partridge Pea, PA Ecotype) 3.5% Echinacea purpurea (Purple Coneflower) 3.0% Rudbeckia hirta, Coastal Plain NC Ecotype (Blackeyed Susan, Coastal Plain NC Ecotype) 2.0% Helianthus helianthoides, PA Ecotype (Oxeye Sunflower, PA Ecotype) 2.0% Penstemon digitalis, PA Ecotype (Tall White Beardtongue, PA Ecotype) 1.0% Elymus hystrix, PA Ecotype (Bottlebrush Grass, PA Ecotype) 1.0% Liatris spicata, PA Ecotype (Mars (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype) 0.5% Agrostis perennans, Albany Pine Bush-NY Ecotype (Autumn Bentgrass, Albany Pine Bush-NY Ecotype) 0.5% Asclepias tuberosa (Butterfly Milkweed) 0.5% Aster macrophyllus, PA Ecotype (Bigleaf Aster, PA Ecotype) 0.5% Aster prenanthoides, PA Ecotype (Zigzag Aster, PA Ecotype) 0.5% Baptisia australis, PA Ecotype (Blue False Indigo, Southern WV Ecotype) 0.5% Geum canadense, PA Ecotype (White Avens, PA Ecotype) 0.5% Pycnanthemum tenuifolium (Narrowleaf Mountainmint) 0.5% Solidago bicolor, PA Ecotype (White (Silver Rod) Goldenrod, PA Ecotype) 0.5% Tradescantia ohionensis, PA Ecotype (Ohio Spiderwort, PA Ecotype) 0.5% Zizia aurea, PA Ecotype (Golden Alexanders, PA Ecotype) 0.4% Anemone virginiana, PA Ecotype (Thimbleweed, PA Ecotype) 0.4% Aster laevis, NY Ecotype (Smooth Blue Aster, NY Ecotype) 0.4% Monarda fistulosa, Fort Indiantown Gap-PA Ecotype (Wild Bergamot, Fort Indiantown Gap-PA Ecotype) 0.3% Asclepias syriaca, PA Ecotype (Common Milkweed, PA Ecotype) 0.2% Solidago juncea, PA Ecotype (Early Goldenrod, PA Ecotype) 0.1% Baptisia tinctoria, PA Ecotype (Yellow False Indigo (Horseflyweed), PA Ecotype) 0.1% Penstemon hirsutus (Hairy Beardtongue) 0.1% Veronasticum virginicum, PA Ecotype (Culver's Root, Culver's Root) Item Number: ERNMX-140	A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray. 2. Protect grade stakes set by others until directed to remove them. B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.	1.3 DEFINITIONS	Type C Seed Mix: "Wildflower Seeding (for Partially Shady Area planting)"	3.3 TURF AREA PREPARATION	A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus. B. Finish Grade: Elevation of finished surface of planting soil. C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil. D. Pesticide: A substance or mixture intended for preventing, destroying, repellent, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses. F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed. H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms. I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.	A. Limit turf subgrade preparation to areas to be planted. B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property. 1. Apply superphosphate fertilizer directly to subgrade before loosening. 2. Thoroughly blend planting soil subsoil before spreading. a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days. b. Mix lime with dry soil before mixing fertilizer. 3. Spread planting soil to a depth of 8 inches (200 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet. a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil. b. Reduce elevation of planting soil to allow for soil thickness of sod. C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future. D. Moisten surface area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil. E. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.	1.4 ACTION SUBMITTALS	2.2 TURFGRASS SOD--NOT USE ON THIS PROJECT	3.4 PREPARATION FOR EROSION-CONTROL MATERIALS	A. Product Data: For each type of product indicated. 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.	A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications for Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted. B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed: 1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars. 2. Sun and Partial Shade: Proportioned by weight as follows: a. 50 percent Kentucky bluegrass (Poa pratensis). b. 30 percent chewsing red fescue (Festuca rubra variety). c. 10 percent perennial ryegrass (Lolium perenne). 3. Shade: Proportioned by weight as follows: a. 50 percent chewsing red fescue (Festuca rubra variety). b. 35 percent rough bluegrass (Poa trivialis). c. 15 percent redtop (Agrostis alba).	A. Prepare area as specified in "Turf Area Preparation" Article. B. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.	1.5 INFORMATIONAL SUBMITTALS	2.3 INORGANIC SOIL AMENDMENTS	3.5 SEEDING	A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. 1. Certification of each seed mixture for turfgrass or sod. Include identification of source and name and telephone number of supplier. B. Qualification Data: For qualified landscape Installer. C. Product Certificates: For soil amendments and fertilizers, from manufacturer. D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.	A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows: 1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve. 2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve. 3. Provide lime in form of ground dolomitic limestone. B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve. C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur. D. Aluminum Sulfate: Commercial grade, unadulterated. E. Perlite: Horticultural perlite, soil amendment grade. F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve. G. Sand: Clean, washed, natural or manufactured, and free of toxic materials. H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight. I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.	A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. 1. Do not use wet seed or seed that is moldy or otherwise damaged. 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer. B. Sow seed at a total rate of 10 lb/1000 sq. ft. C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray. D. Protect seeded areas with slopes exceeding 1/4 with erosion-control blankets installed and stapled according to manufacturer's written instructions. E. Protect seeded areas with slopes not exceeding 1/6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment. 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment. 2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal/1000 sq. ft. (38 to 49 L/92.9 sq. m). Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas. F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch (4.8 mm), and roll surface smooth.	1.6 QUALITY ASSURANCE	2.4 ORGANIC SOIL AMENDMENTS	3.6 HYDROSEEDING	A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment. 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association. 2. Experience: Five years' experience in turf installation in addition to requirements in Section 01400 "Quality Requirements." 3. Installer's Field Supervisor: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress. 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network: a. Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT- Exterior. b. Certified Turfgrass Professional, designated CTP. c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL. 5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site. 6. Pesticide Applicator: State licensed, commercial.	A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows: 1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve. 2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve. 3. Provide lime in form of ground dolomitic limestone. B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve. C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur. D. Aluminum Sulfate: Commercial grade, unadulterated. E. Perlite: Horticultural perlite, soil amendment grade. F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve. G. Sand: Clean, washed, natural or manufactured, and free of toxic materials. H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight. I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.	A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier. 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500 lb/acre (15.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.	1.7 DELIVERY, STORAGE, AND HANDLING	2.5 FERTILIZERS	3.7 SODDING	A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable. B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications for Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying. C. Bulk Materials: 1. Do not store or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways. 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.	A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 to 10 decimoles/m ³ ; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows: 1. Organic Matter Content: 50 to 60 percent dry weight. 2. Feedstock: Agricultural, food, or industrial residues; biosolids; yard trimmings; or source-separated or compostable mixed solid waste. B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8. C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials. 1. In lieu of decomposed wood derivatives, partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark. D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.	