VOLUME 4 – CIVIL

Owego Apalachin Central School District

1 Sheldon Guile Boulevard, Owego NY 13827

Capital Project Phase 4

Owego Free Academy / Middle School

SED#: 60-06-01-06-0-009-034

Apalachin Elementary School

SED#: 60-06-01-06-0-008-018

appel osborne landscape architecture
BUFFALO | SYRACUSE | TROY

HIGHLAND ASSOCIATES
architecture | engineering | interior design

"The design of this project conforms to all applicable provisions of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Code, and the building standards of the New York State Education Department."

HA PN: 2024-240P **April 10, 2026**

OWEGO APALACHIN CENTRAL SCHOOL DISTRICT
CAPITAL PROJECT PHASE 4
OWEGO FREE ACADEMY/MIDDLE SCHOOL SED#: 60-06-01-06-0-009-034
APALACHIN ELEMENTARY SCHOOL SED#: 60-06-01-06-0-008-018
BID DOCUMENTS
APRIL 10, 2026

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SECTION 31 12 01 - SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in Division 31, 32 and 33.

1.2 DESCRIPTION OF WORK

A. The extent of site preparation is shown on the drawings.

B. Site preparation work includes, but is not limited to, the following:

1. Site investigation and underground utility identification (GPR)
2. Vacuum excavation (utility locating)
3. Protection of existing trees and lawns to remain
4. Topsoil stripping and stockpiling on site
5. Site clearing and removals
6. Asphalt Milling
7. Saw cutting
8. Relocations/salvaged materials
9. Clean up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 50 00 - Temporary Facilities and Controls

B. Section 31 22 01 - Site Earthwork

C. Section 32 92 01 - Lawns

D. Section 33 40 01 - Storm Drainage

1.4 SITE INVESTIGATION

A. A site visit before bidding is recommended so the Contractor can inform and familiarize themselves of all site conditions, including but not limited to, site topsoil, sub-soil, subsurface and groundwater conditions affecting proposed work.

B. Verify locations and protect utilities and structures, whether or not shown on the drawings. Existing utilities and structures shown on the drawings are for the Contractor's convenience and locations are not guaranteed.

C. Verify survey information given on drawings. Walk the site with the Owner's Representative to discuss approximate locations of reputed utilities shown and not shown on the survey, prior to performing work. The Contractor shall provide and perform Ground Penetrating Radar (GPR) utility location within an area of approximately 25,000 sf, in specific areas directed by the Architect and Owner, prior to performing any excavation. Notify the Architect and Owner of any and all discrepancies prior to ordering materials and commencing any work. Commencement of any work will be construed as complete acceptance of survey information.

D. Provide Vacuum Excavation (SoftDig or similar) utility locating holes in six (6) locations onsite in areas as directed by the Architect and Owner.

E. Contractor shall provide Test Pits at all connection points at existing utilities and at all utility crossings to verify utility locations, size, type, invert, and elevations PRIOR to ordering and taking delivery of materials for construction. Notify the Architect and Owner of finding immediately. Contractor shall furnish all labor and materials to accomplish at no additional cost to the Owner.

F. Locate and protect from disturbance existing survey monuments, pins, markers, and benchmarks whether or not shown on drawings. When any disturbance or damage occurs, notify Architect in writing within 24 hours. Describe nature of disturbance or damage and date first occurred. Provide copies to applicable government and municipal agencies. Pay costs for restoring monument to satisfaction of said agencies, at no additional expense to the Owner.

1.5 JOB CONDITIONS

A. The terms "Architect" and "Landscape Architect" for Divisions 31, 32 and 33 work shall mean Appel Osborne Landscape Architecture, 102 West Division St., Suite 100, Syracuse, NY 13204, Tel. (315) 476-1022 or other representative(s) that Highland Associates may determine.

B. Examine drawings and specifications for the entire project. Become familiar with the scope and sequencing of work required. Coordinate and cooperate with other Contractors and trades working in and adjacent to the project.

C. Examine work prepared prior to this contract. Commencement of work will be construed as complete acceptance of all preparatory work by others.

D. Obtain and pay for permits required by authorities. Perform the work in compliance with applicable standards, codes and requirements of governing authorities having jurisdiction.

E. Safety is the sole responsibility of the Contractor.

F. Burning on site and use of explosives are not permitted.

G. Responsibility for existing utilities:

1. Contact Dig Safely New York at least two (2) full working days, and not more than ten (10) working days, before digging begins or as required by latest state law. Locate by hand excavation and provide protection from damage to existing utilities to remain in the area. (Tel. 811)

2. Existing utilities encountered within excavated areas shall be supported, blocked and/or braced in a manner approved by the owner of the utility. Leave supports in place to the extent required by the owner of the utility.

3. Should uncharted or incorrectly charted utilities be encountered, notify the Architect immediately for directions as to procedure.

4. Do not break utility connections without providing temporary services as acceptable to the Architect and the owner of the utility.

5. Repair and pay for damages to existing utilities as directed by utility Owner at no additional cost to the Owner.

6. Cap ends of utilities to be abandoned or removed in accordance with regulatory agencies and as directed by the Architect.

H. Provide protections and conduct operations to prevent injury and damage to persons, work of other Contractors, existing items to remain, structures, pavements, lawns, and adjacent properties.

I. Restore work damaged by this Contractor inside and outside the contract limits to the condition existing prior to the start of work, unless otherwise directed, to the satisfaction of the Architect at no additional cost to the Owner.

J. Vehicular and pedestrian traffic control:

1. Maintain vehicular and pedestrian traffic during construction activities.

2. Provide alternate routes and traffic control around closed and obstructed traffic ways as required by governing regulations or the Owner.

3. Provide temporary fencing, flagpersons, barricades, warning signs, and warning lights or other measures to protect the public and cause the least interruption of work.

K. Field Measurements: Take necessary field horizontal and vertical measurements required in order to perform the work and design intent shown on the drawings and outlined in the specifications. Assume complete responsibility for accuracy of such measurements and dimensions.

L. Removal of spoils, dust control, debris, snow and clean up:

1. Control air pollution caused by dust and dirt; comply with governing regulations. Water to control dust when necessary and as directed by the Architect or

Certified Erosion Control Specialist. Provide water sprinkling materials, equipment and labor to prevent the nuisance of dust to the surrounding areas.

2. Legally dispose of removed and demolished items, including trash and debris, off the Owner's property, at a licensed disposal facility having adequate capacity to accept the project's waste.

3. Burning of combustible materials on the site is not permitted.

4. During the contract and at intervals as directed by the Architect, clear the site of extraneous materials, rubbish, construction waste, and debris. Leave the site in a clean, safe, neat, well-draining condition.

5. Soil and Snow Removal: Sweep roads, access ways, paved areas, and parking areas where soil, mud and debris have dropped or tracked from construction and delivery vehicles on a daily basis and as directed by the Architect or Certified Erosion Control Specialist. Remove snow and ice from roads, access ways, paved areas and parking areas utilized for site construction purposes.

6. Spoils: Remove from site and dispose when not required for fill or determined to be unsatisfactory soil material per Section 31 22 01 - Site Earthwork.

M. Construction Review - General: Site visits will be made by the Architect to observe construction conformance to drawings and specifications. The occasional site visits by the Architect shall not be construed as supervision of construction or make them responsible for the safety programs and precautions, including but not limited to: the safe access, visit, use, work travel, or occupancy of any person. Site visits shall not make the Architect responsible for means, methods, techniques, sequences or procedures of construction selected by the Construction Manager, Contractor or his Sub-contractors.

N. Site Complexity: The existing site will be intensively developed. Because of the construction and resulting graphic complexity, it is impractical to show every detail. However, the general design intent is clearly shown and shall be applied to individual conditions not specifically shown as directed by the Architect and at no additional cost to the Owner.

O. Asbestos, Toxic and Hazardous Materials: The Division 31, 32 and 33 site work contract does not include testing for, handling or removal of hazardous materials such as, but not limited to: asbestos, fuel, oil, PCB's, or other toxic or hazardous waste materials as identified by the EPA and/or NYSDEC. If any such materials are encountered during any part of the site work, the Contractor is responsible for identifying potential hazardous material and immediately notify all governing agencies having jurisdiction as required by law. Also, within one (1) hour of discovery notify the Architect, Landscape Architect, Consultants, and Owner. The Owner shall provide testing and removal by others, under separate contract. The Contractor shall recommence work under this contract when the Owner provides written certification that remediation is complete per governing agency. The Contractor shall not be penalized for any delays caused by the hazardous testing and removal, unless such hazardous material incident was a result of Contractor's operations. The Contractor shall indemnify and hold harmless the Architect, Landscape Architect,

Consultants and Owner, agents, and employees from and against all claims, damages, losses and expenses, direct and indirect or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from the performance of the work by the Architect, Landscape Architect, Consultants and Owner, or claims against the Architect, Landscape Architect, Consultants and Owner arising from the work of others, related to hazardous waste.

The above indemnification provision extends to claims against the Architect, Landscape Architect, Consultants and Owner which arise out of, are related to, or are based upon, the dispersal, discharge, escape, release or saturation of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, or pollutant in or into the atmosphere, or on, onto, upon, in or into the surface or subsurface soil, water or water courses, objects, or any tangible or intangible matter, whether sudden or not.

Should the hazardous material incident be the result of the Contractor's operations, the Contractor shall be responsible for all costs associated with the discovery and remediation of such hazardous material such as, but not limited to: testing, consultant fees, damage, loss, fees and charges of attorneys, court and arbitration costs, claims by other contractors, direct and indirect or consequential damages.

P. Salvageable Items: Remove at any time after work starts. Storage or sale on site of salvageable and removed items is not permitted. Do not remove topsoil from site without written permission from the Owner.

1.6 SUBMITTALS:

A. Provide photographic documentation. Photographically document existing features which, may be affected by the construction, inside and outside the contract limit line. Existing features include, but are not limited to: structures, pavements, curbs, utilities, lawns and vegetation, especially individual trees which are over six (6") inches in diameter and noted to remain on the drawings. Also, particular attention shall be paid to the construction access, stockpile and haul road areas. Distribute a copy of the photographic documentation (digital format) to the Owner and Architect prior to the start of construction.

B. Ground Penetrating Radar (GPR) Mapping and Report.

C. Vacuum Excavation Report with pictures, elevations, and descriptions.

PART 2 - PRODUCTS

2.1 PLASTIC FENCE

A. Shall be new or good quality used 4’-0” high heavy duty orange plastic fence NC450.

B. Posts shall be new or good quality U-channel posts to hold plastic fence.

2.2 OTHER PROTECTIVE DEVICES

A. Shall include, but not be limited to; wood planks, rubber mats, barriers, lights, barricades, coverings, traffic controls, steel plates, and other temporary protections.

B. Contractor to provide all necessary protections required by Occupational Safety and Health Administration (OSHA).

PART 3 - EXECUTION

3.1 SITE INVESTIGATION AND UNDERGROUND UTILITY IDENTIFICATION:

A. Provide Ground Penetrating Radar (GPR) Mapping for all utilities within the 25,000 sf boundary directed by the Architect and Owner.

3.2 VACUUM EXCAVATION:

A. Provide Vacuum Excavation utility locating services as indicated in 1.4, D. above.

B. Backfill holes with crushed stone as directed by the Architect and Owner.

C. Identify type, size, and elevations of utilities uncovered.

D. Provide completed report with pictures, elevations, and descriptions for submission to the Owner and Architect.

3.3 PROTECT EXISTING VEGETATION TO REMAIN

A. Prior to commencing site preparation work, notify Architect, and meet on site to locate existing trees, lawns and vegetation which are to remain.

B. Protect and keep existing vegetation to remain free from physical damage. Keep in a healthy, vigorous growing condition for the entire construction period as follows:

1. Keep site disturbance and staging limits to a minimum. Obtain approval from Owner for material and equipment storage areas. Limit access points and routes to the project site. Coordinate site access with other trades and contractors on the work site.

2. Groups of Trees and Vegetation: Place orange plastic construction fencing around drip line(s) of trees and plant beds as detailed or directed by the Architect. Do not store materials, run equipment, park vehicles, or otherwise disturb area within the drip line (full canopy of tree) or in plant beds.

3. Specimen and Individual Trees: Protect each as noted and detailed. Do not store materials, run equipment, park vehicles or otherwise disturb area within the drip line (full canopy of tree).

C. Rejuvenate damaged vegetation by pruning watering, fertilizing, staking and other methods as directed by the Architect. Replace trees and other vegetation that cannot be

restored to full growth with comparable size, quantity, quality and species as determined by the Architect.

D. Repair lawns disturbed due to construction operations outside the grading limits, as specified and directed by the Architect. Provide screened topsoil, seed, and mulch over damaged lawn areas, access ways or where tire rutting occurred.

3.2 TOPSOIL STRIPPING AND STOCKPILING ON SITE

A. Strip full depth of existing topsoil from areas to be regraded, paved, or otherwise built upon. When amount of available topsoil exceeds what is indicated in geo-tech/boring report, on site test pits, or Contractor assumed depth, continue to remove all topsoil and lower the paved or built element subgrade. Place additional satisfactory earth fill in uniform depths as indicated in the Site Earthwork Section 31 22 01. Maintain finished grades as shown on the drawings. This work shall be done at no additional cost to the Owner.

B. Minimum quantity of topsoil shall be as needed to provide four (4") inches settled depth on lawn areas. Verify quality and quantity. Supply imported topsoil when amount of available topsoil meeting above requirements is less than what is required for the proposed lawn areas. See Section 329201 for imported topsoil requirements.

C. When amount of available topsoil meeting above requirements exceeds what is required for the proposed lawn and athletic field areas, lower the lawn and athletic field subgrade and place additional topsoil in a uniform depth as directed by the Architect. Maintain finish grades as shown on the drawings. This work shall be performed and supplied at no additional cost to the Owner.

D. Topsoil shall be well drained, homogeneous texture soil of uniform grade, without the admixture of subsoil material. Topsoil shall be free of dense material, hardpan, and stone over three-quarters (3/4") inch in diameter, and other objectionable foreign material including, but not limited to, brick, concrete, asphalt, glass, nails, screws, toxins, hazardous wastes and chemicals (such as, but not limited to, atrizene and muriatic acid) that may be injurious to humans, animals and plant materials.

E. Excess topsoil, not needed for proposed lawns, as specified, shall be loaded and hauled offsite at no additional cost to the Owner. Should existing topsoil onsite not be in sufficient quantities to provide for proposed lawns and planting area depths as indicated on the plans and as specified, contractor shall furnish and install the required amount of topsoil at no additional cost to the Owner.

3.3 SITE CLEARING AND REMOVALS

A. Items and materials noted to be removed shall become the property of the Contractor, unless otherwise noted. Obtain Owner's approval prior to removal off site or for relocation of salvaged material on site. Remove material off site and legally dispose of it. Backfill voids with imported granular backfill, placed in eight (8") inch layers compacted to 95% maximum density.

B. Remove physical elements above and below grade as shown and which interfere with proposed construction. Physical elements include but are not limited to: trees, root systems, shrubs, vines, grass, vegetation, pavements, walks, curbs, gutters, foundations, previous construction materials, glass, headwalls, flared end sections, catch basins, manholes, inlets, drywells, septic tanks, unused utilities, pipes, cisterns, walls, rocks, and other debris.

C. Trees, shrubs and roots shall be completely removed and disposed of legally off site.

D. Maintain existing utilities shown to remain and protect from damage during demolition and construction operations. Do not interrupt existing utilities; provide temporary services when required, as acceptable to the Architect.

E. Research with Owner possible locations of existing subsurface utilities prior to excavating.

3.5 SAW CUTTING

A. The Work consists of vertical saw cutting of the existing asphalt or concrete pavement structure to facilitate the removal of the asphalt or concrete bound material.

B. The equipment shall be capable of producing a smooth vertical saw cut without causing damage to the adjacent pavements or related site features.

C. The Contractor shall saw cut the asphalt/concrete pavement to a depth which will allow removal of the material without causing damage to the adjacent pavement. Rough, jagged or cracked edges will not be acceptable. Concrete pavement shall be removed at the nearest contraction joint.

3.6 ASPHALT MILLING

A. Mill existing asphalt to limits shown on the drawings and dispose off site.

B. Mill existing asphalt and use as partial stone subbase (for new pavements) when it meets gradation noted in 312201 for maximum 50% of the stone subbase specified depth. Provide a mechanical analysis based on ASTM C 136 for approval prior to installation.

C. The Contractor shall use equipment with automatic grade and slope controls, capable of cold milling existing asphalt pavement to an accurate depth of cut, profile and cross slope and shall be capable of loading the milled material directly into trucks.

D. Cold milling asphalt pavement shall be performed in a manner which prevents the tearing and breaking of underlying and adjacent pavement and the contamination of the millings with granular subbase material, subgrade or deleterious materials. All millings shall be loaded directly to trucks from the milling machine and hauled to stockpile or disposed of.

E. The milled surface shall be swept and jet washed clean prior to installation of new surface material. The Contractor shall sweep the surface in a manner which minimizes dust.

F. The Contractor shall promptly repair any and all localized areas of distress in the milled surface that may present a hazard to traffic, the finished surface, the stability of the new asphalt, or deemed unsuitable by the Architect, at no additional cost to the Owner.

G. Contractor shall apply NYSDOT approved tack coat to the cleaned, milled surface in preparation to received new top course asphalt as specified in Section 321201 - Asphalt Paving.

3.7 RELOCATIONS

A. Any item noted to be relocated shall be removed by the Contractor from its existing position without damaging it, stored, protected from theft, fire, vandalism and damage for the project duration. Reset in the location(s) and in the manner detailed, noted on the drawings or specified.

B. Backfill voids with imported granular fill material, placed in eight (8") inch layers compacted to 95% maximum density when located in proposed pavement areas or 90% maximum density when located in proposed non-paved areas.

C. Salvaged items shall be returned to the Owner as noted on the drawings. Move items to Owner designated areas.

3.8 CLEAN UP

During the contract and at intervals as directed by the Architect and as site preparation is completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 31 12 01

SECTION 31 22 01 - SITE EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of site earthwork and site grading is shown on the drawings.

B. Site earthwork includes, but is not limited to, the following:

1. Fill Materials
2. Source Quality Control
3. Shoring, Bracing, and Supporting
4. Horizontal and Vertical Layout
5. Grading and Excavation
6. Compacted Backfill and Fill
7. Stone Blanket(s)
8. Field Quality Control Testing and Inspection Services
9. Guarantee
10. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 25 01 - Erosion, Sediment, and Pollution Control

C. Section 33 11 01 – Water Distribution

D. Section 33 33 01 – Site Sanitary

E. Section 33 40 01 - Storm Drainage

1.3 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials

B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ASTM D 75 - Practice for Sampling Aggregates

D. ASTM D 422 - Particle-Size Analysis of Soils (without Hydrometer Analysis)

E. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3)

F. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3)

G. ASTM D 2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)

H. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

I. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

J. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

K. ASTM D 6938 - In Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods

L. ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

M. ASTM D 5084 - Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

N. Deep Ripping and Decompaction shall be per NYSDEC recommendations, latest edition

O. Occupational Health and Safety Administration Regulations and Standards

P. American Sports Builders Association (ASBA): Sports Fields - A Construction and Maintenance Manual, latest edition.

Q. ASTM F2898-11 – Standard Test Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-Confined Area Flood Test Method

R. EN 12616 – Permeability of Synthetic Turf Sports Field Base Stone by Double Ring Infiltrometer, Method A.

1.4 SUBMITTALS

A. Furnish name of New York State licensed Land Surveyor to be employed and perform project layout. Obtain Architect's approval prior to performing work.

B Submit written report on NYS licensed Land Surveyor's letterhead verifying that professional's involvement with the project layout. The report shall briefly state the scope of services performed for the project, the dates work was accomplished, and an

explanation of any adjustments required, specifically listing as-built and FIELD VERIFY requirements as noted in 3.2 of this specification section.

C. Provide Earthwork Contractor's experience requirements as indicated in 1.5, "Quality Assurance". Obtain Architect's approval prior to performing work.

D. Samples: 10 lb. samples of each type of fill; submit in airtight containers to testing laboratory.

E. Materials Sources: Submit name of imported materials source for each type of fill material.

F. Fill Composition Test Reports (Imported and Onsite): Provide results of laboratory tests (less than 2 months old) on proposed and actual materials used to determine acceptability. This shall include:

1. One optimum moisture-maximum density curve (Modified Proctor) for each soil/imported fill type as determined by ASTM D1557, Method A, latest issue.
2. Sieve Analysis - ASTM D422
3. Moisture Density Relationship - ASTM D1557, Method C / ASTM D698
4. Plasticity Index - ASTM D4318
5. Soundness Test - ASTM C88
6. Soil Classification - AASHTO and ASTM D2487

G. Compaction Density Test Report(s) required in Field Quality Control of this specification.

H. Contractor's NYS Licensed Professional Engineer's layout and design calculations of sheet piling and shoring required.

I. Synthetic Turf Permeability Testing: Engage an independent testing agency to perform ten (10) permeability test of both the finishing stone and base stone of proposed synthetic turf stone blanket as determined by ASTM D2434 and ASTM F2898-11. Results shall meet the following at minimum:

1. permeability of base stone > 40"/hour
2. permeability for finishing stone > 40"/hour

1.5 QUALITY ASSURANCE

A. Perform all site earthwork, site grading and excavation in compliance with requirements of governing authorities having jurisdiction, OSHA Standards, and "References" in this project specification.

B. The Owner will employ a licensed soil testing and inspection service for Field Quality Control Testing of materials. This Contractor will coordinate day to day scheduling with the Owner's testing agency for conformance with "Field Quality Control Testing and Inspection Services" in this project specification.

C. Earthwork Contractor Experience Requirements: Submit business name, business Owner(s) name(s), business address, telephone number, website and/or email address signed by the Contractor/Subcontractor who meets the qualifications set forth in this specification and is proposed by the Contractor to perform the Earthwork for this Project. Provide a list of at least four (4) Earthwork projects of comparable size, scope and quality completed successfully by the proposed Contractor/Subcontractor within the past three (3) years that includes the date completed, project Owner's name and current contact information, including telephone numbers and email addresses.

D. Layout Foreman Experience: The Earthwork Contractor must provide a competent layout foreman skilled in this specific type of layout/earthwork project. The layout/earthwork foreman shall have a minimum of four (4) similar projects completed within the last three (3) years. Provide a list of projects layout/earthwork foremen has completed including project name, address, Owner contact information and project scope of work.

1.6 JOB CONDITIONS

A. Job conditions in Section 31 12 01 apply.

B. Provide sufficient quantities of fill materials to meet project schedule and requirements. When necessary, store materials on site in advance of need.

C. When fill materials need to be stored on site, locate stockpiles where directed by Owner.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination of material types.

3. Protect all stockpiles from erosion and deterioration of materials by covering with plastic sheets, tarps or as directed by the Architect.

D. Moisten or dry, fill or backfill materials, to the proper moisture content as determined in accordance with ASTM D1557, Method C in order to obtain proper compaction as indicated.

1.7 SUB-SURFACE SOIL INFORMATION

A. Geo-technical Report/Data has not been provided by the Owner. Test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Architect and Owner. Coordinate test locations with Owner prior to starting work. Backfill immediately when completed and repair to satisfactory conditions as determined by the Architect. It is expressly understood that the Owner, Architect, Landscape Architect, and Consulting Engineers are not responsible for interpretations or conclusions drawn therefrom by the Contractor.

1.8 UNUSUAL SUBSURFACE CONDITIONS

A. Notify the Architect immediately in writing via email when unusual conditions are encountered during excavation, including, but not limited to: excessive flooding, miscellaneous structures, uncharted or unlocated utilities, foundations, bed rock, toxic and hazardous materials and chemicals (such as muriatic acid and atrizene), suspected archaeological artifacts, and unsatisfactory soil materials. Request clarification from the Owner's Representative or Architect before proceeding. Refer to paragraph 3.4 of this specification.

PART 2 -PRODUCTS

2.1 FILL MATERIALS

A. **Satisfactory General Earth Fill:**

1. To be used at least 5'-0" outside of structural elements and synthetic turf subgrade areas.

2. Satisfactory general earth fill shall be satisfactory on-site subsoil, or hauled in off-site subsoil free of toxics, hazardous wastes and chemicals (such as, but not limited to, atrizene and muriatic acid) that may be injurious to humans, animals and plant materials. Satisfactory earth fill shall also be free of rubbish, debris, wood, masonry, metal, frost, vegetation, organics or other deleterious material, which cannot be properly compacted. Use satisfactory general earth fill that is dry and free of clay. Rocks, gravel or soil shall not be larger than 3" in any dimension/direction.

3. Satisfactory earth fill materials are also defined as those complying with the American Association of State Highway Transportation Officials (AASHTO), M-145 soil classification Groups A-1, A-2-4, A-2-5, A-3 and Unified Soil Classification System GW, GP, GM, GC, SW, SP, SM, and SC (or a combination of these group symbols) as determined by ASTM D2487.

B. **Imported Granular Backfill and Base Course:**

1. Imported granular backfill to be used for asphalt pavement subbase, concrete subbase, storm structures, storm pipes, water pipes, sanitary manholes, sanitary pipes, other structures, and where indicated on the drawings.

2. Backfill shall be run of crusher stone meeting the following gradation as determined by ASTM-C136:

Standard Sieve Sizes	Percent Passing By Weight
2" or 50 mm	100%
3/4" or 19 mm	75 - 90%
1/4" or 6.3 mm	25 - 60%
#40 or 0.425 mm	5 - 40%

#200 or 0.075 mm	0 - 8%

3. Backfill shall be free of debris and deleterious materials. In no case shall the plasticity index exceed 5.0 or the percentage passing the 200 mesh sieve exceed 8%. The quality of the imported granular backfill shall be determined by the magnesium sulfate soundness test, if considered suspect by the Architect or Geotechnical Engineer. The maximum percent loss at four cycles by weight shall be 20.

C. **Imported Structural Fill:**

1. Imported structural fill to be used in areas of structural elements, for top eight (8") inches of design subgrade elevation for synthetic turf fields and where noted on the drawings.

2. Shall be run-of-bank or run-of-crusher gravel free from organic matter or other deleterious materials, meeting the material gradation requirements of Item 304.05 Sub-base Course, Type 4, of the NYSDOT's Standard Specifications for Construction Materials, as determined by ASTM C136.

Standard Sieve Sizes	Percent Passing By Weight
2" or 50 mm	100%
1/4" or 6.3 mm	25 - 60%
#40 or 0.425 mm	5 - 40%
#200 or 0.075 mm	0 - 8%

3. Imported structural fill shall be accepted on the basis of gradation, soundness, plasticity index and a well-defined Moisture-Density Relationship Curve. Imported structural fill to be placed within 8" of final exterior subgrade shall be subject to Soundness requirements. Soundness shall be less than 30% loss based on a four-cycle magnesium sulfate soundness test. Plasticity Index of that portion of fill material passing the No. 40 mesh sieve shall not exceed 5.0.

D. **Drywell and Stormwater Management Trench (SMT) Backfill:**

1. Shall be No. 1 clean, washed, crushed stone meeting the following gradation as determined by ASTM C136:

Standard Sieve Size	Percent Passing By Weight
1" or 25.0 mm	100%
1/2" or 12.5 mm	90-100%
1/4" or 6.3 mm	0-15%

E. **Stone Blanket (For Synthetic Turf):**

1. Material shall be a 100% fractured, by mechanical means, with elongated characters on each individual particle larger than 1/4". Material shall be clean of mineral fines with particles smaller than 1/4" by manufactured means. Rounded sands and crushed gravels are prohibited.

2. Base Stone: Shall be crushed hard durable angular #57 stone (#1 stone and #2 stone blend) meeting the following gradation as determined by ASTM C117, ASTM C136, and ASTM D 448-86:

Standard Sieve Sizes	Base Stone Percent Passing by Weight
1-1/2" or 38.0 mm	100
1" or 25.0 mm	95 - 100
1/2" or 12.5 mm	25 - 60
No. 4 or 4.75 mm	0 - 10
No. 8 or 2.36 mm	0 - 5

3. Finishing Stone: Shall be crushed hard durable angular #1A stone meeting the following gradation as determined by ASTM C117 C136:

Standard Sieve Sizes	3/4" Max. Depth Finishing Stone Percent Passing by Weight
1/2" or 12.5 mm	100
1/4" or 6.3 mm	90 - 100
1/8" or 3.175 mm	0 - 15
No. 200 or 0.075 mm	0 - 2

4. All stone shall be crushed rock; no sands are acceptable.

5. Delivery Moisture Content: Processed stone must contain 90% to 110% of the optimum moisture content to ensure that fines do not migrate and to facilitate proper compaction. The Contractor shall ensure aggregate leaving the source plant meets this requirement and shall be required to apply water to the processed stone on site if necessary, to achieve the minimum moisture content.

6. Stone blanket stone shall be free of debris and deleterious materials. In no case shall the plasticity index exceed 5.0 or the percentage passing the 200-mesh sieve exceed 4%. The quality of the stone blanket shall be determined by the magnesium sulfate soundness test, if considered suspect by the Architect or Geotechnical Engineer. The maximum percent loss at four cycles by weight shall be 20.

7. Soil Stabilization Fabric: Shall commercially manufactured non-woven polypropylene filter fabric. Standard of quality shall be Mirafi 500X as manufactured by TENCATE or Architect approved equal.

8. Mechanical analysis of base and finishing stone shall be reviewed and approved by both the Architect and Turf Manufacturer.

2.2 UNSATISFACTORY SOIL MATERIALS

A. Shall be defined as soil with high percentage of decomposed rock, sand, organic matter or moisture laden clay to prevent adequate compaction. Also, soil with toxics, hazardous wastes and chemicals (such as atrizene and muriatic acid) that may be injurious to humans, animals and plant materials. Also, soil with significant quantities of rubbish, debris, wood, masonry, metal, frost or other deleterious material which, in the opinion of the Geotechnical Engineer, Owner's Representative, and Architect, cannot be properly compacted shall be classified as unsatisfactory.

B. Unsatisfactory soil materials are defined as those described in AASHTO M-145, soil classification, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 with CBR value less than 7.0. Also Unified Soil Classification System ML, CL, OL, MH, CH, OH as determined by ASTM D2487 (or a combination of these group symbols) with CBR value less than 7.0 in addition to peat (PT) and other highly organic soils, cobbles, boulders; and soil materials, of any classifications that have a moisture content at the time of compaction beyond the range of 1% below and 3% above the optimum moisture content of the soil material/backfill material, as determined by the Moisture Density Relationship test.

C. When unsatisfactory soil materials are encountered at proposed subgrades and other design elevations, proceed as described in Part 3 (Execution) of this Section.

D. When excavated materials become unsatisfactory as a direct result of the Contractor's work, this shall result in the rejection of the unsatisfactory soil materials by the Architect.

E. The use of slag (a byproduct of metal processing) or recycled/crushed concrete is unacceptable for any use on this project site.

2.3 SOURCE QUALITY CONTROL

A. See "Submittals" and "Quality Assurance" of this specification section for general requirements for testing and analysis of soil and fill materials.

B. Where fill materials are specified by reference to a specific standard, Contractor is responsible to test and analyze all samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest until approved.

2.4 SHORING, BRACING AND SUPPORTING

A. Shoring and bracing shall conform to the requirements of the Occupational Health and Safety Act.

B. Shoring and bracing shall be provided, placed and maintained at the locations and elevation that are necessary or required to: support and protect the sides and bottom of the excavation; prevent undue disturbance or weakening of the supporting materials below or beside the works; prevent movement of ground which may disturb or damage the work, adjacent pavements, property, structures or other works.

C. Provide materials for shoring, bracing, and supporting, such as sheet piling, uprights, sheathing, stringers, and cross-braces, in good serviceable condition. Use timbers that are sound and free of large or loose knots.

D. Provide design by Contractor's NYS Licensed Engineer, when shoring is required to perform work as shown on the drawings. Submit to Architect for approval.

E. Installation: Shoring and bracing shall be driven and placed so that it can be removed as backfilling takes place without damage to the pipeline or its appurtenances, structures, and without settlement of or damage to adjacent pavements and structures.

F. Removal: The Contractor shall remove all shoring and bracing as the excavation is backfilled, unless directed by the Architect to be left in place. The procedure for extracting shoring and bracing and placing backfill shall ensure the backfill load is applied gradually, and disturbance of the works or foundation material is avoided.

G. Support all utilities as required by the municipality/utility owner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify field conditions such as bench marks, monuments, topography, inverts, locations of utilities and property lines before proceeding. Notify the Architect immediately, in writing, of discrepancies prior to commencing work. Commencement of work will be construed as complete acceptance of survey and layout information. Additional costs resulting from failure to verify field conditions prior to commencing work shall be borne by this Contractor and at no additional cost to the Owner.

3.2 LAYOUT

A. Stake layout up to and including those elevations and dimensions specifically noted on drawings as "FIELD VERIFY" (FV). Ensure that the field elevation and dimension agrees with the elevation and dimension on the drawings before continuing. Notify the Architect immediately, in writing, of any discrepancies prior to commencing work. Additional costs resulting from failure to verify dimensions as noted on drawings shall be borne by this Contractor and at no additional cost to the Owner.

1. Assume sole responsibility for the accuracy of the layout work.

2. Run from point(s) of beginning (POB), base lines, property monuments, benchmarks, iron survey pins, or other points given on the drawings.

3. Roads, Parking Areas, and Walks: Accurately locate and stake curb lines, center line, swales, point of curve and tangency as necessary to accurately build.

4. Buildings and Site Features: Accurately locate and stake corners, offset corners, slopes, and center lines as necessary to accurately build.

5. Pipe Work: Accurately locate with laser.

B. Athletic Field Layout:

1. Provide accurate layout, alignment and dimensions for fields as shown on drawings and detailed by professional NYS Land Surveyor approved by the Architect.

2. Accurately locate and stake field corners, subsurface location monuments and backstops. Use Owner approved corner markers or stakes 2" x 2" x 2' long pressure treated wood with 16d common nail set flush in top of stake as metal detection element. Set top of athletic field location stakes flush with adjacent finish grades. Spray paint top of stake with day glow orange paint. Protect during construction. Replace if removed at no additional cost to the Owner. Remove as directed by the Architect.

3. Temporarily stripe lawn athletic fields with field line marking mixture approved by Owner and correct surface high and low spots as described in Section 329201 prior to seeding or sodding.

4. Temporarily stripe synthetic turf stone blanket subgrade with field line marking mixture approved by Architect. Meet tolerances described in 3.3 of this specification Section. Correct differences as directed by the Architect.

5. Temporarily stripe synthetic turf stone blanket surface every five (5) yards across the field with field line marking mixture approved by Architect. Correct surface high and low spots as described in Section 334001 prior to synthetic turf installation.

3.3 GRADING

A. Cut and Fill: Presume the earthwork does **NOT** balance on site. Meet the grades shown on the drawings. Haul in or haul away as may be necessary. Provide earthwork calculations and provide for imported or exported material as part of bid. No additional costs will be allowed.

B. Grade areas as indicated, including transition areas, with uniform levels and slopes between finish elevations.

C. Cut to grades and profiles indicated.

D. Set grade stakes at fifty-foot (50') intervals, at corners, and breaks in grade.

E. Conduct operations to avoid ponding of water. Provide all pumping equipment, sump pits, and temporary diversion swales where and when necessary to continue work performance on schedule and as specified.

F. Shape subgrade surface of site elements to within 0.10' above or below required subgrade elevation, compacted as required and sloped to provide drainage as shown on the drawings. Notify Architect and Geo-Technical Engineer for subgrade review prior to continuing work.

G. Shape subgrade surface of athletic fields and track/tennis courts areas using laser plane control system for grading of subgrade elevation to ensure accuracy in grade tolerances of +0" to - ¼" in 10' any direction. Compact as required and sloped to provide drainage as shown on the drawings. Notify Architect and Geo-Technical Engineer for review prior to continuing work.

H. Refer to Section 31 12 01 for topsoil requirements.

3.4 EXCAVATION

A. Remove and legally dispose of material encountered to obtain required subgrade elevations, including pavement, obstructions visible on ground surface, underground structures and utilities indicated to be removed.

B. Sloping and Benching: Follow OSHA recommendations based on soil type to determine slope configurations. Slope the sides of excavations five (5') feet deep and over to the angle of repose of the material excavated; otherwise, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated.

C. Bracing and Shoring:

1. Provide bracing and shoring as required in excavations, to maintain sides and to protect structures from settlement.

2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Carry down shoring and bracing as the excavation progresses.

3. Remove shoring and bracing before completion of backfilling except where required for structural support or slope stability.

4. The design, installation, and maintenance of such shoring and bracing required to accomplish the above purpose are the sole responsibility of the Contractor.

5. Follow OSHA recommendations for bracing and shoring.

6. Indemnify the Owner, the Landscape Architect, Architect, and the Consulting Engineers against any action arising from damage to existing structures, utilities or injury to persons resulting from the Contractor's actions or failure to act, in carrying out the intent of this section.

D. Protections: Protect structures, vegetation, utilities, sidewalks, pavements, and other facilities in areas of work. Barricade and secure open excavations and provide warning lights/signage from dusk to dawn each day.

E. Extent of Excavations: Excavate for structures to elevations and dimensions shown, extending excavation a sufficient distance to permit placing and removal of other work and for review. Trim bottom to required lines and grades to provide solid base to receive concrete or imported granular backfill material.

F. Unsatisfactory Soil Materials: When unsatisfactory soil materials, as defined in this specification, are encountered at design elevations, immediately notify the Architect in writing by email or other equally expeditious means. Continue as directed by the Architect and Geo-Technical Engineer. When, in the sole opinion of the Architect, conditions are not a result of Contractor's negligence, additional excavation may be directed by the Architect and paid for as a Change Order on a unit price or negotiated price basis in accordance with Contract Documents. This additional excavation shall be measured each day and verified by the Owner's representative and the Contractor's Superintendent. A daily written accounting, attested by both parties, shall be maintained with copies daily to the Architect. No claim for extra compensation will be considered except through the procedure outlined above. Assume **2,500 c.y.** (cubic yards) of undercutting and removals, placement of soil stabilization fabric (SSF) and providing and compacting to 95% density imported granular backfill material in Base Bid. Unit price provided shall be utilized to add to or delete from this assumed quantity to account for actual quantity encountered.

G. Unauthorized and Over Excavation: Consists of removal of materials beyond required subgrade elevations or dimensions without specific direction of the Architect or Geotechnical Engineer. Unauthorized or over excavation, as well as remedial work directed by the Architect or Geotechnical Engineer, shall be at Contractor's expense. Fill of unauthorized excavations shall be as follows (all at no additional cost to the Owner):

1. Fill the voids created by the removal of materials beyond indicated subgrade elevations with lean concrete (2000 psi). Or;

2. Extending the indicated bottom elevation of the concrete footing to the lower elevation. Or;

3. Adding imported granular backfill material compacted to 95% density to proper design elevation and layout as directed by the Architect. Testing agency to perform compaction testing prior to proceeding.

H. Dewatering:

1. Contractor shall anticipate seasonal variations of soil moisture content and groundwater in the Base Bid as verified by site investigation indicated in Section 311201.

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

    a. Surface and ground water shall be intercepted and removed before entering excavations. All necessary measures shall be taken. Earth dikes, ditches, or other devices, if required, shall be constructed to prevent such flows.

3. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

    a. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
    b. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.
    c. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

4. The Contractor shall at all times provide and maintain proper and satisfactory means and devices (i.e. ditches, temporary pipes, pumps, and/or other temporary construction) for the removal of all water entering the excavations. Water shall be removed as fast as it may collect, in such manner that shall not interfere with the execution of the work or in the proper placing of pipe, structures or other work.

5. Provide and operate sufficient pumping machinery to keep excavated parts free of water. Dig sump pits when necessary into which the excavation shall be drained. Take care and proper precautions in the use of pumps so that in no case will foundations, footings and utilities already in place or existing foundations, footings of adjacent structures or utilities be undermined or disturbed, and erosion occur due to pumping.

6. Do not discharge pumped materials into any body of water, wetland, adjacent property, roadside swales, subsurface storm systems, or any infiltration practices as determined by the Architect. Provide temporary sediment basins, traps, and filter bags for pumped water.

7. Adjust, repair, replace, or clean all work, surfaces, and property, which may have been affected as a result of any dewatering operation.

I. Prepare subgrade and twelve (12") inches of existing sub-soils below subgrade elevations in excavated areas to minimum density of 95% in structure, pavement, utility areas, trenches, and 90% under lawn non-paved areas.

J. Rock and Rock Excavation:

1. Rock Definition: Shall be defined as solid hard material located in ledges, bedded aggregate deposits and unstratified masses, and all-natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock, which must be removed by pneumatic hammers. Rock does not include shale, slate, soft sandstone, hardpan, masonry or concrete rubble, boulders less than three (3) cubic yards, such other rock material which is decomposed, stratified, weathered or shattered, or any material capable of being removed by a well maintained Caterpillar 225 power shovel, D8 Dozer with Ripper, or Architect approved equivalent.

2. Rock Excavation Administrative Procedures: When encountered, shall be stockpiled for measurement before removal and paid for on a unit price basis in accordance with Contract Documents. Notify Architect immediately of rock discovery prior to performing any rock removal or continued excavation. Rock excavations as defined shall be measured each day and verified by the Owner's designated representative and the Contractor's on-site Superintendent. A daily written accounting, attested to by both parties, shall be maintained with copies daily to the Architect. No claim for extra compensation will be considered except through the procedure outlined above. Contractor to assume **300 c.y.** (cubic yards) of rock excavation and removal in Base Bid. Unit price provided shall be utilized to add to or delete from this assumed quantity to account for actual quantity encountered.

3. Rock Excavation Removal Procedures: Includes removal and disposal of rock. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions.

   a. 24 inches outside of concrete forms other than at footings.
   b. 12 inches outside of concrete forms at footings.
   c. 6 inches outside of minimum required dimensions of concrete cast against grade.
   d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
   e. 8 inches beneath bottom of concrete slabs-on-grade.
   f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

4. Any over-excavation due to rock excavation and removal shall be handled as directed under "Over Excavation" in this Section.

5. Contractor has the option to remove existing rock and dispose off-site or crush existing rock and use as satisfactory general earth fill when it meets gradation noted in 31 22 01 for imported granular backfill material.

3.5 BACKFILL AND FILL

A. Preparation of Ground Surface to Receive Fill: Remove vegetation, organic materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Break up and remove existing foundations, concrete slabs, abandoned utilities, and site features. Plow, strip, roughen, or break up slopes steeper than 1 vertical to 4 horizontal so that fill material will bond to existing surface.

B. Execute these steps when the existing ground surface, after removal of the above unsatisfactory soil materials, has a density less than that specified under "Compaction" for the particular area classification: Break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.

C In no case shall fill be placed on a subgrade that is wet, muddy, rutted, spongy, frozen or that contains frost or that has not been tested and approved to achieve satisfactory results.

D. Areas to receive any fill or backfill should be properly prepared, proof rolled, tested per "Field Quality Control" within this specification, inspected and approved by the Architect and Geo-Technical Engineer prior to the placement of fill.

E. Following grade approval by the Architect and Geo-Technical Engineer, place imported granular backfill, imported structural fill and satisfactory general earth fill material in layers not more than eight (8") inches in loose depth in a manner to minimize segregation. The fill shall be placed in nearly horizontal lifts commencing at the lowest fill area elevation and proceeding with each lift upward and outward from the lower lift.