A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy. B. Lay sod to form a solid mass with tightly joined tufts. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. 1. Lay sod across angle of slopes exceeding 1/3. 2. Anchor sod on slopes exceeding 1/6 with steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage. C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1- 1/2 inches (38 mm) below sod. D. Protect seeded areas with slopes exceeding 1/4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.	1.8 PROJECT CONDITIONS	2.6 MULCHES	3.8 TURF MAINTENANCE	A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion. 1. Spring Planting: March 15 to May 1. 2. Fall Planting: August 15 to October 1. B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.	A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid. B. Superphosphate: Commercial, phosphate, soluble; a minimum of 20 percent available phosphoric acid. C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources or urea formaldehyde, phosphorus, and potassium in the following composition: 1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight. 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory. D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition: 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight. 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.	A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replace bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation. 1. Perform as necessary any procedure that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence. 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement. 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. 4. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm). 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas. 2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate. 3. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-sod growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height: 1. Mow bentgrass to a height of 1/2 inch (13 mm) or less. 2. Mow bermudagrass to a height of 1/2 to 1 inch (13 to 25 mm). 3. Mow perennial ryegrass to a height of 1 to 2 inches (25 to 50 mm). 4. Mow Kentucky bluegrass, annual ryegrass, chewsing red fescue to a height of 1-1/2 to 2 inches (38 to 50 mm). 5. Mow turf-type tall fescue to a height of 2 to 3 inches (50 to 75 mm). D. Turf Post fertilization: Apply fertilizer after initial mowing and when grass is dry. 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) to turf area.	1.9 MAINTENANCE SERVICE	2.7 PESTICIDES	3.9 SATISFACTORY TURF
1. RELATED DOCUMENTS	Type A Seed Mix: "Athletic Field Mix"	3.1 EXAMINATION																																																		
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.	Supplier: Ernst Seeds https://www.ernstseed.com/product/athletic-field-mix/?anchor=4 Or approved equal. Mix Composition 30.0% Festuca arundinacea, 'Fawn' (Tall Fescue, 'Fawn') 30.0% Lolium perenne, 'Shining Star' (Perennial Ryegrass, 'Shining Star' (turf type)) 15.0% Poa pratensis, 'Volt' (Kentucky Bluegrass, 'Volt') 15.0% Poa pratensis, 'Shamrock' (Kentucky Bluegrass, 'Shamrock') 10.0% Lolium multiflorum (Annual Ryegrass)	A. Examine areas to be planted for compliance with requirements and other conditions affecting performance. 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area. 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions. 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results. 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty. B. Proceed with installation only after unsatisfactory conditions have been corrected. C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.																																																		
1.2 SUMMARY	Type B Seed Mix: "Wildflower Seeding (for Partially Shady Area planting)"	3.2 PREPARATION																																																		
A. Section Includes: 1. Seeding. 2. Hydroseeding. 3. Sodding. B. Related Sections: 1. Section 310000 "Site Clearing" for topsoil stripping and stockpiling. 2. Section 310000 "Earthwork" for excavation, filling and backfilling, and rough grading. 3. Section 329300 "Plants" for border edgings.	Seed mix shall be: Partially Shaded Area Roadside Mix by Ernst Conservation Seeds or approved equal. Mix Composition 39.8% Schizachyrium scoparium, 'Camper' (Little Bluestem, 'Camper') 19.0% Elymus virginicus, PA Ecotype (Virginia Wildrye, PA Ecotype) 4.0% Chamaecrista fasciata, PA Ecotype (Partridge Pea, PA Ecotype) 3.5% Echinacea purpurea (Purple Coneflower) 3.0% Rudbeckia hirta, Coastal Plain NC Ecotype (Blackeyed Susan, Coastal Plain NC Ecotype) 2.0% Helianthus helianthoides, PA Ecotype (Oxeye Sunflower, PA Ecotype) 2.0% Penstemon digitalis, PA Ecotype (Tall White Beardtongue, PA Ecotype) 1.0% Elymus hystrix, PA Ecotype (Bottlebrush Grass, PA Ecotype) 1.0% Liatris spicata, PA Ecotype (Mars (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype) 0.5% Agrostis perennans, Albany Pine Bush-NY Ecotype (Autumn Bentgrass, Albany Pine Bush-NY Ecotype) 0.5% Asclepias tuberosa (Butterfly Milkweed) 0.5% Aster macrophyllus, PA Ecotype (Bigleaf Aster, PA Ecotype) 0.5% Aster prenanthoides, PA Ecotype (Zigzag Aster, PA Ecotype) 0.5% Baptisia australis, PA Ecotype (Blue False Indigo, Southern WV Ecotype) 0.5% Geum canadense, PA Ecotype (White Avens, PA Ecotype) 0.5% Pycnanthemum tenuifolium (Narrowleaf Mountainmint) 0.5% Solidago bicolor, PA Ecotype (White (Silver Rod) Goldenrod, PA Ecotype) 0.5% Tradescantia ohionensis, PA Ecotype (Ohio Spiderwort, PA Ecotype) 0.5% Zizia aurea, PA Ecotype (Golden Alexanders, PA Ecotype) 0.4% Anemone virginiana, PA Ecotype (Thimbleweed, PA Ecotype) 0.4% Aster laevis, NY Ecotype (Smooth Blue Aster, NY Ecotype) 0.4% Monarda fistulosa, Fort Indiantown Gap-PA Ecotype (Wild Bergamot, Fort Indiantown Gap-PA Ecotype) 0.3% Asclepias syriaca, PA Ecotype (Common Milkweed, PA Ecotype) 0.2% Solidago juncea, PA Ecotype (Early Goldenrod, PA Ecotype) 0.1% Baptisia tinctoria, PA Ecotype (Yellow False Indigo (Horseflyweed), PA Ecotype) 0.1% Penstemon hirsutus (Hairy Beardtongue) 0.1% Veronasticum virginicum, PA Ecotype (Culver's Root, Culver's Root) Item Number: ERNMX-140	A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray. 2. Protect grade stakes set by others until directed to remove them. B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.																																																		
1.3 DEFINITIONS	Type C Seed Mix: "Wildflower Seeding (for Partially Shady Area planting)"	3.3 TURF AREA PREPARATION																																																		
A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus. B. Finish Grade: Elevation of finished surface of planting soil. C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil. D. Pesticide: A substance or mixture intended for preventing, destroying, repellent, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses. F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed. H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms. I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.	A. Limit turf subgrade preparation to areas to be planted. B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property. 1. Apply superphosphate fertilizer directly to subgrade before loosening. 2. Thoroughly blend planting soil subsoil before spreading. a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days. b. Mix lime with dry soil before mixing fertilizer. 3. Spread planting soil to a depth of 8 inches (200 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet. a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil. b. Reduce elevation of planting soil to allow for soil thickness of sod. C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future. D. Moisten surface area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil. E. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.																																																			
1.4 ACTION SUBMITTALS	2.2 TURFGRASS SOD--NOT USE ON THIS PROJECT	3.4 PREPARATION FOR EROSION-CONTROL MATERIALS																																																		
A. Product Data: For each type of product indicated. 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.	A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications for Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted. B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed: 1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars. 2. Sun and Partial Shade: Proportioned by weight as follows: a. 50 percent Kentucky bluegrass (Poa pratensis). b. 30 percent chewsing red fescue (Festuca rubra variety). c. 10 percent perennial ryegrass (Lolium perenne). 3. Shade: Proportioned by weight as follows: a. 50 percent chewsing red fescue (Festuca rubra variety). b. 35 percent rough bluegrass (Poa trivialis). c. 15 percent redtop (Agrostis alba).	A. Prepare area as specified in "Turf Area Preparation" Article. B. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.																																																		
1.5 INFORMATIONAL SUBMITTALS	2.3 INORGANIC SOIL AMENDMENTS	3.5 SEEDING																																																		
A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. 1. Certification of each seed mixture for turfgrass or sod. Include identification of source and name and telephone number of supplier. B. Qualification Data: For qualified landscape Installer. C. Product Certificates: For soil amendments and fertilizers, from manufacturer. D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.	A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows: 1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve. 2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve. 3. Provide lime in form of ground dolomitic limestone. B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve. C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur. D. Aluminum Sulfate: Commercial grade, unadulterated. E. Perlite: Horticultural perlite, soil amendment grade. F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve. G. Sand: Clean, washed, natural or manufactured, and free of toxic materials. H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight. I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.	A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. 1. Do not use wet seed or seed that is moldy or otherwise damaged. 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer. B. Sow seed at a total rate of 10 lb/1000 sq. ft. C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray. D. Protect seeded areas with slopes exceeding 1/4 with erosion-control blankets installed and stapled according to manufacturer's written instructions. E. Protect seeded areas with slopes not exceeding 1/6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment. 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment. 2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal/1000 sq. ft. (38 to 49 L/92.9 sq. m). Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas. F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch (4.8 mm), and roll surface smooth.																																																		
1.6 QUALITY ASSURANCE	2.4 ORGANIC SOIL AMENDMENTS	3.6 HYDROSEEDING																																																		
A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment. 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association. 2. Experience: Five years' experience in turf installation in addition to requirements in Section 01400 "Quality Requirements." 3. Installer's Field Supervisor: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress. 4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network: a. Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT- Exterior. b. Certified Turfgrass Professional, designated CTP. c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL. 5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site. 6. Pesticide Applicator: State licensed, commercial.	A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows: 1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve. 2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve. 3. Provide lime in form of ground dolomitic limestone. B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve. C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur. D. Aluminum Sulfate: Commercial grade, unadulterated. E. Perlite: Horticultural perlite, soil amendment grade. F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve. G. Sand: Clean, washed, natural or manufactured, and free of toxic materials. H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight. I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.	A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier. 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500 lb/acre (15.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.																																																		
1.7 DELIVERY, STORAGE, AND HANDLING	2.5 FERTILIZERS	3.7 SODDING																																																		
A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable. B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications for Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying. C. Bulk Materials: 1. Do not store or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways. 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.	A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 to 10 decimoles/m ³ ; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows: 1. Organic Matter Content: 50 to 60 percent dry weight. 2. Feedstock: Agricultural, food, or industrial residues; biosolids; yard trimmings; or source-separated or compostable mixed solid waste. B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8. C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials. 1. In lieu of decomposed wood derivatives, partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark. D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.	A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy. B. Lay sod to form a solid mass with tightly joined tufts. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. 1. Lay sod across angle of slopes exceeding 1/3. 2. Anchor sod on slopes exceeding 1/6 with steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage. C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1- 1/2 inches (38 mm) below sod. D. Protect seeded areas with slopes exceeding 1/4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.																																																		
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A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion. 1. Spring Planting: March 15 to May 1. 2. Fall Planting: August 15 to October 1. B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.	A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid. B. Superphosphate: Commercial, phosphate, soluble; a minimum of 20 percent available phosphoric acid. C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources or urea formaldehyde, phosphorus, and potassium in the following composition: 1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight. 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory. D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition: 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight. 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.	A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replace bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation. 1. Perform as necessary any procedure that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence. 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement. 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. 4. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm). 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas. 2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate. 3. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-sod growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height: 1. Mow bentgrass to a height of 1/2 inch (13 mm) or less. 2. Mow bermudagrass to a height of 1/2 to 1 inch (13 to 25 mm). 3. Mow perennial ryegrass to a height of 1 to 2 inches (25 to 50 mm). 4. Mow Kentucky bluegrass, annual ryegrass, chewsing red fescue to a height of 1-1/2 to 2 inches (38 to 50 mm). 5. Mow turf-type tall fescue to a height of 2 to 3 inches (50 to 75 mm). D. Turf Post fertilization: Apply fertilizer after initial mowing and when grass is dry. 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) to turf area.																																																		
1.9 MAINTENANCE SERVICE	2.7 PESTICIDES	3.9 SATISFACTORY TURF																																																		
A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods: 1. Seeded Turf: 365 days from date of Substantial Completion. a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season. 2. Sodded Turf: 365 days from date of Substantial Completion. B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.	A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley. B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8. C. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decimoles/m ³ ; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows: 1. Organic Matter Content: 50 to 60 percent dry weight. 2. Feedstock: Agricultural, food, or industrial residues; biosolids; yard trimmings; or source-separated or compostable mixed solid waste. D. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant- growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5. E. Non asphatic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant- growth or germination inhibitors. F. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant- growth or germination inhibitors.	A. Turf installations shall meet the following criteria as determined by Engineer: 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm). 																																																		