F. Moisture Content: Contractor shall anticipate seasonal variations of all soils (on site or imported) and imported fills moisture content in the Base Bid and timing required for such shall be included in the project schedule. The moisture content of the materials shall be adjusted prior to application of compaction such that it is no more than 1% below or 3% above the optimum moisture content of the material. Apply water to surface, subgrade or layers of soil material when required to achieve compaction densities stated below. Remove and replace, or scarify and air dry, soils or imported materials that is too wet to permit compaction to specified density.

G. Compaction:

1. Compact each eight (8") inch layer of fill and backfill materials.

2. Compact fill and backfill material below subgrade for structures, slabs, pavements, and utilities to minimum 95% of optimum in place density as determined by ASTM D1557, Modified Proctor.

3. Compact fill material below subgrade for lawns or unpaved areas to minimum 90% of optimum in place density as determined by ASTM D1557, Modified Proctor.

H. Equipment:

1. Use sheepsfoot rollers, pneumatic tired rollers, drum rollers, vibrating tampers, and other compaction equipment capable of obtaining the required density throughout the entire layer being compacted.

2. Use power-driven hand tampers for compacting materials adjacent to site structures.

3. For utility trenches or other confined areas, small compaction equipment may be necessary such as a vibratory plate, jumping jack or walk-behind vibratory roller. In these cases, lift heights no greater than six (6") inches should be maintained.

I. Reconditioning Compacted Areas: Where previously completed compacted areas are disturbed by subsequent construction operations (by any Contractor), traffic or adverse weather, scarify and dry out the surface, regrade, and recompact to the required density prior to further construction at no additional cost to the Owner. Use hand tamping for recompaction over underground utilities and trenches.

3.6 DEEP RIPPING AND DECOMPACTION

A. Contractor to provide Deep Ripping and Decompaction and effectively fracture (vertically and laterally) through the thickness of the physically compressed subsoil material, restoring soil porosity, and permeability and aiding infiltration to help reduce runoff to compacted areas of the construction site.

B. Each mitigation area should have minimal above-and-below ground obstruction for the easy avoidance and maneuvering of a large tractor and ripping/decompacting impellents. Coordinate with Architect and Owner.

C. Perform "poor man's Atterberg field test" for soil plasticity for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for:

1. Effective deep ripping of subsoil

2. Re-spreading of topsoil in a friable state

3. Final decompaction (deep subsoiling)

D. Guidance: Implement the Deep Ripping and Decompaction (deep subsoiling) in a two-phase process:

1. Deep rip the affected thickness of exposed subsoil material, aggressively fracturing it before the protected topsoil is reapplied on the site.

2. Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil.

3. Prior to deep ripping and decompaction the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking, should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and rainfall infiltration are being restored, limit all further traffic to permanent travel lanes.

E. Implements: Use a "heavy-duty" agricultural-grade, deep ripper of the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversized rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) The decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. Minimize the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like "lifting and shattering" action up through the soil layers.

F. Pulling-Power of Equipment: Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/leg.

G. Adapt the ripper or the deep subsoiler for pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-24 inches deep.

1. Large, Unobstructed Areas: For larger easy areas, use the standard patterns of movement:

a. The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.
b. The second series runs obliquely, crossing the first series at an angle of about 45 degrees.
c. The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted site, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetometer.)

2. Roadways and Access Routes: In long corridors of limited width and less maneuverability than larger site e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

a. First, apply the same initial lengthwise, parallel series of passes described above.

b. A second series of passes makes a broad "S" shaped pattern of rips, continually and gradually alternating the "S" curves between opposite edges inside the compacted corridor.

c. The third and final series again uses the broad, altering S pattern, but it is "flip-flopped" to continually cross the previous S pattern along the corridors centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

3.7 STONE BLANKET (FOR SYNTHETIC TURF)

A. Prepare subgrade under the stone drainage blanket to a smooth, firm, well-draining surface, sloped as detailed. At no time shall the subgrade be rutted by construction traffic including during the stone blanket material installation. Engage with Owner's testing agency to proof roll the turf subgrade and mark "soft spots" for additional compaction. Repair or replace areas that do not pass proof rolling test as directed by the testing agency.

B. Install geotextile fabric, overlapping rolls a minimum of 24" at all seams. Install and secure flat drains into perimeter storm pipe with approved couplers as shown on the drawings and as specified. Secure all coupler connections with waterproof PVC tape.

C. Handling and Placement:

1. Prior to stone blanket material placement, remove any excess or contaminated backfill from the storm pipes, flat drains, and/or geotextile fabric as directed by the Architect.

2. Should any separation of the materials occur during any stage of the spreading or stockpiling, the Contractor must immediately remove and dispose of segregated material and correct or change handling procedures to prevent any further separation.

3. Utilize a laser plane control system for the grading of the processed stone to ensure accuracy in the grade tolerances of +0" to -1/4" in 10'-0" (measured in any direction).

4. Install processed stone base, from sideline toward center-line, parallel to the flat drain network, to the lines and grades shown on the drawings. Under no circumstances shall the material be pushed more than 30'-0" from the point of discharge. Each layer must be spread uniformly with equipment that will not cause perceptible separation in gradation (segregation of the aggregates), preferably a GPS controlled low ground pressure (LPG) dozer.

5. Shape the final surface of the processed stone to receive the turf system component and continue until the deviation from the required elevation does not exceed a maximum deviation from grade of +0" to -1/4" in ten feet (10'), when measured in any direction using a 10' straight-edge.

6. Engage Owner’s testing agency to proof roll wherever possible and mark "soft spots" for additional compaction. Use static tandem drum-type roller of not less than five (5) tons weight. Repair or replace areas that do not pass proof rolling test as directed by the testing agency.

7. The stone blanket base stone shall be compacted and unyielding, as directed and approved by the Architect.

8. Install finishing stone and roll tight to achieve an unyielding condition so that the surface shall not deviate more than 1/4" in 10' (measured in any direction) when placed under a 10' foot straight edge. This tolerance is required over the entire field.

9. On the completed stone blanket, install temporary painted lines fifteen (15') feet on center approximately on the 5 yard line and review for proper planarity. Perform "string grading" check along these 5 yard lines in the presence of the Architect and Turf Installer. Adjust high and low areas with similar stone blanket material as directed by the Architect and Turf Installer prior to placement of the turf.

10. The surface of the stone blanket course shall be well drained at all times. The permeability of the aggregate shall be checked per ASTM 2434 (constant head) testing methods. Test samples shall be as described in this specification section.

11. Once the stone blanket is in place, the testing agency shall perform permeability tests on the stone blanket in locations as directed by the Architect per EN 12616 and ASTM F2898-11. Provide water necessary for tests.

12. All test results will be logged and documented by the Contractor's Onsite Layout Foreman and Geotechnical Engineer for the testing agency. If at any time the stone blanket base does not meet project specifications, it shall be the Contractor's responsibility to restore, at his expense, the stone drainage blanket base and finishing stone to the required grade, cross section, permeability, infiltration, and density.

13. After the Contractor has independently confirmed compliance with all the above tolerances (planarity and elevation verified by a licensed surveyor and compaction, gradation, permeability, and infiltration verified by geotechnical engineer), he shall notify the Architect and schedule a final site observation for approval. The Contractor shall make available an GPS system and other equipment to the Owner's Inspection Team for the inspection process.

14. Once the stone blanket is approved by the Owner, Architect, Geotechnical Engineer, and Turf Installer, install the synthetic turf over the stone blanket as shown on the drawings, approved submittals and as specified. Prior to start of synthetic turf installation, the Turf Manufacturer/Turf Installer of the synthetic turf system shall inspect the stone blanket and supply a letter certifying base acceptance for the purposes of obtaining the Manufacturer's warranty for the synthetic turf playing surface.

15. The Site Contractor is responsible for providing daily onsite supervision of Turf Installer subcontractor at all times to ensure stone blanket planarity, drainage, and compaction is maintained during and after the turf installation.

3.8 FIELD QUALITY CONTROL TESTING AND INSPECTION SERVICES

A. Soil Testing Service/Geo-Technical Engineer must inspect and approve density tests, retesting, and proof rolling of subgrades, as described in this section, before further construction work is performed thereon.

B. Perform compaction density testing on compacted fill and imported granular base course in accordance with ASTM D1556, ASTM D1557, ASTM D2922, and D3017.

C. In place density testing should be performed at a frequency of one (1) test per 500 square feet per lift in smaller open areas, one (1) test per 2,500 square feet per lift in larger open areas, and one (1) test per 25 feet per lift in confined areas and utility trenches.

D. When the test results indicate that insufficient compaction has been obtained in any layer, the Contractor shall take action to modify or alter the moisture content in the soil, to provide additional compaction and testing or otherwise to increase the in-place soil density. If the Contractor cannot obtain satisfactory compaction due to material properties, the Contractor shall remove the unsatisfactory material and replace with new material at no additional cost to the Owner.

E. Materials contaminated by mud, debris, organics, frost, and/or other deleterious materials shall be removed and replaced with uncontaminated specified material.

F. No fill or backfill shall be placed over an area or lift of fill that has not be tested and achieved satisfactory results.

G. Proof Rolling: On pavement subgrades, in cut areas only, unless otherwise directed by the Architect, the only testing required will be the proof rolling as described below:

1. Provide Soil Testing Service/Geo-Technical Engineer with 48-hour advance notification when subgrades are ready to proof roll.

2. Proof Roll the prepared pavement subgrade surface with fully loaded ten (10 c.y.) cubic yard earth moving truck or, in the opinion of the Architect/Geo-Technical Engineer, using a 5-ton smooth drum roller making at least 3 overlapping passes, in each of 2 perpendicular directions, on static mode at a speed of 1 to 4 feet/second. Check for unstable areas. Subgrades that rut, pump or deflect under the truck's tires may be judged unstable by the Architect/Geo-Technical Engineer. These areas may require further compaction or undercutting as directed by the Soil Testing Service/Geo-Technical Engineer.

H. Stone Blanket Field Testing:

1. Subgrade: Proof rolling and density testing for subgrade as described in Section 312201.

2. Stone Blanket (for Synthetic Turf Field):

   a. Proof rolling as described.

   b. Permeability Test: Perform two (2) permeability test of both installed finishing and base stone as determined by ASTM D2434 confirming permeability rate outlined in "SUBMITTALS" of this specification section.

   c. Infiltrometer Tests: Engage the independent testing agency to perform permeability testing of the in-place stone blanket per EN 12616 and ASTM F2898-11. Results shall meet the following: Direct infiltration rate of stone blanket system ≥ 40"/hour.

      i. Notify Architect forty-eight (48 hrs.) hours in advance and provide water, materials, machinery and labor to carry out testing in presence of Architect.
      ii. Perform six (6) infiltration tests each on the installed synthetic turf stone blanket in areas as directed by the Architect.
      iii. Repair all test areas to match surrounding stone blanket material.

3.9 GUARANTEE

A. Guarantee concrete slabs, pavements, curbs, trenches, utilities, flagpoles, structures, synthetic turf, and lawns free from settlement for a period of one (1) year from the date given on the certificate of substantial completion or final punch list when satisfactorily completed and accepted by the Architect, whichever is later.

B. Repair to proper grade and alignment any and all settlement of concrete slabs, pavements, curbs, trenches, utilities, flagpoles, structures, synthetic turf, and lawns adversely affected by settlement within one (1) year after date given on the certificate of substantial completion or final punch list when satisfactorily completed and accepted by the Architect, whichever is later, at no additional expense to the Owner. In damaged compacted areas, scarify the surface, re-shape, and compact to required density prior to further construction.

C. All repairs/corrections shall be completed to the satisfaction of the Owner within seven (7) days of written notice by the Owner.

3.10 CLEAN UP

During the contract and at intervals as directed by the Architect and as earthwork is completed, clear the site of surplus earth, large surface stones, debris, tools and equipment. Leave the site in a clean, safe, well draining, and neat condition.

END OF SECTION 31 22 01

SECTION 31 25 01 - EROSION, SEDIMENT, AND POLLUTION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Provide erosion, sediment and pollution controls as shown on the drawings and as directed by the Architect to significantly reduce runoff on downstream and neighboring properties. This includes temporary control measures to mitigate land disruption by other Contractors during construction of this project.

B. Erosion, sediment, and pollution control includes, but is not limited to, the following:

1. Storm structure protection
2. Silt fence
3. Off site sediment tracking controls
4. Temporary concrete washout facility
5. Temporary seeding and mulching
6. Permanent seeding and sodding
7. Temporary basin outlet sedimentation trap
8. Temporary sediment filter bag for pumped water
9. Construction site dust control
10. Spill prevention, reporting and documentation
11. Clean up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

D. Code Compliance: The New York State Department of Environmental Conservation requires a SPDES General Permit for Storm Water Discharges from Construction Activity. This Permit GP-0-25-001 is pursuant to the Environmental Conservation Law and has penalties and fines related to violations.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 22 01 - Site Earthwork

C. Section 32 92 01 – Lawns

D. Section 33 11 01 – Water Distribution

E. Section 33 33 01 – Site Sanitary

F. Section 33 40 01 - Storm Drainage

1.3 REFERENCES

A. Spill Guidelines Manual (SGM) New York State Dept. of Environmental Conservation.

B. New York State Standards and Specifications for Erosion and Sediment Control, dated July 2016 or latest edition.

1.4 SUBMITTALS:

A. Manufacturer's Data (MPD) are required for:

1. Storm Structure Protection
2. Silt Fence with Net Backing
3. Soil Separation Fabric for Off Site Sediment Tracking Control
4. Sediment Filter Bag
5. Spill Response Equipment

B. Material Certificates (MC) showing content/mechanical analysis and Samples are required for:

1. No. 3 Stone for Off Site Sediment Tracking Control
2. Temporary Seeding and Mulching: Submit seed mix species and mulch source
3. Permanent Seeding and Sodding: (See Section 32 92 01)

C. Certification Statement: Submit photocopy of Section 31 25 01, 1.7, filled out completely and accurately to the Landscape Architect at the pre-construction meeting.

D. Listing of emergency contract numbers. This list shall include the name of an Emergency Response Contractor that may be used in certain situations.

E. Per NYSDEC SPDES Regulations, all onsite contractors performing earth disturbing activities need to have current NYSDEC endorsed 4-hour erosion and sediment (E&SC) training. Provide copies of all onsite personnel certification cards, prior to construction. The document shall be kept on file (by the Contractor) within the onsite SWPPP log book.

1.5 QUALITY ASSURANCE

A. Perform erosion, sediment and pollution control in compliance with applicable requirements of the New York Standards and Specifications Erosion and Sediment Control Manual, dated July 2016 (or latest edition) or other governing authorities having jurisdiction.

B. Prevention of erosion and pollution from storm water runoff for the duration of this project is the responsibility of this Contractor. All Storm Water Pollution Prevention control work indicated on the drawings and/or specifications shall be included in this Contractor's Base Bid. Damages resulting from, but not limited to, negligence, improper maintenance or general disregard for erosion control measures shall be immediately corrected by this Contractor to the satisfaction of the Landscape Architect, Engineer, or

Certified Erosion Control Specialist hired by the Owner for SWPPP inspections as required by NYSDEC. Damages resulting from other contractors shall be repaired by this Contractor on a time and materials basis and back charged to the responsible party. Any fines levied on the Owner by governing authorities for SWPPP violations shall be back charged to the responsible party.

C. In the event of a chemical or hazardous spill or release, the individual(s) who caused the spill is responsible for prompt and proper clean-up. If the spill requires cleanup procedures beyond the means of the Contractor, an emergency spill cleanup Subcontractor shall be hired by the Contractor. They shall be utilized when the Contractor does not have the appropriate training, equipment or materials to cleanup the area safely and effectively. This shall be done at no additional cost to the Owner. Any testing and cleanup required post cleanup shall be provided by the Contractor at no additional cost to the Owner.

1.6 JOB CONDITIONS

A. Job conditions in Sections 31 12 01, 31 22 01, 32 92 01 and 33 40 01 apply.

B. Contractor will take all necessary precautions to avoid allowing dust generation that violates NYSDEC regulations and compromises compliance with governing authorities air monitoring plan.

C. Winter Stabilization Requirement: When construction schedule, regardless of reason, prohibits installation of permanent stabilization measures and site elements, including substantial lawn growth to prevent erosion, this Contractor shall install and provide temporary seeding, mulching, and other preventative/stabilization measures specified and as directed by the Landscape Architect at no additional cost to the Owner.

1.7 CERTIFICATIONS

A. Authorized, legally responsible signatures for the General Contractor, Site Contractor, Site Earthwork, Landscaping Subcontractor(s) and any other soil disturbing Contractor shall sign and prominently display the following certification statement at the job trailer or office during the life of the project:

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

1. General Contractor
   Signature: _____
   Name: _____
   Title: _____
   Address: _____
   _____
   Phone No.: _____
   Email: _____

2. Site Earthwork Contr.
   Signature: _____
   Name: _____
   Title: _____
   Address: _____
   _____
   Phone No.: _____
   Email: _____

3. Site Landscaping Contr.
   Signature: _____
   Name: _____
   Title: _____
   Address: _____
   _____
   Phone No.: _____
   Email: _____

4. Other Sub Contractors as determined by the Architect
   Signature: _____
   Name: _____

Title: _____

Address: _____

_____

Phone No.: _____

Email: _____

1.8 NOTICES

A. The Operator (Owner) shall file with the New York State Department of Environmental Conservation (NYSDEC) a Notice of Intent (NOI) a minimum of ten (10) days prior to start of construction. Unless notified by the NYSDEC to the contrary within ten (10) days, a general SPDES permit is automatically issued which authorizes discharge of storm water on the construction site.

B. When the site has been finally stabilized, the Operator (Owner) shall file with the NYSDEC a Notice of Termination (NOT).

C. The Operator (Owner) is responsible for payment of annual fees related to the SPDES permit. Filing of a NOT shall typically terminate the Operator's fee responsibility.

1.9 INSPECTIONS AND MAINTENANCE

A. The Architect or qualified personnel of the Operator shall inspect disturbed areas of the construction site at least once per week. Special attention will be focused on areas not finally stabilized, structural control measures, point discharge (outlets) and locations where vehicles enter or exit the site. Disturbed areas will be inspected for pollutants entering the drainage system. Structural control measures will be reviewed for effectiveness in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site will be inspected for evidence of off site sediment tracking. A written report of inspections shall be produced in a journal during the construction operations. The journal shall be made available (by the Operator/Owner) for NYSDEC and the general public to review.

B. The Contractor shall provide timely maintenance of vegetation erosion and sediment control measures, and other protective measures, during construction. Corrective measures must be performed within one (1) calendar day of the Architect's or Operator's (Owner's) report. Failure by the Contractor to perform corrective work within this schedule automatically authorizes the Operator to hire others and backcharge this Contractor. The Architect or Operator will send a letter or email correspondence one (1) calendar day before hiring others and backcharging this Contractor. The Contractor shall keep a written record of maintenance and corrective work in a journal. The journal shall

be made available for the Operator, Architect, Landscape Architect, Soil and Water Conservation District, ACOE, and NYSDEC until the site is finally stabilized.

C. The Contractor shall conduct daily inspections of the equipment staging and maintenance, fueling, hazardous waste staging and waste storage areas to ensure that spill control measures are in place. Stock appropriate clean-up materials whenever changes occur in the types of chemicals used or stored on site.

D. The Contractor is responsible for having mandatory, up to date NYSDEC endorsed 4-hour erosion and sediment control (E&SC) training all personnel working on site in accordance with the SPDES permit.

E. The Operator (Owner) shall provide long term maintenance of the storm water facilities after the site is finally stabilized. The designated maintenance personnel shall keep written records and pictures of maintenance and corrective work in a journal. All stormwater discharge points shall be maintained, inspected, and documented. The journal shall be made available for review by the NYSDEC for a minimum period of five (5) years after the Notice of Termination (NOT) has been filed.

1.10 SPILL PREVENTION, REPORTING AND DOCUMENTATION

A. To minimize the potential for discharge to the environment of oils, petroleum, or other hazardous substances, the following requirements shall apply:

1. All oil, petroleum, or hazardous materials stored or temporarily relocated on site during the construction process shall be stored in a way to provide protection from vehicular damage and to provide containment of leaks or spills. Temporary berms, dikes, storage basins, or similar methods shall be employed as appropriate on site.

2. Refer to Storm Water Pollution Prevention Plan Notes for additional spill prevention good housekeeping practices.

3. Maintain file of Material Safety Data Sheets (MSDSs) or other references for recommended spill clean-up methods and materials.

4. Keep spill response equipment readily accessible.

B. In the event of a spill contact the Construction Manager, Owner (Operator), and Architect. The Contractor shall also notify all other Contractors working around the area of the spill.

C. If spilled material has entered any sanitary/storm sewer system then contact the municipality or agency with jurisdiction over the system, in addition to those listed in this section.

D. The contractor shall be responsible for the initiation of spill reporting and documentation procedures. All petroleum spills must be reported to NYSDEC Spill Hotline at 1-800-

457-7362, less than two (2) hours following discovery. All petroleum spills must be reported to NYSDEC unless all of the following apply:

E.

Criteria	Description
Quantity	Must be known to be less than 5 gallons.
Containment	Must be contained on an impervious surface or within an impervious structure. No access to the environment.
Control	Must be under control and not reach a drain or leave the impervious surface.
Cleanup	Must be cleaned-up within two (2) hours of occurrence.
Environment	Must not have already entered into soil or groundwater or onto surface water.

F. A release of a "reportable quantity"[1] or unknown amount of a hazardous substance must also be immediately reported to the NYSDEC Spill Hotline. Spills of reportable quantities of chemicals or "harmful quantities"[2] of oil to navigable waters must be reported to the federal National Response Center, 1-800-424-8802 or 1-202-426-2675.

[1] *Reportable Quantity*: Refers to the quantity of a hazardous substance or oil that triggers reporting requirements under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) (USEPA, September 1992).

[2] *Harmful Quantity*: Includes discharges that violate applicable water quality standards, cause a film, sheen, or discoloration on a water surface or adjoining shoreline; or cause a sludge or emulsion to be deposited beneath the water surface or shoreline (40 CFR 110.3).

PART 2 - PRODUCTS

2.1 STORM STRUCTURE PROTECTION

A. Shall be a pre-manufactured cylindrical log 12" – 32" in diameter, composed of degradable geotextile mush tube filled with compost filter media to filter sediment and other pollutants. Filter socks may be filled after placement by blowing compost into the tube pneumatically or filled at a staging location and moved into its designated location. Both ends of the filter socks shall be secured to prevent opening.

B. The flat dimension of the sock shall be at least 1.5 times the nominal diameter of the sock.

C. Compost infill shall be a well decomposed (matured at least 3 months), weed-free, organic matter. Shall be aerobically composted, possess no objectionable odors, and contain less than 1% by dry weight, or manmade foreign matter.

D. All biosolids compost must meet NYS DEC's 6NYCRR Part 360 (Solid Waste Management Facilities) requirements.

E. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.

F. Wood stakes shall be a minimum of 2" x 2" in size. Shall be untreated fir, redwood, cedar or pine and shall be cut from sound timbers. Shall be straight and free of loose and unsound knots or other defects which would render them as unfit for the intended use. Metal stakes may not be used as an alternate. Tops of stakes shall not extend above the top of the fiber roll.

G. Standard of quality shall be: Diamond SOCK® pre-filled compost filter sock as manufactured by MKB Stormwater Innovation, 888-578-0777; or Architect Approved Equal

2.2 SILT FENCE

A. Shall be a woven polypropylene geotextile comprised of UV stabilized polypropylene slit film and 1.25" square, non pressure treated, pointed, hardwood posts and net mesh backing for additional support. Standard of quality for silt fence shall be IVI-3611MW as manufactured by Indian Valley Industries, Inc., www.iviindustries.com, (607) 729-5111, or Architect approved equal.

2.3 OFF SITE SEDIMENT TRACKING CONTROLS

A. No. 3 stone shall meet the following requirements:

Standard ASTM Sieve Size	Percent Passing by Weight
3"	100
2"	0-15
Passing No. 50	5-10
Passing No. 100	2-5

B. Soil Stabilization Fabric: Shall be a commercially manufactured, UV stabilized low clogging, high flow, woven geotextile. Standard of quality shall be Mirafi 600X, as manufactured by NICOLON/MIRAFI GROUP, 3500 Parkway Lane, Norcross, Georgia (Tel. 1-800-234-0484) or Architect approved equal.

2.4 TEMPORARY SEDIMENT FILTER BAG FOR PUMPED WATER

A. Provide prefabricated bags/pouches with nonwoven geotextile fabric. The standard of quality shall be Dirtbag as manufactured by ACF Environmental, 800-448-3636 or Architect approved equal.

B. Provide wooden pallet to set filter bag on for ease of disposal.

2.5 TEMPORARY CONCRETE WASHOUT FACILITY

A. Concrete washout facility to fully contain all concrete washout needs of the entire project and all contracts.

B. Concrete washout facility shall be temporary straw bales that are lined with a single sheet of a minimum of 10 mil polyethylene sheeting that extends over the entire basin to prevent escape of discharge. Place a secure, non-collapsing, non-water collecting cover over the concrete washout facility prior to inclement weather to prevent accumulation and overflow of precipitation.

C. Provide concrete washout to prevent discharge from concrete trucks or equipment cleaning to inlets, surface or groundwater.

D. Concrete washout facility shall be no closer than 50 feet from environmentally sensitive areas such as waterbodies, wetlands, and open drainage facilities and watercourses. Signs shall designate concrete washout facilities.

E. Ensure that the concrete washout facility complies with all Federal, State and local laws, rules, and regulations. Ensure that the concrete washout facility is in place before delivery of concrete to site.

F. Provide a sign identifying area as "Concrete Washout" acceptable to the Architect. Maintain throughout the project duration.

2.6 TEMPORARY SEEDING AND MULCHING

A. Seeding shall be 100% Perennial Ryegrass with no more than 30% of any one cultivar and always at least 2 different cultivars and a 90% germination rate or more.

B. All seed mixtures to contain 0.5% weed seed or less.

C. All seed must be fresh seed, not seed that is left over from last year and beyond the sell by date.

D. Dry mulch shall be clean straw bales.

2.7 PERMANENT SEEDING AND SODDING

Seeding and Sodding shall be as specified in Section 329201.

2.8 TEMPORARY BASIN OUTLET SEDIMENTATION TRAP

A. Basin Outlet Sedimentation Trap shall be constructed of perforated (HDPE) pipe and clean No. 1 stone.

B. Filter Fabric: Shall be commercially manufactured, needle-punched, non- woven geotextile, comprised of polypropylene fibers. Standard of quality shall be Mirafi 140N as manufactured by Tencate/Mirafi Group, www.tencate.com, or Architect approved equal.

C. Concrete shall be 4,500 psi as specified in Section 32 13 01.

2.9 SPILL RESPONSE EQUIPMENT

A. The following is a list of recommended spill control material. The contractor is responsible to have spill control and personnel protective equipment readily available for the materials being used. Acquire sufficient quantities and types of appropriate spill control materials needed to contain any spills that can be reasonably anticipated. The need for equipment to disperse, collect and contain spill control materials should be on site at all times.

1. Personal Protective Equipment
   a. Chemical Splash Goggles
   b. Gloves
   c. Boot Covers
   d. Tyvek Aprons or Suits

2. Absorption Materials
   a. Spill Pillows and Socks
   b. Absorbent Booms and Pads
   c. Dikes for use on rough surfaces
   d. Storm Structure Covers
   e. “Loose” Absorbents

3. Tools
   a. Shovel, Broom, Brush
   b. Disposal Bags
   c. Sealing Tape
   d. Hazardous Waste Stickers
   e. “Danger” and “Keep Away” Signs
   f. Five gallon pails or 20 gallon drums with polyethylene liners

B. Basis of Design shall be provided by: 3M, 888-364-3577; New Pig Corporation, 800-468-4647; SpillKits911, 800-474-5911; Dawg, Inc., 800-935-3294; or Architect approved equal.

C. Place spill response equipment in a readily assessable location within or immediately adjacent to the project site.

PART 3 - EXECUTION

3.1 SIGNATURE REQUIREMENTS

A. Between the Pre-Construction Meeting and starting site work, the Contractor shall:

1. Sign the certification statements. Contractor shall prominently display the statements at the job site.

2. Review inspection and maintenance procedures. Decide where journals will be temporarily stored for review by NYSDEC, S&WC, ACOE, Operator (Owner), the Landscape Architect and Architect.

3. Designate specific Owner and Contractor personnel responsible for daily inspection and maintenance. Provide certification cards.

3.2 GENERAL EROSION CONTROL

A. Install initial construction erosion control features, as indicated on drawings and specifications or as directed by the Architect, prior to topsoil stripping, earthwork, and removal of existing vegetation. Keep the disturbance to a minimum and shall not exceed five (5) acres, unless directed by the Architect. Install other features as described in the sequence of erosion, sediment and pollution control on the drawings.

B. Start permanent seeding and mulching within seven (7) calendar days of rough grading. When this is not possible for any reason, provide temporary seeding on non-roof, non-paved areas with 100% perennial rye grass at the rate of six pounds (6#) seed per one thousand (1,000 sf) square feet and straw mulching for complete coverage. When adverse weather conditions prevent good germination, repeat seeding and mulching as directed by the Architect until the area is stabilized. Till under temporary grass and fine grade when preparing for final permanent lawn stabilization.

C. Until a disturbed area is stabilized, trap runoff sediment by the use of sediment debris basins, diversion swales, sediment traps, or other methods acceptable to the Architect and governing authorities. Provide temporary dry mulch (straw) to stabilize exposed soils as directed by the Architect.

D. Provide erosion controls on slopes and swales traversing, bordering, or leaving the site. Limit the water flow to a nonerosive velocity.

E. Do not store fill materials within one hundred (100') feet of the banks of any streams or waterbodies, intermittent or perennial.

F. Inspect erosion and sediment control measures immediately after each rainfall and at least daily during prolonged rainfall. Make required repairs immediately.

G. Remove sediment deposits when they reach approximately one-half of the height of the barrier. Dispose sediment in a manner that does not result in additional erosion or pollution.

H. Provide prompt (weekly) removal and disposal of rubbish and debris in accordance with the governing authorities, Owner policies, and good housekeeping measures.

I. Traffic shall not be permitted to cross filter socks.

3.3 MUNICIPAL SEWER, SWALES AND WETLAND EROSION CONTROL

Control erosion, siltation and pollution to municipal sewers, swales and wetlands by taking appropriate measures such as, but not limited to, the following:

A. Do not disturb the bed and banks of waterbodies unless specifically shown on drawings. When bed and bank work is shown, obtain permits and proceed with work creating the minimum disturbance necessary to complete the project.

B. Prevent petroleum products and excessive amounts of silt, clay, and muck from entering municipal sewers, waters, swales or wetlands of New York State during construction.

C. Prevent fresh concrete, concrete leachate, and washings from equipment and trucks, from entering municipal sewers, waters, swales or wetlands of New York State during construction.

D. Place silt fence to control erosion at the downslope edge of disturbed areas. This barrier to sediments is to be put in place before disturbance of the ground occurs and is to be maintained in good condition until disturbed land is heavily vegetated or otherwise permanently stabilized.

E. Seed areas of soil disturbance resulting from this project with appropriate perennial grass seed and mulched with straw within seven (7) calendar days as described in general erosion control. Mulch shall be maintained until a suitable vegetative ground cover is established and as directed by the Architect.

3.4 CONSTRUCTION SITE DUST CONTROL

A. The Contractor shall prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety issues.

B. Dust control applies to construction roads, access points, other disturbed areas and stockpiles subject to surface dust movement and dust blowing.

C. Contractor may use any number and combination of dust control methods, as approved by the Architect. They include:

1. Applying water to haul roads
2. Restricting vehicle speeds to 10 mph
3. Hauling materials in properly tarpped or watertight containers.
4. Covering stockpiles and materials
5. Wetting equipment and work area
6. Mulching
7. Spray adhesives and polymer additives (MSDS sheets required)
8. Barriers and wind breaks

D. Contractor is responsible for any cleanup and site restoration associated with dust control measures, dust pollution on or off the project site property at no additional cost to the Owner.

3.5 STORM STRUCTURE PROTECTION

A. Install fiber rolls as detailed around drainage structures and where shown on the plans to protect site elements from silt and sediment.

B. Filter socks shall be anchored in earth with wooden stakes driven a minimum of 12” into the soil on 4-foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

C. Wrapping the storm structure grate with fabric is NOT acceptable, however straw bales may be used.

D. Upon stabilization of the area contributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the SWPPP. For removal, the mesh can be cut, and the compost spread as an additional mulch to act as a soil supplement.

3.6 SILT FENCE

A. Locate as shown on drawings and as directed by the Architect. Excavate trench along the lower perimeter(s) of site, along the contract limit line, and as indicated on the drawings. Place excavated material on uphill side of trench for backfilling.

B. Drive stakes securely into the downhill side of the trench. When prefabricated silt fence with fabric attached to stakes is used, drive stakes so that fabric is buried in the ground as detailed.

C. Backfill trench with excavated material, so that fabric is securely buried in the ground to prevent undermining. Tamp soil.

D. Join sections by overlapping fabric between two (2) stakes. Set stakes simultaneously. Overlap by minimum six (6") inches, fold, and staple to prevent sediment bypass.

E. Attach silt fence securely to stakes spaced no more than eight (8' o.c.) feet on center. Secure fence fabric to stake with minimum three one (1") inch staples.

F. Toward the end of the project, when site is stabilized and as directed by the Architect, remove silt fence and correct lawn area around removal to a smooth, neat, well-draining condition.

3.7 OFFSITE SEDIMENT TRACKING CONTROLS

A. Install as detailed and shown on drawings to eliminate tracking sediment off site. Inspect after each rain storm and at the end of each work day.

B. When sediment begins tracking off site, sweep and clean affected roadway immediately and replace stone with clean No. 3 stone to retain sediment on site.

C. Remove fabric and stone at project completion. Complete construction of proposed final surface(s).

3.8 TEMPORARY SEDIMENT FILTER BAG FOR PUMPED WATER

A. Install prefabricated bags/pouches on top of straw bale base as recommended by the manufacturer. Replace system when full (discharge into bag/pouch is significantly reduced).

B. Silt may be used as general site fill or hauled off site. Remove straw bales, fabric, and prefabricated bags/pouches off site. Regrade area and return to lawn as specified.

3.10 TEMPORARY CONCRETE WASHOUT FACILITY

A. Install per detail in a location as approved by the Owner. Provide a stable surface, easily accessible by concrete trucks.

B. A sign shall be installed adjacent to each washout facility to inform concrete equipment operations to utilize the proper facilities. The sign shall be installed as detailed and maintained throughout the project.

C. Temporary concrete washout facility shall be constructed and maintained in sufficient quantity and size to contain all liquids and concrete waste generated by washout operations for the entire project and by all Contracts.

D. Perform washout of concrete mixers, delivery trucks, and other delivery systems in designated areas only.

E. Wash concrete only from mixer chutes into approved concrete washout facility.

F. Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material. Liner seams shall be installed in accordance with manufacturers' recommendations.

G. Contents of the concrete washout facility shall not exceed 50% capacity of the facility. At or before 50% capacity is reached, discontinue pouring concrete until the facility is cleaned out. Remove hardened concrete and properly dispose off site. Allow slurry to evaporate or remove from site and dispose off site. Immediately replace the liner if it gets damaged.

H. Remove concrete washout facility when it is no longer needed as directed by the Architect.

3.9 TEMPORARY SEEDING AND MULCHING

A. Provide temporary seeding of topsoil stockpile immediately.

B. When necessary and as directed by the Architect, provide temporary seeding and mulching on disturbed areas at no additional cost to the Owner.

3.10 PERMANENT SEEDING AND SODDING

A. Install as described in Section 32 92 01.

3.11 TEMPORARY BASIN OUTLET SEDIMENTATION TRAP

A. Install as detailed. Remove temporary trap and install permanent flared end section per detail near end of project when directed by the Architect.

3.12 SPILL RESPONSE EQUIPMENT

Use per manufacturer's recommendations and as directed by the NYSDEC, or other governing agencies.

3.13 CLEAN UP

A. During the contract and at intervals as directed by the Architect and as erosion, sediment and pollution control procedures are completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well draining, and neat condition.

B. Clean storm ponding areas, catch basins and detention basins: Clean out contaminants, sediment, rubbish, construction debris, foreign objects and accumulated floatables from chambers and ponding areas thoroughly, immediately prior to final acceptance.

END OF SECTION 31 25 01

SECTION 32 12 01 - ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of asphalt paving is shown on the drawings.

B. Asphalt Paving work includes, but is not limited to, the following:

1. Soil Stabilization Fabric
2. Granular Base Course
3. Asphaltic Concrete
4. Bituminous Tack Coat
5. Painted Lines and Traffic Markings
6. Hot Pour Crack Sealing and Filling
7. Field Quality Control
8. Clean up

C. Provide all materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 22 01 - Site Earthwork

C. Section 33 40 01 - Storm Drainage

1.3 REFERENCES

A. The latest editions of the following Standards, as referenced herein, shall be applicable:

1. New York State Department of Transportation Standard Specifications, Section 402 - “Hot Mix Asphalt (HMA) Pavements" and 407 - "Bituminous Tack Coat"
2. “Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO).”
3. American Sports Builders Association (ASBA) Asphalt Guidelines, latest edition

B. The following reference standards shall apply for Testing and Inspection:

1. ASTM D1074: Standard Test Method for Compressive Strength of Bituminous Mixtures
2. ASTM D1188: Standard Test Method for Bulk Specific Gravity and Density of Compacted Mixtures Using Paraffin-Coated Specimens.
3. ASTM D2041: Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

4. ASTM D2726: Standard Test Method for Bulk Specific Gravity and Density of Non-absorptive Compacted Bituminous Mixtures
5. ASTM D2950: Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
6. ASTM D3203: Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
7. ASTM D3549: Standard Test Methods for Thickness or Height of Compacted Bituminous Paving Mixture Specimens
8. NYSDOT Materials Method 28 Friction Aggregate Control and Test Procedures

C. The following reference standards shall apply for pavement markings:

1. ASTM D562, D711, D1475, D1640, D2369, D3723, D3960.
2. DOT Code of Federal Regulations, Hazardous Materials and Regulations Board, Reference 49CFR, ICC Regulations
3. Federal Specification TT-P-115E, Type III (Type I if V.O.C. compliance)

D. Additional testing required, only if directed in writing by Architect, due to asphalt installation and material issues:

1. ASTM C295: Standard Guide for Petrographic Examination of Aggregate
2. ASTM D1560: Standard Test Methods for Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus
3. ASTM D4125: Standard Test Methods for Asphalt Content of Bituminous Mixtures by the Nuclear Method
4. ASTM D5444: Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
5. ASTM D6307: Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
6. ASTM D6931: Standard Test Method for Indirect Tensile (IDT) Strength of Asphalt Mixtures
7. ASTM D7312: Standard Test Method for Determining the Pavement Shear Strain and Complex Shear Modulus of Asphalt Mixtures Using the Superpave Shear Tester

1.4 SUBMITTALS

A. Provide Paving Contractor experience requirements, as outlined in "Quality Assurance" of this specification section, for the following:

1. General Paving

B. Provide Asphalt Producer Vendor Certificate and proof of quality control monitoring as outlined in "Quality Assurance" of this specification section.

C. Provide material certificates showing content/mechanical analysis for the following:

1. Asphaltic Concrete Mix Design with Authorization Signature:

a. Type/name of mix (less than 24 months old)
b. All aggregates gradations and quality measurements
c. Plot (0.45 power graph) of the final aggregate blend
d. Bulk (dry) specific gravity of all aggregates and final aggregate blend (Gsb) including worksheets for natural (virgin) as well as reclaimed asphalt pavement (RAP)
e. Grade of asphalt binder (PG) being used
f. Optimum percent asphalt binder (Pb)
g. Mix air voids at optimum (Va)
h. Bulk specific gravity of mix at optimum (Gmb)
i. Theoretical maximum specific gravity of mix at optimum
j. Voids in the Mineral Aggregate (VMA) and Void Filled with Asphalt (VFA)
k. Dust to total asphalt content (AC) ratio
l. All design data and associated design curves

2. Bituminous Tack Coat

D. Provide Manufacturer's Product Data (MPD) for the following:

1. Soil Stabilization Fabric
2. Painted Lines and Traffic Markings
3. Hot Pour Crack Sealing and Filling

E. Provide shop drawings for the following:

1. Painted Lines and Traffic Markings: Shop drawings indicating sizes, shapes, patterns, and colors of markings, including manufacturers and types of paint.
2. Owner to approve all paint colors prior to installation.

F. Submit Asphalt Placement Work Plan, indicating paving pass widths, paving directions, site access, and timing/coordination of any site equipment installation (posts, boxes, fencing, etc.) indicated in 3.3 of this specification section. Supply Owner with yield calculations for all asphalt paving products and materials used on the project as part of the work plan.

G. Field Quality Control test reports as indicated in this specification section.

1.5 QUALITY ASSURANCE

A. Paving Contractor Experience Requirements:

1. General Paving: Contractor shall have the experience of at least five (5) years in business. Paving superintendent has a minimum of three (3) years' experience as a paving crew operating foreman.

B. Asphalt Testing and Inspection Services:

1. The Owner will employ and pay for the services of an Independent Testing Agency to provide testing and inspections of asphalt pavements.

2. The services and the information provided by the Testing Agency are provided for the sole benefit of the Owner. The information is provided to the Contractor for the sole purpose of being aware of what is being reported.

3. The Contractor is solely responsible for assuring the work complies with the Contract Documents in all respects and may not rely on the testing agency for this or any other assurances. The Testing Agency and their representatives are not authorized to revoke, alter, relax, enlarge, or release any of the requirements of the Contract Documents, approve or accept any portion of the work, perform or excuse any duties of the Contractor, or be involved in the scheduling of any work.

4. Asphalt paving materials and operations shall be tested and inspected as the work progresses. Failure by the Testing Agency to detect any defective work or material shall not in any way prevent later rejection (when such defect is discovered) nor shall it obligate the Owner for final acceptance.

C. Asphalt producer shall monitor production according to the procedures of NYSDOT Material Method 28 Friction Aggregate Control and Test Procedures. Asphalt producer shall be a New York State approved/certified HMA (Hot Mix Asphalt) manufacturing facility.

D. Calibrated equipment and qualified personnel must be always accessible during the construction of the HMA.

1.6 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Atmospheric conditions for applying courses:

1. Hot mix asphalt shall generally arrive on the project site between 270°-300° F. (per asphalt producer recommendations).
2. Place asphalt concrete wearing course or bituminous surface treatment only when atmospheric temperature is above 50 degrees F. and rising, and when asphalt binder course is thoroughly dry.
3. Place binder course only when air temperature is above 45 degrees F. and rising and when asphalt base course or granular stone base course is thoroughly dry.

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

D. Codes and Standards: Perform the work in compliance with applicable requirements of governing authorities having jurisdiction. Obtain and pay for permits required by local authorities.

E. Construction Review and Testing: Notify and coordinate with the Independent Testing Agency and Architect when the subgrade is shaped and ready for proof rolling. Also, when the granular base course is fully installed, compacted and ready for density testing. Protect subgrade and subbase at all times.

F. When staging or scheduling delays occur and wearing course cannot be installed directly after binder course installation before winter, provide temporary asphalt transition ramp/collar around drainage structures in paved areas and at handicap ramps to prevent damage by snow plow. Remove prior to installation of wearing course. Power wash surface and apply asphalt tack coat, as specified, prior to wearing course installation, at no additional cost to the Owner.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Deliver all materials to the job site with all labels intact and legible at time of installation.