PARK GATEWAY SHELTER

PART 1 GENERAL **1.1 SECTION INCLUDES** A. Prefabricated, connections and accessories. **1.2 REFERENCES** A. ASTM A 36 - Standard Specification for Carbon Structural Steel. B. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2003a. D. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes. E. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts; 2004. F. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2003. G. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process; 2003. H. American Institute of Steel Construction (AISC). I. American Iron and Steel Institute (AISI) Specifications for Cold Formed Members. J. American Society of Testing Material (ASTM). K. American Welding Society (AWS). L. OSHA Steel Erection Standard 29 CFR 1926.750 Part R. M. SSPC-SP 2-Hand Tool Cleaning; Society for Protective Coatings; 2000. N. SSPC-SP 10-Near-Water Blast Cleaning; Society for Protective Coatings; 2000. O. ICC Evaluation Service, ESR-106, Structural Insulated Panels. **1.3 DESIGN REQUIREMENTS** A. Standard Design Loads: International Building Code (IBC latest Edition), 50 P.S.F. (Ground Snow), 90 M.P.H., Exposure C (Wind), Seismic Design Category B. B. Column to footing connection to be in compliance with OSHA Steel Erection Standard CFR 1926.750 Part R, which requires a minimum of four (4) anchor bolts per column. C. Design Method shall be per applicable local building code requirements. Manufacturer's design shall utilize a three-dimensional structural analysis to determine all member loads and forces. Design and detailing shall be in compliance with AISC 341, Part I or II. D. The pre-engineered package shall be shipped as a pre-cut (except for standing seam roof panels) and pre-fabricated package that shall include the structural framing members, roof panels, fasteners, and trim as well as the installation instructions. The structure shall be shipped un-assembled for minimum shipping charges. E. Field labor shall be only for the assembly of the pre-fabricated parts. No onsite welding shall be permitted. Tube frame connection bolts and fasteners shall be concealed, within the tubing to hidden, except at the baseplate. All rafter tails shall be factory welded into place as well as all compression ring/tube covers. No openings near the base of the column with screw on cover plates. No drilling after bolting shall be allowed for any connections due to the possibility of the deformation of the tube steel parts. **1.4 SUBMITTALS** A. Submit under provisions of the General Conditions. B. Product Data: Manufacturer's data sheets on each product to be used, including: 1. Preparation instructions and recommendations. 2. Storage and handling requirements and recommendations. 3. Installation methods. C. Shop Drawings: Submit a minimum of 4 sets of manufacturer approved shop drawings and 2 sets of structural calculations signed and sealed by a Professional Engineer in the state of New York detailing plan, section and elevation views as necessary to ensure proper field installation procedures. Coordinate shelter erection locations with those listed in the Contract Drawings. D. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns. E. Manufacturer shall provide site specific foundation design signed and sealed by a Professional Engineer in the state of New York. Generic or "typical" foundation details and design shall not be acceptable. **1.5 QUALITY ASSURANCE** A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience. B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified. **1.6 DELIVERY, STORAGE, AND HANDLING** A. Store products in manner to prevent damage prior to installation. Where products need to be stored outdoors, store off the ground and place so that water will drain off and away from their location. B. Inspect parts within 48 hours of delivery, compare with manufacturer's bill of materials and report any missing or non-conforming parts to the manufacturer within this time frame. C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction. **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 absolute limits. **1.8 WARRANTY** A. Minimum ten (10) year warranty for all color finishes, materials and installation. B. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage. **1.9 COORDINATION** A. Coordinate work with other operations and trades to provide concrete mounting pads and/or foundations under finish sidewalk surface. Coordinate work with other trades to provide concealed electrical wiring. **PART 2 PRODUCTS** **2.1 MANUFACTURERS** A. Acceptable Manufacturer: Polygon by Porter Corp, 4240 N. 136th Avenue, Holland, MI 49424 (616) 399-1963 Regional representative: Loren Kushner Porter Corp. 22 Haworth Drive Guilderland, NY 12084 (518)603-7889 B. Or approved equal. Requests for substitutions will be considered in accordance with the General Conditions. **2.2 COMPONENTS** A. Park Gateway structure: 8' x 8' pre-engineered, prefabricated all-steel framed shelters; column, rafter, and purlin structure, with T&G roof deck, all flashing, trim, accessories, and fasteners required for a complete installation. 1. Structural framing (Columns, rafters, tie-beams, purlins, etc.) shall be Hollow Structural Sections (HSS) meeting ASTM A500 grade B. "I" beams, tapered columns, open "C" channels, cold-formed box sections shall not be accepted. 2. Columns: Square ASTM A 500 structural Tubular Steel (TS) welded to 5/8 inch (15mm) base-plates. Column-to-Hip Beam connection is established via a 1/4 inch (6mm) steel plate cap welded at the top of the column. Each column cap is pre-drilled with hex nuts welded inside for a mechanical connection to the hip beam. Columns shall be secured to concrete footings below finished grade to control mounting plates. 3. Hip Beams: ASTM A 500 structural Tubular Steel (TS) with a pre-drilled 1/4 inch (6mm) plate with welded hex nuts at the peak for mechanical attachment to the compression ring. Sidewals of the hip beams are pre-drilled for mechanical connection with the purlin. Ease end of the hip beam includes a welded "bird-proof" cap closure. 4. Structural connections shall be made with A325 high-strength bolts and A563 structural nuts, ASTM A307 grade anchor bolts, self-drilling screws and pop-rivets. 5. Compression Ring: Compression rings shall be made of structural channel sections or welded plates that meet ASTM A36 grade steel. 6. Purlins: ASTM A 500 Structural Steel with pre-drilled 1/4 inch (6mm) plates welded to each end for mechanical connection to the hip beams. 7. Metal Roof Panels: 24-gauge galvalume roof panel with a Kynar 500 paint finish. The ribs shall be 1-3/16" high and 12" on center. Roof panel coverage shall be 36" wide; all angles shall be factory cut. The ribs shall run with the slope of the roof for proper drainage. Color to match bus shelter installed as part of Phase I work in front of Kevin Landau Park. 8. Roof Pitch: 4 Inch per foot rise. (4:12). 9. Metal Roof Trim: Roof trim shall match the color of the roof and shall be formed from 26-gauge painted galvalume steel as follows: 1. Metal ridge caps shall be performed with a single central bend to match the roof slope. The trim shall be hemmed on both sides. 2. Roof peak cap shall be supplied on all buildings that do not include a framed cupola. 3. Edge of the roof deck shall have a preformed "J" channel eave trim, the channel shall be applied along all the eaves to trim and strengthen the eave. The "J" shall have weep holes at 6" on center for roof drainage. 4. Highside trim shall be in a "J" shape and shall supplied for all tiered buildings. 10. Hardware: All necessary hardware meets or exceeds the requirements of ASTM A 325. **2.3 ACCESSORIES** A. Shelter lighting (if included): Provide 50W minimum solar powered L.E.D. interior ceiling mounted light fixture linked to photo-cell on/off sensor, including all battery packs, enclosures, wiring, drivers, roof mounting brackets and controls at each bus shelter. Pre-drill holes in steel framing for wiring. Install light fixture to underside of and parallel to main roof ridge beam. Install solar panel on roof of bus shelter with southern exposure. B. Provide concrete pavers as needed at undersides of mid-point panel supports to meet grade, cut to fit size of mounting bracket and slope of finished grade. **2.4 FINISHES** A. Powder Powder Coating: Steel shall be shot-blasted to the specification of SSPC-SP10 to remove all oil, residue, mill scale, weld spatter and slag. Steel is then washed and zinc-phosphated in an electro deposition pretreatment process, immersed in a liquid epoxy, and coated to uniform 0.7-0.9 mils. No welding of exposed framing shall be allowed after the coating has been applied. A double coat of TGIC-polyester powder is applied, one coat of color and one clear coating for a final finish that is 8-12 mils thick. All materials shall be inspected to meet 100% coating, proper cure, film thickness and impact resistance. 1. Column Color selection: TBD by town. 2. Roof Framing Color selection: TBD by town. **PART 3 EXECUTION** **3.1 EXAMINATION** A. Do not begin installation until substrates have been properly prepared. B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding. **3.2 PREPARATION** A. Clean surfaces thoroughly prior to installation. B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. **3.3 INSTALLATION** A. Install in accordance with manufacturer's instructions. **3.4 PROTECTION** A. Protect installed products until completion of project. B. Touch-up, repair or replace damaged products before Substantial Completion. **PART 4 CLEANING AND PROTECTION** **4.1 Cleaning** A. All cleaning methods shall be tested on material samples prior to application to the stone installation to assure there are no adverse affects of the cleaning method or products to the stone surface. Granite shall be cleaned after installation and all pointing or caulking is complete. All dirt, excess mortar, weld splatter, stains, and other deficiencies shall be removed. All cleaning methods shall be in accordance with ASTM C1515-01. **4.2 Protection of Finished Work** A. Granite installation in progress shall be protected with film or fabric tarps secured over the work. After the granite is installed, it shall be the responsibility of the General Contractor to properly and adequately protect it from damage until all trades are finished. This responsibility includes the stone cleaning costs prior to the required final inspection. Where lumber is required for protection, care should be taken to protect the granite from staining by the lumber, using plastic film or other suitable materials. Any fasteners used in construction of temporary protection fixtures shall be noncorrosive. **PART 5 INSTALLATION** **5.1 General Installation** A. Installation shall be accomplished with competent, experienced Stone Setters, in accordance with the approved shop drawings. Granite shall be free of any ice or frost at time of installation. Salt shall not be used for the purpose of melting ice, frost, or snow on the granite pieces. Adequate protection measures shall be taken to ensure that exposed surfaces of the stone shall be kept free of mortar at all times as elements in mortar may etch the polished surfaces of stones. **5.2 Mortar Setting of Granite** A. Clean base materials to remove dirt or other foreign matter. Saturate concrete substrate several hours prior to setting granite. Prepare and place mortar in accordance with ASTM C270-03. Thoroughly wet stones prior to setting in mortar bed. Apply neat cement grout of approximate 1/16" thickness to granite units prior to placing on mortar bed. Tamp stones into place using a rubber or plastic mallet to obtain full contact with the setting and proper stone unit alignment. **5.3 Mortar Joints** A. Mortar joints shall be raked out to a depth of 1/2" to 1/4". Apply pointing mortar in layers not exceeding 3/8" and allow each layer to harden to the touch before the next layer is applied. Tool finished joints with a concave tool having a diameter approximately 1/8" greater than the joint width. Care shall be taken to keep expansion joints free of mortar, which would compromise their function. **5.4 Anchorage** A. All anchors shall be anchored in accordance with the approved shop drawings. Specific anchorage design and details shall be determined by the granite contractor in consultation with the granite fabricator. To the highest extent possible, all anchor preparations in granite units shall be shop applied. All anchorage devices and anchor hole/clip fillets shall be in accordance with ASTM C152-02. Care must be taken to ensure that any holes capable of retaining water are filled after use to prevent water collection and freezing. **5.5 Sealant Joints** A. Provide sealant as specified in this Appendix for "Joint Sealants." **PART 6 CLEANING AND PROTECTION** **6.1 Cleaning** A. All cleaning methods shall be tested on material samples prior to application to the stone installation to assure there are no adverse affects of the cleaning method or products to the stone surface. Granite shall be cleaned after installation and all pointing or caulking is complete. All dirt, excess mortar, weld splatter, stains, and other deficiencies shall be removed. All cleaning methods shall be in accordance with ASTM C1515-01. **6.2 Protection of Finished Work** A. Granite installation in progress shall be protected with film or fabric tarps secured over the work. After the granite is installed, it shall be the responsibility of the General Contractor to properly and adequately protect it from damage until all trades are finished. This responsibility includes the stone cleaning costs prior to the required final inspection. Where lumber is required for protection, care should be taken to protect the granite from staining by the lumber, using plastic film or other suitable materials. Any fasteners used in construction of temporary protection fixtures shall be noncorrosive. **PART 7 CONSTRUCTION DETAILS** **7.1 CONSTRUCTION DETAILS** A. All granite shall be obtained from quarries having adequate capacity and facilities to meet the specified requirements, and from a firm equipped to process the material promptly on order and in strict accord with specifications. The Landscape Architect reserves the right to approve the material supplier prior to the award of this contract. Stone and workmanship quality shall be in accordance with industry standards and practices as set forth by the MIA. **7.2 Samples** A. The following publications listed here and referred to thereafter by alphanumeric code designation only, form a part of this specification to the extent indicated by the references thereto: 1. CG15-99 Standard Specification for Granite Dimension Stone 2. C119-03 Standard Terminology Relating to Dimension Stone 3. C170-90(1999) Standard Test Method for Compressive Strength of Dimension Stone 4. C270-03 Standard Specification for Mortar for Unit Masonry 5. C124-02a Standard Guide for Selection, Design, and Installation of Exterior Dimension Stone Anchors and Anchoring Systems 6. C1515-01 Standard Guide for Cleaning of Exterior Dimension Stone, Vertical and Horizontal Surfaces, New or Existing 7. C1528-02 Standard Guide for Selection of Dimension Stone for Exterior Use **7.3 Source of Supply** A. All granite shall be obtained from quarries having adequate capacity and facilities to meet the specified requirements, and from a firm equipped to process the material promptly on order and in strict accord with specifications. The Landscape Architect reserves the right to approve the material supplier prior to the award of this contract. Stone and workmanship quality shall be in accordance with industry standards and practices as set forth by the MIA. **7.4 Color** A. Color - Color shall be as specified in the Contract Documents. A color sample shall be submitted at least two (2) months in advance of the test panel for approval by the Engineer/Architect. **7.5 Material Samples** A. MATERIAL SAMPLES - The sample, upon approval, shall be maintained as the standard of minimal quality for approval of all the proposed surfacing and paving work required for the project **7.6 Installers** INSTALLERS - Installer must be a certified Porous Pavé installer or if installation is performed by the contractor's staff, a Porous Pavé representative must be on site to oversee the installation. Contractor that is a Certified Installer shall provide a Certification Number (This number shall be provided to the Engineer for Verification with the Product Manufacturer). The Contractor shall have adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section. All materials, methods of construction and workmanship shall conform to applicable requirements unless otherwise specified. Any deviation from standard installation procedures must be approved with a manufacture official and the Engineer before the installation begins. Asphalt tack coat and prime coats are not applicable to this item. **7.7 Construction Details** EQUIPMENT - All equipment, tools, machinery and other appliances used in handling materials and executing any part of the work shall be subject to the approval of the Engineer/Architect before the work begins. **7.8 Batching and Mixing** A. Batch and mix on site using a standard mortar mixer for large applications, a standard wheel barrel can be used. B. Pre coat mortar mixer or wheel barrel with vegetable oil. C. Mix components according to the manufacturer's directions. IMPORTANT - If using a mortar mixer, only mix for one to two minutes maximum, just long enough for the rock to look dark and wet. If you let the mixer continue to run, the binder draws moisture and will cause a slight color change. IMPORTANT - Porous Pavé can be installed from 45°F to 95°F degree temperatures and the temperature should not fall below 35°F degree during the curing period. IMPORTANT - Six hour window for rain, Porous Pavé binder is moisture cured, water will damage product if it gets wet before it has cured. IMPORTANT - Binder available in Non-Aliphatic or True Color Retention; Aliphatic. **7.9 Test Panel** TEST PANEL - A Test Panel must be constructed at no additional cost to the owner as described below. At least one week prior to the placement of the permanent panels, the Contractor shall place, joint, cure, and finish a test panel. The test panel shall be at least 9 sq. ft. in size, constructed at the required in-place unit weight. The test panel will be constructed at a location designated by the Engineer/Architect and will remain in place for the duration of the project to be used as a reference for acceptance of the pavement surface. The test panel must be tested in accordance with ASTM C1701, Standard Test Method for Infiltration Rate of In-Place Previous Concrete. The test panel must have a minimum infiltration rate of 210 inches per hour. If the test panel does not meet this performance criterion, it shall be removed and re-laid at the Contractor's expense, and the failed test panel disposed of in an appropriate manner. The test panel will not be incorporated into the final work, and will be removed when ordered by the Engineer/Architect. **7.10 Construction, Surface Preparation** The subgrade shall have all foreign material removed and be compacted to an even surface that is parallel to the finish grade of the product as directed by engineer. Contact surfaces of curbing, sidewalk, manholes, and other structures shall be coated with a thin uniform coating of manufacturer's formulated polyurethane binding agent or approved equivalent prior to placing the product top course against them. The Contractor shall provide appropriate and