B. Store materials off ground under cover. Protect from damage or deterioration.

C. Handle materials to prevent damage to surface, edges, ends and factory applied finishes of items. Damaged material shall be rejected and replaced.

PART 2 - PRODUCTS

2.1 SOIL STABILIZATION FABRIC

A. Shall be a heavy duty, commercially manufactured woven polypropylene geotextile. Standard of quality shall be Mirafi 500X, manufactured by TenCate or Architect approved equal.

2.2 GRANULAR BASE COURSE AND GRAVEL PAVEMENT

A. Shall be as specified in Section 31 22 01.

B. The graded and designed granular base below all new Asphaltic Concrete Pavements shall be constructed, tested, and prepared in accordance with Section 31 22 01 - Site Earthwork of the Contract Documents.

2.3 ASPHALTIC CONCRETE

A.

Pavement Types	Percent Asphalt*
19.0mm Type 3 Binder Course	4.8% Asphalt
9.5mm Type 7 Top Course	6.3% Asphalt

* Percentage of Asphalt is approximate and shall be based off actual project submittals provided by the Asphalt Producer.

B. Hot Mix Asphalt Top Course: Pavement shall meet the minimum requirements for 9.5 mm (Type 7) SUPERPAVE Hot Mix Asphalt Top Course (75 gyrations), with a PG 64-

22 Binder as specified in Section 404, of the current NYSDOT Standard Specifications, with the exception that the maximum proportion of Recycled Asphalt Pavement (RAP) to virgin aggregates shall not exceed 20% of the total mix.

C. Hot Mix Asphalt Binder Course: Pavement shall meet the minimum requirements of 19.0mm SUPERPAVE Hot Mix Asphalt Binder Course (75 gyrations), with a PG 64-22 Binder, as specified in Section 404, of the current NYSDOT Standard Specifications, with the exception that the maximum proportion of Recycled Asphalt Pavement (RAP) to virgin aggregates shall not exceed 20% of the total mix.

D. The coarse aggregate used in HMA shall be sound, angular crushed stone (crushed or rounded gravel is not acceptable). The fine aggregate shall be well graded, moderately sharp to sharp (angular) sands.

2.4 BITUMINOUS TACK COAT

A. Material shall consist of an asphalt emulsion, Grade RS-1h, and shall meet the minimum requirements of Section 407, of the current NYSDOT Standard Specifications. Bituminous Tack Coat shall be installed over all new and existing concrete and asphalt pavements and structures prior to the installation of new Hot Mix Asphalt materials. The following application rates shall apply:

1.	New Hot Mix Asphalt	0.05-0.07 gal/sy
2.	Milled Surfaces of Existing Asphalt	0.10-0.15 gal/sy
3.	Abutting Vertical Edges (drainage structures, appurtenances)	0.05-0.07 gal/sy
4.	All Styles of Curbs and Gutters	0.05-0.07 gal/sy
5.	Delayed asphalt installation of HMA Courses	0.10-0.15 gal/sy

2.5 PAINTED LINES AND TRAFFIC MARKINGS

A. The extent of the pavement markings shall match the extent, location and composition of pavement markings existing at the site prior to start of work where applicable.

B. The work includes, but is not limited to the following: parking stall divider lines, wheelchair legends, “STOP” legends, “NO PARKING” legends, pick-up zone, striping and legends, directional arrow legends, diagonal striping, center line striping, fire lane striping, student area line striping, and other pavement markings as may be shown on the plans.

C. Provide ready-mixed, one component waterborne traffic line paint. Standard of quality shall be: Pro-Park® Waterborne Traffic Marking Paint B-97 Series as distributed through Sherwin-Williams, 800-474-3794; or Architect approved equal.

1. Colors (as approved by the Owner in writing):

a.	Yellow:	1 Gallon & 5 Gallon, Product Number B97YD2467
b.	White:	1 Gallon & 5 Gallon, Product Number B97WD2434
c.	Blue:	1 Gallon & 5 Gallon, Product Number B97LD2022
d.	Black:	1 Gallon & 5 Gallon, Product Number B97BD2021

2. Paints shall contain all necessary co-solvents, dispersants, wetting agents, preservatives and all other additives, so that paint shall retain viscosity. Halogenated solvents and glass beads shall not be permitted.

3. Volatile Organic Compound (VOC) content shall not exceed 250 grams maximum per liter of paint as determined in accordance with ASTM D 3960 test, excluding water and exempt solvents.

2.6 HOT POUR CRACK SEALING AND FILLING

A. Single component, hot applied asphalt crack and joint sealant capable of withstanding temperatures of up to 450° without experiencing polymer degradation.

B. Shall be supplied in solid blocks comprised of heat stabilized polymers and asphalt.

C. Meeting the following material requirements when tested in accordance with ASTM D5329. (see chart below)

Chemical & Physical Analysis

Recommended Application Temperature	350-400°F
Maximum Heating Temperature	450°F
Cone Penetration at 25°C	50 max.
Flow at 60°C, mm	0.
Softening point	200°F Min.
Flexibility 0°F	(1" Mandrel)-Pass
Specific Gravity	1.17
Asphalt Compatibility	Passes

D. Standard or quality shall be Crack Master Supreme as manufactured by Thorworks Industries, Inc., 800-395-7325, www.thorworks.com or approved equal.

PART 3 - EXECUTION

3.1 PREPARE SURFACE

A. Prior to commencement of asphalt paving, all excavations, drainage, utilities, backfilling, fencing, bollards, storm structures, curbing installations, adjustments, proof-rolling and density test procedures shall be complete to the satisfaction of the Architect.

B. Prior to commencement of tack coat and asphalt paving within pavement milled areas, as shown on the plans, all cracks and joints in the milled pavement surface shall be prepared and filled in accordance with the project specifications. Any oil or grease spots shall be scraped and treated to prevent bleeding through the tack coat.

C. Saw cut, using straight and true lines, all existing asphalt pavements to remain in place with straight, neat edge for abutting against proposed asphalt pavement.

D. Provide and confirm field quality control as described in Section 312201 for pavement subgrade and granular base course stone.

3.2 CONSTRUCT PAVEMENT GRANULAR BASE COURSE

A. General: Consists of placing granular base course material, in layers of specified thickness, over prepared subgrade and fabric to support a pavement course.

B. Grade Control: Provide engineering layout per Section 312201 and grade stakes. During construction, protect grade stakes; maintain lines and grades including crown and cross-slope of each course.

C. Install soil stabilization fabric after subgrade has been acceptably compacted and proof rolled. Install soil stabilization fabric as recommended by the manufacturer AND;

1. Lay fabric in direction of construction traffic.

2. Overlap fabric side to side and end to end a minimum of two (2') feet.

3. Establish reasonable compaction and rut stability before using heavy or vibratory compaction equipment.

D. Placing:

1. Place granular base material over soil stabilization fabric, on prepared subgrade in layers of uniform thickness, conforming to the asphalt pavement details on the drawings.

2. Place granular base material in a maximum of six (6) inch layers and compact with a vibratory or 10 ton smooth wheeled roller.

E. Provide density testing as described in Section 31 22 01.

F. Surface Smoothness: Test finished surface for smoothness. Surface will not be acceptable when it deviates more than 3/8" measured by a 10 foot straightedge, in any direction.

G. The finished grade of the granular base course shall be verified to ensure that the final finished product of the bituminous concrete pavement surface will be installed to the lines and grades of the existing pavements and proposed elevations surveyed by the Contractor prior to the start of the paving work.

3.3 PLACE ASPHALT MIX

A. General:

1. The Contractor shall submit a paving plan, indicating intended direction of paving, number of pulls, etc. for approval prior to the start of paving operations.

2. Joints: Saw cut vertical straight, neat edges for joints required. Joints shall be sharp and clean, conforming to shapes drawn on drawings. Ragged joints will not be accepted.

3. Mill two (2') feet into surface of adjacent asphalt so joints do not line up or "stack".

4. Place bituminous tack coat to all surfaces as indicated in this specification. When pavement surface temperature is above or below the 75-130 degrees F. range, the grade of asphalt emulsion must be modified according to NYSDOT standards. Tack coat shall not be applied to a wet surface or when the pavement surface temperature is below 45 degrees F.

5. Place asphalt on approved prepared surface, spread and strike-off.

6. Spread mixture at minimum temperature of 225-240 degrees F. Place inaccessible and small areas by hand. Hand work shall be minimized to ensure the best possible finished surface.

7. Place each course to required grade, cross-section, and compacted thickness.

8. Paving operations shall not be scheduled when ample time does not exist to place, compact, and finish roll the hot mix asphalt during daylight hours and prior to rainfall.

B. Pavement Placing: Shall be installed in accordance with Section 402-"Hot Mix Asphalt (HMA) Pavements", of the current NYSDOT Standard Specifications.

C. Paving Equipment:

1. Must be capable of placing, spreading and finishing courses of HMA to the specified thickness.

2. HMA shall be free of marks, segregation and be placed to the required uniform elevation with a smooth texture not showing tearing, shoving, or gouging.

3. Auger extensions are required while pavers are extended beyond the basic screed width.

4. Paving equipment shall be self-propelled and capable of maintaining the line and grade shown on the plans with suitable electronic equipment. The screed shall be straight and true with no bow and utilizing a vibratory screed. Paving equipment should have fully functional screed heaters and joint preheaters.

D. Asphaltic Concrete shall be installed as follows:

1. Medium Duty Asphalt Pavement: Installed in two (2) lifts consisting of 19.0mm SUPERPAVE Hot Mix Asphalt Binder Course overlain by 9.5mm SUPERPAVE Hot Mix Asphalt Top Course.

E. Place in strips not less than ten (10') feet wide, unless otherwise acceptable. In placing each succeeding pass after the placement of the initial pass, the screed of the paver shall be set such that it overlaps the preceding pass by 6" and be sufficiently high such that when compacted, a smooth joint is produced. Prior to pinching the joint, the excess material shall be pushed onto the edge of the new pass with a lute. Excess material shall be removed.

F. After first lift has been placed and rolled, place succeeding lifts and extend rolling to overlap previous lifts. Where possible, top course shall be placed at right angles to binder course and in the direction that the drainage flows. Where this is impractical, offset joints of the two courses by a minimum of two (2') feet so upper and lower joints do not align.

3.4 ROLL ASPHALT MIX

A. General:

1. Rollers shall conform to the manufacturer's specifications for all ballasting. At least one vibratory roller shall be required for each project, with two rollers required as a minimum. (Three rollers shall be required when tonnage is greater than 300 tons/day.)

2. Rollers shall be of a good condition and capable of compacting the HMA to the minimum in-place density required by this specification. Compact asphalt with a nominal 10 ton steel wheel roller or pneumatic rubber tired roller. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

3. Begin rolling when mixture will bear roller weight without obvious or excessive displacement.

B. Finish Rolling: Each lift of the Asphaltic Concrete Pavement shall be mechanically rolled and compacted to the finished thicknesses specified in the Contract Documents. The pavements shall be compacted to a minimum of 94%-97% (95%-102% at longitudinal joints) of the materials theoretical density as determined by AASHTO Method T 209 and an air void percentage of 5%-6% maximum.

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

D. Joints:

1. The Contractor shall sequence the installation and orientation of all Asphaltic Concrete Pavements such that the minimum numbers of longitudinal and transverse joints are produced and in accordance with the approved Asphalt Placement Work Plan.

2. Neat, straight butt joints between successive passes. Offset joints a minimum of six (6") inches between lifts of asphalt.

3. When repairs or staging of work occurs, make neat vertical saw cut between old and new work to create butt joint. Heat joint prior to pouring. Cold joints are not acceptable.

4. Apply bituminous tack coat to all surfaces and rates indicated under "Bituminous Tack Coat" of this specification section. Tack coat shall not be required on abutting vertical edges for pavements placed in the same day.

5. Minimize construction, longitudinal, and transverse joints left open for an extended period of time.

6. Construct longitudinal joints by paving in a hot fashion with a temperature of not less than 220°F to ensure maximum performance and adhesion.

7. Compact all joints to provide for a neat, uniform and tightly bonded joint that will meet both surface tolerances and density requirements of this specification.

8. Cut straight and true (vertical construction or transverse joints if the material has cooled to less than 220°F prior to the placement of the next pass to ensure the best performing joint possible.

F. Edges: Roll at 45 degrees as detailed, creating clean edge conforming to shapes indicated on the drawings. Ragged edges will not be accepted. Return and saw cut ragged edges at no additional cost to the Owner as directed by the Architect.

G. The final finished grades of the new Bituminous Concrete Pavements must be smooth and true to the contours and shall be installed to the lines and grades of the site prior to start of construction. The final finished grades shall match adjacent pavement surfaces and concrete slabs, aprons, and doorways.

H. Construction Delays (over 48 hours): When placement of the wearing course over the binder course is delayed over 48 hours, thoroughly clean existing surface of dirt, oil and other debris by pressure washing and sweeping. Place bituminous tack coat as specified in this section.

3.5 ASPHALT TOLERANCES

A. Thickness and Density: Compact each asphalt course to produce the thickness indicated on the drawings within the following tolerances:

1. Binder Course: Plus or minus 1/4-inch
2. Wearing Course: Plus or minus 1/8-inch

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

1. For Asphalt Concrete:

Binder Course Surface:	1/4"
Wearing Course Surface:	1/8"

C. Asphalt Cores: Shall be provided as indicated under "Field Quality Control" of this specification.

3.6 FIELD QUALITY CONTROL

A. The Owner's Testing Agency shall provide the following in the daily report at a minimum:

1. Verify the following for the asphalt mix design prior to asphalt placement:

a. The asphalt mix design has been approved.
b. The asphalt mix design specifies the minimum relative compaction and the methods required to determine maximum density.

2. Verify the asphalt subgrade has been acceptably proof-rolled. (See Section 31 22 01.)

3. Inspect /test aggregate base course material for in-place density (95%) and thickness. Test materials for gradation classification, and physical properties. (See Section 31 22 01.)

4. Inspect/test asphalt wearing course material for compaction during placement and conduct thickness measurements during lay-down. Take temperature of the asphalt mixture and compare actual temperature with the approved asphalt mixture design range. As a minimum, perform the following inspection/tests:

a. Collect trip tickets from trucks delivered to the site and verify correct mix design being used for the project.
b. Temperature tests: one per truck.
c. Lay down thickness (uncompacted): one per strip or 500 square feet minimum
d. Verify equipment rolling pattern and passes to ensure proper compaction: one per day
e. Density test (daily lab density): one test per 5000 square feet minimum
f. Hot mix samples (laboratory testing for density per ASTM D1188): one per day
g. Thickness per ASTM D3549 and density samples per ASTM D2950 by a properly calibrated nuclear asphalt testing device. If there is a disagreement between tests done by ASTM D2950 and ASTM D1188,

the values done by ASTM D1188 will govern: one test per 20,000 square feet (surface lift), one test per 10,000 square feet (base lift)

h. Air voids per ASTM D3203 or D2726: one test per 5000 square feet minimum

i. Verify compaction at the joints and seams. The completed paved surface to be true to grade and cross section. Verify smoothness by using an unleveled 10 foot straightedge and ensuring no gap at any point between straightedge and pavement exceeds surface smoothness requirements above except at interception or at changes of grade.

j. The screed/lay down thickness tolerance shall be between 1/8 to 3/16 inches greater than the required asphalt minimum layer requirement. When screed depth is set for the exact thickness as specified, immediately notify the Owner's Representative and Contractor that the installed asphalt thickness may be deficient to achieve the specified minimum thickness. Identify areas of non-complying thickness and attach a drawing identifying the areas to the daily field report.

k. Immediately notify the Owner's Representative and Contractor when paving is being conducted in cold weather and asphalt temperatures are below or above the design mix range.

l. Check the surface grades and drainage patterns. Identify on a drawing all paved areas that are holding water after asphalt placement and notify the Owner's Representative and Contractor. Small ponding areas (bird baths) larger than two (2') feet in any dimension are not acceptable. When this test proves that surface conditions are not acceptable, the Contractor will be responsible for correcting the problem areas. Install a one (1") inch shim coat of wearing course material, or other means acceptable to the Architect.

m. Verify tack coat and edge coat have been applied at the proper rate.

5. Asphalt Cores: Shall be as directed by the Architect.

a. Prior to final acceptance of the asphalt and before lining or other surface materials (resilient track surfacing, etc.) are placed, the Owner's Testing Agency shall core 3" diameter areas of the asphalt surfacing where directed by the Architect. Consistency, density, thickness, and tensile strength per ASTM D6931 will be evaluated.

b. Patch core areas as directed by the Architect to match adjacent density, texture and thickness.

c. Coordinate day to day scheduling with the Testing Agency.

d. If cores vary significantly from the contract requirements, additional cores will be performed by the Testing Agency as directed by the Architect. Once the overall general quality is determined, provide remedial work as directed by the Architect to achieve the quality and consistence as specified.

B. Unacceptable Paving: Remove and replace unacceptable paving as directed by the Architect, immediately and without argument or delay. Correction of deficient areas in the wearing course shall be done by sawcutting and removal of defective area of work. Tack coat shall be applied to all edges and the pavement shall be replaced. Shimming or

skin patching of the wearing course shall not be permitted. Correction of deficient areas within the binder course shall be corrected by sawcutting and milling high spots, and truing and leveling low spots or as directed by the Architect.

3.7 SURFACE PROTECTION

A. Protection: After final rolling and sealing, do not permit any type of vehicular or construction traffic on pavement until it has cooled and hardened as recommended by the producer/manufacturer, minimum of 48 hours.

B. Provide protection including, but not limited to, fencing, traffic cones, barrels, lights, reflective signs, flagpersons and barricades until mixture has cooled and attained its maximum degree of hardness.

3.8 PAINTED LINES AND TRAFFIC MARKINGS

A. Cleaning: Sweep and clean surface to eliminate loose material and dust. Remove dirt, oils and other foreign matter. All surfaces to receive pavement markings shall be clean and in good condition to accept pavement markings.

B. Coordinate provisions for installation with work of other trades.

C. Locate to alignment and dimensions as shown on drawings and/or approved by Owner.

D. Painted markings shall meet regulations described in the "Manual of Uniform Traffic Control Devices", latest edition, as published by NYSDOT, Division of Traffic and Safety, Section 262.25 and figure PM-42; and they shall comply with the most recent version of the Americans with Disabilities Act Standards for Accessible Design.

E. Protect: Adjacent surfaces and other items to remain with tape, drop cloths, or other Architect approved means.

F. Application: Two coats according to manufacturer's recommendations resulting in a dense, opaque application without any ghosting of former pavement markings showing through. Overspraying along edges will not be accepted. Edges shall be sharp and crisp, to the shapes required by the drawings.

1. First coat shall be installed at the recommended DFT (dry film thickness) after paving is in place. The second coat shall be applied at the recommended DFT no later than thirty (30) days after the completion of work.

2. Apply paint materials using clean brushes, rollers or spraying equipment.

3. Apply paint materials as a rate not exceeding those recommended by the paint manufacturer for surfaces being painted, less 10% of losses

4. Comply with manufacturer’s recommendations for drying time between coats. The minimum DFT must be met. Apply additional coats as needed to achieve minimum total specified DFT of the paint system.

5. The minimum required total Dry Film Thickness (DFT): The DFT shall be the minimum required thickness as measured in mils.

6. System coverage requirements minimum total thickness (unless otherwise noted):

   a. 1st Coat – 3.0 mils
   b. 2nd Coat – 6.0 mils

7. Exterior Paint Systems: Provide the following paint systems as indicated: (Colors to be approved by Owner.)

   a. Parking stall, division and limit lines shall be 4" in width, true and straight. Color: White – DFT 6.0 mils
   b. Pavement lettering "NO PARKING" shall be 2'-0" in height. Color: Yellow – DFT 6.0 mils
   c. Compact lettering "COMPACT" shall be 1'-0" in height. Color White – DFT 6.0 mils
   d. Stop legends shall be as detailed on drawings. Color: White – DFT 6.0 mils
   e. Wheelchair legends shall be as detailed on the drawings. Color: Blue background with white symbols. Parking stall striping shall be Blue at handicap stalls only – DFT 6.0mils
   f. Diagonal striping Handicapped. Color: Blue – DFT 6.0 mils
   g. Diagonal striping Loading Zone. Color: Yellow – DFT 6.0 mils
   h. Directional signage shall be as detailed on the drawings. Color: White – DFT 6.0 mils
   i. Center line striping shall be 4" in width as detailed on the drawings. Color: White – DFT 6.0 mils
   j. Fire line striping shall be 4" in width. Color: Yellow – DFT 6.0 mils
   k. Electric vehicle charger legends shall be as detailed on the drawings. Color: Green background with white symbols and border – DFT 6.0mils

G. Allow 48 hours minimum curing time for paint before allowing traffic on surfaces. Clean up thoroughly including all protective tape, spilled paint, and debris. All parking area marking and painting to be protected by appropriate traffic barriers, lighted if necessary, so located as to prohibit parking and traffic until traffic lines are completed and properly dry.

3.9 HOT POUR CRACK SEALING AND FILLING

A. The crack must be free from moisture, dust, and loose aggregate. Routing or wire brushing are preferred methods followed by a compressed air heat lance immediately prior to sealing. The substrate and air temperature must be above 45°F.

B. Shall be melted in direct fired or oil jacketed melters. Material should reach the recommended pouring temperature of 350-400°F. Fresh material may be added as sealant is used.

C. Apply heated crack filler using either a pump and wand system or a pour pot. For best results the sealant depth to width ratio should not exceed 2 to 1 (i.e. 2-inches deep to 1-inch wide). The cooled sealant height should not exceed 1/8" above surrounding pavement. Using a sealing shoe or squeegee, band the material 2 to 3 inches wide over the crack.

3.10 CLEAN UP

During the contract, and at intervals as directed by the Architect, and as asphalt paving is completed, clear the site of extraneous fabric, gravel, asphalt and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 12 01

SECTION 321301 - SITE CONCRETE WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of site concrete work is shown on the drawings and includes formwork, reinforcement, accessories, cast in place concrete, installation of embedded items, mix designs, finishing, curing, sealing, testing and acceptance requirements for concrete.

B. Site Concrete work includes, but is not limited to, the following:

1. Concrete walks and pads
2. Concrete turf termination curb
3. Concrete curb ramps with detectable warning system
4. Concrete athletic equipment
5. Concrete footings, bases, foundations, saddles, cradles, collars, and thrust blocks
6. Exterior anchoring cement non-shrink grout
7. Concrete scheduling April 1 to October 15
8. Clean up

C. Provide materials, labor, equipment and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 312201 - Site Earthwork

B. Section 323000 Series - Site Improvements for Athletic Field Equipment and Furnishings, Synthetic Turf, Fencing, Flagpoles, Pole to Pole Tension Netting

C. Section 331101 - Water Distribution

D. Section 333000 - Site Sanitary

E. Section 334001 - Storm Drainage

1.3 REFERENCES

A. American Concrete Institute (ACI), latest editions:
1. 301-16 – Specification for Structural Concrete
2. 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete
3. 305R-20 – Guide to Hot Weather Concreting
4. 306R-16 – Guide to Cold Weather Concreting
5. 311 – Recommend Practices for Concrete Inspection
6. 315 - Details and Detailing Concrete Reinforcement
7. 318-19 - Building Code Requirements for Structural Concrete
8. 347 – Guide to Formwork for Concrete

B. Portland Cement Association (PCA). “Design and Control of Concrete Mixtures”, latest edition.

C. American Society for Testing and Materials (ASTM):
1. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement
2. ASTM C31 - Standard Practice for Making and Curing Test Specimens in the Field
3. ASTM C33 - Concrete Aggregate
4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
5. ASTM C94 - Ready-Mixed Concrete
6. ASTM C109 - Test Method for Compressive Strength of Hydraulic Cement Mortars
7. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
8. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)
9. ASTM C150 - Portland Cement
10. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete
11. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method
12. ASTM C260 - Air Entraining Admixtures for Concrete
13. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete
14. ASTM C595 – Blended Hydraulic Cements

D. Concrete Reinforcing Steel Institute (CRCI)_Manual of Standard Practices

E. New York State Building Code, latest edition

F. New York State Department of Transportation (NYSDOT) Standard Specifications

1.4 SUBMITTALS:

A. Steel Reinforcement Shop Drawings that detail fabrication, bending, and placement. Comply with CRSI – Manual of Standard Practice showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement, mechanical connections, tie spacing, hoop spacing required for:

1. Turf Termination curb
2. Athletic Equipment footings

B. Manufacturers Product Data (MPD) and Samples where indicated are required for the following:

1. Expansion Joint and Sealant (Vertical and Horizontal): MPD and Color Samples
2. Water Based Curing and Sealing Compound
3. Water Based Penetrating Sealing Compound
4. Slip Dowel System
5. Fiber Reinforcement: (Curbs Only)
6. Cold and Hot Weather Admixture

7. Air Entrainment
8. Detectable Warning System
9. Exterior Anchoring Cement Non-Shrink Grout
10. High Strength Anchoring Epoxy System
11. Concrete Bonding Agent

C. Submit proposed 4,500 psi concrete mix design and test data in accordance with ACI 301 to the Architect for review prior to commencement of the work.

1. Indicate the locations and elements for which the mix will be used.
2. Include in the concrete mix design all required or proposed admixtures necessary to facilitate the installation of the concrete by the means and methods selected by Contractor for this project.

C. Mill test certificates and/or test reports for cement indicating compliance with these specifications.

D. Qualification Data: For Concrete Manufacturer.

E. Welding Certifications

F. Formal Letter from Concrete Contractor and/or Concrete Manufacturer with recommendations of materials to be used to maintain and remove ice / snow from newly installed concrete surfaces. The letter should also reference the potential damage of concrete surfaces from the use of de-icing chemicals and rock salt, by the Owner, during the first (1) year of concrete curing, from the date of placement.

1.5 QUALITY ASSURANCE

A. Concrete Manufacturer Qualifications: Company experienced in manufacturing ready-mix concrete products and that complies with ASTM C 94 and ASTM C 685 requirements for production facilities and equipment.
1. Batch tickets are required to be provided for each batch of concrete produced and delivered to the project site.

B. Concrete Testing Services: The Owner shall employ an acceptable independent testing laboratory to perform materials evaluation, testing of concrete mixes, and quality control testing. Coordinate day-to-day scheduling with the testing agency. Field technician shall be ACI Certified Grade 1 Field Technician.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4 “Structural Welding Code – Reinforcing Steel”

D. Construct and erect concrete formwork in accordance with ACI 301 and 347.

E. Perform concrete reinforcing work in accordance with ACI 301.

F. Perform cast-in-place concrete work in accordance with ACI 301.

G. Conform to current New York State Building Code.

H. Field quality control tests are specified in Part 3 - Execution.

1.6 JOB CONDITIONS

A. Job conditions in Section 312201 apply. Provide ample and skilled manpower for concrete installation which is a recognized time sensitive procedure.

B. All concrete work shall conform to American Concrete Institute (ACI) 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete".

C. Do not install concrete work when the temperature of the outside air is below 50 degrees F. and falling unless suitable means acceptable to the Architect are provided to protect work from cold and frost and ensure that mortar and concrete will cure without freezing as indicated in "Cold Weather Concreting" below, including temporary heat and covers.

D. Cold Weather Concreting: Provide non-chloride accelerating water reducing admixture in site concrete work placed at ambient air temperatures below 50 degrees F. (10 degrees C.). Comply with International Masonry Industry All-Weather Council cold weather construction and protecting recommendations and American Concrete Institute 306R-10 "Guide to Cold Weather Concreting."

E. Hot Weather: Provide water reducing retarding admixture in site concrete work placed at ambient air temperatures above 80° F. Comply with American Concrete Institute 305R-20 "Guide to Hot Weather Concreting."

F. Construction Review: Notify the Architect/Geotechnical Engineer when stairs, retaining walls, foundations, walks, ramps, curbs, and pads are formed and ready to receive concrete. Radius form layout shall be inspected and approved by the Architect.

G. Schedule: Unless otherwise directed in writing by the Architect, construct site concrete work from April 1 to October 15. This permits a minimum 30-day dry curing period prior to possible application of deicing chemicals and rock salt by the Owner.

1.7 ADA REQUIREMENTS

A. GENERAL: Concrete work shall comply with the Americans with Disabilities Act as described in the 2010 ADA Standards issued by the Department of Justice (DOJ) and the Department of Transportation (DOT) or latest edition, shall be used.

B. Curb ramp and concrete walk surfaces shall meet the following tolerances:

1. Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes.

2. Thresholds at doorways shall not exceed 3/4" in height for exterior sliding doors or 1/2" for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2.
3. Detectable warning system shall cast in place for the safety and convenience of the visually impaired. Contractor shall have a minimum of three (3) years experience with materials and installation.

PART 2 - PRODUCTS

2.1 FORM MATERIALS AND ACCESSORIES

A. Forms: Either steel or wood, exterior type softwood, PS1, of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use forms that are straight and free of distortion and defects, extending the full depth of concrete. Concrete walks which require radius form work shall be set with flexible forms, conforming to the shapes and dimensions as indicated.

B. Lumber: PS 20.

C. Form Ties: Snap-off, metal type of fixed length, cone type.

4. Ties shall be left in place and equipped with swaged washers or other approved devices to prevent seepage of moisture along the tie.
5. Depth of Breakback: Minimum one (1") inch.
6. Unless otherwise noted, provide form ties, which will not leave holes larger than one (1") inch diameter in concrete surface.

D. Dovetail Anchor Slot: Galvanized steel, form filled, release tape sealed slots; bend tab anchors.

E. Form Release Agent: Shall be non-staining and non-residual. Increte Wall Form Release manufactured by Increte or Architect approved equal.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, plain finish, free of rust and/or oxidation. Reinforcing bars shall be bundled and tagged with grades and suitable identification markings, shall be waterproof, and shall not be removed until steel is placed.

B. Steel Welded Wire Reinforcement ASTM A185, plain type:

1. Flat Sheets
2. Mesh size: 6 x 6 (standard W1.4 x W1.4, heavy duty W2.1 x W2.1)
3. Free of rust and/or oxidation

C. Reinforcement Accessories:

1. Tie Wire: FS QQ- W-461 G, annealed steel, back, 16-gage minimum.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. They shall provide sufficient supports at close enough spacing so that the steel will carry the weight of the workmen and the fresh concrete without deformation from its specified location.

D. Fabricate concrete reinforcing in accordance with ACI 315 and CRSI's Manual of Standard Practice.

E. Slip Dowels: Shall be a slip dowel system comprised of a round dowel sleeve and corresponding base. Standard of quality: shall be Speed Dowel as distributed by A.H. Harris, (860) 216-9500 or Architect approved equal.

2.3 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials or the same type, brand, and source throughout the project:
1. Portland Cement: ASTM C 150, Type I/II.
2. Fly Ash: ASTM C 618, Class F or C, with loss on ignition less than 6%.
3. Slag Cement: ASTM C 989, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595 Type 1L.

B. Aggregates per (ASTM C33):

1. Fine aggregates: clean, sharp, natural sand.
2. Coarse Aggregates: hard, sharp, angular, strong, clean, 3/4" maximum size stone meeting the requirements of New York State Department of Transportation Specification 703.02.

C. Water: Clean (not detrimental to concrete) and potable (ASTM C 94).

2.4 ADMIXTURES

A. Calcium Chloride in concrete is prohibited.

B. Air Entrainment Admixture: ASTM C260, Darex AEA ED or Architect approved equal.

C. Water Reducing Admixture: ASTM C494, Type A; not containing more chloride ions than are present in municipal drinking water.

D. High Range Water Reducing Admixture: ASTM C494, Type F or G; not containing more chloride ions than are present in municipal drinking water.

E. Cold Weather Accelerating Admixture: (Ambient temperature below 50°F.) Non-chloride water reducing accelerating admixture, ASTM C494, Type C, PolarSet as manufactured by WR Grace & Co. or Architect approved equal. Mix at rates

recommended by the manufacturer. No reduction in compression rating of the concrete is permitted.

F. Hot Weather Water Reducing and Retarding Admixture: (Ambient temperature above 80° F.) Shall be Daratard series admixture, ASTM C494, Type D, as manufactured by WR Grace & Co. or Architect approved equal. Mix at a rate recommended by the manufacturer. No reduction in compression rating of the concrete is permitted.

2.5 RELATED MATERIALS

A. Expansion Joints:

1. For Radius Applications: Expansion joint filler shall be polyethylene closed cell backing with peel off strip, X-Foam as manufactured by W.R. Meadows or Architect approved equal.
2. For Straight Applications: Expansion joint filler shall be fiber expansion joint with peel off snap-cap, as manufactured by W.R. Meadows or Architect approved equal.

B. Caulking for flat slabs shall be one-part elastomeric self-leveling polyurethane gray sealant Pourthane SL or Architect approved equal. Caulking for vertical surfaces shall be one component elastomeric gun grade polyurethane sealant Pourthane NS, color as selected by the Owner to match wall stain or Architect approved equal.

C. Fiber Reinforcement for Concrete Curbs: Shall be Grace Fibers ¾" long, fibrillated polypropylene fibers as manufactured by WR Grace & Co. or Architect approved equal. Add fibers to concrete at the rate of 2.0 lbs/c.y. and as recommended by the manufacturer.

2.6 COMPOUNDS, HARDENERS, AND SEALERS

A. Water Based, Acrylic, Curing and Sealing Compound: ASTM C309, Type 1, Class A and B, clear or translucent. Standard of quality shall be VOCOMP-20 as manufactured by W.R. Meadows or Architect approved equal.

B. Water Based Penetrating Sealer: clear, penetrating, breathable, VOC-compliant, solvent free surface treatment for use on concrete to protect against water and chloride intrusion. Standard of quality shall be Protectosil 300 S as manufactured by Evonik Corporation or Architect approved equal.

2.7 CONCRETE MIX - GENERAL

A. Prepare design mixes for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both. Concrete mix designs shall conform to the requirements of ACI 301.

B. Cementitious Materials:

1. Use cementitious materials of the same brand and type and from the same manufacturing plant as those used in establishing the approved concrete mix design.

2. Fly ash or slag cement may be used as needed to reduce the total amount of Portland cement, which would otherwise be used, by not more than 15 percent. Notify concrete finishers of concrete material containing fly ash or slag cement.

    a. Exception: Do not use fly ash or slag cement in any concrete mixtures for exterior concrete / slabs that will have moisture sensitive coating or finishes applied to the concrete.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Use aggregates from the same source and of the same size range as those used in the approved concrete mix design.

E. Admixtures: Use admixtures of the same brand and type as those used in the approved concrete mix design. Use admixtures according to the manufacturer's instructions.

F. Mix and deliver ready-mix concrete in accordance with ASTM C94.

1. Concrete must achieve stated minimum compressive strength at 28 days.
2. Concrete containing fly ash or slag cement must achieve stated minimum compressive strength at 56 days.

2.8 CONCRETE MIX – WALKS, SLABS, FOOTINGS, AND CURBS

A. Concrete Mix:

1. Compressive Strength (Minimum at 28 days): 4,500 psi
2. Slump (Maximum): 4 inches +/- 1"
3. Air Entrainment: 6 – 8.5% +/- 1.5%
4. Flexural Strength (ASTM C78): 650 psi at 28 days.

B. Use water-reducing admixture in all concrete.

C. Water/Cement Ratio: Maximum 0.45 for 4,500 psi concrete.

D. Maximum Size of Coarse Aggregate:

1. General Work: Per ACI 301, 3/4" maximum.

E. Select admixture proportions for normal weight concrete in accordance with ACI 301.

F. Add air-entraining agent to concrete mix for all concrete work exposed to exterior.

2.9 MIXING WATER CONTROL

A. The quantity of mixing water used in the concrete mix shall be determined by the Contractor, except that the Architect/Geotechnical Engineer may direct that such quantity of water be reduced if the slump of the concrete exceeds the specified slump. The Contractor's determination of the quantity of mixing water shall conform to the various limits on water/cement ration and slump specified. Concrete consistency shall be uniform from batch to batch.

B. During the work, the batch plant will make quantitative measured moisture determinations of the aggregates utilized in each batch. Aggregate weights and batch water requirements shall be adjusted accordingly for measured aggregate moisture content.

C. When concrete is transported in units approved for mixing, the addition of not more than 10% of the total design water will be permitted at the job site to obtain initial slump.

1. Any addition of water shall be followed by mixing of at least 30 revolutions in the mixing speed range.
2. No more than two additions of water at the point of deposition before discharge shall be allowed.
3. No retempering of the concrete will be permitted. Retempering is defined as the addition of water after the mix has attained its desired initial slump.

2.10 DETECTABLE WARNING SYSTEM

A. Cast in place vitrified polymer composite (VPC) detectable/tactile warning tiles shall be an epoxy polymer composition with aluminum oxide particles in the truncated domes. Standard of quality shall be Armor-Tile 24" x 36" cast-in-Place Inline Dome Tactile Tile (ADA-C-2436) as manufactured by Engineered Plastics, Inc. 800-682-2525 or Architect approved equal.

B. Color shall be colonial red (Federal No. 20109) or Architect approved equal.

C. Guarantee period shall be five (5) years from substantial completion including defective work, breakage, deformation, heave, and loosening tiles.

2.11 EXTERIOR ANCHORING CEMENT (NON-SHRINK GROUT)

A. For Steel Posts, Fencing and Other Non-Aluminum Elements: Shall be an exterior grade anchoring cement (non-shrink grout) with a min. compressive strength (ASTM C-109) of 7,200 psi at 28 days. Standard of quality shall be Super Por-Rok as manufactured by CGM, Inc., www.cgmbuildingproducts.com, or Architect approved equal.

B. For Aluminum Posts and Elements: Shall be an exterior grade anchoring cement (non-shrink grout) with a min. compressive strength (ASTM C-109) of 7,200 psi at 28 days.

Standard of quality shall be Por-Rok as manufactured by CGM, Inc., www.cgmbuildingproducts.com, or Architect approved equal.

2.12 HIGH STRENGTH ANCHORING EPOXY SYSTEM

A. A two-component vinylester adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment.

B. Designed for bonding threaded rod and reinforcing bar elements into drilled holes in concrete and masonry base materials.

C. Standard of quality shall be AC100+ GOLD Vinylester Injection Adhesive Anchoring System as distributed by A.H. Harris, (315) 414-0340, or Architect approved equal.

2.13 CONCRETE BONDING AGENT

A. Shall be a concrete bonding adhesive specifically formulated for permanently bonding new concrete to old concrete in exterior applications.

B. Concrete bonding adhesive applied to appropriate substrates will achieve tensile bond strengths typical of 150 psi in 28 days.

C. Standard of quality shall be Quickrete Concrete Bonding Adhesive or Architect approved equal.

PART 3 - EXECUTION

3.1 CONCRETE WALKS, PADS, AND RAMPS

A. Surface Preparation: Remove loose material from the compacted subgrade surface immediately before placing concrete. Remove any standing water, mud, debris, frost, snow, ice from surfaces upon or against which concrete is to be placed.

B. Proof-roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Do not begin concrete pour until such conditions have been corrected, subgrade is compacted to 95% and ready to receive concrete.

C. Form Construction: Construct to required size and shape. Brace and secure to maintain alignment, elevation and position. Check completed formwork for grade and alignment, prior to installing concrete. Clean forms as needed to removed foreign matter.

D. Install welded wire mesh on concrete brick or mesh chairs to proper level in maximum lengths possible. Offset end laps in both directions. Splice laps with tie wire. Lifting mesh after concrete pouring is not acceptable.

E. Prepare concrete mixture including the following:

i. Add hot weather or cold weather admixture to accommodate field weather conditions.

F. Concrete Testing: Will be performed as described in Part 3, "Field Quality Control" of this specification section.

G. Conveying Concrete:

1. Convey concrete by means that will prevent segregation and loss of mortar form the mix.
2. Provide adequate manpower and equipment in the form of buckets, buggies, chutes, conveyors or other approved means to assure continuous operation.
3. Convey concrete so that no equipment with aluminum parts comes in contact with fresh concrete.

H. Concrete Placement:

1. Do not place concrete until subgrade and forms have been checked for line and grade.
2. Moisten granular base course as required to provide a uniform dampened condition at the time concrete is placed.
3. Do not place concrete around manholes or other structures until they have been brought to the required finish grade, alignment, and expansion joints have been installed.

I. Spread concrete as soon as it is deposited on the granular base course, using methods which prevent segregation of the mix, and with as little rehandling as possible. Consolidate concrete along the face of forms. Consolidate with care to prevent dislocation of mesh, reinforcing and joint materials.

J. Concrete Joints:

1. Construct expansion and contraction joints as detailed and as shown on plans. Concrete joints that do not follow the pattern(s) shown on the plans and/or changes that have been approved by the Architect will be removed and replaced at no additional cost to the Owner.
2. When the walkway is abutting existing walks, place transverse joints to align with previously placed joints, unless otherwise shown.
3. Contraction Joints: Approximately 5'-0” on center. Break walk into individual slabs of not more than twenty-five (25 sf) square feet with jointing tool, round edges. Saw cut scoring pattern (contraction joints) to depth shown on details for each type of concrete work with new, sharp concrete sawblade one day (24 hours) after the pour. Joint cuts to be clean, sharp, uniformly made cuts to achieve scoring pattern as shown and detailed.
4. Expansion Joints: Provide where abutting building(s), columns, structures, concrete paving and curbs, catch basins, manholes, inlets, walks, walls, other fixed objects and as directed by the Architect.
5. Locate expansion joints at thirty feet on center (30' o.c.) for each walkway lane, unless otherwise shown. Provide slip dowels as detailed and specified.

6. Locate expansion joints with slip dowels at all flush building access points, whether specifically shown on drawings or not.
7. Extend joint fillers full width and depth of the joint, flush with finished pavement grade, and not less than 1/4" or more than 1/2" below the finished pavement surface. Joint surfaces shall be clean and dry prior to installation of sealant as per manufacturer's recommendations. Remove excess sealant on surfaces adjacent to joint.

K. Concrete Finishing:

1. Perform concrete finishing using machine or hand methods as required.
2. After striking off and consolidating concrete, smooth the surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.
3. After floating, test surface for trueness with a ten (10') foot straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous, smooth finish.
4. Work edges of slabs and joints with a 1/8" radius edging tool, two (2") wide, unless otherwise shown.
5. After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows.
6. Broom finish, by drawing a medium hair broom across the concrete surface as detailed. Repeat operation when required to provide a medium texture acceptable to the Architect.
7. For handicap curb ramps, tool grooves along sloping surfaces in line with drainage flow as detailed.

L. Concrete Curing and Sealing:

1. Refer to schedule note in 1.6 above.
2. Immediately after placement, protect concrete from premature drying.
3. Remove all dirt, dust, oil, grease, asphalt, vegetation, grass, and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry.
4. Stir curing compound thoroughly before using.
5. Apply a continuous, uniform film by solvent-resistant low-pressure spray only, short-nap roller or lamb's wool applicator. For best results, use a canister curing compound sprayer. Use spray tip number 8004 or equivalent for water-based or waterborne products.
6. For curing, coat evenly and uniformly as soon as possible after final finishing.
7. Apply penetrating sealer minimum thirty (30) days after application of curing compound when all construction is completed and structure is ready for occupancy / use, prior to any application of de-icing chemicals. Following manufacturer’s recommendations for application over concrete including removing any remaining curing products.
8. When soil contamination occurs, notify the Architect immediately in writing. Remove contaminated soils and legally dispose of, provide soil test(s), replace soil, plantings and lawns at no additional cost to the Owner.