adequate protection of adjacent work space from splashing of paving materials. Remove all stains from exposed surfaces of paving structures, and grounds. Remove all waste and spillage. The Contractor shall provide appropriate, adequate, and suitable protection to assure no damage or disturbance to existing improvements or vegetation, where required before starting work and maintain protection throughout the course of the work. The Contractor shall restore damaged improvements, at no additional costs, including existing paving or adjacent to the site that has been damaged as a result of construction work, to their original condition or repair as directed to the satisfaction of the Engineer. **7.11 Construction Placement** Minimum depth of 2" thick where vehicle traffic occurs such as driveways and parking areas. Typical Product that meets or exceeds the testing specifications set forth above can be installed when the surface temperatures of the subgrade is 50°F or above. The moisture content condition shall be evaluated according to the Manufacturer's recommended practices. The Product shall not be installed when the ambient air temperature in the shade away from the artificial heat, at the paving site is above 95°F or when the surface temperature is below 50°F or when the weather is foggy, rainy or otherwise unfavorable. The Contractor shall not pave on days when rain is forecast for the day, unless a change in the weather results in favorable paving conditions as determined by the Engineer. A typical Product top course that meets or exceeds the testing specifications set forth above shall not be placed when the surface temperature is below 50°F or when the weather is foggy, rainy or otherwise unfavorable. During installation and compaction of subbase materials, grade and drainage conditions should be considered and evaluated in the field to avoid over-compaction or the creation of areas of potential ponding. The spreading and finishing of adjacent strips of the Product surface shall proceed by such sequence or timing in the adjacent strips that the prescribed full width of the pavement will be completed without the formation of longitudinal joints. Product shall be installed per the manufacturer's recommendations with a minimum product thickness as shown in the contract documents. Longitudinal or transverse joint staggering is not applicable. Traffic on the product shall be restricted for at least 24 hours after installation or as required by the Product Manufacturer. The surface of the Product shall be smooth and true to the existing or established grade. If the Product becomes plugged with dirt, or in any other way becomes defective during construction, shall be removed and replaced by the contractor, at no additional cost to the owner. Any Product pavement that becomes loose and broken within the first year of placing the product shall be removed and replaced by the contractor, at no additional cost to the owner. **7.12 Method of Measurement** The quantity for payment, in square feet of material, shall be computed within the payment lines shown on the plans or otherwise ordered in writing by the Engineer, and in accordance with the plans and specifications. **7.13 Basis of Payment** The unit bid price per square foot shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. No direct payment will be made for any losses of material which may result from shrinkage, compaction, settlement, waste, overflow or any other causes. Excavation and furnishing and placing of subbase course materials shall be paid for under separate bid items. **7.14 Payment will be made under:** **ITEM NO. ITEM PAY UNIT** **PIPE HANDRAIL** **PART 1 GENERAL** Under this item, the Contractor shall furnish and erect powder coated Pipe Handrails for steps and/or ramps where shown on the plans or directed by the Engineer, in accordance with the plans, specifications and directions of the Engineer. All handrail, including extensions shall comply with Americans with Disabilities Act (ADA) provisions as described in ANSI A117.1-1998 (or most recent edition). **PART 2 MATERIALS** All posts and rails shall be galvanized steel pipe in accordance with ASTM Designation F-1083 schedule 40. All materials as delivered shall be in condition for erection without field fitting or cutting. Pipe handrail shall be as manufactured by or approved equal. **Welding:** Welding shall be done by competent mechanics as specified under Section "B" and all welds shall be ground smooth. **Surface Coatings:** All surfaces of the posts and rails shall be powder coated, after welding, with TGIC-Polyester 3 to 6 mils thick. Galvanizing of all components shall provide an acceptable substrate for applied powder coatings. No lacquer, urethane or other coatings which would prevent proper adhesion of powder coating shall be applied to the pipe. The powder coating shall be applied to the galvanized surfaces in such a manner that the coating will not peel off. Ensure surfaces to be coated are clean and dry and free of grease, dust, rust etc. All coated parts shall first receive phosphating and chromating treatments to improve the adhesion of the surface coating. Color to be black unless otherwise indicated on the plans. The entire pipe handrail installation shall be coated with one of the two following types of powder coating. All pipe handrail components shall be coated on all surfaces with the exception of the dowels. **TGIC-Polyester Powder Coating:** TGIC-Polyester Powder coating shall be applied to the galvanized steel in such a manner that the coating will not peel off. The TGIC-Polyester shall be applied at a film thickness of 3 to 6 mils by electrostatic spray process and baked finished per manufacturer's directions. The TGIC-Polyester shall be applied without voids, tears or cuts that reveal the substrate and shall thoroughly adhere to the metal without peeling when scratched with a pick device or knife blade point. **TESTS:** Laboratory Test For TGIC - Powder Coating: At the discretion of the Engineer, a sample of the TGIC - Polyester powder coated handrail shall be laboratory tested for bonding of the powder coating to the metal. The test shall be the Cross Hatch test per ASTM D3359, method B. Failure to satisfactorily pass this test shall be a cause for rejection. **Touch-up & Repair:** For minor damage caused by installation or transportation and field welded metal powder coated surfaces, clean welds, bolted connections and abraded areas: 1. On damaged galvanized surfaces, apply organic zinc repair paint complying with ASTM A780. Galvanizing repair paint shall have 65% zinc by weight. Thickness of repair paint shall be not less than that required by ASTM A123. 2. On damaged powder coated surfaces, touch-up finish in conformance with manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of 6 (six) feet. **PART 3 INSTALLATION** The posts shall be set in holes which shall have been formed/dug into the granite step treads or concrete pads, as shown on the plans or directed by the Engineer. After the posts have been set in place and properly supported to hold them to grade and grade, the remaining space shall be neatly filled with a grout consisting of one (1) part cement and two (2) parts sand. Color of grout shall match surrounding pavement or stone. **SUBMITTALS:** All submittals shall be in accordance with the requirements of the General Conditions, Section C, Special Provisions, Article 11. **Sample:** Submit one twelve (12") inch section of galvanized, powder coated pipe for approval. **Shop Drawings:** The Contractor shall submit shop drawings in accordance with the requirements of the General Conditions, Section C, Special Requirements Article 11. Pipe rail shall be fabricated in strict accordance with the plans and shop drawings. **Shop drawings to include complete details of fence construction, height, post spacing layout, dimensions and concrete footing detail.** **Certification:** Submit certification that the materials used comply with this specification. **MEASUREMENT AND PAYMENT:** The quantity of PIPE HANDRAIL to be paid for under this item shall be the number of LINEAR FEET of powder coated handrail, including handrail extensions furnished and erected complete in accordance with the plans, specifications and directions of the Engineer. The price bid shall be a unit price per LINEAR FOOT of handrail and shall include the cost of furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, including powder coating and powder coating touch-up, all in accordance with the plans and specifications to the satisfaction of the Engineer. Core drilling, if required and granite stair treads will be paid for under their separate items. **END OF SECTION**	**POROUS PAVING SURFACE PRODUCT, TYPE POROUS PAVE XL** **DESCRIPTION** This work shall consist of furnishing and installing a Porous Paving Surface Product, herein referred to as "Product", in accordance with these specifications and in conformance with the lines, grades, and details shown on the Contract Documents and as directed by the Engineer. A Test Panel must be constructed by the Contractor at no additional cost to the owner as described under the Construction Details. **MATERIALS** The Product shall consist of recycled rubber granules and/or aggregate, bonded to create a porous surface treatment. Use one of the following Products or an approved equivalent as determined by the Engineer/Architect: Porous Pavé XL, Porous Pavé Inc, 4385 East 110th Street Grant MI 49327 The slip resistance of the Product shall have a Coefficient of Friction no greater than 0.6 when measured in accordance with ASTM D2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine. **POROUS PAVE XL** A. Porous Pavé XL -50% chipped recycled tires, 50% stone aggregate and a moisture cured proprietary hard binding agent.