M. Detectable Warning System:

1. Pour and float concrete, set tile by tamping grid pattern down into the concrete until all air voids are removed with a rubber mallet.
2. Place two cinder blocks or 25 lbs weight on the tile to prevent floating.
3. Create an edge around the perimeter of the tile using a 3/8" radius edging tool then float the concrete around the tile's perimeter using a steel trowel.
4. After concrete has cured, remove protective plastic wrap.
5. Protect tiles against damage during construction and clean tiles as recommended by the manufacturer.

3.2 CONCRETE CURB

A. General: Concrete Gutter and Curb shall meet the requirements specified for concrete in this Section, Item 3.1 above. Install forms true to line and grades given on plan. Provide permanent in place expansion joints using pre-molded expansion joint filler thirty feet (30' o.c.) on center, maximum. Install reinforcing bars as detailed. Remove forms in twenty-four (24) hours. Saw cut the contraction joints approximately 10' on center 1-1/2" deep with a new sharp concrete saw blade the next day after the pour along top and both faces of curb. Note: When the saw-cutting is not performed as described, an extended written guarantee or credit for defective work will be required by the Architect.

B. Finishing: Remove ties and patch tie holes, including those below grade. Remove fins and patch minor voids. Chip out major stone pockets and repair. Rub surface smooth with carborundum brick dipped in neat cement grout to fill pin holes. Trowelled on cement plaster is prohibited. After drying, rub off excess cement dust with burlap.

C. Curing: See 3.1, above.

D. Slip-formed (machine formed) gutters and curbs are acceptable when installed in accordance with NYSDOT 609-3.04-B using Type "J" concrete and mixing in fiber mesh as specified. Expansion and contraction joints are still required as detailed including slip dowels at expansion joints.

3.3 CONCRETE TURF TERMINATION CURB

A. General: Concrete turf termination curb shall meet the requirements specified for concrete in this Section, Item 3.1, except as noted below.

B. Verify that lines, levels, locations and form dimensions comply with drawings and submittals.

C. Design, erect, support, brace, and maintain formwork to support applied vertical and lateral loads. Construct formwork to provide correct size, alignment, elevation, pitch on tread, and position of concrete work.

D. Design and erect formwork to permit removal without damage to cast-in-place concrete surfaces and adjacent materials during stripping.

E. Install, align, and level forms. Support and brace forms in place.

F. Coat form surfaces with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage. Apply before placing reinforcing steel, anchoring devices, and embedded items.

G. Provide reinforcing bars adequately supported and secured to prevent displacement.

H. Placement of concrete shall be in layers not to exceed 18 inches without consolidation with the aid of mechanical vibrating equipment. To achieve even and dense surfaces, free of aggregate pockets or honeycomb, vibration shall be supplemented by spading by hand in the corners and angles of forms and along surface while concrete is plastic under the vibratory action. Placement of concrete shall conform to recommendations of ACI 309 "Recommended Practice for Consolidation of Concrete".

I. Install, set, and build-in items furnished by other trades. Provide adequate notification for installation of necessary items. Coordinate with reinforcing, safety railings and hand railings.

J. Remove ties and patch tie holes, including those below grade. Remove fins and patch minor voids. Chip out major stone pockets and repair. Rub surface smooth with carborundum brick dipped in neat cement grout to fill pin holes. Trowelled on cement plaster is prohibited. After drying, rub off all excess cement dust with burlap.

K. Medium broom finish concrete turf termination curb with strokes perpendicular to the field.

L. Cure and seal as specified in this section, item 3.1 above.

M. Strip Forms and Bracing: Three (3) days minimum before stripping. It is the Contractor's responsibility to determine the time at which forms may be removed without damaging the turf termination curb and only after concrete has gained sufficient strength to carry its own weight and imposed loads.

3.4 FOOTINGS, BASES, FOUNDATIONS, SADDLES, CRADLES, COLLARS, AND THRUST BLOCKS

A. Footings, Bases, Foundations: Locate and provide where shown on drawings and as detailed.

B. Saddles: Locate and provide where shown on drawings or where vertical distance between crossing pipes is eighteen (18") inches or less. Construct saddles spring line (centerline) to spring line and full width of trenches.

C. Cradles: Locate and provide where shown on drawings. Construct cradles the full width of the trench, six (6") inches below the pipe and on both sides of the pipe up to the spring line.

D. Collars: Locate and provide where shown on drawings or where pipe slopes exceed ten (10%) percent. Construct collars one (1') foot thick, full width of trench plus one (1') foot extension each side, above and below pipe.

E. Thrust Blocks: Locate and provide where shown on drawings. Also for sanitary force main and water pipes at (1) connections to existing systems, (2) at changes in horizontal alignment of 22-1/2 degrees or more, and (3) at tees, crosses, valves, hydrants and plug (end of pipe) conditions. Block and anchor with concrete so that there will be no movement of the pipe in the joints due to internal or external pressures. The concrete shall be placed around the fittings and completely fill the space between the fittings and walls of the trench, from 6" below the fittings of pipe, to 12" above the fittings. The anchor concrete shall be so placed that the bell and spigot joints or other joints may be recaulked or tightened if necessary. Concrete thrust blocks shall conform dimensionally to details shown on drawings.

3.5 INTERRUPTION OF CONCRETING

A. Should placing concrete be suspended or unavoidably interrupted, provide keyways and bulkheads to prevent feather-edging when work is resumed. Roughen horizontal surface for bond.

3.6 REPAIR AND PROTECTION FOR CONCRETE WORK

A. Cut out and replace defective concrete work which has blisters, cracking, crazing, curling, discoloration, dusting, efflorescence, low spots, pop outs, scaling or mortar flaking, spalling, settling, or heaving as defined by Portland Cement Association 2001, "Concrete Slab Surface Defects" and as directed by the Architect.

B. Modify or replace concrete not conforming to the required lines, details, elevations and specifications as directed by the Architect.

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

3.7 ANCHORING RAILINGS AND POSTS INTO CONCRETE

A. Aluminum posts **must** be coated or treated with a good sealer or paint prior to anchoring.

B. Drill the hole as detailed. Blow out all dust and loose particles.

C. Fill the hole with water. Scrub the sides and bottom of the hole and with a stiff wire brush such as a bottlebrush. This is important.

D. Remove excess water with rag or other absorbent materials. Leave the hole clean and uniformly damp.

E. Mix the anchoring cement in a clean container to flowable consistency based on the following formula. For best results, measure accurately. The correct amount of water is as follows:

2.3 oz per lb
11.5 oz for 5 lbs
115 oz for 50 lbs
7 quarts for 100 lbs

Measure the amount of anchoring cement and water to be mixed. Add the measured amount of water to the appropriate amount of cement and mix until the desired consistency is achieved. (NEVER USE MORE WATER THAN PRESCRIBED). This will reduce the ultimate strength, increase the possibility of volume instability and may cause the product to become soft and less durable.)

F. Fill the hole with the plastic cement first, and then tamp the bolt, post or rod with a twisting motion into place. If the material becomes too fluid during the tamping process and sags out of place, let it stand for a few minutes and it will stiffen. Smooth out the surface around the bolt with spatula or trowel.

G. Let the cement harden for at least 60 minutes. For heavy equipment, allow 4 hours prior to use or loading.

3.8 ANCHORING BOLTS, DOWELS, AND REBAR INTO CONCRETE

A. Anchor Hole Preparation: Prepare all anchor holes prior to placement of anchoring epoxy. Hole diameter is typically 1/8" (3 mm) greater than the anchor diameter. Hole depth is typically nine times anchor diameter. Required minimum anchor hole depth is 6". Consult project specifications and details. Drill hole to proper diameter and depth and blow all dust from the bottom of the hole, brush and blow (4x) repeatedly to remove all dust and debris. The anchor hole must be clean and free of standing water prior to placement of material.

B. Application: Use only professional caulking guns. Remove plastic caps and plugs from cartridge. Save for closing cartridge. Attach mixing nozzle to cartridge. Discard small amounts of gunned products until uniform color is achieved. Mixing nozzle will harden in approximately 20 min. if not in use.

C. Hardened nozzles must be discarded. Dispense the epoxy at the bottom of the hole while withdrawing nozzle. Dispense epoxy (typically filling 5/8 of hole) so that once threaded rod or rebar is inserted, the hole is completely full. Insert threaded rod or rebar to the bottom of the hole while turning clockwise. Promptly remove any excess material. Leave anchor undisturbed for 6 hours (at 77°F /25°C), or longer for colder temperatures. Load can be applied 8 hours at 77°F (25°C).

3.9 CONCRETE BONDING AGENT

A. Required at elements where new concrete is applied and joined to existing concrete.

B. Surface Preparation:

1. Apply only to clean, sound, dry surfaces.
2. Remove dust, dirt, oil, grease, wax, unsound concrete and plaster, paint, and other foreign materials.

C. Applications:

1. Apply to a dry surface with brush, roller or spray to the thickness of a paint coat.
5. Place new concrete, topping mixes, Portland cement, or patches as soon as the adhesive is dry.
6. Make sure basecoat is dry before applying adhesive.
7. Tools, brushes and other application accessories should be immediately cleaned with soapy water. Use hot water to clean up any drippings.

3.10 FIELD QUALITY CONTROL

A. Field inspection and testing shall be performed by ACI certified technicians; Grade 1. Certificates shall be submitted to the Architect for people performing inspection and testing prior to the start of work.

B. Field Inspection and testing shall be paid for as directed under 1.5 "Quality Assurance". Where retesting, additional inspection, lab tests or other professional services are required due to rejected work, any cost associated therewith will be solely at the Contractor's expense.

C. The Contractor shall plan his operations to allow adequate time for all required testing and inspection.

D. The Contractor shall provide facilities and equipment necessary to obtain and handle representative sample of materials to be tested.

E. The testing laboratory shall be responsible to the Owner for the field control of all concrete and may reject batches because of high slump, uncontrolled air entrainment, delays or other conditions of non-compliance with these specifications.

F. Sampling and Field testing will be performed during concrete placement per ASTM C31, C39, C143, C172 and C173.

G. Five (5) Concrete Test Cylinders: Taken for every thirty (30) or less cubic yards of concrete placed are required or a fraction thereof;

1. Two (2) Cylinders will be tested at 7 days; two (2) cylinders will be tested at 28 days and one (1) cylinder will be tested at 56 days.

H. One (1) Additional Test Cylinder: Taken during cold weather concreting, to be cured on the job site under the same conditions as placed concrete it represents, is required.

I. Air Content Test: Taken for each set of test cylinders taken, is required.

J. One (1) Slump Test: Taken for each set of test cylinders taken is required.

K. Test results will be reported to the General Contractor and Architect on same day tests are made. Emailed reports will follow to the Owner, Architect, and Landscape Architect. Email copies of laboratory test, evaluation reports for concrete materials and mix designs will be submitted.

3.11 CLEAN UP

During the contract and at intervals as directed by the Architect and as concrete work is completed, clear the site of gravel, concrete, appurtenances and debris. Leave the site in a clean, safe, well-drained, neat condition.

END OF SECTION 32 13 01

SECTION 321801 – SYNTHETIC TURF

1.0 PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of synthetic turf work is shown on the drawings.

B. Synthetic turf work includes, but is not limited to, the following:

1. Drainage blanket surface inspection, adjustment, and approval
2. Dual blended slit film and monofilament U.V. resistant polyethylene fibers turf stitched into a primary and secondary backing.
3. Tufted-in game lines and perimeter lines. Remaining required game markings and logos shall be permanently inlaid or painted as specified.
4. Resilient two (2) layer infill system, consisting of a mixture of rubber granules and silica sand.
5. Maintenance manual and onsite maintenance training
6. G-max testing prior to Owner use of facility
7. Twelve (12) year manufacturer's warranty
8. Revisiting site for future G-max testing, infill adjustments, and wear areas
9. Clean up

C. Provide all labor, materials, tools, and equipment necessary to install synthetic grass system as indicated on the plans and as specified.

D. The installation of all new materials shall be performed in strict accordance with the manufacturer's installation instructions and in accordance with all approved shop drawings and submittals. The final product shall be a well-draining, even playing surface free of distortion, inconsistent infill levels, and other imperfections.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 312201 - Site Earthwork

B. Section 323001 - Athletic Equipment and Furnishings

C. Section 334001 - Storm Drainage

1.3 REFERENCES

A. FM P7825 - Approved Guide; Factory Mutual Research Corporation: current edition

B. ASTM Standard Test Methods:

D1577 - Standard Test Method for Linear Density of Textile Fiber
D5848 - Standard Test Method for Mass per Unit Area of Pile Yarn Floor Covering

D418 - Standard Test Method for Testing Pile Yarn Floor Covering Construction
D1335 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
D2256 - Standard Method of Test for Tensile Properties of Yarns by Single Strand Method
D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf playing Surfaces
D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
F355A - Standard Test Method for Shock-Absorbing Properties of Play Surfaces
F355E - Standard Test Method for Standard Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play
F1936 - Standard Test Method of Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field
F1551 - Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials
F2765 - Standard Specification for Total Lead Content in Synthetic Turf Fibers
D5603- Standard Classification for Rubber Compounding Materials-Recycled Vulcanizate Particulate Rubber

C. European Standard EN-71-3 - Safety of Toys Part 3: Migration of Certain Elements.

D. National Federation of State High School Associations (NFHS) Rules and Regulations, latest edition.

E. Synthetic Turf Council (STC): Suggested Guidelines for the Essential Elements of Synthetic Turf Systems, latest edition and Guidelines for Crumb Rubber Used in Synthetic Turf Fields, latest edition.

F. American Sport Builders Association (ASBA): Sports Fields - A Construction and Maintenance Manual, latest edition.

1.4 SUBMITTALS

A. Prior to the Architect approval of specified synthetic turf system, submit the following within seventy two (72) hours of bid opening, as requested:

1. Submit two (2) 12” x 12” rag samples of proposed synthetic turf carpet including infill representative of finished synthetic turf system.

2. Certified copies of independent (third-party) laboratory reports on ASTM tests as follows:

a) Specific Gravity, ASTM D792

b) Tuft Bind, ASTM D1335
c) Grab Tear Strength, ASTM D1682 or D5034
d) Pile Height, Face or Pile Weight & Total Fabric Weight, ASTM D418 or D5848
e) Primary & Secondary Backing Weights, ASTM D418 and D5848
f) Flammability (Pill Test), ASTM D2859
g) Water Permeability, ASTM F1551
h) Yarn Breaking Strength, ASTM D2256

3. List of five (5) similar existing (in play) blended slit film/monofilament hybrid installations that have been installed in the Northeast Region of the United States including, Owner representative and telephone number(s).

4. The Turf Contractor and Turf Manufacturer (if different from the company) shall provide a letter showing evidence that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.

5. The Turf Contractor and Turf Manufacturer (if different from the company) shall provide three (3) copies of a current 3rd party, NON-CANCELABLE warranty insurance policy, supported by an A-Rated domestic insurance carrier, with a policy minimum claim limit of at least $1,000,000. and annual aggregate limit of at least $15,000,000. in order to fully cover the full replacement of the turf system in the event of total failure. Actual policy must be submitted for approval.

6. Letter stating the products expected useful life under normal use conditions defined in the manufacturer's warranty.

7. A letter and specifications sheet certifying that the products in this section meet or exceed specified requirements including certification from the turf manufacturer that lead or lead chromate are not used in the manufacturing of the specified system AND that the turf system is entirely **PFAS FREE**.

8. Letter and confirmation that the turf manufacturing company meet the New York State Carpet Collection Program Law, latest and most up to date law.

B. Submit the following prior to ordering of materials:

1. Shop Drawings (to scale) indicating:

a) Colored Field Layout and Field Marking plan for the specified NFHS sports.
b) Colored Logo / Lettering Designs and Dimensions.
c) Roll/Seaming Layout
d) Methods of attachment, field openings and perimeter conditions.

2. Material Certificates: Provide material certificates for each material used in the turf system from the turf manufacturer that will be used for this project including,

but not limited to, type and composition of fiber(s), primary and secondary backing, and urethane(s).

3. Samples: Submit two (2) 12” x 12” samples of each turf color specified to be used for tufted and inlaid lines / logos. Tufted and Inlaid turf shall match the specified synthetic turf system. Provide two (2) bagged samples each of rubber and sand infill material.

4. Supplier Certification that crumb rubber infill (CRI) being used for the turf system is from only used, whole, vulcanized automobile, SUV, or truck tires and produced in compliance with North American tire manufacturing specifications. Include documentation of compliance with EN-71-3 Standard for Children's Toys as indicated in Part 2, Paragraph 2.1, D. Include documentation of compliance with ASTM D5603-01 as indicated in Paragraph 7.3.2.

5. The Turf Contractor and Turf Manufacturer (if different from the company) shall provide a sample warranty that meet requirements in 1.8 of this section.

6. Submit copies of proposed installation foreman’s resume. Installation crew must meet or exceed all requirements outlined in Section 1.8.

C. Provide crumb rubber infill (CRI) order certification noting type and origin of raw material, production facility, production method, fiber content (%), and CRI sieve and gradation analysis. All supersacks shall provide traceability to date of production and origin of processing.

D. No reclaimed infill, sand or rubber, from other synthetic turf field installations are permitted.

E. Prior to Final Acceptance, the Turf Contractor shall submit to the Architect / Owner:

1. Independent G-Max test results and a letter indicating compliance with future G-Max testing as specified in 1.5 of this Section.

2. Three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and markings.

3. Recommended Maintenance schedule provided by vendor for first three (3) years after installation.

4. Synthetic Turf Warranty: Submit twelve (12) year fully executed Manufacturer Warranty and ensure that forms have been completed in Owner's name and registered with Manufacturer and Insurance carrier. This includes the Certificate of Insurance from the Insurance Carrier confirming that the third-party insurance policy, non-cancelable and pre-paid is in effect covering this installation and is in force.

1.5 QUALITY ASSURANCE

A. Turf Manufacturer Qualifications: Company specializing in manufacturing of products specified in this section. The Turf Contractor and/or the Turf Manufacturer:

1. Must be experienced in the manufacture and installation of this specific type of synthetic infill blended fiber grass system including fibers, backing, backing coating, adhesives, infills and installation methods at exterior sites over the last three (3) years.

2. Must have a minimum of five (5) exterior fields installed with same slit film/monofilament product specified still in use and fields should be a minimum of 65,000 square feet in size.

B. Turf Installer Qualifications: Company specializing in performing the installation work of this section.

1. The Turf Contractor must have been in business (under its' current name and Ownership) for at least the past five (5) years and must have a minimum of twenty five (25) athletic fields still in use in the United States for a minimum of the last five (5) years.

2. The designated Supervisory Personnel on the project must be factory certified, in writing by the Turf Manufacturer, as competent in the installation of this specified blended slit film/monofilament material, including sewing seams and proper installation of the infill mixture.

3. The Factory Certified Supervisory Personnel shall be on site to certify the turf installation and Warranty compliance.

4. The Turf Contractor must provide competent workmen skilled in this specific type of synthetic grass installation. The installation crew / technicians shall have experience of at least three (3) fields in play with the same monofilament fiber system being used.

C. Prior to the beginning of the synthetic turf installation:

1. The installer of the synthetic turf shall inspect the stone drainage sub-base for tolerance to grade.

2. String line the entire field every five (5') feet to identify high and low spots. Assist the stone drainage blanket installer with correcting any deficiencies in a proper and timely manner.

3. The turf installer will review and confirm Owner provided project test results for stone drainage base compaction, planarity and permeability to be in compliance with project specifications as it relates to the synthetic turf warranty.

4. The turf installer will accept the stone drainage sub-base in writing and supply a "Certificate of Base Acceptance" for the Architects approval before turf installation can begin.

D. Shock Attenuation Evaluation (G-Max Testing):

1. Near the completion of the turf, hire a third party, independent testing agency to perform ten (10) in place G max tests in compliance with ASTM F1936 and F355A, in locations as directed by the Architect. If any test results exceeds **125**, modify the infill material ratios as necessary to achieve satisfactory results. Perform additional testing to verify the results as directed by the Architect.

2. Guarantee / Warranty: During the twelve (12) year guarantee period, the G max rating shall remain less than **165**. Hire a third party, independent testing agency to perform ten (10) in place G max tests, in locations as directed by the Owner, during the first, third, fifth, seventh, ninth and eleventh years. If any test results meet or exceed **165**, modify the infill material ratios as necessary to achieve satisfactory results. Perform additional testing to verify the results as directed by the Owner. If the G max rating exceeds **165** after three (3) attempts to repair the high rating, the Turf Contractor and Turf Manufacturer shall fully replace the synthetic turf field within ninety (90) calendar days at no cost to the Owner.

E. Materials Quality:

1. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields used for full contact football. The materials as hereinafter specified, should be able to withstand full climatic exposure in the specific location of the field, be resistant to insect infestation, rot, fungus and mildew; it shall also withstand ultra-violet light and heat degradation, and shall have the basic non clogging characteristic of vertical flow through drainage allowing free movement of surface run-off vertically through the turf where such water may flow through the stone blanket and into the field perimeter drainage system.

2. The adhesive bonding and sewn seams of all system components shall provide a permanent, tight, secure, and hazard free athletic playing surface. All inlaid lines / markings / logos and sewn seams shall remain in place throughout the duration of the warranty period.

3. The installed synthetic turf system (turf and infill), for the life of the product, shall drain through a rate of not less than 20 inches +/- per hour.

4. Crumb Rubber Infill (CRI):

   a. Shall not contain more than 0.01% by weight liberated fiber in accordance with the Synthetic Turf Council.
   b. Shall not contain more that 0.1% by weight within a 100-gram sample of metal content in accordance with ASTM D5603-01.

c. Provide testing of one (1) supersacks of CRI for iron content per load (or 44 bags), in accordance with ASTM D5603-01, 7.3.2. This would average 5 bags per field.
d. Crumb rubber infill material that does not meet the standards for ASTM D5603-01 and EN-71-3 shall be removed and replaced at no additional cost to the Owner.

5. Material that does not meet the standards shall be removed and replaced at no additional cost to the Owner.

1.6 PRE-INSTALLATION MEETING

A. Convene One (1) Week after receipt of Submittals identified in 1.4, A. above;

1. An interview shall take place at a time and date to be determined by the Architect at the District Office of Owego Apalachin CSD. Present at this meeting shall be the Landscape Architect, Owner's Representative(s), the Project Manager and Site Superintendent for the Prime Contractor and the Project Manager and Project Foreman for the Turf Installer. The purpose of this meeting will be to review turf product and installation means and methods, to interview and ascertain the experience and competence of the Turf Installer, as well as, the onsite Project Foreman for this project and to review the project schedule. The basis of choosing this particular product shall be in part due to the results of this interview process. Contractor shall submit all required submittals before this meeting as described in 1.4, A. above.

B. Convene Two (2) Weeks Prior to Stone Drainage Blanket Completion:

1. A second meeting shall take place at a time and date to be determined by the Architect at the District Office of Owego Apalachin CSD. Present at this meeting shall be the Landscape Architect, Owner's Representative(s), and the Project Manager for the Prime Contractor. The purpose of this meeting shall be to review and confirm schedule. (with particular attention on the turf installation) and to confirm that the turf product has been ordered by way of notarized copies of the original confirmed Purchase Order and guaranteed delivery date.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to project site in wrapped, neat, secure condition. Provide means to unload products from delivery trucks.

B. Store products under cover and elevated above grade. Turf and turf material left on bare ground is not acceptable to be used and may be rejected by the Architect.

C. Protect all products and installation area from vandalism, theft, other construction, premature use, etc. until Owner acceptance and Architect sign off.

1.8 WARRANTY

A. The warranty coverage shall not be prorated nor place limits on the amount of the field's annual usage.

B. The Turf Contractor and/ or Turf Manufacturer shall provide a twelve (12) year Warranty and supported by a prepaid third party insured eight (8) year warranty, from an A-rated domestic insurance carrier, which warrants the usability and playability of the artificial turf system for its intended uses. Letters of credit are not acceptable.

C. The Turf Contractor and/or Turf Manufacturer must verify that their onsite representative has inspected the installation and that the work conforms to the Turf Manufacturer's requirements.

D. The Warranty shall support that all designs, game markings, and layouts conform to all currently applicable NFHS rules and regulations, or league specific requirements, depending on application.

E. The Warranty must have the following minimum characteristics:

a. Provide full coverage for a minimum of twelve (12) years from the date of Substantial Completion.

b. The turf fabric shall not lose more than an average 2% per year and not be limited to the amount of annual usage.

c. Shall guarantee the availability of replacement material for the synthetic turf system installed for the life of the warranty, including items that are no longer serviceable to maintain a serviceable and playable surface.

d. The warranty shall be all encompassing of the turf system including, but not limited to, the fibers, backing, adhesives, infill, tape and logos.

e. The Warranty shall include general wear including lacrosse goal crease(s) and damage caused from UV degradation.

f. The Warranty shall specifically exclude vandalism, and acts of God beyond the control of the Owner or the manufacturer.

g. Covers defects in the installation and workmanship, and further warrant that the installation was done in accordance with both the Manufactures' recommendations and any written directives of the Manufacturer's onsite representative.

h. Shall NOT be limited to just the repair or replacement of affected areas. Shall include all necessary materials, labor, transportation, removals, and disposal costs to complete repairs or replacement.

i. The synthetic grass turf must maintain an ASTM F355A and ASTM F1936 G-max of between 125 and 165 for the life of the Warranty. Refer to 1.5, D. of this section.

j. The synthetic grass turf must maintain an ASTM F355E of between 700 and 1000 for the life of the Warranty. Refer to 1.5. of this section.

k. Any repairs or service to the field requested by the Owner or the Owner's representative shall be addressed within seven (7) days from the date of written notification.

1.9 MAINTENANCE SERVICE

A. The Turf Contractor will train the Owner's facility maintenance staff in the use of the specified maintenance attachments and equipment to routinely groom, sweep and plow the field.

B. The Turf Contractor will provide the Owner's facility maintenance staff with a recommended maintenance schedule specific for the intended level of use, etc.

1.10 SUBSTITUTIONS

A. If a product is being submitted as a substitution to the specified product; then the Prime Contractor shall submit and request a product material substitution with his/her bid. The Prime Contractor shall at a minimum provide the following for review by the Architect and Owner:

1. All submittals as specified herein
2. Product comparison
3. Cost Information (including proposal of change in Contract Sum)
4. Contractor’s certification that proposed substitution complies with requirements in the Contract Documents
5. Contractor’s waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2.0 PART 2 - PRODUCTS

2.1 SYNTHETIC TURF SYSTEM

A. The installed synthetic turf system shall have the following physical properties:

Product Weight:	68 to 80 oz/sy (+/- 2 oz)	D418/D5848
Pile Yarn Weight:	50 oz/sy (+/- 3 oz)	D418/D5848
Fiber Denier	12,000 min. Mono, 5,000 min Slit	D1577
Yarn Thickness:	100 min for Slit, 300 min for Mono	D3218
Pile Height:	2 ¼” to 2½ “	D418/D5848

Avg. Tuft Bind:	8+ lbs. min. (with infill)	D1335
Primary Backing:	7 oz/sy	D418/D5848
Secondary Backing:	16 to 22 oz/sy (urethane)	D418/D5848
Avg. Grab Tear (length)	>200 lbs./force	D5034
Avg. Grab Tear (width)	>300 lbs./force	D5034
Abrasiveness Index	<25	F1015
Permeability	>20 inches/hour	DIN 18-035-6
Pill Flammability	Pass	D2859
G Max (Impact)	< 125 at install, < 165 over life of field	F355A / F1936
Tufting Gauge	3/8" to 3/4"	
Stitch Rate	9 stitches per 3"	
Field Color	Field (Dark) Green	
Roll Width / Length	15'wide and up to 220' long	
Infill	2.7lbs/sf ambient ground rubber / 3lbs/sf sand	
Drainage	3/16" holes on staggered 4" centers	

B. Turf Carpet: shall consist of 100% polyethylene slit film fiber and monofilament blended in dual yarn types and dual yarn thicknesses tufted through the same stitch into a primary backing with a secondary backing consisting of a minimum of 16 ounces of urethane per square yard.

1. The Carpet shall be furnished in 15' wide rolls with four (4") inch white, football 5-yard lines tufted into each roll, when applicable. The perimeter white line shall also be tufted into the individual sideline rolls, when applicable. The rolls shall be of sufficient length to go from sideline to sidle line without splicing. Head seams, between the sidelines, will not be acceptable. All seams will be sewn (glued seams are NOT acceptable) and thread for sewing shall be as recommended by the Turf Manufacturer.

2. The fiber shall be low friction, UV-resistant fiber measuring not less than 2 ¼ inches high. The same fiber from the above listed projects (Section 1.4, B.) must be used on this project.

3. All colored inlaid lines, sport markings, numbers, and logos shall be made of the same exact blended fiber material as specified for the field carpet and shall be cut in and glued or "inlaid" as recommended by the Turf Manufacturer.

C. Field Markings: All markings to be installed in accordance with the Owner / Architect approved shop drawings, NFHS, and ASBA standards.

1. Inlaid Lines: field lines to be inlaid into the turf:

   a. Soccer: All lines shall be inlaid White.
   b. Men's Lacrosse: All lines shall be inlaid Red.
   c. Women's Lacrosse: All lines shall be inlaid Blue.
   d. Field Hockey: All lines shall be inlaid Lagoon Blue.
   e. Softball: All lines shall be inlaid Silver.

f. Logos, Text, and Graphics: will be inlaid according to color and artwork, submitted by the Owner / Architect to the Turf Contractor.

D. Resilient infill: The resilient infill materials shall be approved by the Manufacturer. The infill shall consist of a specially formulated mixture of approximately 2.7 lbs. minimum per square foot of crumb rubber and 3 lbs. minimum per square foot of sand engineered to provide the look, feel, footing, and shock absorption of a natural grass field in ideal conditions.

1. Ambient ground SBR Crumb Rubber: Granules shall contain minimal dust or contaminants and shall be derived from the ambient processing form of recycled tires. Color shall be substantially black and shall meet the 10 – 20, 8 – 16 or 8 – 14 mesh size designation.

   a. The clean, uniformly sized particles shall be consistent in shape and particle size distribution.
   b. The particles shall resist abrasion in high traffic and excessive wear applications and provide stability to artificial sports turf applications.
   c. The particles shall be processed and sized under rigid specifications and Manufacturers' statistical and quality control assurance program.
   d. Particles shall be structurally pure and consistently uniform in size distribution for predictable performance.

2. SBR Crumb Rubber Certification: The Turf Contractor / Turf Manufacturer shall provide in writing that they maintain an ongoing Quality Control program meeting all the standards of the STC Guidelines for CRI Used in Synthetic Turf Fields and capable of meeting all specifications described herein.

   a. Turf Contractor shall supply the Architect with a copy of the Crumb Rubber Infill (CRI) Shipment / Order Certification that includes, type and origin of raw material (certify that it comes from tires), production facility, production method, fiber content (%), and (CRI) sieve / gradation analysis.

   b. The SBR rubber infill provided for this project shall comply with the Synthetic Turf Council's recommended testing guidelines for infill based on the EN 71-3 standard for children's toys or come from a source that maintains an active Environmental Labs (UL) Environmental Claim Validation Summary showing that the rubber produced actively meets the EN 71 standard and CPSIA standard for lead. Provide written document stipulating the above.

3. Sand Particulate: The sand provided as a component of the infill mixture shall be rounded so as to minimize abrasion to the athlete and synthetic grass fibers. Supplied from either Unimin or US Silica or Architect approved equal.

E. Inlaying Materials:

1. Adhesive for inlaying lines and markings shall be a two-component fast set urethane adhesive obtained from a single manufacturer and be equivalent to Ultrabond Turf PU 2K as manufactured by Mapei Corporation (800)-992-6273, or one-part moisture-cured polyurethane obtained from a single manufacturer and be equivalent to 34-G as manufactured by Synthetic Surfaces, Inc. (908)-233-6803 or Architect approved equal.

2. Seaming Tape: Tape for securing inlaid lines shall be high quality tape made with a minimum roll width of twelve inches (12").

A. Stadium Alternating Field Panels: Field Color shall be dual color alternating panels with blended fibers of Field Green and Summer Green. Other markings shall be as noted in 2.1

B. Soccer Overplay Areas: Field colors for overplay areas shall be Royal Blue.

C. Standard of Quality shall be:

A-Turf Titan-RS50 synthetic turf system as manufactured by:
A-Turf, Inc.
Williamsville, NY 14231
www.aturf.com
Contact: Rick Krysztof, (888)-777-6910 Or:

Field Turf Vertex (FTVT-57) synthetic turf system as manufactured by:
FieldTurf International, Inc.
Dalton, GA 30721
www.fieldturf.com
Contact: Chris White, (607)-729-8500 Or:

AstroTurf Bionic Rootzone 3D3 Blend 52 with Root Zone synthetic turf system as manufactured by:
AstroTurf, Corporation
2680 Abutment Road, SE
Dalton, GA 30721
www.astroturf.com
Contact: Hunter Moffatt, (518)-337-6221 Or:

Architect approved equal.

3.0 PART 3 - EXECUTION

3.1 GENERAL

A. The installation shall be performed in full compliance with approved Shop Drawings and Submittals.

B. Only trained technicians, skilled in the installation of outdoor athletic caliber synthetic turf systems working under the direct supervision of the Factory Certified Installation Supervisors, shall undertake any cutting, sewing, gluing, top-dressing or brushing operations.

C. The designated Supervisory personnel on the project must be certified, in writing by the turf manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the infill mixture.

D. All designs, markings, layouts, and materials shall conform to all currently applicable NFHS rules and/or other rules or standard that may apply to this type of synthetic grass installation. All designs, markings and layouts must first be approved by the Architect and Owner in the form of an approved shop drawings. All markings will be installed in full compliance with those drawings.

3.2 EXAMINATION

A. Verify that all stone drainage sub-base leveling is complete prior to installation.

B. The surface to receive the synthetic turf shall be inspected by the Turf Contractor, and prior to the beginning of installation, the Turf Installer must accept the sub-base planarity in writing. The surface must be perfectly clean as installation commences and planarity shall be maintained to a surface tolerance that does not exceed 0"-1/4" over 10 feet and 0"-1/4" from design grade throughout the installation process by the Turf Contractor.

3.3 TURF INSTALLATION

A. Install in accordance with Manufacturer's instructions. The Turf Contractor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted in writing, by the Manufacturer's onsite representative, and submitted to the Architect/Owner, verifying that the changes do not in any way affect the warranty or performance of the system. Infill materials shall be approved by the Manufacturer and installed in accordance with the Manufacturer's standard procedures.

B. The carpet rolls are to be installed directly over the properly prepared stone drainage blanket or resilient pad, if applicable. Rolls shall be laid out flat a minimum of four (4) hours prior to starting seaming procedures and allowed to relax / expand. Extreme care should be taken to avoid disturbing the stone blanket or pad, both in regard to compaction and planarity. Provide a 2-5 ton static roller onsite to repair and properly stabilize any disturbed areas of the stone blanket.

C. The full width rolls shall be laid out across the field. Turf shall be sufficient length to permit full cross-field installation from sideline to sideline. No "head" or cross seams will be allowed in the main playing area between sidelines. Utilizing standard state of the art sewing procedures each roll shall be attached to the next. When all of the rolls of the

playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf.

D. All seams shall be sewn using double bagger stitches and polyester thread (per the manufacturer's standard sewing procedures). Seams shall be flat, tight and permanent with no separation or fraying, for the life of the carpet.

E. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the Manufacturer or 1.75 inches within the fiber matrix. The mix shall be uniform and an even thickness to assure proper playing characteristics.

D. All equipment used for spreading of infill shall be fitted with a magnetic tow bar, so that as CRI is being installed, metallic impurities will be collected. If spreading equipment cannot be fitted with a magnetic tow bar, the contractor shall follow each pass of the spreading machine with a magnetic tow bar equipped on separate equipment to collect metallic impurities as the infill is being installed.

G. The infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical. Specifically formulated rubber and sand infill shall be installed in accordance with manufactures system recommendations.

H. Synthetic turf shall be attached to the perimeter edge detail in accordance with the Manufacturer's standard procedures and as detailed.

I. Inlaid markings that are not tufted into the system shall be cut in and glued in accordance with synthetic turf contractors approved seaming methods for "inlaid" game markings.

J. Prior to field acceptance, the turf shall be groomed by means of a nylon rotary brush to provide the look, feel and safety of optimally maintained natural grass, including subtle undulation normally associated with natural grass athletic fields as reviewed and approved by the Architect. The field shall have a magnetic tow bar run over the final surface one last time prior to the final grooming.

K. The Turf Contractor shall leave the Owner one (1) full spare bags of Virgin EPDM rubber to use in topdressing the fields. Leave in a location as approved by the Owner.

3.4 CLEAN UP

A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items to the satisfaction of the Architect / Owner.

B. All usable remnants of new material shall be neatly rolled up and turned over to the Owner at a place and area designated by the Owner.

C. During the contract and at intervals as directed by the Architect and as synthetic turf installation is completed, clear the site of all extraneous materials, rubbish, or debris and leave the site in a clean, safe, well draining, neat condition.

D. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION 321801

SECTION 323001 – ATHLETIC EQUIPMENT AND FURNISHINGS

1.0 PART 1. GENERAL

1.1. DESCRIPTION OF WORK

A. The extent of the athletic equipment and furnishings is shown on the drawings and as specified.

B. Athletic equipment and furnishings work includes, but is not limited to, the following:

1. Providing, installing, and turning over select athletic equipment and furnishings as noted in the specifications and as detailed.
2. Cleanup

C. Provide all materials, labor, equipment and services required to accomplish all related work in accordance with the drawings and specifications.

1.2. RELATED WORK SPECIFIED ELSEWHERE

A. Section 312201 - Site Earthwork

B. Section 321301 - Site Concrete Work

C. Section 321801 - Synthetic Turf

1.3. REFERENCES

A. American Sports Builders Association (ASBA)

B. National Federation of State High School Associations (NFHS)

C. Manufacturers Data and Recommendations on Installation Requirements

1.4. SUBMITTALS

A. Provide Manufacturer's Product Data (MPD), Shop Drawings and samples as noted:

1. Team Benches: MPD
2. Pitcher’s Rubber, Home Plate, and Bases: MPD
3. Portable Pitcher’s Mound: MPD
4. Communication Boxes: MPD
5. Soccer Goals: MPD
6. Soccer Goal Levered External Wheel Kit: MPD
7. Lacrosse Goals: MPD
8. Field Hockey Goals: MPD
9. Corner Flags: MPD

1.5. JOB CONDITIONS

All job conditions in Section 312201 apply.

2.0 PART 2. PRODUCTS

2.1. SINGLE-TIER ALUMINUM TEAM BENCHES

A. Shall be 12’ long, all aluminum construction, with seat plank and backrest. Fabricated frame with 1/8” aluminum formed steel frame and 2.0”x2.0”x1/8” square aluminum tubing. Planking shall be 8” and 10” aluminum extrusion seating and backrest. Benches shall beet ANSI 903 compliance for accessibility. Hardware accessories shall include stainless steel assembly hardware and galvanized steel anchoring hardware.

B. Six (6) units required.

C. Basis of design and standard of quality shall be model ATBBRPT12 as manufactured by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

D. Powder coated finish selected by Owner. Provide color chart of all available powder coat selections.

2.2. PITCHER'S RUBBER, HOME PLATE AND BASES

A. Pitcher's Rubber: Shall be moveable, 6" x 24" white rubber high-durability, molded rubber construction with dual stanchion aluminum tube inserts. Standard of Quality shall be Item SHLBMPR224 Hollywood Dual Stanchion Pitching Rubber as manufactured by Schutt Sports or Architect approved equal. Provide one (1) total.

B. Home Plate Forming System: As manufactured and supplied by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

1. Home Plate Forming System: Provide one (1).

a. Measures 2'-8" L x 2" -8" W x 5"H
b. Welded Construction, fabricated of aluminum sheet with one (1)-½" schedule 40 aluminum drainage pipe and five (5) ¾" aluminum round stock threaded studs with 3/8" stainless steel bolts for home plate tray height adjustment.
c. Removable and height adjustable home plate tray.
d. Includes replaceable SHSRHP Schutt Hollywood Bury All Home Plate
e. Includes Synthetic Infill Turf Attachment Ledge
f. HPFSCP Removeable Cover Plug: 1/8" (0.125") aluminum sheet with 1.5" square aluminum support structure, synthetic turf provided by and installed by Turf Installer.

C. Bases: Shall be natural rubber cover over foam core, 15" x 15" x 3", set of 3 bases with anchors, 6" base stanchions and ground anchors. Standard of Quality shall be Hollywood Impact Double First Base Set (Softball) as manufactured by Schutt Sports or Architect approved equal. Provide one (1) set of bases.

D. Turf Base Set: Shall be all rubber construction with mesh reinforcement and pegs molded to the underside that grip turf and infill material to prevent lateral movement. Provide set of 3 bases, pitching rubber and home plate. Standard of quality shall be TB (set of 3), TBHP, and TBPR as distributed by Sportsfield Specialties, Inc., 888-975-3343 or Architect approved equal. Provide one (1) set.

E. Anchor Access Frame: Shall be SHAFIT Hollywood Anchor Access Frame with Infill Retainer System for Synthetic Turf Applications as manufactured and supplied by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

1. Schutt/Hollywood Anchor Access Frame for Infill Turf: Provide three (3).

a. Dimensions: 8-1/16"W x 8-1/16"L x 10"H
b. Box: 1/8" (0.125") aluminum construction, welded frame with open bottom having the following attributes:
i. 1/8" (0.125") aluminum construction
ii. Integrated synthetic infill turf attachment ledge
iii. Infill retainer system with 1-1/4" (1.25") flexible gasket seals specifically designed for synthetic infill turf applications
iv. Anchor base, anchor bolts and anchor spacer
v. 1" PVC drain stub for positive drainage connection
c. Solid Cover: 1/8" (0.125") aluminum construction wit the following attributes:
i. Infill retainer system with 1-1/4" (1.25") flexible gasket seals specifically designed for synthetic infill turf applications
ii. Adhere synthetic turf material directly to the aluminum surface with appropriate adhesive and/or mechanical fasteners as determined by the Turf Installer
d. Assembly Hardware

G. Dual Anchor Access Frame: Shall be SHAFPRIT Hollywood Dual Anchor Access Frame with Infill Retainer System for Synthetic Turf Applications as manufactured and supplied by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

1. Schutt/Hollywood Dual Anchor Access Frame for Infill Turf: Provide two (2).

a. Dimensions: 6-1/16"W x 22-15/16"L x 10"H
b. Box: 1/8" (0.125") aluminum construction, welded frame with open bottom having the following attributes:
i. 1/8" (0.125") aluminum construction

ii. Integrated synthetic infill turf attachment ledge
iii. Infill retainer system with 1-1/4" (1.25") flexible gasket seals specifically designed for synthetic infill turf applications
iv. Anchor base, anchor bolts and anchor spacer
v. 1" PVC drain stub for positive drainage connection

c. Solid Cover: 1/8" (0.125") aluminum construction wit the following attributes:
i. Infill retainer system with 1-1/4" (1.25") flexible gasket seals specifically designed for synthetic infill turf applications
ii. Adhere synthetic turf material directly to the aluminum surface with appropriate adhesive and/or mechanical fasteners as determined by the Turf Installer

d. Assembly Hardware

2.3. COMMUNICATION BOXES

A. Shall be 18"W x 30"L x 14"H constructed of 3/16” aluminum, for synthetic turf installation. Cover is made of 1/8” aluminum (plywood unacceptable) and includes flexible gasket seals to prevent infill migration. Cover shall be recessed to accept synthetic infill turf. Shall have two (2) 10-1/8” diameter hand holes with circular lids; lids to have “turn and lock” feature.

B. Basis of design and standard of quality shall be model CBIT1830 ComBox® as manufactured by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

C. Provide two (2).

2.4. ROUND FACED SOCCER SYSTEM

A. Basis of design and standard of quality shall be SG824R as manufactured by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

B. Provide one (1) pair of soccer goals and safety clamps.

C. Components:

1. SG824R Round Post Soccer Goal(s):

a. Cross Bar: #4950-TOPCROSSBAR Fabricated of 6061 T6 extruded aluminum tube, 4.375” x 4.688”, having the following attributes:
1. Length: 24’ (inside of upright to inside of upright)
2. Round face with radiused backside corners
3. 7-gauge powder coated steel crossbar attachment brackets
4. Powder coated white

b. End Frame: #4950-ENDFRAME fabricated of 6061 extruded aluminum tube having the following attributes:

1. Upright posts, 4.375” x 4.688”, round face with radiused backside corners
2. Rolled side frame, 2” x 3” x .1/8” wall thickness, tig welded to upright posts
3. Powder coated white

c. Ground Bar: #4950-BOTTOMGROUNDBAR fabricated of 6061 T6 extruded aluminum tube, 2” square x .1/4” wall thickness, having the following attributes:
1. Powder coated white

d. Accessories:
1. Welded aluminum net clips, guaranteed for life
2. Soccer Net: 4mm braided polyethylene, 4” square mesh, orange
3. Stainless steel assembly hardware

2. SGMKR SGMobile - Soccer Goal Portable Wheel Mobility Kit with infill retainer system:

a. Soccer Goal Wheel Insert
1. Welded 13gauge stainless steel frame
2. UHMW plastic wheel
3. Stainless steel hardware

b. Soccer Goal Mobility Handle
1. Formed 3/8” stainless steel round stock
2. Stainless steel hardware
3. Powder coated white.

3. SG2S - Soccer Goal Back Bar Safety Clamp Kit:

a. #SG2S-GP Safety Clamp
1. Fabricated of ¼” aluminum
2. Powder coated white
3. Quick release hardware
4. For use with Access Kit

b. Access Box
1. Fabricated of 1.8” (.125”) Aluminum, Welded
2. 3/32” (.090”) Aluminum Exterior Synthetic Turf Attachment Ledge
3. Includes Flexible gasket Seals to Prevent Horizontal Infill Migration (Factory Pre-Installed – Inside and Outside Perimeters).
4. Pre-Installed 1” Positive Drainage Stub
5. Stainless Steel Assembly Hardware
6. Galvanized Steel Anchoring Hardware

4. Concrete shall be 4,500 psi as described in Section 321301.

2.5. SOCCER GOAL LEVERED WHEEL KIT

A. Be able to raise and lower with removable levered handle.

B. Provide one (1) set.

C. Standard of quality shall be Model SGWKL as manufactured by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

2.6 LACROSSE GOALS

A. Goals: Shall be heavy duty powder coated steel pipe posts and cross bar, 4" flat steel base bar. Standard of quality shall be Steel Base Lacrosse Goal as manufactured by Gilman Gear or Architect approved equal.

B. Provide two (2) goals.

C. Nets shall be 4.0mm high extension polyester lacrosse net, 6' x 6' x 7' official size. Color as selected by the owner. Triple stitched bindings with quick fasteners and lacing cord. Standard of quality shall be Lacrosse Net as manufactured by Gilman Gear or Architect approved equal.

2.7. FIELD HOCKEY GOALS:

A. Frame: Shall be fabricated of 2" x 2" x 0.090" wall square aluminum tubing, tig welded. Aluminum welded net clips. Powder coat finish white.

B. Backboard shall be made of marine grade plywood.

C. Accessories: Black nylon net, stainless steel assembly hardware and field hockey goal wheel kit.

D. Provide two (2) goals.

E. Standard of quality shall be FHG Field Hockey Goal and FHGWK Field Hockey Goal Wheel Kit as manufactured by Sportsfield Specialties, Inc., 888-975-3343 or Architect approved equal.

2.8. CORNER FLAGS:

A. Shall be a hollow plastic base, 1" diameter PVC upright, with red triangular flag; Overall height of 60". Yellow hollow base to be weighted with sand on site.

B. Provide one (1) set of four (4).

C. Basis of design and standard of quality shall be model SG6B1104 as distributed by Sportsfield Specialties, Inc., 888-975-3343, or Architect approved equal.

3.0 PART 3. EXECUTION

3.1 TEAM BENCHES

A. Install per manufacturer’s recommendations. Turn over to Owner.

3.2 PITCHER’S RUBBER, HOME PLATE, AND BASES

A. Install in areas as shown on the plans and detailed per manufacturer’s recommendations. Review layout with Architect prior to installation.

3.3 COMMUNICATION BOXES

A. Site Contractor shall install per drawings and manufacturer's recommendations. The Site Contractor shall provide complete excavation, trenching, bedding, conduit with pull strings across the field and beyond the turf termination curb, backfill and compaction. Electrical Contractor shall provide any wiring.

3.4 SOCCER GOALS AND ACCESS BOX

A. Install in areas as shown on the plans and detailed per manufacturer’s recommendations. Review layout with Architect prior to installation.

B. Install concrete anchor system as detailed.

3.5 SOCCER GOALS LEVERED EXTERNAL WHEEL KIT

A. Furnish and installer per manufacture’s recommendations. Turn over to Owner as directed by the Architect.

3.6 LACROSSE GOALS

A. Furnish and Install per manufacturer’s recommendations. Turn over to Owner.

3.7 FIELD HOCKEY GOALS

A. Furnish and Install per manufacturer’s recommendations. Turn over to Owner.

3.8 CORNER FLAGS

A. Furnish and Install per manufacturer’s recommendations. Turn over to Owner.

3.9 CLEAN UP

A. During the contract and at intervals as required by the contract documents and as directed by the Architect and as field event furnishings are installed, clear the site of all

extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well-draining, neat condition.

END OF SECTION 32 30 01

SECTION 323002 - SCOREBOARD(S)

1.0 PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The extent of the scoreboard(s) are shown on the drawings.

B. Work includes, but is not limited to, the following:

1. One (1) Single-sided LED Multi-sport Scoreboard(s)
2. Decorative Accent Panels and Trusses
3. One (1) set of Delay of Game Clocks
4. Back of Scoreboard Colored Panels and School Graphics
5. Wireless on-field Control Equipment for Scoreboard, Clocks, and Sports Display
6. Concrete Footings and Painted Steel Structural Columns/Supports, Bracing and Mounting Clips
7. Trenching, Backfill and Compaction for Drilled Pier Footings
8. Scoreboard Training and Warranty
9. Cleanup

C. Provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.2 RELATED REQUIREMENTS

A. Section 311201 - Site Preparation

B. Section 312201 - Site Earthwork

C. Section 321301 - Site Concrete Work

1.3 REFERENCES

A. Standard for Electric Signs, UL-48, 13th Edition

B. Standard for Control Centers for Changing Message Type Signs, UL-1433, 1st Edition

C. Standard for CAN/CSA C22.2

D. Federal Communications Commission Regulation Part 15

E. National Electric Code

1.4 SUBMITTALS

A. Product data:

1. Submit manufacturer's product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.

B. Shop Drawings: Contractor to provide complete detailed drawings prepared, signed and sealed by a Registered Professional Engineer (P.E.) licensed in the State of New York. Include:

1. Detailed and dimensioned drawings for columns and footing steel.
2. Footings and foundation sizes and types and relationships to finish grade in compliance with construction documents. Exposed portions of foundations, pier height and top elevations shall be subject to Architect approval.
3. Engineering calculations.
4. Minimum sizes for structural steel and foundations are shown on bid document drawings, in order to establish an equal bidding opportunity for all participants. Reduction in minimum sizes of concrete foundation and structural steel will not be allowed.
5. Qualifications of NYS Professional Engineer who seals the shop drawings and calculations.

C. Material Certificate: 4,500 psi concrete mix design for footings.

D. Maintenance data: Submit manufacturer's installation, operation, and maintenance manuals.

E. Functional system block diagram showing all major equipment and signal flow.

F. References as required in 1.8 "Qualifications" of this specification section.

1.5 JOB CONDITIONS

A. Products delivered to the site. Scoreboard and equipment to be housed in a clean, dry environment.

B. Environmental limitations: Do not install scoreboard equipment until mounting structure is secure and concrete has ample time to cure.

C. Field measurements: Verify position and elevation of structure and its layout for scoreboard equipment. Verify dimensions by field measurements. Coordinate with Owner.

D. Verify mounting structure is capable of supporting the scoreboard's weight and wind load in addition to the auxiliary equipment. Structure and components must be designed to meet or exceed a 90 mph, 3 second gust wind design per NYSBC 2010, Category II, Exposure C.

E. Scoreboard manufacturer shall verify mounting structure is capable of supporting the scoreboard's weight and wind load in addition to the auxiliary equipment during the submittal process and field verify at time of scoreboard installations.

F. Installation may proceed within acceptable weather conditions, as approved by the Contractor.

G. All job conditions in Section 312201 apply.

1.6 QUALITY ASSURANCE

A. Scoreboards for outdoor use.

B. Source Limitations: Each type of scoring or related equipment must be obtained through one (1) source from a single manufacturer.

C. ETL listed to UL Standards 48 and 1433

D. NEC compliant

E. FCC compliant

F. ETLC listed to CAN/CSA 22.2

G. Installer's qualification: Business familiar in the installation of systems similar in complexity to those essential for this project; and fulfillment of the following:

1. At least (5) five years' experience with systems of the specified types and products included.
2. Installer to be factory educated in the installation and maintenance of any digital signal processed based control systems.

1.7 WARRANTY

A. Provide five (5) years of factory warranty on all equipment, permanently mounted scoreboards, and LED video displays. Warranty coverage shall include replacement of the defective part from current stock. The defective part will, then, need to be returned to the manufacturer.

B. Provide one (1) year warranty on all handheld control consoles/units.

C. Provide toll-free service coordination

D. Provide technical phone and onsite support during regular District business hours as requested by the Owner.

E. Provide an exchange program to supply replacement parts for components that fail during the coverage period. To minimize downtime, the exchange parts shall be shipped on the same day the order is received or the following day. The manufacturer will include an air bill for the return of the defective components.

2.0 PART 2 - PRODUCTS

2.1 MANUFACTURER(S)

A. Daktronics, Inc., 331 32nd Avenue, P.O. Box 5128, Brookings, South Dakota 57006-5128, or Architect approved equal.

2.2 STANDARD OF QUALITY

A. Single-sided LED multi-sport scoreboard displays period time to 99:59. It scores HOME and GUEST to 99 and PERIOD to nine (9). During the last minute of the period, it's able to display time to 1/10 of a second. The scoreboard also has integrated components: Delay of Game, 100x250 15.85mm color (RGB) sports statistics and interactive LED display, facility identification panels, and decorative panels or Architect approved equal.

B. Single-sided multisport scoreboard displays PLAYER number to 99 and PENALTY time to 9:59 for two players on both teams. The scoreboard is designed to complement 18' (5.49 m) wide scoreboards for lacrosse, field hockey or any other sport with players and penalties.

2.3 SCOREBOARD – MULTI-PURPOSE FIELD

A. General information:

1. Dimensions: 5'-0" high, 18'-0" wide, 0'-8" deep
2. Base weight: 265 lb (261 kg) with vinyl captions
3. Base power requirement: 560 W
4. Color: provide over 150 colors to choose from

B. Construction:

1. Alcoa aluminum alloy 5052 construction
2. To avoid oil canning or waves in the face of the aluminum, no mechanical fasteners (screws, rivets or welds shall be used to attach the face to the scoreboard body frame. Commercial sign tape shall be used to cover 100% coverage on all face attachment points.
3. The scoreboard body shall not have any vertical or horizontal member spaced more than 42" O.C.
4. Scoreboard face, back and perimeter: 0.063" thick
5. Scoreboard top and bottom: 0.125" thick
6. Digit faceplates: 0.063" thick

C. Digits:

1. TS AlInGaP Light Emitting Diodes (LEDs)
2. Seven bar segments per digit

3. PanaView® LED 140 degree digit technology. LED elements must protrude from scoreboard face and should not include any plastic, reflective protective face cover
4. LED Color: White
5. All components of each LED digit shall be encapsulated in a minimum of 1/8" thick potting material allowing the entire unit to be 100% waterproof
6. HOME, GUEST, DOWN, TO GO, BALL ON, QTR, and clock digits: 24" (610 mm) high
7. Individual digit panels are fastened with a maximum of four screws for easy access and quick removal. Rivets are not an acceptable fastening method.

D. Captions:

1. HOME, GUEST, DOWN, TO GO, BALL ON, and QTR captions: 12" (305 mm) high
2. All captions: white vinyl applied directly to scoreboard face

E. Additional Required Equipment:

1. Vinyl Scoreboard striping
2. 120 volt horn
3. Programmable Team Name Message Centers (TNMCs) with white LEDs
4. IDA-1001-25 100% aluminum, decorative trusses (3' x 18'-0") above scoreboard with backlit (illuminated) school identification lettering or logo
5. 2.4 GHz spread spectrum radio control mounted within the scoreboard cabinet
6. 2.4 GHz spread spectrum radio control receiver mounted within the scoreboard cabinet to allow for control of top section of scoreboard, wirelessly from anywhere on the field via handheld controller.
7. All Sport Pro wireless laptop and iPad control for all scoring functions.
8. Back Panel: 10'-0" x 18'-0" x 7" decorative non-backlit school identification panel of the back of the scoreboard.

2.4 PLAYER-PENALTY SCOREBOARD at MULTI-PURPOSE FIELD

A. General information:

1. Dimensions: 5'-0" high, 18'-0" wide, 0'-8" deep
2. Weight: 350 lb (159 kg)
3. Power requirement: 560 W
4. Color: provide over 150 colors to choose from

B. Construction:

1. Alcoa aluminum alloy 5052 construction
2. To avoid oil canning or waves in the face of the aluminum, no mechanical fasteners (screws, rivets or welds shall be used to attach the face to the scoreboard body frame. Commercial sign tape shall be used to cover 100% coverage on all face attachment points.
3. The scoreboard body shall not have any vertical or horizontal member spaced more than 42" O.C.
4. Scoreboard face, back and perimeter: 0.063" thick
5. Scoreboard top and bottom: 0.125" thick
6. Digit faceplates: 0.063" thick

C. Digits:

1. TS AlInGaP Light Emitting Diodes (LEDs)
2. Seven bar segments per digit
3. PanaView® LED 140 degree digit technology. LED elements must protrude from scoreboard face and should not include any plastic, reflective protective face cover
4. LED Color: White
5. All components of each LED digit shall be encapsulated in a minimum of 1/8" thick potting material allowing the entire unit to be 100% waterproof
6. PLAYER and PENALTY digits: 18" (457 mm) high
7. Individual digit panels are fastened with a maximum of four screws for easy access and quick removal. Rivets are not an acceptable fastening method.

D. Captions:

1. PLAYER and PENALTY captions: 8" (203 mm) high
2. All captions: white vinyl applied directly to scoreboard face

E. Additional Required Equipment

1. Scoreboard striping

2.5 DELAY OF GAME TIMERS – QTY 2

A. Daktronics TI-2015 or Architect approved equal segment timer displays the segment number, which can be set to start flashing when a preset limit (warning time) is reached. An audible horn sounds at the end of segments. The timer can also be configured to count up or down from any preset number from 0 to 99 or used as a speed of pitch display for baseball.

B. General information
1. Dimensions: 2'-4" (711 mm) high, 3'-4" (1.02 m) wide, 0'-8" (203 mm) deep
2. Weight: 36 lb (16 kg)
3. Power requirement: 35 W (red/amber digits), 75 W (white digits)
4. Color: semi-gloss black

C. Construction
1. Alcoa aluminum alloy 5052 for excellent corrosion resistance
2. Display back, face, and perimeter: 0.063" (1.60 mm) thick .

D. Digits:
1. LED color: White
2. Clock digits: 24" (610 mm) high
3. Seven bar segments per digit
4. PanaView® LED digit technology with 140 degree viewing angle
5. All digits are sealed front and back with 1/8” thick, weather-tight silicone gel
6. Digit control driver is sealed front and back with 1/8” thick, weather-tight silicone gel.

E. Horn:
1. Vibrating horn mounted inside the scoreboard cabinet behind face
2. Sounds automatically when period clock counts down to zero
3. Sounds manually as directed by operator

F. Required Accessory Equipment
1. Individual digit protective screens
2. 2.4 GHz radio control communication

2.6 SCORING CONSOLE FOR SCOREBOARDS

A. Consoles shall be a handheld controller (Qty: 2).

B. Controls multiple scoreboards and displays, including other compatible displays currently owned by customer.

C. Handheld Console includes:

1. 2.4 GHz spread spectrum radio with 64 non-interfering channels; includes a transmitter installed inside the console enclosure and a receiver installed inside the scoreboard
2. Rechargeable battery provides 8-10 hours of operation on full charge
3. Durable ABS plastic enclosure to house electronics
4. Sealed membrane water-resistant keyboard
5. 97x32 LCD to verify entries and recall information currently displayed
6. Carrying/operation case with belt clip, wrist and neck strap

2.7 STRUCTURAL STEEL SUPPORT AND CONCRETE

A. Shall be structural grade A992 (50 ksi) steel columns, size as noted on drawings.

B. Columns shall be factory painted black with two coats of enamel paint capable of adhering to treated steel. Field touchup as directed by the Architect. Provide one

unopened can of touchup paint for Owner.

A. Footings shall be sized as noted on drawings and utilize 4,500 psi mix concrete and reinforcing as specified in Section 321301 and encase steel columns as shown.

B. Provide NYS Licensed Engineer shop drawings for scoreboard steel and footing design.

3.0 PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that mounting structure is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings. Verify concrete has cured adequately according to specifications.

B. Verify surfaces that the scoreboard board is to be mounted to are ready to receive the work. Verify that the conduit and junction boxes specified are as specified and indicated in the plans and shop drawings. Verify concrete has cured adequately according to specifications.

3.2 INSTALL STEEL COLUMNS AND CONCRETE FOOTINGS

Install steel columns and concrete footings as shown on the drawings and per manufacturer's recommendations.

3.3 INSTALLATION

A. Power conduit, cabling and outlet boxes to be provided and installed by the electrical contractor. Signal raceways conduit and boxes to be provided by the electrical contractor. Electrical contractor is responsible for pulling signal wires between each scoreboard and control console location. Contractor assigned the scoreboard equipment to terminate signal wire of control console and scoreboard.

B. Mount scoreboards and exterior displays to beams in location detailed and in accordance with manufacturer’s instructions. Verify unit to be plumb and level.

C. Mount LED message board and exterior displays to beams in location detailed and in accordance with manufacturer’s instructions. Verify unit to be plumb and level.

3.4 INSTALLATION—CONTROL CENTER

A. Provide boxes, cover plates and connectors as required to meet control specification requirements. Control cables from scoreboard to control console junction box shall be concealed. Control cables from video display to computer junction box shall be concealed.

B. Test the operation of the scoreboard, control console and all cables and connections. Leave control console unit in carrying case and other loose accessories with Owner's

designated representative.

C. Verify earth ground does not exceed 15 ohms.

D. Test the operation of the video board, install software and test computer and all cables and connections

E. Conduct operator training on the video board operation.

END OF SECTION 32 30 02

SECTION 32 30 03 - FLAGPOLE(S)

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of new flagpole(s) is shown on the drawings.

B. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 32 13 01 - Site Concrete Work

1.3 SUBMITTALS:

A. Provide Manufacturer's Product Data (MPD):

1. Flagpole and Accessories

1.4 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Construction Review: Notify the Architect when flagpole footing location is coordinated to avoid underground utilities and marked in the field.

PART 2 - PRODUCTS

2.1 FLAGPOLE AND ACCESSORIES (Provide **1**)

A. Downlighter Flagpole: One piece, cone tapered aluminum flagpole, conforming to NAAMM Metal Flagpole Manual.

1. Type: Shoebase Mount
2. Nominal Height: 30'
3. Butt Diameters include: 7"
4. Wall Thickness: .156"

B. Aluminum ASTM B221.

1. Finish: Dark Bronze Anodized

C. Foundation Base: Anchor Base: Cast from A356 alloy aluminum, the shoebase shall be heat-treated to a T-6 condition after attachment to the shaft. The shaft shall be inserted into the shoebase casting. The casting and shaft shall be joined by a continuous circumferential weld at the outside top and inside bottom of the shoebase. Each

shoebase flagpole shall include four anchor bolts, two hex nuts, two flat washers and one lock washer, sized to match the anchor bolts.

D. Flash Collar/Base: High Profile flash collar to accommodate shoebase mount.

E. Internal Halyard Rope Based System: with cam cleat and locking raised access door.

1. Provide snap hooks
2. Provide rubber covered counterweight
3. Provide retainer ring

F. Double 20 WATT integral lighting system with 120v photocell.

G. Provide 5' x 8' American Flag with flagpole.

H. Standard of quality shall be Eagle United NightMaster Downlighter as manufactured by Eagle Mountain Flag, P.O. Box 500, Wimberly, TX 78676, www.eaglemountainflag.com or Architect approved equal.

2.2 CONCRETE FOOTING: Shall be 4,500 psi as specified in Section 32 13 01.

PART 3 - EXECUTION

3.1 INSTALL FLAGPOLE

A. Locate as shown on drawings. Coordinate footing location to avoid utilities. Install per manufacturer's recommendations. Coordinate with Electrical Contractor for connections.

B. Set pole vertical and plumb. Brace securely.

C. Protect flagpole installation from movement and loading until the concrete footing has attained its full design strength (approximately 28 days).

D. Sand smooth and touch paint scrapes and scratches with compatible matching paint. Protect adjacent surfaces. Clean thoroughly when drips or spills occur.

E. Install ball, truck, halyards and other flagpole accessories securely.

3.2 CLEAN UP

During the contract and at intervals as directed by the Architect and as flagpole installation is completed, clear the site of gravel, concrete, appurtenances and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 30 03

SECTION 32 30 04 - ELEVATED ALUMINUM BLEACHERS

1.0 PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of the closed deck fixed bleachers are shown on the drawings. Make all transition connections smooth and in a neat workmanlike condition.

B. Approximately fixed elevated angle frame bleachers include, but are not limited to, the following:

1. Concrete pad and footings
2. Structural aluminum framing
3. Aluminum seats, closed deck and guardrail fencing, stairs, and handicap ramp.
4. Cleanup

C. Access for bleachers shall be by means of stairs and ramp meeting pavement as shown on drawings.

D. Provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications. Provide all design, engineering, freight, installation, supervision, state approvals, and inspections.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 22 01 - Site Earthwork

B. Section 32 12 01 - Asphalt Paving

C. Section 32 13 01 - Site Concrete Work

1.3 REFERENCES

A. All design, materials, and workmanship shall be in accordance with the following and the most stringent:

1. NY State Building Code (NYCRR), Latest Edition
2. AISC Steel Construction Manual, Latest Edition
3. NFPA 101 and 102, Latest Edition
4. ICC-300-2017 (Standards for Bleachers, Folding and Telescopic Seating and Grandstands)
5. ANSI/AWS D1.1 Structural Welding Code
6. Americans with Disabilities ACT (ADA)
7. International Building Code (IBC) – latest version or State version with amendments

1.4 DESIGN CRITERIA

A. All material and workmanship shall be in accordance with the applicable state building code/ IBC current edition and NFPA.

B. Design Loads:

Dead Load	10 psf
Live Load	100 psf gross horizontal projection
Live Load Seat and Tread Planks	120 plf
Wind Speed	Design per local wind speeds & building codes
Sway Load	24 plf per row parallel to seatboards
Sway Load	10 plf per row perpendicular to seatboards
Seismic Load	Design per local seismic conditions
Guardrail Loads	Per building code listed in 1.3, above

C. Serviceability Requirements: Deflection shall be limited to 1/200 of the span for all structural members.

D. Foundation Design: Foundations shall be designed for bearing, overturning, and sliding for the following load cases as well as all applicable load cases in the building code using an allowable stress design.

1. 1.0 DL + 1.0 LL + SWAY
2. 0.6 DL + 1.0 WL
3. 1.0 DL + 0.75 WL + 0.75 LL

E. Soil bearing capacity to be verified by Contractor prior to placement of footings. Foundation sizes if shown on drawings will not be reduced under any circumstances.

1.5 SUBMITTALS

A. Fabricator AISC Certificate of compliance with the Standard for Steel Building Structures as outlined in 1.07 of this specification.

B. Product Certificate: Prepare written statement on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

C. Experience requirements listed in 1.07.

D. Shop Drawings: Complete detailed drawings prepared, signed and sealed by a Registered Professional Engineer (P.E.) licensed in the State of New York. Include:

1. Detailed and dimensioned plans.
2. Seating plan indicating aisles, walkways, seating sections and exits and showing exit calculations using appropriate tables and requirements of the New York State Building Code.
3. Sections and details showing complete methods of assembly and anchorage.

4. Footings and foundation sizes and types and relationships to finish grade in compliance with construction documents. Exposed portions of foundations, pier height and top elevations shall be subject to customer approval.
5. Engineering calculations.
6. Minimum sizes for structural steel and foundations are shown on bid document drawings, in order to establish an equal bidding opportunity for all participants. Reduction in minimum sizes of concrete foundation and structural steel will not be allowed.

E. Qualifications of NYS Professional Engineer who seals the shop drawings and calculations.

F. Samples for verification of product and color to include 3' section of deck assembly with interlocking riser in specified dimensions and finishes and 3' long seat board with mounting bracket.

1.6 JOB CONDITIONS

A. All job conditions in Section 31 12 01 apply.

B. A qualified representative of the grandstand manufacturer must be onsite at all times during installation of the grandstand.

C. Verify site location of bleachers and locate all underground utilities. Visit site as described in Section 31 12 01.

D. NY State Professional Engineer (PE) hired by the bleachers supplier will determine soil bearing capacity of on site soils from provided soil boring, pit information, and additional testing as the PE deems necessary. The PE is solely responsible for design interpretations and subsequent design of the bleachers.

E. The contract documents provided by the Owner include existing and proposed grades.

F. The contract documents indicate grades, approximate pier locations and walkways to meet the side stairs for the specified product. If a product other than as specified is submitted, the Contractor shall also submit a revised plan indicating grades and walkway locations relating to the stairs of the proposed product for the Architect’s approval.

1.7 QUALITY ASSURANCE

A. AISC Certification: All structural steel shall be fabricated in an American Institute of Steel Construction (AISC) certified plant that is certified "STD" at the time of the bid. The manufacturer shall be listed on AISC's website as a certified fabricator.

B. Experience: Manufacturer of grandstand system shall have a minimum of five (5) years' experience in fabrication of grandstand structures and shall, provide references to five (5) successful projects of similar size and project specific requirements within New York State. Submit to Architect for approval

C. Installation: Installation shall be performed by factory trained and certified representatives of the grandstand manufacturer. Installer shall have completed at least three (3) installations of similar size in the past two (2) years. Provide documentation to support individuals qualifications.

D. Source Quality Control: Mill Test Certification.

E. Provide test reports certifying that the bleachers have been inspected and installed in accordance with the contract documents. This shall be performed by an independent testing agency hired by the Contractor. The testing agency's representative shall be either a NYS licensed Professional Engineer or working under the direct supervision of a NYS licensed Professional Engineer. The inspection shall include examination of:

1. High strength bolted connections for general conformance with the AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts". The connections shall be examined to confirm a "snug tight" condition with all plies in intimate contact.
2. General conformance with the AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts" to confirm that all nuts are "run down"
3. Confirmation of non-slip finish installation.

1.8 SUBSTITUTIONS

A. Substitutions: If a product is being submitted as a substitution to the specified product; then the Prime Contractor shall submit and request a product material substitution with his/her bid. The Prime Contractor shall at a minimum provide the following for review by the Architect and Owner:

1. All submittals as specified herein.
2. Product comparison
3. Cost information (including proposal of change in Contract Sum)
4. Contractor's certification that proposed substitution complies with requirements in the Contract Documents.
5. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

NOTE: Delays caused by required submittals due to noncompliance with the specification shall not extend any milestone date in the contract. The contractor is responsible for complying with all aspects of this specification.

1.9 WARRANTY

A. All products shall carry, after proper erection, and under normal use for the type of structure, a five (5) year warranty against all defects in materials and workmanship from the date of substantial completion.

B. In addition, all aluminum plank extrusions shall be covered by a three (3) year warranty against deterioration of anodized finish or loss of structural strength due specifically to constant exposure to changing weather and environmental conditions.

2.0 PART 2 - PRODUCTS

2.1 MANUFACTURER(S)

A. E&D Specialty Stands, (800) 525-8515; Dant Clayton Corporation, (800) 467-3655; Sturdi-Steel (800) 433-3116; or Architect approved equal. Listing as acceptable manufacturer does not remove responsibility to meet specifications.

2.2 GENERAL

Provide new bleachers consisting of 7 rows high with the accessories and features defined below. Net seating capacity of 343 + 6 H.C. (not including aisles, based on 18" per seat).

2.3 UNDERSTRUCTURE

The understructure of each unit shall consist of a series of frames. Standard dimensions are 8" rise per row, 17" height of seats above foot plant, and 24" depth row. Framework shall be structural aluminum. Each frame shall consist of vertical, horizontal and diagonal bracing to support the seat and foot planks as specified herein. Bolted or otherwise mechanical fastening of each frame's components will not be acceptable. All cross bracing and horizontal bracing is to be aluminum angle 6061-T6 (or mechanically equivalent) and placed in number and location to sustain design loads. Internal splicing where required shall be two per joint and shall penetrate the joint a minimum of 8" in each direction and be riveted at one end only to allow construction and expansion.

2.4 SEAT PLANK

Shall be anodized aluminum, nominally 2" x 10" with a wall thickness nominally .078". All seat planks shall be of aluminum alloy 6063-T6, and have a clear anodic coating (204R1) applied in accordance with AAS Standard AA-M10C22A31. Anodized end caps on all rows.

2.5 FOOT PLANK/TREAD

Shall be aluminum, non-skid surface nominally 2" x 10", footrest shall consist of 2 such planks with a wall thickness nominally .078" with anodized end caps. All foot planks shall be of aluminum alloy 6063-T6, and be mill finish.

2.6 VERTICAL RISERS

Vertical rise plank shall be provided between seat and foot plank and be mill finish. Plan shall be 2" x 10" at top row only and 1" x 6" on all other rows with a wall thickness nominally .078" fastened by clip sets. End caps shall be field installed using mechanical fasteners on all vertical risers and have clear anodic finish.

2.7 AISLES

Aisle footboards shall be of aluminum alloy 6083-T6 and be of mill finish contrasting aisle markings. Three aisle stiffener angles shall be used to strengthen the aisle step. There shall be 2 aisles, 54" wide, located as required by the applicable codes defined above.

2.8 AISLE HANDRAILS

Where there is seating on both side of the aisle, handrails located within the aisle shall be discontinuous with gaps or breaks at intervals not exceeding 3 rows to facilitate access to seating to permit crossing from one site of the aisle to the other. These gaps or breaks shall have a clear width of at least 22 inches and not greater than 36 inches, measured horizontally. Where handrails are provided in the middle aisle stairs, there shall be an intermediate handrail located approximately 12 inches below the main handrail. The handrail shall have clear anodic finish and also have rounded terminations or binds.

2.9 FRONT WALKWAY

There shall be a front walkway 48" high and 63" in clear width and shall be 7 planks arranged side by side to form a safe walkway platform, aluminum alloy 6061-T6 mill finish. Walkway plan shall be aluminum, non-skid surface nominally 2" x 10" with a wall thickness of .078". Understructure shall be constructed from same materials as specified in understructure above. Front railing shall consist of a 1-5/8" OD Schedule 40 aluminum alloy 6105-T5 clear anodized 204R1 top horizontal pipe rail, and intermediate horizontal pipe rail and a 1" x 6" toeboard. Rail pipe shall attach to upright members by means of heavy duty tension bands using 3/8" diameter carriage bolts, lock washers and nuts with a hot dipped galvanized finish and consist of internal splice connectors, elbows, and pipe caps mechanically fastened.

2.10 ENTRY STEPS

There shall be 2 sets of entry steps. Frames shall be of mill finish aluminum angle, 6061-T6 or mechanically equivalent and shall be 48" high and 63" in clear width. Guardrail and handrails shall be provided for stairs as required. Stairs shall be aluminum, non-skid surface nominally 2" x 12" with a wall thickness of .078".

2.11 GUARD RAILING

The railing shall consist of upright members of clear anodic finish extruded aluminum angle. Horizontal members shall be of extruded anodized aluminum tube 1-5/8" O.D. (schedule 40 pipe). Rail pipe shall attach to upright members by means of heavy duty tension bonds using 3/8" diameter carriage bolts, lock washers and nuts with a hot dipped galvanized finish and consist of internal splice connectors, elbows, and pipe caps mechanically fastened. The guard railing system shall be a chain link system consisting of 3 side rails and 2 back rails, with a top rail height of 42" and a maximum opening of less than 4". Guardrail shall consist of 9 gauge, 2" mesh aluminized chain link fabric, tension bars, brace bands, combo rail end caps and wire ties.

2.12 END CAPS

Shall be extruded aluminum, 6063-T6 alloy, and have a clear anodic coating (204R1) applied in accordance with AAS Standard AA-M10C22A31. All end caps are anodized and shall be field installed. End caps shall also be mechanically fastened on the underneath side of each plank with rivets and have smooth edges for safety.

2.13 CLIP SETS

Shall adequately connect seat and foot planks to the supporting structure so as to transmit all design loads to the understructure members, as specified in the design section. All planks shall be connected to the supporting structure using four-way adjustable clips, carriage bolts, lock washers, and hex nuts of 5/16" steel with a hot dipped galvanized finish.

2.14 ANCHOR BOLTS

Shall be 3/8" diameter x 3-1/2" long " wedge type" concrete anchor, with a minimum of 2-3/8" penetration in concrete foundation as specified below. The anchor bolt load capacity shall meet the minimum working load requirements of a tension capacity of 1200 lbs and a sheer capacity 1300 lbs. These loads shall be based on testing conducted according to ASTM Standard E488, and in compliance with AISI, UL, FM and ICBO.

2.15 CONCRETE FOUNDATION

The bleacher system uplift anchoring system is based on the assumption of the concrete foundation meeting a minimum of 4500 psi compressive strength which is in full compliance with ACI 318 and 301, (American Concrete Institute, Specifications for Structural Concrete for Buildings). The foundation system shall be design to meet the following minimum loading requirements:

Bleacher System Frames typically at 6'-0" o.c.	
Bleachers frame base uniform total loading D.L. + L.L.	750 plf (unfactored)
Bleacher frame base uniform wind uplift loading	250 plf (unfactored)
Seismic Loading Requirements	per local requirements

All exterior concrete shall be air-entrained as specified in 321301.

Reinforcing steel shall be in accordance with ASTM A615, grade 60.

Embedment of reinforcing in concrete shall be as follows, unless otherwise noted on drawings:

3" Placed directly against earth
2" Concrete poured against forms and exposed to weather

2.16 HANDICAP AREAS

A. Handicap seating will be enclosed on all three sides with guard railing. No exposed vertical rise is allowed in the handicap area.

B. All handicap spaces will have handicap seating in pairs to two. All handicapped seating will have adjacent companion seat.

C. All handicapped seating will have a clear unobstructed view of playing field. Spectator traffic will not be allowed to obstruct handicap viewing, per federal ADA.

2.17 CONCRETE PAD

A. Concrete pad shall be as described in Section 32 13 01.

2.18 ASPHALT

A. The asphalt walk to the concrete pad shall be medium duty asphalt as described in Section 32 12 01.

2.19 HARDWARE

A. Bolts and nuts shall be hot dipped galvanized.

3.0 PART 3 - EXECUTION

3.1 INSTALLATION OF BLEACHERS

A. All work shall be performed by factory trained technicians, experienced in bleacher/bleacher seating installation.

B. Completed installation shall be as shown on plans and on approved shop drawings.

3.2 CONCRETE FOUNDATIONS AND PADS

A. Grade subgrade parallel to the finished grade. Check for unstable areas in the presence of the Architect.

B. Install as described in Section 321301.

3.3 CLEAN UP

During the contract and at intervals as directed by the Architect and as fixed bleacher installation is completed, clear the site of all extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well-drained, neat condition.

END OF SECTION 32 30 04

SECTION 32 30 05 - STEEL SWING GATES

1.0 PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The location of powder coated galvanized steel swing gate is shown on the drawings.

B. Provide materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 32 13 01 - Site Concrete Work

1.3 SUBMITTALS

A. Shop Drawings, Samples, and Manufacturer's Data: Provide five copies stamped and approved by the Contractor before submittal to the Architect. Submit to the Architect for review a minimum of two weeks before delivery to site.

B. Powder Coating Color Charts.

1.4 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Construction Review: Notify the Architect when steel swing gate is staked out.

C. Materials and methods of construction shall comply with the following standards:

American Institute of Steel Construction (AISC)
American Welding Society (AWS)
National Association of Architectural Metal Manufacturers (NAAM)

2.0 PART 2 - PRODUCTS

2.1 POWDER COATED STEEL SWING GATES

A. Posts and rails: Schedule 40 galvanized steel, meeting ASTM A-36. All elements to be powder coated. Color as directed by the Owner.

B. Appurtenances: Metal accessories shall be first quality, galvanized, and powder coated same as post and rails.

3.0 PART 3 - EXECUTION

3.1 FABRICATION

A. Take field measurements and coordinate work with others.
B. Shop fabricate in accordance with field measurements, favorably reviewed shop drawings and standards referenced above in Job Conditions.

C. Provide continuous weld shop connections, except as otherwise indicated. Grind smooth welds and surfaces exposed to touch.

D. Provide metal fabrications work square, plumb, straight and true to shop drawing dimensions.

E. Bend or form pipe to continuous and true curves, with joints neatly welded and assembled.

F. Provide for anchorage of type required, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

G. Fabricate, preassemble, and powder coat assembly in shop to greatest extent possible to minimize field fitting and assembly.

3.2 FIELD INSTALLATION

A. Do not install top, bottom or brace rails until concrete has attained its full design strength (approximately 28 days).

B. Transport safely and install as detailed.

C. Field touch paint chipped and scratched spots. Protect adjacent surfaces from paint spill and overspray. Clean spills and overspray.

3.3 CLEAN UP

A. During the contract and at intervals as directed by the Architect and as galvanized steel swing gate installation is completed, clear the site of all extraneous concrete, stone, asphalt or debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 30 05

SECTION 32 30 06 - TRAFFIC SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of traffic signs is shown on the drawings.

B. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 SUBMITTALS:

A. Provide shop drawings for each different type and size of sign listed in the Traffic Sign Schedule.

B. Provide MPD for signposts, breakaway system, and sign plates.

1.3 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. No work shall be fabricated until shop drawings for the work have been favorably reviewed by the Architect.

C. Construction Review: Notify the Architect when locations for signs are coordinated to avoid underground utilities and marked in the field for review.

D. Provide posts, bolts, splice bars, sign plates and build in coordination with work of other trades.

PART 2 - PRODUCTS

2.1 SIGNS

A. Sign Plate:

1. Sign Plate shall be aluminum sheets .090" (approximately 3/32") thick, with two coats of Dupont Imron spray semigloss paint.

2. Letters, numbers, symbols, and arrows shall be engineering grade, (EG) reflective. Sign plates, letters and numbers shall meet the colors and regulations described in the "Manual of Uniform Traffic Control Devices", latest edition, as published by the State of New York Department of Transportation, Division of Traffic and Safety.

3. The following Traffic Sign Schedule shall apply:

SIGN WORDING	SIGN NO.	SIZE	LETTER SIZE / COLORS
HC Reserved Parking w/	P4 - 6C	12" x 18"	2" Green/White Blue Background
Van Accessible	P3-8(NY)	12" x 6"	2" Green/White Background
No Parking Any Time	P1-1	12" x 18"	3"C/Red on White
One Way	R3 - 10C and R3 - 11C	36" x 12"	4"/White and Black

4. Refer to Traffic Sign Schedule and/or sign details on drawings for sign wording, quantities, and other information.

5. Hardware shall be galvanized.

6. Standard of quality shall be as manufactured by Eastern Metal/USA-Sign, www.usa-sign.com or Architect approved equal.

B. Breakaway Signposts:

1. Shall be minimum 2.5 lbs. / ft high carbon new billet steel (SP-80) U-channel posts with predrilled 3/8" holes at 1" on center.

2. Crashworthy to NCHRP 350 criteria. Meeting FHWA (Federal Highway Administration) for small sign support applications.

3. Lap Splice U-channel Breakaway System shall be 3/8” x ¾” x 5” and sized to post, bar color silver. Special manufacturer designed bolts for lap splice are required.

4. Hot dipped galvanized as directed by the Architect.

5. Standard of quality shall be “Rib-Bak” U-channel signposts as manufactured by NUCOR Steel Marion, Inc. www.nucorhighway.com (800) 333-4011 or Architect approved equal.

C. Rubber Bases (where indicated on plans):

1. Shall be portable sign rubber bases with base weights as manufactured by Rubber Form Recycled Products, www.rubberform.com, (716)-478-0404, or Architect approved equal.

PART 3 - EXECUTION

3.1 INSTALL SIGNS

A. Erect signs plumb. Drive posts into firm ground or bolt to sleeve in pavement areas or concrete footings as detailed. Use driving caps to avoid deforming posts.

B. Mount sign plates at heights detailed. Attach metal sign plates to steel posts securely with 1/4" galvanized allen head screws.

3.2 CLEAN UP

During the contract and at intervals as directed by the Architect and as traffic sign installation(s) are completed, clear the site of extraneous paint, fasteners, concrete, gravel, asphalt, and debris. Leave the site in a clean, safe, well-drained, neat condition.

END OF SECTION 32 30 06

SECTION 32 30 07 – REMOVABLE METAL BOLLARDS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of metal bollards is shown on the drawings and as specified in the contract documents.

B. Metal bollards work includes, but is not limited to, the following:

1. Providing and installing metal bollards and furnishings as noted in the specifications and as detailed.
2. Cleanup

C. Provide all labor, materials, tools, equipment, and services required to install metal bollards and furnishings as indicated on the plans and as specified.

D. The installation of all new materials shall be performed in strict accordance with the manufacturer’s installation instruction and in accordance with all approved shop drawings and submittals.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 32 13 01 - Site Concrete Work

1.3 REFERENCES

A. Manufacturers Data and Recommended Installation Requirements

1.4 SUBMITTALS:

A. Provide Manufacturer's Product Data (MPD), Material Certificate and samples as noted:

1. Removable Metal Bollard with receiver and cover - MPD and Color Sample

1.5 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Construction Review: Notify the Architect when footing location(s) for metal bollards are coordinated to avoid underground utilities and marked in the field.

1.6 QUALITY ASSURANCE

A. Manufacturer’s warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to project site in wrapped, neat, secure condition. Provide means to unload products from delivery trucks.

B. Protect all products and installation area from vandalism, theft, other construction, premature use, etc. until Owner acceptance and Architect sign off.

C. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately reordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

PART 2 - PRODUCTS

2.1 REMOVABLE METAL BOLLARD

A. Shall be 6" O.D. schedule 40 powder coated carbon steel with ground receiver and cover. Model R-7902 as manufactured by Reliance Foundary or Architect approved equal. Provide color sample for owner selection. Provide quantities and in locations as shown on the plans.