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CONCRETE GRID PAVEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Work consists of furnishing and construction of Belgard Concrete Grid Pavement System (Turfstone) in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans.
- B. Installation work includes:
 - 1. Funitshing and installing geotextiles (where required), base course, bedding course, concrete grid pavers and joint fill to the lines and grades shown on the construction drawings.

1.2 RELATED SECTIONS

- A. Section: Earthwork
- B. Section: Geosynthetics

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. GSP-4M Guide for Design of Pavement Structures
- B. American Society of Civil Engineers (ASCE)
 - 1. ASCE 58-10 Structural Design of Interlocking Concrete Pavement for Municipal Streets and Roadways
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM C-33 Concrete Aggregates
 - 2. ASTM C-137 Guide to Degradation of Small-Size Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 3. ASTM C-138 Sieve Analysis of Fine and Coarse Grained Aggregates
 - 4. ASTM C-140 Sampling and Testing Concrete Masonry Units and Related Units
 - 5. ASTM C-179 Pigments for Integrally Colored Concrete
 - 6. ASTM C-291 Standard Practice for Paving Units
 - 7. ASTM D-698 Laboratory Compaction Characteristics of Soil Using Standard Effort
 - 8. ASTM D-1557 Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 9. ASTM D-2449 Densities and Identification of Soils (Visual-Manual Procedure)
 - 10. ASTM D-2940 Graded Aggregate Material for Bases or Subbases for Highways or Airports
 - 11. ASTM D-4873 Identification, Storage and Handling of Geosynthetic Rolls and Samples
 - 12. ASTM D-4874 Standard Practice for Sampling Geotextiles for Landscaping Purposes
 - 13. ASTM D-4928 Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
 - D. Interlocking Concrete Pavement Institute (ICPI)
 - 1. Tech Spec Technical Bulletin

1.4 SUBMITTALS

- A. Submit the following under provisions of the General Conditions.
 - 1. Product Data: Manufacturer's Data sheets on each product to be used including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
 - 4. Material Safety Data Sheets (MSDS).
 - 5. Topsoil Infill Material
 - 6. 1. Source and type of topsoil, seed mix, if used to be used.
 - 7. Written Method Statement and Quality Control Plan that describes material staging and flow, paving direction and installation procedures, including representative reporting forms that ensure conformance to the project specifications.

1.5 QUALITY ASSURANCE

- A. Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude prior to bid date to be qualified.

- B. At a minimum, the Site Engineer shall be furnished with a certificate from the Interlocking Concrete Pavement Institute (ICPI) certifying qualification program. The Site Engineer is expected to verify for himself the qualification.
- C. Contractor shall conform to all local, state/provincial licensing and bonding requirements.

- D. Contractor will hold a mandatory pre-construction meeting with Design Engineer, Owner, and affected sub-trades addressing the paving work area to review method statement and quality control plan and communicate all parties a work flow that is most desirable to meet the construction schedule as set forth by the General Contractor. Additional details of Pre-Construction meeting are outlined in Article 3.01.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Contractor shall check all materials upon delivery to assure that the proper materials have been received and are in good condition before storage or on the manufacturer's packing slip.
- C. Contractor shall not accept any damage or contamination due to job site conditions and in accordance with manufacturer's recommendations. Damaged or contaminated materials shall not be incorporated into the work.
- D. Deliver concrete grid pavers to the site in steel crated, plastic wrapped, or plastic wrapped and strapped units.
- E. Use caution when handling concrete grid pavers to insure that the pavers do not damage the product.
- F. Handle and transport aggregates to avoid segregation, contamination and degradation. Keep different materials sufficiently separated as to prevent mixing. Do not dump or store one material on top of another unless it is part of the installation process. Cover material with waterproof covering to prevent damage or loss due to rain or wind. Cover the pavers with a tarp when not in use.
- G. Geotextiles shall be delivered, stored and handled in accordance with ASTM D-4873.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not install during heavy rain, freezing conditions or snowfall.
- B. Do not install on frozen soil substrate.
- C. Do not install frozen bedding course sand, joint fill or base course material.

1.8 MAINTENANCE MATERIALS

- A. Provide 80 square feet additional concrete grid paver material for use by Owner for maintenance and repair as stock.
- B. Store concrete grid paver materials in Owner designated location.

PART 2 - PRODUCTS

2.1 DEFINITIONS

- A. **Base Course** - within the context of this specification, a dense graded free draining aggregate material of a designed thickness that provides structural support over the substrate.
- B. **Bedding Course** - within the context of this specification, a one-inch thick layer of course, washed sand loosely screeded free for bedding of the concrete grid pavers.
- C. **Concrete Grid Pavers** - individual grid paving units manufacturing from concrete. Concrete grid pavers are shipped in clusters called bundles or cubes, which consist of several layers of pavers strapped or wrapped together. These are used primarily for separation by paving layers.
- D. **Concrete Grid System** - a system of paving consisting of concrete grid pavers placed in an Interlocking pattern, compacted into a bedding course.
- E. **Joint Fill** - topical used to fill spaces within and between the concrete grid pavers. Grass seed or soil plugs are placed on the surface to help stabilize the joint fill.
- F. **Laying Face** - the working edge of the pavement where the laying of pavers is occurring.
- G. **Mechanical Installation** - The use of specialized machines to lay all types of grid pavers from the bundles and place them on the prepared bedding course. All specialized machines are designed specifically for this application.
- H. **Subgrade** - the soil upon which the pavement structure and shoulders are constructed.

2.2 CONCRETE GRID PAVERS

- A. Supplied by: Oldcastle Architectural Location as noted below:
 - CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT
 - Anchor Concrete Products
 - 1915 Atlantic Avenue, Manasquan, NJ 07836
 - 800-682-5625
 - 732-292-2650 Fax
- B. The concrete grid paver product to be provided shall be Belgard Turfstone with the following dimensions:
 - 1. Concrete grid paver size shall be 15.34" x 23.56".
 - 2. Concrete grid paver thickness shall be 3/16".
- C. Concrete grid paver thickness shall be 3/16".
- D. Concrete grid paver thickness shall be 3/16".
- E. Concrete grid paver thickness shall be 3/16".
- F. Concrete grid paver thickness shall be 3/16".
- G. Concrete grid paver thickness shall be 3/16".
- H. Concrete grid paver thickness shall be 3/16".

- I. Measured length or width of test specimens shall not be more than +/- 0.125 in from approved sample, while measured thickness shall not differ by more than +/- 0.125 in from the specified standard dimensions
- C-140.
- 3. Maximum water absorption of 30,000 psi (35 MPa) with no individual unit under 4,500 psi (31 MPa) when tested in accordance with ASTM C-140.
- D. Efflorescence shall not be a cause for rejection.
- E. Paving in Concrete Pavers shall conform to ASTM C-979.

2.3 BEDDING COURSE

- A. Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock.
- B. Do not use lime-treated sand or stone dust.
- C. Verify gradation conforms to ASTM C-33 requirements for concrete sand (listed in Table 1) as tested in accordance to ASTM C-136.

Table 1

Grading Requirements for Bedding Sand

Steel Size	Percent Passing
3/8 in (9.5 mm)	100
No. 4 (14.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.60 mm)	25 to 60
No. 50 (0.30 mm)	5 to 30
No. 100 (0.15 mm)	0 to 10
No. 200 (0.075 mm)	0 to 1

2.4 JOINT FILL

- A. Topsoil shall conform to ASTM D5268.
- B. Grass seed or soil plugs shall be used at the surface.

2.5 BASE COURSE

- A. Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock.
- B. Verify gradation conforms to ASTM D-2940 as presented in Table 2.