B. Concrete: Shall be 4,500 psi as specified in Section 321301.

C. Provide two (2) additional removable metal bollards (not shown on plans) to be installed in locations as field directed by the Owner. This shall include removals, concrete footings as described in 32 13 01, 3.1 and surface repair.

PART 3 - EXECUTION

3.1 INSTALL METAL BOLLARD

A. Locate per plan and install as detailed and per manufacturer's recommendations. Neatly saw cut pavement or install bollards before paving.

B. Auger hole for concrete footing. Set metal bollard in center of hole and brace plumb and vertical.

C. When concrete has set, remove braces.

D. Finished metal bollard shall be set plumb. Cover shall be smooth and free of chipped or cracked areas. Protect bollards until accepted.

E. Patch asphalt as necessary to match grade and section of adjacent asphalt pavement and provide asphalt joint sealant between new and existing asphalt as described in section 32 12 01.

3.2 CLEAN UP

During the contract and at intervals as required by the contract documents and as directed by the Architect and as metal bollards are installed, clear the site of all extraneous materials, rubbish, and debris. Leave the site in a clean, safe, well-draining, neat condition.

END OF SECTION 32 30 07

SECTION 32 30 08 - PLAYSCAPE WORK

1.0 PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of playground work is shown on the drawings.

B. Playscape contractor/installer to provide all materials, labor, equipment and services required to accomplish all related work in accordance with the drawings and specifications.

1. Receiving, unloading, and storing of equipment and surfacing
2. Play Equipment
3. Drainage Stone and Fabric
4. Play Area Surfacing Material (Synthetic Turf)
5. Installation – of the equipment
6. Installation – of the surfacing system including drain stone and filter fabric.
7. Play Equipment Audit – as per this specification.

C. Playscape contractor to provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 22 01 - Site Earthwork

C. Section 32 12 01 - Asphalt Paving

D. Section 32 13 01 - Site Concrete Work

E. Section 33 40 01 - Storm Drainage

1.3 SUBMITTALS:

A. Drawing Submittal: A scaled plan view drawing shall be submitted that, as closely as possible, follows the attached drawing. Equipment layout shall be in conformance to the CPSC, ASTM and ADA requirements.

B. List of Components: Submit a list of all playscape components.

C. Color: Submit a 3D color rendering of the play equipment and a chart of available color options. If equipment is other than specified, submit physical color samples for all colors available in all material types.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Extent of surface systems and use zones for equipment.
   2. Critical heights for playground surfaces and fall heights for equipment.

E. IPEMA CERTIFICATION: All standard pieces of playground equipment shall be certified by the International Playground Equipment Manufacturers Association (IPEMA) for conformance to the requirements of ASTM F1487.

F. CPSC COMPLIANCE: All pieces of playground equipment shall be certified by the manufacturer to be in compliance with the Handbook for Public Playground Safety.

G. CPSIA of 2008 COMPLIANCE: All playground equipment shall be certified by the manufacturer to be in compliance with all applicable requirements of the Consumer Product Safety Improvement Act of 2008. Lead test data that is shipped with the equipment shall be turned over to the Owner immediately after the equipment arrives.

H. Playground Grass Surface:

   1. Laboratory Test Reports: Materials certificates certifying each material item complies with, or exceeds, specified requirements. Certificates of compliance must be signed by materials producer and contractor.

   2. Product Verification: Delivery slip for each material shipment, including carpet and infill material.

   3. Field test inspection reports and samples for material including Impact Attenuation, Permeability, and Flammability.

   4. Two 1'x1' product samples.

   5. A written guarantee from manufacturer for workmanship.

   6. Impact attenuation (per fall height requirements), permeability, and flammability test results from independent approved and certified testing laboratories.

   7. The artificial grass installer/contractor will provide a maintenance procedure for the installed surface.

I. MAINTENANCE AND USE MANUAL: Submit information describing the manufacturer's maintenance manual.

1.4 REFERENCES

A. Impact Attenuation: According to ASTM F 1292-13 or latest version.

B. Accessibility of Surface Systems: According to ASTM F 1951-13 of latest version.

C. ASTM F 1292-04 “Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment”.

D. ASTM D2859 “Flammability Standard”.

E. ASTM F1951-99: “Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.”

1.5 JOB CONDITIONS

A. Job conditions in Section 312201 apply.

B. Construction Review: Notify the Architect when the playscape is staked out, posts are installed, and upon completion of playscape.

F. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit playground surface system installation to be performed according to manufacturer's written instructions and warranty requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer and Installer: At least twenty (20) completed play structures with similar components and complexity. Upon request, provide list of completed structures to the Owner’s Representative with playground owner’s name, address, telephone number and representative’s name.

B. Installer must be a Manufacturer's Factory Certified Installer:

1. Proof of certification by manufacturer shall be produced.
2. Certified Playground Safety Inspector with crew at all times.
3. Proof of NPSI Certification required.

D. Certificate of qualifications of the playground surfacing installer.

E. IPEMA Certified: Product and crew chiefs must be IPEMA certified.

F. Source Limitations: Obtain playground surface system materials, including primers and binders, from manufacturer specified

1. Provide secondary materials including adhesives, primers, and repairs materials of type and from source recommended by manufacturer of playground surface system materials.

G. Standards and Guidelines: Comply with CPSC No. 325, "Handbook for Public Playground Safety"; ASTM F 1292; and ASTM F 1487.

H. Playground Grass Surface Installer Qualifications: A list of ten (10) playground surfacing projects completed with a similar product within the last five (5) years. At least one of these projects must be more than 5,000 square feet and completed in the last two (2) years. List shall include names of project representatives and respective telephone numbers. This list shall also contain projects which require the same level of difficulty, e.g. number of poles and cutouts, transitions, and other special requirements. These ten (10) projects shall have been contracted and installed by the company bidding the job.

1.7 WARRANTY – PLAY EQUIPMENT

A. Provide a certificate of warranty that meets or exceeds the requirements below. If the manufacturer's standard warranty does not meet these minimum requirements, a certificate of extended warranty from the manufacturer or contractor must be included. Warranty periods may not be expressed as 'Life-Time' and must be expressed in specific years as required below.

B. 100-Year Limited Warranty: On all aluminum posts, stainless steel fasteners, clamps, beams and caps against structural failure due to corrosion/ natural deterioration or manufacturing defects, and on traditional play structure steel posts against structural failure due to material or manufacturing defects.

C. 15- Year Limited Warranty: On all steel arches, all plastic components (including perimeter timbers), all aluminum and steel components not covered above, outdoor musical instruments, decks and deck coatings (except chains) against structural failure due to material or manufacturing defects.

D. 10- Year Limited Warranty: On concrete products against structural failure due to natural deterioration or manufacturing defects. Does not cover minor chips, hairline cracks or efflorescence.

E. 8- Year Limited Warranty: On net climbers and climbing cables against defects in materials or manufacturing defects.

F. 5-Year Limited Warranty: On Rhapsody® cables and mallets against defects in materials or manufacturing defects, on polycarbonate panels against defects in materials or manufacturing defects, and on bamboo panels against delamination due to defects in materials or manufacturing defects. Does not cover damage which may be associated with the natural characteristics of bamboo aging, including but not limited to discoloration, splitting, cracking, warping or twisting, nor the formation of algae, mold and other forms of fungal-type bodies on bamboo materials.

G. 3-Year Limited Warranty: on all other parts, i.e.: electronic products, all swing seats and hangers, climber handholds, chains, track ride trolleys and bumpers, all rocking equipment including accessible gliders, belting material, fitness equipment resistance mechanism, seesaws, etc., against failure due to corrosion/ natural deterioration or manufacturing defects.

1.8 WARRANTY – SURFACING

A. The artificial grass installed under this contract will be warranted for a period of ten (10) years for materials and workmanship and covers the surface for wear through, deterioration and excessive fading/ UV degradation. Vandalism and force majeure will not be covered. Written warranty must be submitted by the installer.

B. When defective material or workmanship is discovered which will require repair or replacement, all such repair work or replacement work shall be done by the contractor at its own expense after written notification is given of such required repairs. However, if the contractor fails to comply with the requirements of the above guarantee within reasonable time after notification is given, the city shall proceed to have the repairs made by others at the contractor's expense.

1. Any unsafe conditions that arise shall be secured and maintained by the installer until all required repairs or replacements have been completed.

2. All resurfacing will conform in kind and quality to the specifications set forth in the plans and specifications and will be free of defects in workmanship and material.

1.9 TESTING OF PLAYGROUND GRASS SURFACE

A. The following are test results from an independent testing laboratory which must also be submitted:

1. Impact Attenuation: ASTM 1292-04: Impact attenuation test results will be provided. These test results shall be certified and submitted on the letterhead of an independent testing lab. Impact attenuation test results shall meet or exceed Consumer Product Safety Commission Guidelines for impact attenuation (G-max and Head Injury Criterion "H.I.C."). Test results must be administered and evaluated under the same test and these results must be shown for three drops at each required temperature: 32o, 72o, 120o; yield less than 200 G's and less than 1,000 H.I.C. Only test results from ASTM testing approved laboratories, F8 committee will be acceptable. Approved testing laboratories are TSI and Detroit Testing.

2. Permeability: Product shall meet or exceed a coefficient of permeability of five (5) feet per minute. NOTE: From a geotechnical standpoint, the permeability of a material is a measure of the velocity at which water will flow through the void spaces or pores under a given hydraulic gradient. The product shall handle a minimum of 8" of rainfall per hour.

3. Flammability (PILL test)

1.10 ADA COMPLIANCE CHART

A. The play area or areas shall meet or exceed the accessibility requirements set for by the ADA as follows:

B. Apalachin Elementary School (2–12-year-olds, Pre-K-1st):

Total Elevated Play Components:	6		
Total Elevated Play Components Accessible by Transfer or Ramp:	6	Required	3
Total Elevated Play Components Accessible by Ramp Shown:	0	Required	0
Total Accessible Ground Level Play Components Shown:	5	Required	2
Types of Ground Level Play Components Shown:	5	Required	2
User Capacity:	45		

C. Apalachin Elementary School (5–12-year-olds):

Total Elevated Play Components:	13		
Total Elevated Play Components Accessible by Transfer or Ramp:	8	Required	7
Total Elevated Play Components Accessible by Ramp Shown:	0	Required	0
Total Accessible Ground Level Play Components Shown:	10	Required	4
Types of Ground Level Play Components Shown:	5	Required	3
User Capacity:	75		

2.0 PART 2 PRODUCTS

2.1 PLAY AREA EQUIPMENT

A. Playground Equipment: Details and specifications representing the minimum acceptable standard of quality have been based on playground equipment by Landscape Structures or Architect approved equal and will be furnished by the Owner when requested by the Contractor a minimum of eight (8) weeks prior to Contractor schedule.

B. Steel and Aluminum Posts:
1. 111404Z 182"Steel Post DB 44" Bury
2. 111404C 132"Alum Post DB
3. 111404D 124"Alum Post DB
4. 111404E 116"Alum Post DB
5. 111404F 108"Alum Post DB
6. 111404H 92"Alum Post DB
7. 111404I 84"Alum Post DB

C. 121948A Kick Plate 8"Rise:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Kick Plate: Fabricated from 11 GA (.120") (3,04 mm) HR flat steel. Finish: TenderTuff, brown or gray in color.

D. 121949A Tri-Deck Kick Plate 8"Rise:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Kick Plate: Fabricated from 11 GA (.120") (3,04 mm) HR flat steel. Finish: TenderTuff, brown or gray in color.

E. 111231A Triangular Tenderdeck:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Triangular Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 37 3/4" (66,68 mm x 958,85 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

F. 111228A Square Tenderdeck:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Square Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 47" x 47" (66,68 mm x 1194 mm x 1194 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design,

stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific manufacturer's product installation/specifications).

G. 111229A Square Deck Extension:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Square Deck Extension: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 42" x 47" (66,68 mm x 1067 mm x 1194 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific manufacturer's product installation/specifications).

H. 122197A 90* Triangular Tenderdeck

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Triangular Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 37 3/4" (66,68 mm x 958,85 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

I. 178710A Hexagon Tenderdeck:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Deck Brace: Fabricated from 3/8" x 1 3/4" x 28 1/2" long zinc plated steel strap. Finish: ProShield®, silver in color.

Hex Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 36 3/4" (66,68 mm x 933,45 mm) per each of the six sides for an overall dimension of 77 5/8" (1971,68 mm) face to face. Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

J. 152911A Curved Transfer Module Right 32"Dk DB:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Railings: Weldment comprised of 1.125" (28,58 mm) O.D. x 11 GA. (.120") (3,04 mm) steel tubing with 203 or 303 stainless steel 3/8" (9,53 mm) threaded inserts. Finish: TenderTuff, color specified.

Panels: Permalene, color specified.

Step Support: Weldment comprised of 1.660" (42,16 mm) O.D. RS-20 (.080" - .095") (2,03 mm-2,41 mm) galvanized steel tubing and 1 3/4" x 1 3/4" x 1/8" (44,45 mm x 44,45 mm x 3,17 mm) HR angle. Finish: ProShield, color specified.

Step Sections/Top Step Section: Formed from 12 GA (.105") (2,66 mm) HRPO sheet steel conforming to ASTM A1011. Standing surface is 24 3/8" (619,13 mm) wide x 14" (355,6 mm) deep and is perforated with 5/16" (7,92 mm) diameter holes. Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Deck Support: Weldment comprised of 3 1/2" (88,9 mm) O.D. RS-20 (.125") (3,17 mm) galvanized steel tubing and 3/8" (9,53 mm) O.D. x 5" (127 mm) long CRS rod. Finish: ProShield, color specified.

Deck: Flange formed from 12 GA (.105") (2,66 mm) HRPO sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes and measures 29" (737 mm) per (2) sides. Finish: TenderTuff, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

K. 154884A CoolToppers Single Post Pyramid Roof DB Only:

Extension Arms: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095"-.105")

(2,41 mm-2,66 mm) galvanized steel tubing, 1/4" (6,35 mm) steel plate and 1/4" (6,35 mm) diameter carbon steel J-hooks. Finish: ProShield, color specified.

Clamp: Weldment comprised of 1/4" x 3" (6,35 mm x 76 mm) HRPO flat steel and 1/4" (6,35 mm) HRPO steel plate. Finish: ProShield, color specified.

CoolTopper Shade Top: Heavy duty, 62.9 mils (1.6 mm) thick professional grade shade fabric for tensioned structures and other shade applications. Made from UV stabilized HDPE monofilament and tape yarns. Specialized lock stitch knit for more air movement and better channeling of cooling breezeways. Constructed to block up to 97.7% of harmful UV sun rays. Fade and tear resistant, will not crack, rot or fray. Tensile strength warp 142.75 lbs. weft 560.67 lbs. Tear strength warp 42.03 lb. and weft 80.70 lbs.. Burst pressure 507.63 PSI. Remove fabric when wind speed is expected to exceed 90 mph and snow load is expected to exceed 5 psf, per International Building Code (IBC) 2009.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

L. 130567A Hex Shingle Roof:

Roof Sleeve: Cast from A356 aluminum alloy.

Hex Shingle Roof Section: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

M. 166809A E-Pod Seat:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

E-Pod: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Pod Casting: Fabricated from sand cast alloy 356 in accordance with ASTM B26. Finish: ProShield, color specified.

N. 120901A Grab Bar:

Half Clamp: Cast aluminum. Finish: ProShield, color specified.

Grab Bar: Weldment comprised of formed 7/8" (22,23 mm) O.D. x 11 GA (.120") (3,04 mm) and 1/4" x 1 3/4" (6,35 mm x (44,45 mm) stainless steel half clamps. Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

O. 345284A Optigear Panel Above Deck:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Optigear Panel Assy.: (Panels) Two color Permalene, color specified. (Poly Panel) .236" (5,99 mm) thick clear polycarbonate, 3/8" (9,53 mm) threaded rod and 3/16" (4,75 mm) SST plate.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Angled Panel Bracket: Weldment comprised of .190" (4,83 mm) thick 5052 aluminum formed angle with (2) 6005-T5 aluminum threaded tubes 1 1/8" (28,58 mm) O.D. x 1 1/2" (38,1 mm) long. Finish: ProShield, color specified.

P. 345294A Image Panel - 176 Block Above Deck:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Angled Panel Bracket: Weldment comprised of .190" (4,83 mm) thick 5052 aluminum formed angle with (2) 6005-T5 aluminum threaded tubes 1 1/8" (28,58 mm) O.D. x 1 1/2" (38,1 mm) long. Finish: ProShield, color specified.

Pivot Blocks: U.V. stabilized high-density polyethylene.

Rod Cover: Recycled Permalene, color specified.

Permalene Panels: Recycled Permalene, color specified.

Steel Rod: 1/2" (12,7 mm) diameter CRS zinc plated rod.

Q. 111240B Balcony Deck w/Wheel:

Barrier: Weldment comprised of 5/8" (15,87 mm) solid steel vertical rails, 1 1/8" (28,57 mm) O.D. steel horizontal rails with 203 or 303 stainless steel welded inserts with 5/8" (15,87 mm) internal threads. Finish: TenderTuff, color specified.

Deck: Fabricated from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,93 mm) diameter holes perforated. The finished size measures 2 5/8" x 34" (66,67 mm x 863 mm) (straight edge) x 17" (431 mm) radius (curved edge). Finish: TenderTuff, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Wheel: 12" (305 mm) diameter cast A319.1 aluminum alloy. Shaft-303 stainless steel. Finish: TenderTuff, color specified.

Wheel Bracket: Weldment comprised of formed 3/16" (4,75 mm) plate and 5/8" (15,88 mm) O.D. stainelss steel shaft. Finish: ProShield, Black in color.

Wheel Clamp: Formed from 3/16" x 2" (4,75 mm x 52 mm) HRPO zinc-plated. Finish: ProShield, color specified.

R. 116244A Pipe Barrier Above Deck:

90o Bracket: Formed from 1/4" x 1 1/4" (6,35 mm x 31,75 mm) HRPO flat steel. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Pipe Barrier: Weldment comprised of 5/8" (15,88 mm) solid steel vertical rails, 1 1/8" (28,58 mm) O.D. x 11 GA (.120") (3,04 mm) steel horizontal rails with 203 or 303 stainless steel welded inserts with 5/8" (15,88 mm) internal threads, 1 1/2" x 1 1/2" x 29 1/2" (38,1 mm x 38,1 mm x 749,3 mm) angle iron. Barrier measures 33 7/8" (860,43 mm) wide x 39 13/16" (1011,22 mm) high. Finish: TenderTuff, color specified.

S. 152444A Grid Walk w/Guardrails:

Guardrail: Weldment comprised of 1.315" (33,40 mm) O.D. RS20 (.080" - .090") (2,03 mm-2,28 mm) galvanized steel tubing, .625" (15,88 mm) O.D. CF steel bar and 1/4" x 1 3/4" (6,35 mm x 44,45 mm) steel half clamps. Finish: ProShield, color specified.

Plank: Weldment comprised of 1/4" x 2 1/2" x 30" (6,35 mm x 63,5 mm x 762 mm) steel plates, 1.660" (42,16 mm) O.D. schedule 40 black steel tubing, and 1/4" (6,35 mm) diameter wire. Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Clamps: Cast aluminum. Finish: ProShield, color specified.

T. 362045A Crossbar Bridge DB Only Ground Level Only:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Cable Assy.: (Cable) Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. (Cable Connectors) 6063-T6 aluminum.

Upper Beam: Weldment/assembly consisting of galvanized steel tube 3.5iOD .165W (RS40), Sheet HRPO .1046 (12ga) (Rib), SST sheet 3/8" (Tabs), zinc plated steel .25" (clamp), Finish: ProShield, color Specified.

Chain: Steel 1/4" (6,35 mm) straight link chain, 3,150 lb (1428,82 kilograms). working load limit. Finish: ProGuard.

Rungs: Comprised of galvanized steel tube 2.375iOD .109W (RS20), End caps: Cast aluminum. Finish: ProShield, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

Footers: Comprised of HRPO steel sheet 0.250" thick. Finish: Hot Dip Galvanized.

U. 360412A Crux Climber 72" Deck DB Only:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Step: Formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Finish: TenderTuff, color specified.

V. 271761B Alpine Slide 96" Deck DB:

Slide Hood: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Exit Support: Weldment comprised of 2.375" (60,32 mm) O.D. x .120" (3,04 mm) black steel tubing and 1/4" (6,35 mm) x 3" (76,2 mm) mounting plate. Finish: ProShield, specify color.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Slide: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

W. 222708A WhooshWinder Slide 72"Dk DB:

Rail Spacer: Fabricated from 1.312" (33,32 mm) O.D. x 16 Ga. (.065") (1,65 mm) steel tubing. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Rail: 1 1/8" (28,58 mm) O.D. 6061-T6 aluminum extrusion with 5/16" (7,92 mm) walls. Finish: ProShield, color specified.

Slide Sections: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Exit Footer: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095" - .105") (2,41 mm-2,66 mm) galvanized steel tubing and 1/4" x 3" x 7 1/2" (6,35 mm x 76 mm x 191 mm) HRPO steel mounting plate. Finish: ProShield, color specified.

Mid-Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS20 (.090" - .100") (2,28 mm-2,54 mm) galvanized steel tubing and 7 GA. (.179") (4,54 mm) HRPO steel strap. Finish: ProShield, color specified.

Deck Extension: Weldment comprised of 12 GA. (.105" (2,66 mm) HRPO sheet steel. Finish: Tender-Tuff coated, color specified.

Dk. Ext. Panel: 7 GA. (.179")(4,54 mm) HRPO flat steel. Finish: ProShield®, color specified.

Lower Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS20 (.090"-.100") (2,28 mm - 2,54 mm) galvanized steel tubing and 1/4" (6,35 mm) flat steel. Finish: ProShield, color specified.

X. 148426A Firepole Perm Handholds 48"Dk DB:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Handhold Panel: Recycled Permalene, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Firepole: Weldment comprised of 1.900" (48,26 mm) O.D. RS-20 (.090"-.100") (2,28 mm-2,54 mm) galvanized steel tubing, and 1.315" (33,40 mm) O.D. RS-20 (.080"-.090") (2,03 mm-2,28 mm) galvanized steel tubing. Finish: ProShield, color specified.

Y. 182503B Welcome Sign (LSI Provided) Ages 2-12 years Direct Bury:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Post: Weldment comprised 2.375" (60,33 mm) O.D. RS20 (.095-.105) (2,41 mm-2,67 mm) wall galvanized tube, 1/4" (6,35 mm) HRPO steel sheet and aluminum post cap. Finish: ProShield, color specified.

Z. 168099A Cozy Dome DB:

Mount Plate: Fabricated from 1/4" (6,35 mm) HRPO steel plate. Finish: ProShield, color specified.

Cozy Dome Panel: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Ring Plate: Fabricated from 1/4" (6,35 mm) HRPO steel plate. Finish: ProShield, color specified.

Direct Bury Plate: Weldment comprised of 2.375" (60,33 mm) O.D. RS20 (.095"-.105") (2,41 mm-2,66 mm) wall galvanized steel tubing and 1/4" (6,35 mm) HRPO steel plate. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

AA. 158997A Pod Climber 10" DB:

Disc: Rotationally molded from U.V. stabilized linear low-density polyethylene, disc measures 14" (356 mm) in diameter x 7" (178 mm) high, color specified.

Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS-20 (.090" - .100") (2,28 mm-2,54 mm) 1.315" (33,40 mm) O.D. RS-20 (.080" - 090") (2,03 mm-2,28 mm) and 3/16" x 5" (4,75 mm x 127 mm) diameter plate. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

BB. 120711A Pod Climber 16" DB:

Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS-20 (.090" - .100") (2,28 mm-2,54 mm) 1.315" (33,40 mm) O.D. RS-20 (.080" - 090") (2,03 mm-2,28 mm) and 3/16" x 5" (4,75 mm x 127 mm) diameter plate. Finish: ProShield, color specified.

Disc: Rotationally molded from U.V. stabilized linear low-density polyethylene, disc measures 14" (356 mm) in diameter x 7" (178 mm) high, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

CC. 120710A Pod Climber 8" DB:

Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS-20 (.090" - .100") (2,28 mm-2,54 mm) 1.315" (33,40 mm) O.D. RS-20 (.080" - 090") (2,03 mm-2,28 mm) and 3/16" x 5" (4,75 mm x 127 mm) diameter plate. Finish: ProShield, color specified.

Disc: Rotationally molded from U.V. stabilized linear low-density polyethylene, disc measures 14" (356 mm) in diameter x 7" (178 mm) high, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

DD. Steel and Aluminum Posts:

111404E 116"Alum Post DB

111403D 158"Alum Post For Roof DB

111404D 124"Alum Post DB

111404H 92"Alum Post DB

111404G 100"Alum Post DB

EE. 121948A Kick Plate 8"Rise:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Kick Plate: Fabricated from 11 GA (.120") (3,04 mm) HR flat steel. Finish: TenderTuff, brown or gray in color.

FF. 119646A Tri-Deck Extension:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Triangular Deck Extension: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size of two of the three sides measures 2 5/8" x 37 7/8" (66,68 mm x 962,03 mm) on the face of the deck and the other side measures 2 5/8" x 43 3/4" (66,68 mm x 1111,25 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

GG. 185852A Transfer Step w/2 Handloops DB:

Handloop: Weldment comprised of 1.125" (28,58 mm) O.D. x 11 GA (.120") (3,05 mm) steel tubing with 203 or 303 stainless steel inserts, with 5/8" (15,88 mm) internal thread. Finish: TenderTuff, color specified.

Step Support: Weldment comprised of 1.660" (42,16 mm) O.D. RS-20 (.080" - .095") (2,03 mm-2,41 mm) galvanized steel tubing and 1 3/4" x 1 3/4" x 1/8" (44,45 mm x 44,45 mm x 3,17 mm) HR angle. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Step: Formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Finish: TenderTuff, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

HH. 111231A Triangular Tenderdeck:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Triangular Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 37 3/4" (66,68 mm x 958,85 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

II. 111228A Square Tenderdeck:

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Square Deck: Flange formed from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Deck face has (4) slotted holes for face mounting components. The finished size measures 2 5/8" x 47" x 47" (66,68 mm x 1194 mm x 1194 mm). Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

JJ. 118110A Square Poly Roof Custom Logo Panels:

Poly Roof: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Roof Sleeve: Cast from A356 aluminum alloy.

Roof Logo: Two color roof logo measures 41" (1041 mm) wide x 5 1/8" (130,18 mm) high, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

KK. 120901A Grab Bar:

Half Clamp: Cast aluminum. Finish: ProShield, color specified.

Grab Bar: Weldment comprised of formed 7/8" (22,23 mm) O.D. x 11 GA (.120") (3,04 mm) and 1/4" x 1 3/4" (6,35 mm x (44,45 mm) stainless steel half clamps. Finish: TenderTuff, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

LL. 120818A Playstructure Seat:

Seat: Flange formed from 11 GA (.120") (3,04 mm) sheet steel. Seating surface is perforated with 1/4" (6,35 mm)diameter holes. Finish: TenderTuff, color specified.

Deck Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

MM. 177718A Rain Sound Wheel Panel Above Deck:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Rain Sound Wheel Panel Assy.: Assembly comprised of (Permalene Panels), color specified. (Shaft) 1" (25 mm) diameter x 4 3/4" (120,65 mm) long stainless steel. (Inner & Outer Rings) 16 GA. (.059") (1,50 mm) HRPO sheet steel. Finish: ProShield, color specified. (Brackets) 16 GA. (.059") (1,50 mm) HRPO sheet steel. Finish: Zinc plate with clear chromate finish. (Spacer) 3/4" (19,05 mm) diameter x 2 1/8" (53,98 mm) long stainless steel. (Flange Oilite Bearing) 1.625" (41,28 mm) diameter x 1.000" (25 mm) long.

Hub: Fabricated from 1/4" (6,35 mm) thick HRPO sheet steel. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Panel: Permalene panel measures 35 5/8" (904,87 mm) wide x 41" (1041 mm), color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Angled Panel Bracket: Weldment comprised of .190" (4,83 mm) thick 5052 aluminum formed angle with (2) 6005-T5 aluminum threaded tubes 1 1/8" (28,58 mm) O.D. x 1 1/2" (38,1 mm) long. Finish: ProShield, color specified.

NN. 345279A Table Panel DB:

Access Clamp: Weldment comprised of 3/8" (9,53 mm) HRPO steel plate and 1/4" x 1 3/4" (6,35 mm x 44,45 mm) wide steel clamp. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Table End Panel: Recycled Permalene, color specified.

Table Panel: Recycled Permalene, color specified.

Table Top Bracket: Fabricated from 1/4" x 3 1/2" x 28 9/16" (6,35 mm x 88,9 mm x 725,47 mm) HRPO flat steel. Finish: ProShield, color matched to posts.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Support Leg: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095" - .105") (2,41 mm-2,66 mm) galvanized steel tubing and 1/4" x 2 1/2" x 9" (6,35 mm x 63,5 mm x (229 mm) flat plate. Finish: ProShield, color specified.

OO. 116244A Pipe Barrier Above Deck:

90o Bracket: Formed from 1/4" x 1 1/4" (6,35 mm x 31,75 mm) HRPO flat steel. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product

installation/specifications).

Pipe Barrier: Weldment comprised of 5/8" (15,88 mm) solid steel vertical rails, 1 1/8" (28,58 mm) O.D. x 11 GA (.120") (3,04 mm) steel horizontal rails with 203 or 303 stainless steel welded inserts with 5/8" (15,88 mm) internal threads, 1 1/2" x 1 1/2" x 29 1/2" (38,1 mm x 38,1 mm x 749,3 mm) angle iron. Barrier measures 33 7/8" (860,43 mm) wide x 39 13/16" (1011,22 mm) high. Finish: TenderTuff, color specified.

PP. 345292A Ring-a-Bell Panel Above Deck:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Bell: Fabricated from 10 GA. (.135") (3,42 mm) HRPO low carbon steel. Finish: ProShield, color specified.

Bell Striker: Recycled Permalene, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Angled Panel Bracket: Weldment comprised of .190" (4,83 mm) thick 5052 aluminum formed angle with (2) 6005-T5 aluminum threaded tubes 1 1/8" (28,58 mm) O.D. x 1 1/2" (38,1 mm) long. Finish: ProShield, color specified.

Permalene Panels: Recycled Permalene, color specified.

QQ. 114665A Arch Bridge (42"):

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Arch Bridge: Fabricated from 12 GA (.105") (2,66 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Finish: TenderTuff, color specified.

Panel: One-color panel measures 35 5/8" (904 mm) wide x 41" (1040 mm) high, color specified.

RR. 182503C Welcome Sign (LSI Provided) Ages 5-12 years Direct Bury:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Sign Panel: Panel is fabricated from 1/8" (.125")(3,17 mm) aluminum plate. Finish: ProShield®, gray in color. (Sign) Digital image is transfered to a 1/8" (.125")(3,17 mm) ProShield coated aluminum plate, then infused into the ProShield.

Post: Weldment comprised 2.375" (60,33 mm) O.D. RS20 (.095-.105) (2,41 mm-2,67 mm) wall galvanized tube, 1/4" (6,35 mm) HRPO steel sheet and aluminum post cap. Finish: ProShield, color specified.

SS. 158105A Wobble Pod DB Only:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Spring Leg: Weldment comprised of 3 1/2" (88,9 mm) O.D. RS20 (.120"-.130") (3,04 mm-3,30 mm) galvanized steel tubing and 1/4" x 10" (6,35 mm x 254 mm) diameter HRPO zinc plated steel mounting plate. ProShield, color specified.

Spring Assembly: Comprised of 5 5/8" (142,88 mm) diameter 13/16" (20,62 mm) tempered alloy steel coil, 1/4" (6,35 mm) thick HRPO zinc plated steel, 1/4" (6,35 mm) thick HRPO sheet steel and spring wedge casting made from A-356T-6 aluminum. Finish: ProShield, color specified.

Permalene Panels: Recycled Permalene, color specified.

Cables: Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. (Cable Connector) 6063-T6 aluminum. Black in color.

Frame: Weldment/assembly consisting of galvanized steel tube 1.660iOD .0955W (RS20), Sheet HRPO 1/4" (Tabs), zinc plated steel .25" (clamp), Finish: ProShield, color Specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

TT. 302748A Vine Climber 8"Dk to 96"Dk DB Only:

Ball Knot: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Cable Assy.: (Cable) Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. (Cable Connectors) 6063-T6 aluminum.

Pod Bolt Plate: Weldment consists of 3/16" (4,75 mm) HRPO steel plate and 3/8" (9,53 mm) thick HRPO steel plate. Finish: ProShield, color specified.

GripX Platform: 3/4" (19,05 mm) Thick recycled Permalene®, black in color.

Pod: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Chain: Steel 1/4" (6,35 mm) straight link chain, 3,150 lb (1428,82 kilograms). working load limit. Finish: ProGuard.

Sleeves: Fabricated from 6061-T6 aluminum. Finish: ProShied, color specified

Weldment comprised of: 2.375" O.D. .134" wall (RS40) and 1.315" O.D. .083" wall (RS20) galvanized steel, HRPO steel sheet 0.250" thick, 3/8" SST tab. Finish: ProShield, color specified.

Deck: Comprised of HRPO steel sheet 0.250" thick, perforated. Finish: TenderTuff™, color specified.

Footers: Comprised of HRPO steel sheet 0.250" thick. Finish: Hot Dip Galvanized.

UU. 152907B Deck Link w/Barriers Steel end panels 2 Steps:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Barrier: Weldment comprised of 1.125" (28,58 mm) O.D. x 11 Ga. (.120") (3,04 mm)

wall steel tubing, 5/8" (15,88 mm) O.D. steel bar with 203 or 303 stainless steel 3/8" (9,53 mm)threaded inserts. Finish: TenderTuff, color specified.

Step Section: Formed from 12 GA (.105") (2,66 mm) sheet steel comforming to ASTM A1011. Standing surface is 24 1/4" (615,95 mm) wide x 14" (356 mm) deep and is perforated with 5/16" (7,94 mm) diameter holes. Finish: TenderTuff, color specified.

SteelX Panels: Zinc plated 7 GA (.179") (4,55 mm) HRPO flat steel. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Clamps: Cast aluminum. Finish: ProShield, color specified.

VV. 345333A Mobius Climber w/Permalene Handholds 72" Dk DB Only:

Cone Assembly: Weldment comprised of 2.375" (60,33 mm) diameter (.154") (3,91 mm) wall 6005-T1 aluminum tube and .190" (4,83 mm) thick aluminum sheet. Finish: Clear anodize.

Sleeves: Fabricated from 6061-T6 aluminum. Finish: Clear anodize.

Tri Handhold: Polyester Resin (Silicia, Dualite)

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Handhold Panel: Recycled Permalene, color specified.

Deck Mounting Bracket: Fabricated from .190" (4,83 mm) thick aluminum sheet. Finish: ProShield, Cool Silver in color.

Support Posts: Fabricated from 2.375" (60,33 mm) RS40 (.130"-.140") (3,30 mm-3,56 mm) wall galvanized steel tube. Finish: ProShield, Cool Silver in color.

WW. 345331D Zenith Climber w/Permalene Handholds Attached to Square Deck 96" Deck DB:

Net: Made of tightly woven, polyester-wrapped, six stranded galvanized-steel cable with a PVC wrapped steel core. 20 mm, steel-core interior rope and 20 mm, steel-core perimeter rope.

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Net Clamp: Weldment comprised of 1/4" x 1 3/4" (6,35 mm x 44,45 mm) HRPO flat steel and .375" (9,53 mm) stainless steel sheet. Finish: ProShield, color specified.

Eye Bolt Separator: Weldment comprised of 1/4" SST plate, 1/2" SST plate, Eye Bolt Galvanized Steel and 3/4-10 thread SST hex Nut.

Casting cover: Cast Aluminum. Finish: ProShield, color specified.

Turnbuckle: Clevis to Clevis Turnbuckle 3/4-10unc threads with 6" max adjustment. Finish: Forged Galvanized Steel Body.

Anchor Assembly: Weldment comprised of 1/4" HRPO steel plate and 1/2" HRPO steel plate. Finish: Hot Dip Galvanized

Anchor Covers: Comprised of 11ga (.1196) HRPO steel sheet. Finish: Hot Dip Galvanized.

Brace: Weldment comprised of 2.875 OD RS40 (.149-.182 wall) galvanized steel tubing and 1/4" x 3" wide steel clamp. Finish: ProShield, color specified.

Belt: Made from .315" (8,00 mm) thick mini rough top 3-ply rubber belting with polyester fabric plys, black in color.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Handhold Panel: Recycled Permalene, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

XX. 345322A O-Zone 3-Ring Climber w/Permalene Handholds 16"Deck Diff Attached to 16"Dk DB:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Ring Caps: Fabricated from sand-cast alloy 356. Finish: ProShield, color specified.

Arch Beam: Weldment comprised of 2.375" (60,32 mm) O.D. RS20 (.095" - .105") (2,41 mm-2,66 mm) wall galvanized steel tubing, 1/4" (6,35 mm) HRPO flat steel and 3/8" (9,52 mm) stainless flat steel. Finish: ProShield, color specified.

Footer (DB): Weldment comprised of 1.660" (42,16 mm) O.D. RS20 (.085"-.095") (2,16 mm-2,41 mm) galvanized steel tubing and 3/16" (4,75 mm) HRPO sheet steel. Finish: ProShield, color specified.

Ring: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Upper Cable: Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. (Cable Connector) 6063-T6 aluminum Finish: ProShield, black in color. (Footing Connectors) Fabricated from 1.250" (31,75 mm) O.D. 6063-T6 aluminum.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Handhold Panel: Recycled Permalene, color specified.

Lower Cable: Made of tightly woven polyester-wrapped, six-stranded galvanized-steel cable with a polypropylene core. (Cable Connector) 6063-T6 aluminum. Finish: ProShield®, black in color. (Footing Connector) Fabricated from 1.250" (31,75 mm) O.D. 6063-T6 aluminum.

Clamps: Cast aluminum. Finish: ProShield, color specified.

YY. 345312A Loop Ladder 40"Dk DB:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85

mm). Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Loop Ladder: Weldment comprised of 1.125" (28,58 mm) O.D. x 11 GA (.120") (3,04 mm) black steel tubing. Finish: TenderTuff, Red in color.

Handhold Panel: Recycled Permalene, color specified.

ZZ. 152907B Deck Link w/Barriers Steel end panels 2 Steps:

Spacer Tube: Made from 6061-T6 aluminum 7/8" (22,23 mm) O.D. x 1 11/16" (42,85 mm). Finish: ProShield, color specified.

Barrier: Weldment comprised of 1.125" (28,58 mm) O.D. x 11 Ga. (.120") (3,04 mm) wall steel tubing, 5/8" (15,88 mm) O.D. steel bar with 203 or 303 stainless steel 3/8" (9,53 mm)threaded inserts. Finish: TenderTuff, color specified.

Step Section: Formed from 12 GA (.105") (2,66 mm) sheet steel comforming to ASTM A1011. Standing surface is 24 1/4" (615,95 mm) wide x 14" (356 mm) deep and is perforated with 5/16" (7,94 mm) diameter holes. Finish: TenderTuff, color specified.

SteelX Panels: Zinc plated 7 GA (.179") (4,55 mm) HRPO flat steel. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Clamps: Cast aluminum. Finish: ProShield, color specified.

AAA. 153076A Mini Summit Climber 40"Dk DB:

Support: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095" - .105") (2,41 mm-2,66 mm) galvanized steel tubing and 1/4" x 3" (6,35 mm x 76 mm) mounting plate. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design,

stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Handhold Panel: Recycled Permalene, color specified.

Summit Climber: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

BBB. 152431A ABC Climber 40"Dk DB:

Panels: Permalene, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Climber Bracket: Fabricated from formed 3/16" x 2" (4,75 mm x 51 mm) HRPO steel sheet. Finish: ProShield, color specified.

Climber Plank: Flange formed from 11 GA (.120") (3,04 mm) sheet steel conforming to ASTM A1011. Standing surface is perforated with 5/16" (7,92 mm) diameter holes. Finish: TenderTuff, color specified.

Footer: Weldment comprised of 1.660" (42,16 mm) O.D. RS-40 (.085" - .095") (2,16 mm-2,41 mm) galvanized steel tubing and 3/16" x 2" (4,75 mm x 51 mm) HR flat steel. Finish: ProShield, color specified.

Clamps: Cast aluminum. Finish: ProShield, color specified.

CCC. 123333A Rollerslide 40"Dk DB:

Tube: 1 1/8" O.D. x 1 5/8" long aluminum tube. Finish: ProShield, color specified.

Rail Spacer: Fabricated from 1.312" (33,32 mm) O.D. x 16 GA (.065") (1,65 mm) steel tubing. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Hood: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Rail: 1 1/8" (28,58 mm) O.D. 6061-T6 aluminum extrusion with 5/16" (7,92 mm) walls. Finish: ProShield, color specified.

Rollers: Fabricated from 1.900" (48,26 mm) O.D. x 16 GA (.060") (1,52 mm) galvanized steel tubing. Finish: TenderTuff, color specified.

Rails: Extruded from 6005-T1 aluminum. Finish: ProShield, color specified.

Roller Shafts: Fabricated from 1/2" (305 mm) diameter CRS zinc-plated with yellow chromate finish.

Support Leg: Fabricated from 1.900" (48,26 mm) O.D. RS-20 (.090" - .100") (2,28 mm-2,54 mm) galvanized steel tubing. Finish: ProShield, color specified.

Top Plate: Formed from 10 GA (.135") (3,43 mm) 304-2B SST. Finish: TenderTuff, color specified.

DDD. 124863C SlideWinder2 48"Dk DB 2 Left:

Rail Spacer: Fabricated from 1.312" (33,32 mm) O.D. x 16 Ga. (.065") (1,65 mm) steel tubing. Finish: ProShield, color specified.

Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Rail: 1 1/8" (28,58 mm) O.D. 6061-T6 aluminum extrusion with 5/16" (7,92 mm) walls. Finish: ProShield, color specified.

Slide Sections: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

Exit Footer: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095" - .105") (2,41 mm-2,66 mm) galvanized steel tubing and 1/4" x 3" x 7 1/2" (6,35 mm x 76 mm x 191 mm) HRPO steel mounting plate. Finish: ProShield, color specified.

Mid-Support: Weldment comprised of 1.900" (48,26 mm) O.D. RS20 (.090" - .100") (2,28 mm-2,54 mm) galvanized steel tubing and 7 GA. (.179") (4,54 mm) HRPO steel strap. Finish: ProShield, color specified.

Support Base (SM): Weldment comprised of 1.660" (42,16 mm) O.D. RS-20 (.085" - .095") (2,16 mm-2,41 mm) galvanized steel tubing and 1/4" x 3" x 8" (6,35 mm x 76 mm x 203 mm) mounting plate. Finish: ProShield, color specified.

EEE. 141683G 92" TenderTuff Bench w/o Back DB:

Leg: Weldment comprised of 2.375" (60,33 mm) O.D. RS-40 (.130" - .140") (3,30 mm-3,56 mm) galvanized steel tubing and 3/8" x 4" (9,53 mm x 102 mm) HRPO steel straps. Finish: ProShield, color specified.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Seat Planks: Fabricated from formed 11 GA (.120") (3,04 mm) HRPO sheet steel perforated, planks measure 10 3/4" (273,05 mm) wide x 72" (1829 mm) long and 10 3/4" (273,05 mm) wide x 92" 2337 mm) long with 5/16" (7,92 mm) diameter holes on surface. Finish: TenderTuff, color specified.

173591A OmniSpin Spinner Surface Mount

OmniSpin Spinner: Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified.

OmniSpin Spinner Frame Assembly: (Frame) Weldment comprised of 2.375" (60,33 mm)O.D. RS20 (.095"-.105") (2,41 mm-2,66 mm) wall galvanized steel tubing, 2.875" (73,03 mm) O.D. RS40 (.160"-.170") (4,06 mm-4,32 mm) wall galvanized steel tubing, 1/4" (6,35 mm) HR flat steel and 3 1/2" (88,9 mm) O.D. CF steel bar. (Base) Weldment comprised of 3/8" (9,53 mm) HRPO sheet steel and 3/16" (4,75 mm) HRPO sheet steel. (Shock Covers) 16 GA (.060") (1,52 mm) HRPO sheet steel. (Crank Arms & Pins) Fabricated from stainless steel. (Shocks) Gas shocks with fixed bearings. Finish: ProShield, black in color.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

FFF. 247189A Chill Spinner DB:

Belt Seat: Made from .315" (8,00 mm) thick mini rough top 3-ply rubber belting with polyester fabric plys, black in color.

Belt: Made from .315" (8,00 mm) thick mini rough top 3-ply rubber belting with polyester fabric plys, black in color.

Bearing: 2" (50 mm) Deep groove stainless steel.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Bumper: Molded from U.V. stabilized black EPDM rubber.

Seat Frame: Weldment comprised of 1.66" (42,1 mm) O.D. RS40 (.130"-.140") (3,30 mm-3,56 mm) wall galvanized steel tubing, 1/4" (6,35 mm) thick HRPO steel sheet and 3.500" (88,9 mm) O.D. steel pipe. Finish: ProShield, color specified.

Seat Post: Weldment comprised of 3.500" (88,9 mm) O.D. (8 GA) (.165") wall galvanized steel tubing. Finish: ProShield®, color specified.

GGG. 154883B 249"Steel Post (60" Bury) For CoolTopper Single Post Pyramid Roof:

CoolTopper Post: Weldment comprised of 5" (127 mm) O.D. x 11 GA. (.120") (3,04 mm) galvanized steel tubing and 1/4" (6,35 mm) steel plate. Finish: ProShield, color specified.

HHH. 154884A CoolToppers Single Post Pyramid Roof DB Only:

Extension Arms: Weldment comprised of 2.375" (60,33 mm) O.D. RS-20 (.095"-.105") (2,41 mm-2,66 mm) galvanized steel tubing, 1/4" (6,35 mm) steel plate and 1/4" (6,35 mm) diameter carbon steel J-hooks. Finish: ProShield, color specified.

Clamp: Weldment comprised of 1/4" x 3" (6,35 mm x 76 mm) HRPO flat steel and 1/4" (6,35 mm) HRPO steel plate. Finish: ProShield, color specified.

CoolTopper Shade Top: Heavy duty, 62.9 mils (1.6 mm) thick professional grade shade fabric for tensioned structures and other shade applications. Made from UV stabilized HDPE monofilament and tape yarns. Specialized lock stitch knit for more air movement and better channeling of cooling breezeways. Constructed to block up to 97.7% of

harmful UV sun rays. Fade and tear resistant, will not crack, rot or fray. Tensile strength warp 142.75 lbs. weft 560.67 lbs. Tear strength warp 42.03 lb. and weft 80.70 lbs.. Burst pressure 507.63 PSI. Remove fabric when wind speed is expected to exceed 90 mph and snow load is expected to exceed 5 psf, per International Building Code (IBC) 2009.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

III. 221292A 5" Arch Swing Frame 8' Beam Height Only DB Only:

Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Arch Posts: See PlayBooster (PB) General Specifications.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Swing Beam: Weldment comprised of tee clamps and 5" (127 mm) O.D. extruded 6005-T5 aluminum alloy tube with a .125" (3,17 mm) W. Finish: ProShield, color specified.

JJJ. 221293A 5" Arch Swing Frame Additional Bay 8' Beam Height Only DB Only:

Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color specified.

Arch Posts: See PlayBooster (PB) General Specifications.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Swing Beam: Weldment comprised of tee clamps and 5" (127 mm) O.D. extruded 6005-T5 aluminum alloy tube with a .125" (3,17 mm) W. Finish: ProShield, color specified.

KKK. 177337A Toddler Swing Add-On Beam:

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Swing Beam: Weldment comprised of 3.500" (88,9 mm) O.D. RS-20 (.120" - .130")

(3,04 mm-3,30 mm) galvanized steel tubing, 6" (152 mm) wide zinc plated steel clamp, 3.500" (88,9 mm) pipe cap, and 1 1/4" (31,75 mm) housings with bronze bushings. Finish: ProShield, color specified.

LLL. 174018A Belt Seat ProGuard Chains for 8' Beam Height:

Chain/ProGuard: Steel 3/16" (4,75 mm) straight link chain, 800 lb. (362,87 kilograms) working load limit. Finish: ProGuard.

Bolt Link: Stainless Steel

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Belt Seat: Molded from UV stabilized black EPDM rubber encapsulating a weldment comprised of a 22 GA (.029") (0,74 mm) spring stainless steel sheet and (4) .105" (2,67 mm) thick stainless steel washers. The belt seat elliptical shape measures 7" (178 mm) wide x 26" (660 mm) long x .700" (17,78 mm) thick.

MMM. 176038G Full Bucket Seat ProGuard Chains for Toddler Swing:

Chain/ProGuard: Steel 3/16" (4,75 mm) straight link chain, 800 lb. (362,87 kilograms) working load limit. Finish: ProGuard.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Full Bucket Seat: Made of U.V. stabilized high-quality black rubber encapsulating a 24 GA (.024") (0,61 mm) stainless steel reinforcement plate. Handles cast from 356-T6 aluminum alloy with black polyarmor paint finish. Handles attach to seat with (3) 1/4" (6,35 mm) x 1 5/16" (33,32 mm) long stainless steel rivets. The full bucket measures 9" (229 mm) deep x 10 1/2" (266,7 mm) wide.

NNN. 177351A Molded Bucket Seat (5-12 yrs) w/Harness ProGuard Chains for 8' Beam Height:

Chain/ProGuard: Steel 3/16" (4,75 mm) straight link chain, 800 lb. (362,87 kilograms) working load limit. Finish: ProGuard.

Dbl. Pivot Block: Fabricated from 6061-T6 Aluminum with bronze oil impregnated

bearing.

Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).

Bucket Seat Assy: (Bucket Seat & Yoke) Rotationally molded from U.V. stabilized linear low-density polyethylene, color specified. (Pipebolt) Made from 1.125" (28,58 mm) O.D. 6005-T5 threaded annodized aluminum tube. (Bearings) UHMW PE lubricated. (Brackets) Made from 356-T6 aluminum.

Bumper: Molded from U.V. stabilized black EPDM rubber.

Mounting Bracket: Cast from 535 aluminum magnesium.

2.2 SUBSURFACE DRAINAGE FABRIC: 140N non-woven filter fabric as manufactured by Mirafi, Inc., Mirafi, Inc., Charlotte, NC (704) 523-7477 or Architect approved equal.

2.3 PLAY SURFACE DRAINAGE STONE: The playscape surface drainage stone base material shall be crushed stone conforming to ASTM C 33 No. 57 as presented in Table 1; or as required by Playscape Surfacing manufacturer and approved by the Architect.

TABLE 1 - GRANULAR BASE GRADING REQUIREMENTS

ASTM C 33 No 57	
Sieve Size	**Percent Passing**
1 ½ in (37.5 mm)	100
1 in (25 mm)	95 to 100
½ in (12.5 mm)	25 to 60
No. 4 (4.75 mm)	0 to 10
No. 8 (2.36 mm)	0 to 5

2.4 RESILIENT SUBSURFACE PADDING & SYNTHETIC TURF PLAY AREA SURFACING

A. Artificial grass and components shall be provided by single source.

B. Blades: Primary blades are a slit film XP polyethylene with anti-microbial agent AlphaSan® integrated into the primary yarn. An anti-static agent must also be integrated into the construction so as to not allow static charge build up. Secondary blade is a heat textured nylon monofilament. Polyethylene blades that are web or honeycomb fibrillated shall not be accepted.

C. Weight: The product face weight will be 48 ounces. With backing, the total weight of the product will be 106 ounces.

D. Tufting: The tufting gauge will be 3/8", pile height 1-1/2". Tufting configuration – dual yarn same row setup.

E. Backing: The backing shall be a multi-layered, three parts.

1. First single layer (stabilized primary consisting of polyester, fiberglass, and polyurethane). It is 18 pic construction and 6 ounces.
2. II. Second layer is a minimum 48 ounce urethane layer.
3. III. Third layer is 6 ounce geotextile fleece.

F. Seams: Primary seaming system shall be a micromechanical seam, utilizing hook and loop technology

G. Resilient subsurface padding: 2" SafetyFoam Pad which is a closed cell expanded polypropylene panel.

H. Infill: Rubber options include 0.75-1 lbs. of 10/20 or 14/20 crumb rubber granules per square foot. Sand options include 3.75 - 4 lbs. of 12/20 silica sand, Envirofill®, or T°Cool® per square foot.

I. Standard of quality is Playground Grass Ultra as manufactured by Forever Lawn of Ohio, Inc, Tel. 844-614-8873, www.playgroundgrass.com; or Architect approved equal.

PART 3 EXECUTION

3.1 EXAMINATION OF SITE

A. Prior to beginning installation, examine site and existing conditions to verify that site clearing and earthwork operations, including rough and finish grading, have been completed in accordance with play structure manufacturer's requirements for proper installation of the play structure.

B. Identify to Owner any conditions that would prevent installation of play structure in accordance with manufacturer's instructions. Do not begin installation of play structure until unsatisfactory conditions have been corrected. Beginning of installation indicates acceptance of existing conditions.

3.2 CONTRACT INSTALLATION

A. Equipment shall be installed in conformance to the manufacturer's specifications and architectural drawings and specifications contained within this document.

B. At the completion of the project provide a written statement which certifies the playscape has been inspected and is safe for use.

3.3 PLAY STRUCTURES

A. Installed equipment to conform with manufacturer's specifications and IPEMA standards. Installer must be Manufacturer Certified and CPSI to assure proper installation of equipment.

B. Install concrete footings as shown in detail. Top of concrete footing shall be brought to subgrade only and in no case shall they be less than 15 inches below finish grade.

C. Adjust play structure according to manufacturer's instructions. All members shall be vertical or horizontal.

3.4 SUBSURFACE DRAINAGE FABRIC

A. Fasten in continuous strips on top of all playground subgrades, after equipment is installed. Overlap joints by 18" minimum and staple per manufacturer's instructions. Install second layer after drainage stone is placed.

3.5 INSTALLATION OF PLAY SURFACE DRAINAGE STONE, RESILIENT SUBSURFACE PADDING & SYNTHETIC TURF PLAY AREA SURFACING

A. The base shall be angular #57 crushed stone, leveled and compacted at a depth of 8" (min).

B. The perimeter of the area shall be defined with a composite nailer board, unless an acceptable surface for anchoring the turf currently exists. These nailer boards will be secured into concrete or held in place with rebar spikes.

C. Cleaning: The entire surface shall be clean and free from any foreign and loose material.

D. SafetyFoam Pro resilient subsurface padding will be laid out in 2'x4' interlocking panels over the base.

E. Sythetic Turf: The turf will be rolled out in sections, cut around the poles, and seamed together using the micromechanical seaming system as the primary bond.

F. Securing: The turf will be secured around the perimeter. If using nailer boards, 1" staples will be used to secure the turf to the boards. Staples will be placed every 1/2".

3.6 ADJUSTING, CLEANING AND PROTECTION

A. Adjust all components after completion of installation to comply with manufacturer's requirements and to provide for safe operation of all items.

B. Clean all surfaces after completion of structure installation, and provide means of preventing unauthorized access to structure until surfacing is installed and/or concrete has cured.

3.7 CLEAN UP

During the contract and at intervals as directed by the Architect and as playscape installation is completed, clear the site of extraneous packaging and debris. Leave the site in a clean, safe, well draining, neat condition.

4.0 PART 4 - INSPECTION

4.1 POST INSTALLATION AUDIT

The Playscape Installer/Contractor will contract with the supplier to have the play equipment Audited after installation and will provide this information, through the Architect or owner, should any installation errors result in non-conformance of the play equipment to the ASTM or CPSC playground safety standards.

A. The Audit shall be performed by a Certified Playground Safety Inspector.

B. The Audit shall be based on;

a. Handbook for Public Playground Safety, Publication number 325, 1997 U.S. Consumer Product Safety Commission, Washington, DC 20207
b. Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, Designation F 1487-07ae1, ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428

C. The Audit report shall include:

a. An inventory of the play equipment giving each play structure an official name and documenting the following information: manufacturer, age group designation, critical fall height (in inches) and a listing of each component type to be audited in the play area.
b. A summary of non-compliance, beginning with Hazard Priority Rating 1, the most severe, and ending with HPR 3, the least severe. The name of the Play Structure where the non-compliance was found is stated along with the following: the inspection category (along with a short-hand description of the section of standard being reviewed), citation (of the exact section of the standard), picture (of the non-compliant item) and the inspector's findings.

END OF SECTION 32 30 08

SECTION 323101 - VINYL CLAD CHAIN LINK FENCE, BACKSTOPS, AND GATES

1.0 PART 1. GENERAL

1.1. DESCRIPTION OF WORK:

A. The extent of vinyl clad chain link fence is shown on the drawings and includes, but is not limited to, the following:

1. New vinyl clad chain link fence and gates.
2. Backstops

B. Provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.2. RELATED WORK SPECIFIED ELSEWHERE:

A. Section 31 22 01 - Site Earthwork

B. Section 32 12 01 - Asphalt Paving

C. Section 32 13 01 - Site Concrete Work

1.3. REFERENCES:

A. ASTM F552 Standard Terminology Relating to Chain Link Fencing

B. ASTM F567 Standard Practice for Installation of Chain Link Fence

C. ASTM F626 Standard Specification for Fence Fittings

D. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric

E. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates

F. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials

G. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework

H. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

I. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates.

J. WLG 2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing.

1.4. SUBMITTALS:

A. Provide Qualification Experience requirements as specified in "Quality Assurance" of this section. Provide a list of completed projects including Owner contact information.

B. Manufacturer's Product Data (MPD): Manufacturer’s catalog cuts indicating material compliance and specified options.

C. Shop Drawings: For fence, backstops, and gates including plan layout and details illustrating fence heights, location and sizes of posts, finishes, rails, braces, and installation procedures. Provide footing sizes and hardware list.

D. Samples:

1. 4" section of line post with specified vinyl coating.
2. 12" x 12" section of vinyl fence fabric.

E. Provide a copy of manufacturers’ 15-year warranty.

1.5. JOB CONDITIONS:

A. All job conditions in Section 312201 apply.

B. Construction Review: Notify the Architect when fence and gates are staked out.

1.6. QUALITY ASSURANCE:

A. Manufacturer: Company having manufacturing facilities in the United States with five (5) years experience specializing in manufacturing of chain link fence products.

B. Fence Contractor: Contractor having five (5) years experience installing similar projects in accordance with ASTM F567.

C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

D. Single source: To ensure system integrity, obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

1.7. WARRANTY:

A. Provide manufacturer's standard limited warranty that its chain link fence system is free from defects in material and workmanship including cracking, peeling, blistering and corroding for a period of fifteen (15) years from the date of purchase.

2.0 PART 2. PRODUCTS

2.1. GENERAL:

A. Vinyl Chain Link Fence and Gates: Shall conform to Chain Link Fence Manufacturer's Institute specifications. See drawings for sizes of posts and fabric.

B. All posts, rails, fittings, fabric and tension bars shall be vinyl coated galvanized steel, painting of these items will not be acceptable.

C. Color System: All posts, rails, fittings, fabric, hardware, and tension bars shall be black in compliance with ASTM F934.

D. Standard of quality: shall Color Bond II, Class 2b as manufactured by Merchant Metals, (888) 260-1600 or Architect approved equal.

2.2. CHAIN LINK FABRIC:

A. The base metal of chain-link fabric is composed of commercial quality medium high carbon, hot-dipped galvanized steel wire. Core wire tensile strength 75,000 psi.

B. The vinyl coating is securely fused over the galvanized steel wire by the Thermal Fusion process under pressure to 5,000 psi to insure a dense and impervious covering free of voids, having a smooth and lustrous surface appearance. The vinyl coating thickness, 6 mil (0.15 mm) to 10 mil (0.25 mm), zinc coating weight, and wire tensile strength conforms to ASTM F668 Class 2B. The wire shall be vinyl clad before weaving and is free and flexible at all joints. The mesh is measured by the distance between the wires forming parallel sides of the mesh. The height of the fabric, measured from the ends of the knuckles, has a permissible variation of plus or minus one inch.

C. Wire Coating: Only Plasticized Polyvinyl Chloride (PVC) with low temperature (-20 degrees C.) plasticizer, no fillers, extenders or extraneous matter, other than the necessary stabilizers and pigments are used. Colors are stabilized and have a light fastness that withstands a minimum WEATHER-O-METER exposure of 4,000 hours without any deterioration (Test Equipment Operating Light and Water Exposure Apparatus Carbon-Arc Type) ASTM-D 1499. The vinyl covering, in addition, resists attack from prolonged exposure to diluted solutions of most common mineral acids, sea water and diluted solutions of most salts and alkali.

D. Fabric is knuckled at both selvages (top and bottom). Any twisted salvage will be rejected.

Usage	Mesh Size	Break Load of Wire	Thermally Fused -Vinyl Coated Core Wire Gauge
Standard	2" (50 mm)	1290 lbF	9 ga. [0.148" (3.76 mm)]

Backstop Reinforcement	2" (50 mm)	2170 lbF	6 ga. [0.192" (4.88 mm)]

2.3. STEEL PIPE FRAME WORK:

A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface. Exterior of pipe to have ASTM F1043 PVC thermally fused color coating, minimum thickness 10 mils (0.254 mm) to 15 mils (0.38 mm). Regular Grade: Minimum steel yield strength of 30,000 psi (205 MPa) [all sizes]

B. Top, Intermediate and Bottom Rails: Top rail is thermally fused vinyl coated galvanized steel pipe in 21 foot lengths jointed by 7" inches long sleeves, vinyl clad, to run continuously along top of fence. Bottom and intermediate rails shall conform to specifications for top rail and are jointed at line posts with vinyl clad boulevard clamps.

C. Line Posts: Line posts are thermally fused vinyl coated galvanized steel pipe. Posts are sufficient length to allow for installation as detailed and are spaced in the line of fence not farther apart than 10 feet.

D. Terminal and Corner Posts: Shall be thermally fused vinyl coated galvanized steel. Each post is of sufficient length to allow for a depth as detailed. Fabric is attached to the terminal post by means of vinyl coated tension bars and held by vinyl coated tension bands. Corner posts are placed at each change in direction or as directed by the Architect. All corner and terminal posts are braced with vinyl-clad galvanized steel 1.66 inch O.D. brace, rail, 10 feet long, with a diagonal 3/8 inch diameter truss rod, and attached to the first adjacent line post.

2.4. FITTINGS:

A. All fittings to be PVC thermally fused color coated having a minimum thickness of 0.006” (0.152 mm) per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.

B. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. For top rail, provide line post loop tops to secure top rail.

C. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.

D. Top rail sleeves: 7” (178 mm) PVC coated galvanized steel sleeve per ASTM F626 that allow for expansion and contraction of rail.

E. Wire ties: 9 gauge (0.148") (3.76 mm) vinyl coated galvanized steel wire for attachment of fabric to line posts and rails. Tie wire PVC coated and in compliance with ASTM F626. Color to match fabric color.

F. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105") (2.67mm) pressed vinyl coated steel by 3/4" (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16" (7.94 mm) galvanized carriage bolt and nut.

G. Tension (stretcher) vinyl coated galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.

H. Truss rod assembly: PVC coated galvanized steel minimum 5/16" (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626.

I. Carriage bolts and nuts: Galvanized of commercial quality but not vinyl coated. Provide PVC touchup paint to color coat all nuts and bolts, when fence is completed.

2.5. CHAIN LINK SWING GATES:

A. Swing gates: Fabricate chain link swing gates in accordance with ASTM F900. Gate frame to be of welded construction. Weld areas to be protected with zinc-rich paint per ASTM A780 then over coated with liquid PVC to match frame. The gate frame members are to be spaced no greater than 8' 0" (2.44 m) apart horizontally or vertically. Exterior members to be 1.900" (48.3 mm) OD pipe, interior members when required shall be 1.660" (42.2 mm) OD pipe. PVC coated pipe to be [Grade 1 ASTM F1083] per section 2.3. Chain link fabric to match specification of fence system. Fabric to be stretched tightly and secured to vertical outer frame members using tension bar and tension bands spaced 12" (304.8 mm) on center and tied to the horizontal and interior members 12" (304.8 mm) on center using 9 gauge vinyl coated galvanized steel ties per section 2.4.

B. Hinges: Hot dip galvanized powder coated pressed steel or malleable iron, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180°.

C. Latch: Powder coated galvanized forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate.

D. Double gates: Provide powder coated galvanized drop rod with center gate stop pipe or receiver to secure inactive leaf in the closed position. Provide powder coated galvanized pressed steel locking latch, requiring one padlock for locking both gate leaves, accessible from either side.

E. Keeper to secure open leafs: Provide galvanized gate hold back keeper for each gate leaf over 5' (1524 mm) wide. Gate keeper shall consist of mechanical device for securing

free end of gate when in full open position. Verify with Owner and Architect prior to installing.

F. Latch, hinges, moveable parts shall be field coated with liquid PVC.

G. Gate posts: PVC color coated Grade 1 pipe ASTM F108 per section 2.3.

2.6. CONCRETE FOOTINGS:

A. Shall be 4,500 psi as specified in Section 32 13 01, 2.3, 2.4.

3.0 PART 3. EXECUTION

3.1. SITE EXAMINATION AND PREPARATION:

A. Ensure property lines and legal boundaries of work are clearly established.
B. Survey of fence location to be provided by Site Contractor.

C. Clearing: The Site Contractor shall clear, grub and remove vegetation/debris for the fence installation area.

D. Verify areas to receive fencing are completed to final grade with finished elevations shown on the drawings.

3.2. CHAIN LINK FRAMEWORK INSTALLATION:

A. Install chain link fence system in accordance with ASTM F567, manufacturer's instructions, and Chain Link Fence Manufacture's Institute specifications.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly maximum ten (10’) feet on center.

D. Excavation: Drill holes of diameters and spacings shown, for post footings in firm, undisturbed or compacted soil.

1. Excavate hole depths as detailed when in firm, undisturbed soil. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads.
2. Spread soil from excavations uniformly adjacent to the fence line, or on adjacent areas of the site, as directed.

E. Setting Posts: Remove all loose and foreign materials from sides and bottoms of holes.

1. Center and align posts in holes. Install posts plumb, in neat, straight lines, and with minimal waviness of top railing.

2. Place concrete around posts in a continuous pour and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
3. Trowel finish tops of footings, and dome surface to direct water away from posts. Extend footings for posts as detailed.
4. Keep exposed concrete surfaces moist for at least 7 days after placement, or cure with curing material, or other acceptable method.

F. Concrete Strength: Allow concrete to attain at least 75% of its minimum 28-day compressive strength, but in no case sooner than 7 days after placement, before rails, tension bands or fabric is installed. Do not stretch and tension fabric and wires, and do not hang gates until the concrete has attained its full design strength.

G. Check each post for vertical and top alignment and maintain in position during placement and finishing operations.

H. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6’ (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.

I. Top rail: Install in lengths of 21’ (6.400 m). Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.

J. Center Rails: Install mid rails between line posts and attach to post using rail end or line rail clamps. A center rail is required for fabric height 8'-0" and over.

K. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.

L. Fasteners: Peen ends of bolts or score threads to prevent removal of nuts. Paint all exposed surfaces, nicks or scratches, nuts and bolts, with liquid black PVC touch up paint.

3.3. CHAIN LINK FABRIC INSTALLATION:

A. Fabric: Install fabric on security side or play side for athletic facilities as directed by the Architect, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15” (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is above finish grade as detailed.

B. Secure fabric using wire ties to line posts at 12" on center and to rails and braces 12" on center. Tie wire shall be secured to the fabric by wrapping it two (2), 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.4. CHAIN LINK GATE INSTALLATION

A. Swing gates: Installation of swing gates and gate posts shall be per ASTM F567. Direction of swing shall be as shown on drawings and/or as directed by the Owner. Gates shall be hung plumb in the closed position with minimal space from grade to bottom of gate leaf. Double gate drop bar receiver shall be set in a minimum concrete footing 12" diameter by 48" deep. Gate leaf holdbacks shall be installed on all double gates and all gate leafs greater than 5' (1524 mm) in width as directed by the Owner, if required.

3.5. CLEAN UP:

A. During the contract and at intervals as directed by the Architect and as chain link fence, backstop and gate installation is completed, clear the site of all extraneous concrete, gravel, fence material or debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 31 01

SECTION 323102 - POLE TO POLE TENSION NETTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of pole to pole tension safety netting backstop is shown on the drawings and includes, but is not limited to, the following:

1. Poles
2. Wire rope support structure
3. Netting

B. Provide all materials, labor, equipment, and services required to accomplish all related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 312201 - Site Earthwork

B. Section 321301 - Site Concrete Work

C. Section 323102 - Vinyl Clad Chain Link Fence, Backstops, and Gates

1.3 REFERENCES

A. Comply with applicable requirements for the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. National Federation of State High School Associations (NFHS)
2. International Association of Athletics Federations (IAAF)
3. American Sports Builders Association (ASBA)
4. Manufacturers Data and Recommended Installation Requirements

1.4 SUBMITTALS

A. Provide Qualification Experience requirements as specified in "Quality Assurance" of this section. Provide a list of completed projects including Owner contact information.

B. Manufacturer's Product Data (MPD): Manufacturer’s catalog cuts indicating material compliance and specified options.

C. Shop Drawings: Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Architect or Owner representatives review. Provide footing sizes and hardware list. Footings and steel detailing shown on the drawings shall not be reduced in size.

D. Samples: 6" x 6" section of netting

E. Netting Footing and Steel Shop Drawings stamped and signed by the Contractor's Professional Engineer licensed in New York State.

1.5 JOB CONDITIONS

A. All job conditions in Section 312201 apply.

B. Construction Review: Notify the Architect when fence and gates are staked out.

1.6 QUALITY ASSURANCE

A. Manufacturers warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements. The Manufacturer shall have a current American Sports Builders Association (ASBA) Supplier Certificate of Distinction designation.

B. Manufacturer: Company having manufacturing facilities in the United States with five (5) years experience specializing in manufacturing of tension netting products.

C. Pole to Pole Tension Netting Contractor: Contractor having five (5) years experience installing similar projects in accordance with ASTM F567.

D. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

E. Single source: To ensure system integrity obtain the netting system, framework, fittings, and accessories from a single source.

F. NYS Engineer qualifications: The pole-to-pole tension netting design, construction, and installation, shall be approved by the Contractor's registered NYS licensed professional engineer.

1.7 PRODUCT DELIVERY AND STORAGE

A. Materials delivered to the site shall be examined for damage and defect in shipping. Any defects shall be noted and reported to the Owners representative. Replacement, if necessary, shall be immediately reordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

1.8 WARRANTY

A. Provide manufacturer's standard limited warranty that its safety netting is free from defects in material and workmanship including cracking, peeling, blistering and corroding for a period of one (1) year from the date of installation.

PART 2 - PRODUCTS

2.1 POLE TO POLE TENSION NETTING SYSTEMS

A. Base: TNPPUC- Pole-to-Pole Tension Ball Netting System with Ultra Cross Netting as manufactured and/or supplied by:

Sportsfield Specialties, Inc.
P.O. Box 231
41155 State Highway 10
Delhi, NY 13753
p. 888-975-3343
f. 607-746-8481
www.sportsfieldspecialties.com

or Architect approved equal.

B. Components:

1. Pole-to-Pole Tension Ball Safety Netting System Upright Support Posts and Pole Structures - Fabricated, Sized and Configured as Required:

a. Post and Netting Height above finish grade required:
30' for multi-purpose turf field, as shown on the plans.
b. Powder coated finish (black to match fencing)
c. Permanent embedment mount with stamped foundation design as required
d. Hot dipped galvanized assembly hardware - quantities, sizes and configurations as required
e. 8" Schedule 40 steel posts, single piece design for 30’ netting
f. 120’ lf +/- of 30’ high netting required.

2. Pole-to-Pole Tension Ball Safety Netting System Wire Rope Support Structure:

a. Length, height and configuration as required.
b. 7 x 19 GAC Galvanized Aircraft Cable - 5/16" diameter main horizontal support, 9,800 lb. minimum breaking strength, 3,267 lb. minimum working load limit.
c. 7 x 19 GAC Galvanized Aircraft Cable - 1/4" diameter vertical and bottom horizontal support, 7,000 lb. minimum breaking strength, 2,333 lb. minimum working load limit.

d. Hot dipped galvanized attachment and assembly hardware - quantities, sizes and configurations as required.

3. Pole-to-Pole Tension Ball Safety Netting System Net and Rope Bound Border:

a. Length, height and configuration as required
b. Ultra cross knotless netting
c. Dyneema Ultra-High Molecular Weight Polyethylene (UHMWPE) SK-75 Back Fiber Construction
d. 4 Ply, 1.2 mm (0.0472") diameter twine
e. 95% open mesh area (see-through visibility)
f. 58,445 psi minimum breaking strength
g. 30% maximum elongation at break
h. 1-3/4" (44 mm) square mesh size, 0.009 lbs. per square foot
i. 4-strand, braided, continuous monofilament Dyneema Fiber
j. Black multi-filament polypropylene solid braid derby rope sewn binding on perimeter edges - ¼" diameter, 530 lb. minimum breaking strength
k. Urethane black bonded finish
l. Strong resistance to ultraviolet (UV) light degradation
m. Excellent resistance to chemicals and water absorption
n. Shall have storm guard release capability.

4. Included Accessories:
a. Hot dipped galvanized attachment and assembly hardware - quantities, sizes and configurations as required
b. Black multi-filament polypropylene solid braid rope for net binding attachment to wire rope support structure - ¼" diameter, 530 lb. minimum breaking strength - quantities and configurations as required.
c. Stamped and sealed drawings and calculations by a licensed Professional Engineer of Record in the State of New York

C. Color System: All posts, rails, fittings, fabric, hardware, and tension bars shall be black in compliance with ASTM F934.

D. Standard of quality: shall be Color Bond II, Class 2b as manufactured by Merchant Metals, (888) 260-1600 or Architect approved equal.

2.2 CONCRETE FOOTINGS

A. Shall be 4,500 psi as specified in Section 321301, 2.1.

PART 3 - EXECUTION

3.1 SITE EXAMINATION AND PREPARATION

A. Ensure property lines and legal boundaries of work are clearly established (by the Site Contractor)

B. Survey and field verification of backstop and dugout location to be provided by Site Contractor.

C. Clearing: The Site Contractor shall clear, grub and remove vegetation/debris for the backstop installation area.

D. Verify areas to receive backstop are completed to final grade with finished elevations shown on the drawings.

3.2 NETTING FRAMEWORK INSTALLATION

A. Locate posts.

B. Excavation: Drill holes of diameters and spacings shown, for post footings in firm, undisturbed or compacted soil.

1. Excavate hole depths as detailed when in firm, undisturbed soil. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads.

2. Remove soil excavated from site.

C. Setting Posts: Remove all loose and foreign materials from sides and bottoms of holes.

1. Center and align posts in holes. Install posts plumb, in neat, straight lines, and with minimal waviness of top railing.

2. Install reinforcing bars as indicated.

3. Place concrete around posts in a continuous pour, and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

4. Top of footing shall meet elevation as indicated on drawings so that grade beam can be placed over as shown.

5. Keep exposed concrete surfaces moist for at least 7 days after placement, or cure with curing material, or other acceptable method.

D. Concrete Strength: Allow concrete to attain at least 75% of its minimum 28-day compressive strength, but in no case sooner than 7 days after placement, before rails, tension bands or fabric is installed. Do not stretch and tension fabric and wires, and do not hang gates until the concrete has attained its full design strength.

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. All Pole-to-Pole Tension Ball Safety Netting Systems with Ultra Crossing and Accessories shall be installed as recommended per manufacturer's written instructions and as indicted on the drawings.

3.3 CLEAN UP

A. During the contract and at intervals as directed by the Architect and as netting, backstop and post installation is completed, clear the site of all extraneous concrete, gravel, fence material or debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 32 31 02

SECTION 329201 - SEEDED AND SODDED LAWNS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of the lawn work is shown on the drawings. The lawn work limits equal the Contract Limit Line except as noted on the drawings. Non-paved, non-roofed areas within the Contract Limit Line shall receive four (4") or six (6") inches settled depth of topsoil and lawn seed or sod. Existing lawn areas that are not disturbed require no additional work. Lawn types as shown on the drawings are defined as follows:

1. Lawn Type 1: Strip and stockpile topsoil, remove debris, furnish and place 4" settled depth topsoil, seed, and mulch.

2. Lawn Type 2 (OFA): Strip and stockpile topsoil, mechanically screen, furnish and place 6” topsoil settled depth, blend with compost, and sod.

   Lawn Type 2 (AES): Strip and stockpile topsoil, mechanically screen, furnish and place 4” topsoil settled depth and sod.

B. Lawn work includes, but is not limited to, the following:

1. Placing and spreading stockpiled topsoil
2. Importing, placing, and spreading topsoil
3. Providing mechanically screened topsoil for athletic fields
4. Sod bed preparation and placing
5. Seed bed preparation
6. Temporary striping of athletic fields for planarity verification
7. Seeding and sodding lawns
8. Mulching and fertilizing
9. Maintenance: See watering, mowing, fertilizing, core aerating, weed control, grow in and other specific requirements.
10. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation (Topsoil Stripping)

B. Section 31 22 01 - Site Earthwork

1.3 REFERENCES

A. ASTM D4972 - Standard Test Method for pH of Soils

B. ASTM D5268 - Standard Specification for Topsoil Used for Landscaping Purposes

C. ASTM D422 and D1140 - Standard Test Method for Particle Size Analysis of Soils

D. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effect

E. ASTM F1647 - Standard Test Method for Organic Material Content of Athletic Field Rootzone Mixes.

F. ASTM F1632 - Standard Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sportsfield Rootzone Mixes

G. ASTM F2060 - Standard Guide for Maintaining Cool Season Turfgrasses on Athletic Fields

H. National Turfgrass Federation, Inc.

I. National Turfgrass Evaluation Program (NTEP).

J. Cornell Universities: Sportsfield Management Guidelines

K. Turfgrass Producers International: Guideline Specifications to Turfgrass Sodding, latest edition.

1.4 SUBMITTALS:

A. Furnish name of Landscape Contractor or Nurseryman to perform lawn work and a list of completed projects including contact information for each project demonstrating compliance with applicable qualification requirements outlined in 1.5 "Quality Assurance" of this specification section.

B. Provide Material Certificates and MPD for:

1. Sod species and source, location for sod producer
2. Seed species and source
3. Limestone
4. Fertilizers
5. Hydromulch
6. Straw (dry mulch) - location of straw producer

C. Provide Topsoil Test Report (for Onsite and Imported Topsoil): Submit test results from Architect approved independent testing laboratory on their letterhead. Report shall:

1. Certify soil texture, organic content, and particle size analysis.
2. Chemical analysis testing nitrogen, phosphorus, potassium, calcium, magnesium, cation exchange capacity, base saturation percentages, micronutrients and acidity (pH).

3. Provide timing and rates of soil additives, liming and fertilizers. (Materials and procedures regarding soil amendments and fertilizers specified in this section are approximate.) Adjust all soil amendments to comply with test results based on actual soil tests and as directed by the Architect at no additional cost to the Owner.

D. Provide letter on Contractor's letterhead certifying that only topsoil from the above tested source was used on the project.

E. Lawn Seed Mix: Submit one (1 lb.) pound seed sample for each mix specified in supplier's unopened package with supplier's certification statement clearly showing the following:

1. Name and address of labeler
2. Lot number
3. Kind and variety of turfgrass seed listed in order of predominance
4. Percent by weight of pure seed of each species and variety (percent purity)
5. Germination percentage (percent viable seed)
6. Percent by weight of other crop seed
7. Percent by weight of weed seed
8. Percent undesirable grass seed
9. Percent by weight of inert matter
10. Date on which the germination test was conducted

F. Submit seed tags from **ALL** used or partially used seed bags. At times throughout the project, the Architect may request seed samples of onsite seed bags.

G. Provide schedule for review and approval as outlined under "Sequence and Scheduling" of this specification section.

1.5 QUALITY ASSURANCE

A. General and Athletic Field Lawn Contractor: Work shall be contracted to a single, established Landscape Contracting or Nursery firm having sufficiently experienced crews, supervisor(s), specialized equipment, and an excellent record of performance on completed lawn and athletic field projects of comparable size, scope, and quality. Provide expert turfman to direct the work in the field on a regular, daily basis. The expert turfman shall be employed by the same company engaged in the installation of the lawn and athletic field work for a minimum of five (5) years.

B. Sod Standards: Comply with the Turfgrass Producers International: Guideline Specifications to Turfgrass Sodding, latest edition.

C. Nomenclature: Seed names shall conform to the National Turfgrass Federation, Inc.

D. Seed Quality Rating: Shall meet testing standard for New York State outlined by the National Turfgrass Evaluation Program (NTEP).

E. Testing: If required by the Architect for poor lawn grow in, engage an Architect approved independent, qualified New York State testing service and turfgrass specialist to evaluate Contractor grow in practices and materials used. Pay for all testing/inspection services, materials, and manpower to correct lawn areas as approved by the Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Sod:

1. Cut, deliver, and install sod within a 24-hour period. Sod cutting and shipping shall be coordinated with the sod installers.

2. Do not harvest or transport sod when moisture content may adversely affect sod survival.

3. Protect sod from sun, wind, and dehydration prior to installation.

4. Do not tear, stretch or drop sod during handling and installation.

5. Store sod materials at site in an orderly manner at location(s) acceptable to the Architect.

B. Seed:

1. Packing and Shipping: Ship seed and associated materials with certificates of inspections required by governing authorities.

2. Do not make substitutions. If specified seed material is not obtainable, submit to the Architect proof of non-availability and a proposal for use of equivalent material with similar performance criteria as the originally specified seed material.

3. Store all seed at the site in a cool, dry place in a manner to prevent wetting and deterioration, as approved by the Architect. Replace any seed damaged during storage as directed by the Architect.

4. Deliver seed in supplier's unopened packages bearing labels showing the supplier's name and seed analysis by weight.

C. Fertilizer:

1. Deliver fertilizer in the manufacturer's standard sized bags showing the weight, analysis, and manufacturer's name. Store all fertilizer under a waterproof cover or in a dry place as approved by the Architect.

1.7 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Lawn Work:

1. Perform lawn work after planting, fine grading and other work affecting the ground surfaces in the lawn work areas has been completed satisfactorily.

2. Where practical, the Owner will provide a connection to the water system such as, but not limited to, existing yard hydrants, building hose bibs, etc. If this source is insufficient, not available or practical to provide a source of sufficient water to meet the requirements herein, the Contractor shall secure a water source sufficient to meet the water requirements herein such as, but not limited to, municipal hydrants, water truck, etc. at no additional cost to the Owner.

3. Contractor shall provide all watering equipment and appurtenances such as, but not limited to, meters, backflow preventer, labor, hoses, sprinklers, irrigation and watering equipment.

4. Calendar dates for seeding and sodding under "Sequence and Scheduling" of this specification section shall apply.

5. Place sod only when ground surface is free of mud, frost, snow and ice.

6. For General Lawn Type 1, perform lawn seeding using mechanical and hand seeding methods. Hydromulching is not permitted within ten (10') feet of buildings edges.

7. Protect newly seeded/sodded lawns from vehicles, vandalism, or trespass. Provide temporary fencing or barriers as required.

C. Construction Review:

1. Upon completion of topsoil spreading and sod and/or seed bed preparation, notify Architect to review work.

2. The Architect may review fine graded areas by the Contractor to check for surface smoothness and general compliance with grading requirements. Fill or cut by hand raking or other acceptable means to achieve smooth, even well-draining lawn surfaces free of "bird baths" and breaks in grade as directed by the Architect at no additional expense to the Owner.

3. On athletic fields the Architect shall review planarity of the field by string grading and/or by visual inspection of the temporary line markings installed by the Contractor prior to seeding/sodding as indicated in Part 3 - Execution.

4. Review of any fine graded lawn and athletic field areas by Architect shall not alleviate the Contractor of his responsibility for conforming to the required grades as shown on the drawings, nor be misconstrued as final acceptance of lawn work.

1.8 SEQUENCING AND SCHEDULING

A. Schedule: Prior to construction, provide a schedule which addresses the following lawn thresholds involving erosion control stabilization and competitive use of playfields:

1. Seeding and Sodding Installation: The Contractor may invoice for 50% of the approved schedule of value breakdown at the time of acceptable installation.

a. Unless otherwise directed in writing by the Architect, seed and sod lawns from April 1 to May 15, and from August 15 to October 1. Seeding and sodding between May 16 and August 14 is not acceptable unless adequate water supply is available and applied to the turfgrass as required herein and approved by the Architect.
b. Proceed with and complete seeding and sodding as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.

2. Substantial Completion: The Contractor may invoice for 25% of the approved schedule of value breakdown at the time of substantial completion as described in Part 3, "Standards For Substantial Completion Of Lawns" of this specification section. At this time, the Architect may issue the Notice of Termination to satisfy the NYS DEC stabilization requirements. The date of substantial completion is anticipated approximately 60 days after lawn installation presuming all Contractor maintenance operations have been vigorously performed.

3. Final Acceptance: The Contractor may invoice for the final 25% of the approved schedule of value breakdown at the time of final acceptance as described in Part 3, "Standards For Final Acceptance Of Lawns" of this specification section. The date of final acceptance is anticipated approximately 30 days after substantial completion presuming all Contractor maintenance operations have been vigorously performed.

4. Owner Maintenance: After final acceptance of the lawns, the Owner will maintain for 1 to 3 growing seasons to reach competitive maturity and beyond per ASTM F2060.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Source: Provide from off site, Architect approved source, when stripped, stockpiled and amended quantity is inadequate to provide four (4") or six (6") inches settled depth of topsoil for all lawn areas at no additional cost to the Owner.

B. Texture and Content: Provide topsoil conforming to the following:

1. Soil texture and content:

   a. Sandy loam topsoil, well drained homogeneous texture and of uniform grade, without the admixture of subsoil material. Topsoil shall be entirely free of dense material, hardpan, clay, stones over 3/4" in diameter, sod, or any other objectionable foreign material, including but not limited to, glass, debris, toxins, hazardous wastes and chemicals (such as atrizene or muriatic acid within the past seven (7) years) that may be injurious to humans, animals and plant materials.
   b. Organic Matter: Containing not less than 5% or more than 10% organic matter in that portion of a sample passing a 1/4" sieve when determined by the wet combustion method on a sample dried at 105 degrees F.

2. pH Value: Containing a pH value within the range of 6.0 to 7.0 on that portion of the sample which passes a 1/4" sieve.