Table 2

Grading Requirements for Base Course Material

Steel Size	Percent Passing
3/8 in (9.5 mm)	100
1/2 in (12.7 mm)	95 to 100
3/4 in (19.05 mm)	70 to 92
5/8 in (9.5 mm)	50 to 70
No. 4 (14.75 mm)	35 to 50
No. 6 (4.75 mm)	12 to 25
No. 200 (0.075 mm)	0 to 8

2.6 GEOSYNTHETICS

- A. Where required, geotextiles (ADS BX14GG BIAxIAL GEOGRID) fabric shall be selected by the Design Engineer based on the intended

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION INSPECTION

- A. Prior to commencement of any work, the Contractor shall conduct a pre-construction meeting with the Owner, Design Engineer and affected sub-trades. The pre-construction meeting should, at a minimum:
 - 1. The site location conforms to the Sheet Plan.
 - 2. The proposed work area is within the specified lines, elevations and compaction densities of the subgrade soils. Subgrade shall be trimmed to within 0 to 5% of the specified grades. The surface of the prepared subgrade shall not deviate by more than 3/8 in from the 10 foot straight edge laid in any direction.
 - 3. Location of utility lines, grade beams, structures, lights, standards, trees wells or any other protrusions as applicable to the project, and that project formwork details are available for each.
 - 4. Proof rolling of the subgrade to determine presence of soft spots or localized pockets of objectionable materials.
 - 5. Compaction of the subgrade should be conducted to at least 95% of the specified CBR for all areas. Stabilization of the subgrade with lime or other additives may be required with the addition of lime or other stabilizers or expansive subgrade soils.
 - 6. Where deficiencies or inconsistencies are identified, the Contractor shall notify the Design Engineer in writing. The Contractor will not proceed with the work until the Design Engineer has verified that the deficiencies or inconsistencies have been addressed.

3.2 INSTALLATION BASE COURSE

- A. Installation geotextile (i.e. geogrid) is required in accordance with the specifications and drawings. The geogrid is applied to the bottom and sides of the excavation with overlapping joints to refer to Geotextiles specific to minimum overlap.
- B. Install the Base Course at the thickness, compaction, surface tolerances, and elevations outlined in the specifications.
- C. The aggregate should be spread and compacted in uniform layers not exceeding 2 in thick loose thickness.
- D. Density testing shall be conducted to verify performance.
- E. 3.5% slope tolerance should be plus or minus 10% of the 10 ft (1.0 m) straight edge laid in any direction.
- F. All areas will be to prepare proper bedding course including near curbs, grade beams, concrete columns and utility structures, lights, standards, tree wells, building edges and other protrusions as applicable to the project. In areas not accessible to large compaction equipment, compact to specified density with hand tamper.
- G. The upper surface of the base shall be uniformly graded and compacted to prevent infiltration of the bedding sand into the base both during construction and through its service life. Segregated areas of the granular base shall be blended by the application of crushed fines that have been watered and compacted to the surface.
- H. Before commencing placing of the Bedding Course, the base shall be inspected by the Owner or the Consultant

3.3 INSTALLATION BEDDING COURSE, CONCRETE GRID PAVERS AND JOINT FILL

- A. Spread the Bedding Course evenly over the Base Course and screed to a nominal 1 in. (25 mm) thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the trowel to smooth the base in the Base Course surface.
- B. Place the bedding sand to stay ahead of the laid pavers. Do not use the trowel to smooth the base in the Base Course surface.
- C. Ensure that concrete grid pavers are laid on a clean, dry, and stable bedding course before installation. Concrete grid pavers shall be inspected for color distribution and at each location or discoloration of grid pavers shall be installed. Installation of concrete grid paver in place shall be deemed to represent acceptance of the concrete grid pavers.
- D. Lay the concrete grid pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.
- E. Joints between the individual concrete grid pavers, and between concrete grid pavers and buildings, curbs, or other protrusions/edging, on average shall be between 1/8 in. (3 to 6 mm) wide.
- F. Fill gaps at the joints of the pavers and between the pavers and the curb.
- G. Cut all grid pavers using a masonry saw. Upon completion of cutting, the area must be swept clean of all debris to facilitate inspection and to ensure the Concrete Grid Pavers are not damaged during compaction.
- H. Using a low amplitude plate compactor capable of at least 4,000 kips, compact at a frequency of 75 hz -100 hz, compact the Concrete Grid Pavers and bedding course. A tamper or nylone pad between the compactor and Concrete Grid Pavers may be necessary to prevent cracking and chipping.
- I. The grid pavers shall be compacted to achieve consolidation of the sand bedding and to level and profile by no more than three passes. Initial compaction shall proceed as closely as possible following the installation of the grid paving units and prior to the acceptance of any traffic or application of joint fill.
- J. Any units that are structurally damaged during compaction shall be immediately removed and replaced.
- K. Spread topsoil into the joints between the grid pavers to a thickness of 1/2 in (12.7 mm) over the entire surface throughout. This will require all joints to be filled with topsoil at the end of each day. Cover the laying face with straw mulch if it does not cut and damage the grid pavers.
- L. Broadcast grass seed at the rate recommended by the seed supplier, or place sod plugs into all openings.
- M. All work to within 3 ft (1 m) of the laying face must be fully compacted with filled joints at the end of each day. Cover the laying face with straw mulch if it does not cut and damage the grid pavers.
- N. The final surface elevation shall not be less than 3.8 in (10 mm) above adjacent drainage inlets, concrete curbs or channels.
- O. The surface elevation of grid pavers shall be 1.6 to 1.4 in. (3 to 6 mm) above adjacent drainage inlets, concrete curbs or channels.
- P. Distribute straw covering to protect germinating grass seed or sod. Water entire area. Do not traffic pavement for 30 days.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

- A. Quality Assurance - The Owner may engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction.
- B. Quality Control - The Contractor shall provide a minimum inspection verification that the Contractor's quality control and testing are adequate. Quality control shall include observation of construction for general compliance with drawings and project specifications.
- C. Quality Control - The Contractor shall engage inspection and testing services to perform the minimum quality control testing described in the design plans and specifications. Only qualified and experienced technicians and engineers shall perform testing and inspection services.
- D. Quality control testing shall include both testing to verify soil types and compaction, and verification that the system is being constructed in accordance with the design plans and project specifications.

3.5 AS-BUILT CONSTRUCTION TOLERANCES

- A. Final inspection shall be conducted to verify performance to the drawings after removal of excess straw cover after 30 days. All pavements shall be firmed to levels and tested to ensure positive drainage at all drainage outlets and channels.
- B. The final surface elevation shall not deviate more than +/- 3/8 in under a 10 ft long straight edge.

END OF SECTION

Geosynthetics

Part 1 - General

1.1 SECTION INCLUDES

A. Geosynthetics

1.2 RELATED SECTIONS

A. Clearing

B. Earthwork

C. Concrete Grid Pavement

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D1117 - Test Methods for Nonwoven Fabrics
 - 2. D4355 - Determination of Geotextile Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
 - 3. D4522 - Standard Test Method of Geotextiles by Permeability
 - 4. D4533 - Tearing Strength of Geotextiles
 - 5. D4642 - Grab Breaking Load and Elongation of Geotextiles
 - 6. D4643 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
 - 7. D4834 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
 - 8. D5054 - Breaking Strength and Elongation of Textile Fabric (Grab Test)
 - 9. D5100 - Measuring the Permeance of Geotextiles and Geomembranes
 - 10. D5261 - Measuring the Uniformity of Geotextiles and Geomembranes
- B. New York State Department of Transportation
 - 1. Standard Specifications Section 207 - Geosynthetics