3. Soluble salt content: Not higher than 500 parts per million.

4. Sieve Analysis for general lawn work: Shall be screened or rock picked to meet the following gradation:

Sieve Designation	% Passing
3/4"	100
1/4"	97-100
No. 200	20-65 (of the 1/4" sieve)

5. Sieve Analysis for Athletic Field lawn work: Shall be mechanically screened by an onsite screening facility provided by the Contractor prior to placing and spreading. Athletic field topsoil shall meet the above sieve requirements.

C. No lawn shall be seeded or sodded on topsoil that has been chemically treated until sufficient time has elapsed to permit dissipation of all toxic materials. The Contractor shall assume full responsibility for any loss or damage to turfgrass sod or the inability to grow a sufficient stand of grass from seed, as indicated herein, arising from improper use of chemicals or due to failure to allow sufficient time to permit dissipation of toxic residues, whether or not such materials are specified herein.

2.2 LAWN SEED MIX

A. Provide fresh, clean, new-crop seed mixed in the proportions specified for species and variety, and conforming to Federal, State, latest American Association of Nurseryman (AAN) Standards and National Turf Evaluation Program (NTEP).

B. Acceptable material in a seed mixture other than pure live seed consists of nonviable seed, chaff, hulls, live seed of crop plants and inert matter. The percentage of weed seed shall not exceed 0.05% by weight.

C. All seed must by fresh seed. Seed that is left over from the previous year and beyond sell by date is not acceptable.

D. Grass seed shall be certified "Blue Tag" seed composed of a blend of varieties mixed in proportion by weight and tested for minimum percentages of purity and germination. Submit the proposed mixture to the Architect for approval.

E. Provide the following lawn seed mix:

1. General Lawn Type 1:

Amount by Weight	Species or Variety	Purity	Percentage Germination
40% (Min.)	Kentucky Bluegrass Blend*	95%	85%
35% (Max.)	Fine Textured Endophytic Perennial Rye**	98%	90%
25% (Min.)	Creeping Red Fescue***	97%	85%
100%			

* Kentucky Bluegrass Blend shall contain no more than 25% of any one cultivar and always at least two (2) different cultivars. Acceptable cultivars: Rambo, Princeton-105, Wildwood, Allure, Coventry, Champagne, Northstar, Cardiff, Nimbus, Raven, SR2100, Misty, America, Brilliant, Limousine, Conni, Liberator, Apollo, NuGlade, Total, Eclipse, Unique, Impact, Midnight, Arcadia, and Serene or Architect approved equal.

** Perennial Rye Blend shall contain no more 30% of any one (1) cultivar and always at least three (3) different cultivars. Acceptable cultivars: Palmer III, Calypso II, Brightstar II, Secretariat, Monterey, Catalina, Pennant II, Premier II, Sonata, Sunshine and Ascend or Architect approved equal.

*** SR5000 is acceptable.

2. Overseeding: Seed blend shall consist of 100% Perennial Ryegrass with at least three (3) cultivars. Acceptable Perennial Ryegrass cultivars include the following: Palmer III, Calypso II, Brighstar II, Secretariat, Monterey, Catalina, Pennant II, Premier II, Sonata, Sunshine, and Ascend. The Perennial Ryegrass shall have a minimum germination percentage of 90%. The percentage of weed seed shall not exceed 0.05% and other crop seed shall not exceed 0.5% by weight of the mixture.

F. Acceptable Seed Suppliers:

United Agri Products
Steve Hyde (315) 383-5035;

Matrix Turf Solutions
Jerry Clark (315) 480-7340;

Lesco, Inc.
Will Abel (315) 437-3423;

Preferred Seed
Jack Bryant (716) 895-7333;

Or Architect approved equal.

2.3 SOD

A. Sod shall conform to NYSDOT Item 713-14 and be approved nursery grown mineral soil sod with 60% Kentucky Bluegrass and 40% Fine Fescue blend with a minimum (4) varieties. Muck grown sod is NOT acceptable. Installation of plastic netting is NOT acceptable.

B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch and extraneous material viable and capable of growth and development when planted. Sod is considered free of weeds when less than five (5) weeds are found per one hundred (100 s.f.) square feet.

C. Thickness of Cut: Furnish sod machine cut at a uniform soil thickness of 0.60 inch at the time of cutting and of supplier's standard width, length, and thickness: uniformly 1" to 1-1/2" thick with clean cut edges. Measurement of thickness shall exclude top growth and thatch. Mow sod before stripping.

D. Mowing Height: Before stripping, sod shall be mowed uniformly at a height of 1 to 1-1/2 inches.

E. Thatch: Sod shall be relatively free of thatch, up to 1/2 inch allowable (un-compressed).

F. Pad Size:

1. For Athletic Fields and Other Such Large Areas: Sod shall be thick-cut "big" rolls of 250 s.f. Maximum allowable deviation from standard width and lengths shall be plus or minus 1/8" on width and plus or minus 1/2% on length. Broken and torn or uneven rolls will not be acceptable.

G. Strength of Sod Sections: Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10% of the section.

H. Standard of Quality: Shall be Premium Sod supplied by Batavia Turf (585) 548-2552, Sky High Turf Farms (315) 687-6510, Saratoga Sod Farm (518) 664-5038, Lakeside Sod (716) 741-2877 or Architect approved equal.

2.4 LIMESTONE

A. Shall be ground limestone in the producer's standard bags containing not less than 85% total carbonates and conforming to the following gradations:

Sieve Designation	% Passing
No. 100	50-100
No. 20	100

B. The lime shall be uniform in composition, dry and free flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any lime which becomes caked or otherwise damaged making it unsuitable for use will be rejected.

2.5 TACKIFIER FOR SEEDED LAWNS

A. Shall be liquid concentrate diluted with drinkable water forming a transparent three-dimensional film-like crust permeable to water and air, containing no agents toxic to seed germination to hold straw mulch in place.

B. Standard of quality shall be Terra Tack or Architect approved equal.

2.6 FERTILIZER

A. For Starter Fertilization: Immediately prior to seeding, fertilize with a commercial starter fertilizer, granular, non-burning product, with not less than 90% organic slow acting, micro nutrients and 1% iron, guaranteed analysis commercial fertilizer. Fertilizer ratio shall be: (1-2-1). Apply at a rate of 0.33 - 0.66 lbs of nitrogen (N) per 1,000 sf.

B. For Subsequent and Final Fertilizations: Apply commercial fertilizer, poly coated granular non-burning product with not less than 90% organic slow acting, guaranteed analysis

1. For Spring and Fall Lawn Work: Fertilizer ratio shall be: (3-0-1). Apply at rate of 1.5 - 2 lbs nitrogen (N)/1,000 s.f.

2.7 MULCH FOR SEEDED LAWNS

A. Dry Application Straw: Shall be straw consisting of clean stalks of oats, wheat, rye or other approved crops well seasoned before baling which are free of noxious weed seeds and roots. Weight shall be based on 15% moisture.

B. Hydro Applications: Shall be hydromulch containing 100% wood fiber mulch. Standard of quality shall be Mat Fiber as manufactured by Mat, Inc. and distributed by Matrix Turf Solutions, (315) 468-6000 or Architect approved equal.

2.8 WATER: Free of substance harmful to lawn, other plants, humans and animals.

2.9 COMPOST

A. Compost shall contain organic matter or material of a generally humus nature capable of sustaining vegetation growth, with no foreign matter (ie. glass, plastic, etc.) or other material toxic to plant growth. It shall be free from stones, lumps, or similar objects larger than one-half inch in greatest diameter, roots, and brush. Composts derived from organic wastes such as food and agricultural residues and animals manures, and sewage sludge that meet the above requirements, and are approved by the National Environmental Protection Agency and NYS Department of Environmental Conservation are acceptable compost sources.

B. Compost shall have the following properties:

Parameters	Range
pH	6.0 to 7.5
Moisture Content	35 to 55%
Particle Size	< 1/2"
C:N Ratio	15:1 to 30:1
Soluble Silts	< 4.0 minutes (ds)
Organic Matter Content	> 20%
Bulk Density	< 1200 lbs/cy
Foreign Matter	< 1% (dry weight)

C.

Field Specific Requirements	Min. Compost Needed
Baseball Field	200 Cy
Softball Field	125 cy

D. Standard of quality shall be WeCare Organics, P.O. Box 785, Hillburn, NY 10931, (845) 753-2242, www.wecareorganics.com, or Architect approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify limits of lawn and other types of ground cover materials in the field with drawings. Also any imported and screened topsoil areas. Notify Architect of discrepancies prior to proceeding with lawn work.

B. Examine finish surfaces, grade, topsoil quality, and depth.

C. Do not start lawn work until unsatisfactory conditions are corrected to the satisfaction of the Architect.

3.2 SPREAD TOPSOIL

A. Limit preparation to areas which will be immediately seeded or sodded.

B. Perform topsoil spreading operations only during dry weather.

C. To insure a proper bond with the topsoil, disc, harrow, or otherwise scarify and loosen the lawn subgrade to a depth of four (4") inches before spreading topsoil.

D. Spread topsoil to ensure a minimum settled depth of four (4") or six (6") inches in lawn areas.

3.3 PREPARE GENERAL LAWN AREAS TYPE 1

A. Perform a pH test, sieve, and nutrient analysis of the topsoil and advise the results to the Architect prior to adding limestone or other soil amendments. Soil amendments shall be uniformly incorporated into the top four (4") inches of topsoil by discing, harrowing or other approved methods.

B. Remove debris and stones 3/4" or larger by handpicking, fine tooth aluminum grading rakes, and mechanized stone picker. When topsoil has hardened, cultivate soil to a four (4") inch depth by plowing, discing, harrowing, or otherwise scarifying and loosening the topsoil.

C. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Scarify, rake, level, and roll with a light static roller as necessary to obtain true, even lawn surfaces and fill depressions as required to drain. Correct irregularities in the surface resulting from tillage operations to prevent formation of depressions or water pockets.

D. Cultivate soil to provide a firm bed of minimum of four (4") inches deep, free of clods, stones, or foreign matter over 3/4" in diameter from the top of soil. Do not move heavy objects except necessary lawn making equipment over the lawn areas after the soil is prepared unless it is again loosened and graded. Remove stones and all debris greater than one 3/4" in diameter during cultivation. Level undulations and irregularities in the surface.

E. For pH correction provide adjusted rate of application as recommended in Topsoil Test Report submittal. For low pH correction: Add ground limestone at the rate indicated by the soil test. For high pH correction: Materials and application rates shall be determined by appropriate soil tests.

F. Place starter fertilizer at the rate of 0.33 - 0.66 lbs. of nitrogen (N) per 1,000 sf. and mix into full depth of topsoil.

G. Rake area with fine toothed aluminum grading rake before placing seed to obtain a smooth surface at the proper elevation. Drag area with a wood float to level out minor humps and hollows. Beds shall have a smooth friable uniform surface, free of areas ponding water.

3.4 MODIFY, SCREEN AND SPREAD TOPSOIL IN ATHLETIC FIELD LAWN TYPE 2

A. Mechanically screen modified topsoil to remove objects greater than 3/4" prior to spreading.

B. Premix by volume the compost required under Part 2 - Products, of this specification section, to six (6") inches stockpiled or imported topsoil (total 6" settled depth). Perform a pH test of the premixed material and advise the results to the Architect prior to placing limestone or other soil amendments as recommended by the soil test(s).

C. Perform modified topsoil spreading only during dry weather. Spread to ensure a minimum settled depth of six (6") inches.

D. Grade lawn areas to smooth, free draining even surface with a loose, moderately coarse texture. Scarify, rake, level, and roll with a light static roller as necessary to obtain true, even lawn surfaces and fill depressions as required to drain. Correct irregularities in the surface resulting from tillage operations to prevent formation of depressions or water pockets.

E. For pH correction provide adjusted rate of application as recommended in Topsoil Test Report submittal. For low pH correction: Add ground limestone at the rate indicated by the soil test. For high pH correction: Materials and application rates shall be determined by appropriate soil tests.

F. Place starter fertilizer at the rate of 0.33 - 0.66 lbs. of nitrogen (N) per 1,000 sf. and mix into full depth of topsoil.

G. Rake area with fine toothed aluminum grading rake before placing seed or sod on athletic fields to obtain a smooth surface at the proper elevation. Drag area with a wood float to level out minor humps and hollows. Beds shall have a smooth friable uniform surface, free of areas ponding water.

H. Prior to seeding or sodding, place temporary striping lines on the athletic fields with a marking mixture which is not toxic to seed germination. Place straight lines across fields 15' on center. These lines will be reviewed to determine visual planarity of the topsoil surface. Correct high and low spots as directed by the Architect. Drag and spread lines prior to seeding or sodding.

3.5 LAWN SEEDING

A. Notify Architect when seed bed is ready for review as specified in Job Conditions. Obtain Architect's approval of finish grade prior to seeding.

B. Seed lawns immediately after preparation of bed and Architect's approval.

C. For General Lawn Type 1:

1. Seed at the rate of 6 lbs. per 1,000 S.F.

2. Seeding shall be performed as follows: ½ rate and mechanically incorporated into the top ½" of topsoil. The remaining ½ rate shall be mechanically spread at 90 degrees to the first application and lightly rolled.

3.6 MULCHING SEEDED AREAS

A. Mulch immediately after seeding.

B. Dry Mulch Application: Place mulch by hand or by machine at a rate of one bale/1,000 s.f. to produce a light even mulch cover so that 50% of soil is visible through the mulch layer.

C. Hydro Application: Place hydromulch by machine at a rate of one bale/1,000 sq. ft. to produce a light even mulch cover so that 50% of soil is visible through the mulch layer. NOTE: Seeding with a hydroseeder is NOT acceptable.

D. Anchor mulch by thorough heavy coat of tackifier over entire area and watering.

E. Protect seed bed from washout, wind erosion, rutting and drying out. Do not use machinery that leaves ruts in the seed bed. It is the Contractor's responsibility to add or remove mulch as needed to encourage optimum seed germination and growth.

3.8 SODDING

A. Notify Architect that sod bed is ready for review as specified in Job Conditions. Obtain Architect's approval prior to sodding.

B. Moistening the Soil: During periods of higher than optimal temperature for species being specified and after unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to laying the sod.

C. Sod immediately after preparation of bed and Architect's approval.

D. Lay sod to form a solid mass with tightly-fitted joints in strips parallel to contours. Butt ends and sides of sod strips. Do not overlap edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with finish grade of adjacent curbs, pavements, drainage structures and seeded areas.

E. Do not lay dormant sod or install sod on soil surfaces that are hot, dry, saturated or frozen.

F. When sodding slopes, install initial row of sod in a straight line, beginning at bottom of slope. Place subsequent rows parallel to and lightly against previously installed row.

G. Sod strips laid in drainageways must meet the finished grades shown on the drawings.

H. Sod abutting existing lawn or seeded lawns shall meet flush with top of sod pad (soil and thatch). Remove excess topsoil as necessary to meet flush.

I. Stake sod in lawn swales and on lawn slopes 3H to 1V (horizontal to vertical) and steeper to prevent slippage. Use two (2) biodegradable stakes per square yard of sod. Stakes are to have their flat sides against the slope and be driven flush with sod surface.

J. Roll with light static lawn roller to ensure contact with subgrade.

K. As sodding is completed in anyone section, water sod thoroughly to a depth sufficient to ensure the underside of the new sod pad and topsoil immediately below the pad is thoroughly wet. Contractor is responsible to ensure there is an adequate water supply available prior to installation. Do not allow sod to dry out.

3.10 MAINTENANCE

A. Maintenance by Contractor begins as soon as lawns are sodded or seeded. Protect lawns from drought, washout and wind erosion. In general, maintain new installed lawn areas, including watering, fertilizing, core aerating, spot weeding, overseeding, mowing, applications of herbicides, fungicides, insecticides, and re-sodding until a full, uniform, healthy, vigorous stand of grass free of weed, undesirable grass species, disease, and insects is achieved and accepted by the Architect. Specifically:

1. Watering Seeded Lawns:

a. First Week: In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week to maintain moist soil to promptly germinate the lawn seed, preventing it from drying out, and keeping it in a healthy, growing condition until final acceptance. Lawn areas shall receive a minimum of one (1") of water per week, by natural rainfall, irrigation or a combination of both. Water daily until 2nd mowing (just enough water to keep the top ½" of soil moist, 1 time daily).

2. Watering Sodded Lawns:

a. First Week: Soil on sod pads shall be kept moist. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of at least four (4") inches.

3. Second and Subsequent Weeks: Contractor shall provide water to the lawns as required to maintain adequate moisture, in the upper four (4") inches of soil,

necessary for the promotion of deep root growth until final acceptance. After 2nd mowing, water two (2) times weekly until thoroughly established.

4. Protect: Protect lawn areas against trespass, vandalism and routine pedestrian traffic and Owner maintenance traffic by temporary fencing or other means.

5. Repair: Repair, rework, resod and overseed (as originally specified for that area) areas that have washed out, eroded, do not germinate and are vandalized or otherwise damaged. Overseeding rates are to be adjusted to 6 lbs. of seed per 1,000 s.f.

6. Mow: Initial mowing shall begin when the blade height reaches 2" and the soil will bear the weight of the lawn mower. Use mowers with low impact tires. For the first 3 mowings cut the grass blades to 1.5 inches. After that mow the grass when it reaches a height of about 3.5" to a height of about 2.5". Never remove more than 1/3 of the grass blade at any one mowing. A minimum of FIVE (5) to SEVEN (7) mowings are required (approximately once per week after the initial germination period to final acceptance). Notify the Architect of dates in writing as mowing is performed. Excess clippings shall be carefully raked so as not to remove healthy grasses, and removed.

7. Core Aerating: Between mowings three (3) and four (4), core aerate lawns about three (3") inches on center minimum three (3") inches deep to ensure aggressive root growth. This will require multiple passes at different directions to achieve 16 to 20 holes 3/4" to 1" diameter per square foot. Sweep scattered plugs off paved areas onto adjacent lawn areas. Pulverize plugs during subsequent mowing operations. Moisten field by thoroughly watering the topsoil profile, several days in advance of coring to facilitate proper penetration of the topsoil.

8. Fertilizer: Immediately after core aerating, between mowings three (3) and four(4), apply subsequent fertilizer at the rate of 1.5-2 lbs./1,000 s.f. Apply a final fertilizer just prior to final acceptance at the same application rate.

9. Weed Control: When infestation of weeds or crabgrass develops, treat infestation by hand weeding or herbicides control appropriate to the area. Furnish and install weed chemical control as recommended by manufacturer. Herbicides controls must be acceptable to the Owner. Obtain and pay for permits. Use as directed by the manufacturer and applicable laws, codes, ordinances and regulatory requirements. Under NO circumstances is it acceptable to seed or overseed over Nutsedge, Crabgrass or other grassy/broadleaf weeds.

B. Maintenance by the Contractor continues through the certificate of substantial completion to final acceptance by the Architect as described below. Maintenance by Owner begins after final acceptance of the lawn.

3.11 STANDARDS FOR SUBSTANTIAL COMPLETION OF LAWNS: Review to determine substantial completion of lawns will be made by the Architect, upon request. Provide notification at least five (5) working days before requested review date.

A. Lawn areas will be substantially complete provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, partially mature stand of lawn is established free of weeds, undesirable grass species, disease, and insects. With proper watering and maintenance as indicated herein, this should culminate after an approximate 60-72 day period for initial germination with average temperatures above 40°F. Grass roots shall have matured to a minimum of 1½" depth as determined by the Architect when core samples are taken.

B. Lawn areas shall not have more than 10% dead/bare spots.

C. Contractor shall provide a written copy of all maintenance activities performed up to this date.

D. The architect will prepare a written punch list of items which need correction prior to final acceptance.

3.12 STANDARDS FOR FINAL ACCEPTANCE OF LAWNS: Review to determine final acceptance of lawns will be made by the Architect, upon request. Provide notification at least five (5) working days before requested review date.

A. Lawn areas will be acceptable provided requirements, including maintenance, have been complied with. A healthy, vigorous, uniform, full stand of lawn is established free of weeds, undesirable grass species, disease, and insects. Grass roots shall have matured to a minimum of 2" depth as determined by the Architect when core samples are taken.

B. Any lawn which contains disease, more than 1% dead/bare spots, or any dead/bare area greater than one (1) square foot shall be rejected and the unacceptable area(s) repaired as originally specified at no additional cost to the Owner.

C. In the event the Contractor fails to complete the punch list items within a 30 day period with average temperatures of 40°F after the time of Substantial Completion, the Contractor shall be liable to the Owner for any additional costs including those charged by the Architect.

D. Contractor shall provide a written copy of all maintenance activities performed during the contract up to final acceptance of lawns.

3.13 CLEAN UP

During the contract and at intervals as directed by the Architect and as lawn work is completed, clear the site of extraneous materials, rubbish, and debris. Leave the site in a clean, safe, neat, well-draining condition.

END OF SECTION 32 92 01

SECTION 33 11 01 – WATER DISTRIBUTION

1.0 PART 1 GENERAL

1.1. DESCRIPTION OF WORK:

A. The extent of the water distribution system is shown on the drawings.

B. The water distribution work includes, but is not limited to, the following:

1. Trenching and Backfilling
2. Piping and jointing
3. Connections to existing water system
4. Valves & Valve Boxes
5. Concrete Thrust Blocks
6. Tapping Sleeve and Corporation Stop
7. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2. RELATED WORK SPECIFIED ELSEWHERE:

A. Section 31 22 01 - Site Earthwork

B. Section 32 12 01 - Site Concrete Work

C. Section 33 11 02 - Disinfection of Water System

D. Section 33 40 01 - Storm Drainage

1.3. REFERENCES (AWWA, latest edition):

A. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water; American Water Works Association (ANSI/AWWA C104/A21.4).

B. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association (ANSI/AWWA C111/A21.11).

C. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association (ANSI/AWWA C151/A21.51).

D. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; American Water Works Association (ANSI/AWWA C509/C509a).

E. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances; American Water Works Association (ANSI/AWWA C600).

F. UL 246 - Hydrants for Fire-Protection Service; Underwriters Laboratories Inc..

1.4. SUBMITTALS:

A. Provide Manufacturer's Product Data (MPD) for:

1. Water pipe and joints
2. Valves and Valve Boxes
3. Tapping Sleeve and Corporation Stop

B. Provide Material Certificates and samples as noted:

1. Granular Backfill: Material Certificates and sample.
2. 4,500 psi concrete: Material Certificate showing design mixes.

C. Permits, Notification, Certification, and Test Reports: Provide per 1.5, C, D, E, and 3.5.

1.5. JOB CONDITIONS:

A. Job conditions in Section 33 40 01 apply.

B. Water distribution work shall conform to standards of applicable government authorities having jurisdiction.

C. Obtain and pay for permits and approvals required by local authorities. Copy permit to Architect.

D. Notify Municipality in writing two (2 wks.) weeks prior to start of work. Copy letter to Architect.

E. Construction Review: Notify Municipality and Architect when the work is being performed. Municipality must be onsite to inspect and approve the installation at all times or as directed by the Municipality and Architect.

1.6. QUALITY ASSURANCE:

A. Perform work in accordance with NYS Health Department and Municipality Standards.

B. Codes and Standards: ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", comply with applicable provisions except as otherwise indicated.

C. All connections shall be made by Contractor's licensed county plumber.

1.7. TESTING:

A. Notify Architect, Owner, and Municipal Engineer a minimum of forty-eight (48 hrs.) hours in advance.

B. Provide materials and labor to carry out testing in the presence of the Architect and Municipal Engineer. Test water system with an hydrostatic pressure test for two hours in conformance with AWWA Standard C600.

1. Do not exceed the following leakage rates per 1,000 feet of pipe, respectively, for the two hour test period at 150 psi:

Pipe Diameter	Allowable Leakage
¾"	0.124 gal.
1"	0.165 gal.
1 ½"	0.248 gal.
2"	0.331 gal.
2 ½"	0.414 gal.
4"	0.662 gal.
6"	0.993 gal.
8"	1.324 gal.
10"	1.655 gal.
12"	1.986 gal.

2. Valid test pressure shall not vary more than (+/-) 5 psi.
3. Any leakage beyond limits described shall be located and repaired. Retest system to insure adequate performance of pipe.

2.0 PART 2 PRODUCTS

2.1 PIPING, FITTINGS, AND BACKFILL:

A. Ductile iron pipe for four (4") inch internal diameter and larger shall be Class 52, conforming to ANSI/AWWA C151/A21.51. Push joints shall be single gasketed, flexible, rubber, rated for maximum working pressure of 200 psi conforming to ASTM D-1869. Pipe and fittings shall be coated inside and out with coal tar varnish in conformance with ANSI/AWWA C153/A21.53.

B. Backfill shall be as specified in Section 31 12 01, 2.1.

C. Concrete for thrust blocks shall be 4,500 psi as specified in Section 321201-2.1.

2.2 GATE VALVE AND VALVE BOX:

A. Gate Valves - Open Counter-clockwise (left)

1. Valves shall be 125 pound flanged gate valves meeting American Water Works Association (AWWA) Standards, iron body, bronze mounted, double disc type with removable brass seats, non-rising manganese bronze stems, and open counter clockwise.
2. Valves shall be successfully subjected to a hydrostatic pressure test of not less than four (4) times the maximum working pressure.
3. Standard of quality shall be AWWA gate valves as manufactured by Kennedy or equal approved by the local Water Authority.
4. Valves shall be compatible with the type of pipe and joint being used without the use of an adaptor.

B. Valve Box shall be cast iron, yoke type, adjustable for height with cast iron cover marked "Water". Boxes shall be designed for pipe in trench having a 5'-6" cover over pipe.

2.3 ACCESSORIES:

A. Concrete for Thrust Restraints:

1. Portland Cement: ASTM C150, Type 1A.
2. Aggregates: ASTM C33; coarse aggregate - crushed limestone, maximum one inch (1") size; fine aggregate - clean, sharp, natural sand.
3. Water: Clean, potable.
4. Air-Entraining Admixture: ASTM C260, Darex or Architect approved equal.
5. Ready Mix Concrete: ASTM C94.
6. Minimum Concrete Strength: Compressive strength shall be greater than 4,000 psi at 28 days; minimum cement content – 6.5 bags/c.y.; 4.0 gals./bag of cement; slump from 1-1/2" to 3"; air entrainment from 5% to 8-1/2%; and flexural strength (ASTM C78) shall be greater than 650 psi at 28 days.

B. Flexible Couplings: Smith-Blair Couplings. Approved product numbers:

1. 441 Cast straight & transition coupling
2. 482 Cast end cap coupling
3. 261 All stainless steel full circle clamp coupling
4. 264 All stainless steel tapped full circle clamp coupling
5. 912 Cast iron flanged coupling adapter

C. Mechanical Joint Retainer Glands: Ductile iron, AWWA/ANSI C110/A21.10 and C111/A21.11. Set screws shall be 5/8" NC thread with torque-set head, or 5/8" square head bolts, with knurled cup-point, made of 4140 steel and hardened to Rockwell "C" scale 4547.

D. Tapping Sleeve and Valve:

1. JCM 432, Smith-Blair 663, or Insta-Valve Plus, all stainless steel with ¾" NPT test plug. Sleeve shall be supplied with stainless steel bolts and nuts. Tapping valve shall be compatible with Smith tapping machine. Valve shall be furnished with mechanical joints and shall open to the right.

2.4. CORPORATION STOP:

Shall be copper service thread connection outlet as manufactured by Mueller Co., 500 West Eldorado Street, Decatur, IL 62525. (Tel. 1-800-423-1323. Fax 1-217-425-7537) or Architect approved equal.

3.0 PART 3 EXECUTION

3.1. CONNECTIONS TO OTHER WATER SYSTEMS:

A. Connections at Buildings:

1. Locate accurately per site and plumbing drawings. Verify inverts, locations and sizes. Notify Architect of any discrepancies immediately prior to installation.
2. Install the site water system as shown on the drawings. Install temporary plugs, mark above grade, and protect. Coordinate with the Village of Lake Placid and the Owner.

3. The Site Contractor's licensed plumber shall be responsible for connecting the water plumbing system to the site water system and coordinating with this Contractor.
4. Connect existing building service piping to new distribution main using smooth flexible coupling to join dissimilar pipes to provide watertight joint with low friction loss characteristics.

B. Connections to the existing water supply system:

1. Provide the Village of Lake Placid DPW and fire department with at least two (2) weeks written notice prior to conducting work so that field procedures and installations can be reviewed by a representative of the Municipality. Copy letter to Architect and Owner.
2. Locate accurately per site drawings and Village of Lake Placid. Verify inverts, locations and sizes. Notify Architect of any discrepancies prior to installation.
3. Connect new 6" ductile iron service main to the existing 8" ductile iron main using a Tapping Sleeve and Valve as specified hereafter:
   a. Pipe to be tapped shall be excavated and thoroughly cleaned at the location to be tapped. Cleaning shall extend a minimum of 12 inches on each side of the sleeve.
   b. Pipe, sleeve and valve shall be disinfected in accordance with AWWA C651.
   c. Tapping sleeve and valve shall be installed in accordance with manufacturer's instructions, and bolts tightened to the proper torque.
   d. Tap shall be made in the presence of Municipal Public Works Plumbing Inspector after sleeve and valve have been pressure tested to ensure proper installation. If sleeve or valve fails pressure test, the defective installation shall be disassembled and reinstalled.
4. Make connections securely, watertight, and detailed.

3.2. TRENCHING AND BACKFILL:

A. See Section 31 22 01 for additional requirements.

B. Hand trim excavation for accurate placement of pipe. Remove all stones greater than 4" diameter to a depth of at least 6" below the bottom of the pipe.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction and dead ends as shown on the Contract Drawings. Place concrete to permit full access to pipe and pipe accessories. Care shall be exercised in the placement of concrete to allow disassembly of mechanical joints.

D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.3. INSTALLATION – PIPE:

A. Maintain separation of water main from sewer piping in accordance with details shown on Contract Drawings.

B. Water pipe shall have a minimum of six (6') feet of cover as measured from the top of the pipe to finish grades. Bed pipe as detailed. Place backfill around pipes to equal depths on both

sides as work progresses. When pipe laying is not actually in progress, the open ends of the pipes shall be closed temporarily with pipe plugs or by other means. When water is in the trench, plugs shall not be removed until danger of water entering the pipe has passed.

C. Install pipe to indicated elevation to within tolerance of 1 inches.

D. No pipe shall be laid upon a foundation in which frost exists, nor at any time when there is a danger of the formation of ice, or the penetration of frost at the bottom of the excavation.

E. Two brass wedges shall be inserted securely between bell and spigot ends of pipes, maintaining the full watertightness of the joint.

F. Otherwise install ductile iron piping and fittings to AWWA C600.

G. Route pipe in straight line.

H. Install pipe to allow for expansion and contraction without stressing pipe or joints.

I. Install access fittings to permit disinfection of water system performed under Section 331102.

J. Compact trenches to at least ninety-five (95%) percent maximum density as specified in Section 312201. Settlement shall be repaired by the Contractor at no additional cost to the Owner.

K. Install concrete cradles, saddles and thrust blocks where shown on drawings as detailed and specified in Section 321301, Part 3. Provide bracing and blocking at bends, 22-1/2 degrees or greater, tees, crosses and plugs. Block and anchor with concrete so that there will be no movement of the pipe in the joints due to internal or external pressures. The concrete shall be placed around the fittings and completely fill the space between the fittings and walls of the trench, from 6" below the fittings of pipe, to 12" above the fittings. The anchor concrete shall be so placed that the bell and spigot joints or other joints may be recaulked or tightened if necessary. Concrete thrust blocks shall conform dimensionally to details shown on drawings.

3.4 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover approximately one inch below surrounding finished grade. Care shall be exercised in backfilling around valve boxes to prevent displacement of box.

3.5 FIELD QUALITY CONTROL:

A. All new water piping and fittings shall be thoroughly flushed prior to pressure testing. The flushing rate shall be at least 2.5 ft./sec.

B. Pressure test all new water piping and fittings using a test pressure not less than 150 psi.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to the Owner.

D. After all work has been successfully inspected and tested, the new water piping and fittings shall be disinfected by the Contractor in accordance with AWWA C651, latest edition as specified in Section 33 11 02 of these Specifications.

3.6 CLEAN UP:

During the contract and at intervals as directed by the Architect and as the water distribution system is completed, clear the site of pipe, trench and backfill material, stone, concrete and debris. Leave the site in a clean, safe, well draining, and neat condition.

END OF SECTION 33 11 01

SECTION 33 11 02 - DISINFECTION OF WATER SYSTEM

1.0 PART 1 GENERAL

1.1. SECTION INCLUDES

A. Disinfection of site domestic and fire water lines and appurtenances specified in Section 331101.

B. Testing and reporting results.

1.2. RELATED WORK SPECIFIED ELSEWHERE

A. Section 331101 - Water Distribution

1.3. REFERENCES

A. AWWA B300 - Hypochlorites; American Water Works Association; 1992 (ANSI/AWWA B300).

B. AWWA B301 - Liquid Chlorine; American Water Works Association; 1992 (ANSI/AWWA B301).

C. AWWA B302 - Ammonium Sulfate; American Water Works Association; 1995 (Revised) (ANSI/AWWA B302).

D. AWWA B303 - Sodium Chlorite; American Water Works Association; 1995 (Revised) (ANSI/AWWA B303).

E. AWWA C651 - Disinfecting Water Mains; American Water Works Association; 1992 (ANSI/AWWA C651).

1.4. SUBMITTALS: (See Section 311201, 1.5)

A. Test Reports: Indicate results comparative to specified requirements.

B. Certificate: Certify that cleanliness of water distribution system meets or exceed specified requirements.

C. Disinfection report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
5. Date and time of flushing start and completion.
6. Disinfectant residual after flushing in ppm for each outlet tested.

D. Bacteriological report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.
7. Certification that water conforms, or fails to conform, to bacterial standards of NYS Department of Health and the Water Municipality.

1.5. QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.

1.6. REGULATORY CERTIFICATION REQUIREMENTS

A. Provide certificate of compliance from authority having jurisdiction indicating approval of water system. Provide written certification from Municipal Department of Public Works Superintendent that water system has been tested for leakage and sterilized and disinfected in a manner satisfactory to the Health Department having jurisdiction, but in no event less stringent than that provided for in AWWA Standard for disinfecting water mains C601, latest issue. Hypochlorites and liquid chlorines used in disinfection shall conform to most recent AWWA Standards B300 and B301. Provide certification prior to Architect issuing final acceptance. No water main or pipes shall be placed into service until test results are provided documenting that the water system is bacteriologically safe.

2.0 PART 2 PRODUCTS

2.1. DISINFECTION CHEMICALS:

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

3.0 PART 3 EXECUTION

3.1. EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.2. EXECUTION

A. Provide specific water main taps located adjacent to ends of main and attach required equipment to perform the work of this Section.

B. Inject treatment disinfectant along with potable water into piping system. Chlorine shall be fed at a constant metered rate into the feed water so that the chlorine concentration will result in at least 50 milligrams per liter (parts per million) concentration. Chlorine required to produce .50 mg/l concentration per 100 feet of pipe shall be as follows: 4" - 0.33 Gal. of 1% chlorine solution, 6" - 0.73 Gal. of 1% Chlorine Solution; 8" - 1.30 Gal. After filling the main pipe with chlorine solution, open each service line and hydrant branch to fill them with the same chlorine solution. Test the solution as it is withdrawn from each point until at least 50 mg/l concentration is obtained.

C. Maintain disinfectant in system for 24 hours. Read and record chlorine residual after the 24 hour contact time; Minimum allowable level shall be 20 ppm.

D. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water. After flushing, take 2 samples, one from the domestic service line at its connection to the building plumbing system and one from a hydrant remote from the domestic service connection. Submit these samples for bacteriological analysis. Submit test reports to the Architect. If the initial disinfection fails to produce acceptable results, the procedure shall be repeated until a satisfactory report is obtained.

E. Temporary taps shall be excavated, shut off and abandoned following satisfactory quality test results. Replace permanent system devices removed for disinfection.

3.3. FIELD QUALITY CONTROL

A. Test samples in accordance with AWWA C651.

3.4. CLEAN UP:

A. During the contract and at intervals as directed by the Architect and as the disinfection of water system is completed, clear the site extraneous materials and debris. Leave the site in a clean, safe, well draining, neat condition.

END OF SECTION 33 11 02

SECTION 33 30 01 – SITE SANITARY

1.0 PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of Sanitary work is shown on the drawings.

B. Sanitary work includes, but is not limited to:

1. Sanitary Manhole(s)
2. Concrete manhole adaptors
3. Trenching and Backfilling
4. Piping and jointing
5. Connections to existing sanitary systems
6. Cleanouts
7. Sanitary Line Cleaning, Investigation, and Scoping
8. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 25 01 - Erosion, Sediment, and Pollution Control

C. Section 31 22 01 - Site Earthwork: For Elaboration of Shoring and Bracing, Dewatering, Backfilling, Compaction and Field Quality Control Testing

D. Section 32 13 01 - Site Concrete Work

E. Section 33 40 01 - Storm Drainage

1.3 SUBMITTALS:

A. Provide Manufacturer's Product Data (MPD) and Shop Drawings for:

1. Precast Structure (Manholes): Also, certification that structures meet H-20 loading requirements specified.
2. Pipe and jointing-MPD only
3. Cleanouts-MPD only
4. Concrete manhole adaptors

B. Provide Material Certificates: Also, samples as noted.

1. Granular Backfill: Sample
2. 4500 psi concrete

C. Provide Permits, Test Results, Certifications and Operator's Manuals as noted below:

1. Permit: Copy of each as required in 1.4 B.
2. Exfiltration Test Results: As required in 1.5 below.
3. Certification: As required in 1.4 C below.

D. Sanitary Line Scoping Video indicating:
1. Size of sanitary lines and inverts below sanitary manhole rims.
2. Condition of existing sanitary pipes and manholes as specified in this Section.

1.4 JOB CONDITIONS

A. Job conditions in Section 31 22 01 and 33 40 01 apply.

B. Sewer work shall conform to standards of applicable government authorities having jurisdiction. Obtain and pay for permits and approvals required by local authorities. Copy permit to Architect.

C. Certification: The sanitary system must be installed and certified by a licensed county Plumber when required by municipal or state law.

D. Construction Review: Notify the Architect when the sanitary sewer system is approximately 25%, 75% and 95% complete.

1.5 TESTING

A. Notify Architect forty-eight (48 hrs.) hours in advance. Provide materials and labor to carry out testing in the presence of the Architect.

B. Test sewer systems with an exfiltration test for a period of two (2) hours that meets the following requirements:

1. Gravity Systems: Do not exceed a leakage rate of 10 gallons per inch of internal pipe diameter per mile per day with minimum 2 feet head, excluding manholes.

2. When standards of government authorities having jurisdiction are different, such as allowing no leakage or requiring stricter leakage rates, conform to the stricter standards.

3. Any leakage beyond limits described shall be located and repaired. Retest pipe to insure adequate performance of pipe.

C. Provide materials and labor to start-up and troubleshoot effluent pump operation and instrumentation by a service representative of the pump manufacturer. Provide Operator's manual.

2.0 PART 2 - PRODUCTS

2.1 SANITARY MANHOLE

A. Shall conform to Section 33 40 01 - 2.2, A., 2.3, 2.5, and 2.6.

B. Manhole frames and covers shall be Syracuse Casting Sales Corp. Pattern 1030, Neenah Foundry Co. R-1642 with Type "A" lid of Architect approved equal. Lid shall have raised lettering on the cover to designate "SANITARY SEWER". Frames and covers shall be machined to prohibit rocking.

C. Pipes entering manhole shall have concrete manhole adaptors as manufactured by (CMA) FERNCO or Architect approved equal.

2.2 GRANULAR BACKFILL

A. Backfill for piping and sanitary structures shall be as specified in Section 312201, 2.1, B.

2.3 PIPING

A. P.V.C. Gravity Sewer Pipe shall conform to ASTM D-3034, SDR 35. Joints shall be rubber flexible gasketed joints conforming to the ASTM F477.

2.4 CLEANOUT

A. Cleanout shall be PVC, compatible with gravity sewer pipe.

2.5 SANITARY LINE CLEANING & SCOPING

A. Contractor shall provide 1,000 linear feet of sanitary line cleaning and scoping in areas directed by the Architect and as shown on the plans.

B. Cleaning Equipment: Acceptable cleaning equipment includes, but is not limited to, rodding machines, bucket machines, hydraulic flushers, movable dams with flexible scrapers.

C. Scoping Equipment: Acceptable scoping equipment includes, but is not limited to, pipe inspection camera with pan-and-tilt, radial viewing that pans 275 degrees and rotates to 360 degrees. The camera shall have the following attributes:

1. Be operative in 100 percent humidity conditions.

2. Measure with an accurate footage counter that displays on the monitor the exact distance of the camera, to the nearest tenth of a foot, from the centerline of the starting manhole.

3. Camera with height adjustment so that the camera lens is always centered at half the inside diameter, or higher, in the pipe being televised.

4. Lighting for the camera shall be suitable to allow a clear picture of the entire pipe periphery.

5. The video camera shall be capable of showing on the digital inspection the Owner's name, project name, contractor name, date, line size and material, line identification (Owner's manhole numbers at both ends), ongoing footage counter, and slope and angle of pipe.

D. For four- and six-inch lateral internal television inspections a "push camera" shall be used to produce color videos. Camera reel shall be equipped with a footage counter to identify approximate distances from the start of the inspection.

3.0 PART 3 - EXECUTION

3.1 CONNECTIONS TO OTHER SANITARY SYSTEMS

A. Connections at Building(s):

1. Locate accurately per site and plumbing drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation.
2. Install pipe and jointing to five (5') feet from the exterior building face.
3. Cap end and mark.
4. Connection will be made by the Plumbing Contractor.

B. Connections to existing Sanitary Systems:

1. Locate accurately per drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation. Coordinate with the Municipality and other agencies having jurisdiction.
2. Notify governing agency in writing a minimum of two (2 weeks) weeks prior to anticipated date of connection. Copy letter to Architect.
3. Connect the site sanitary system to the existing sanitary system. Make connections securely, watertight and as detailed.

3.2 TRENCHING AND BACKFILL

Shall be as described in Section 33 40 01, 3.2.

3.3 MASONRY

Shall be as described in Section 33 40 01, 3.3.

3.4 CASTINGS

Shall be as described in Section 33 40 01, 3.4.

3.5 PIPE LAYING

A. Bed pipe in granular backfill or concrete as shown on drawings, compact under springline of pipe to assure firm support. Align pipe to line and grade given in plan and profile. Set batter boards or set by laser level.

B. Place backfill around pipes to equal depths on both sides as work progresses. Compact trenches to at least ninety-five (95%) percent maximum density as specified in Section 312201.

C. P.V.C. pipe push type joints shall be made using the flexible gaskets specified. Push together pipes so that the gasket is firmly seated in the socket.

D. "Lamp" pipes to check for misalignment and breakage after backfilling has been completed. Replace pipes deviating more than 1/2" from line or grade at no additional cost to the Owner.

E. Conduct testing as described in 1.6 above.

3.6 CLEANOUT

Install as detailed. Construct flush with finished grade.

3.7 SANITARY LINE CLEANING & SCOPING

A. Cleaning Operations:

1. Potable water withdrawal from hydrants will be allowed for utility cleaning purposes. A contractor provided hydrant meter with backflow prevention device shall be used when withdrawing water from a fire hydrant.

2. The pipe sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. The equipment shall be capable of removing dirt, grease, rocks, sand, and other materials and obstructions from the utility lines and manholes.

3. Any roots which could prevent adequate internal television inspection shall be removed. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupine, and equipment such as high-velocity jet cleaners.

4. Flows diverted during cleaning operations shall be returned to the utility system.

5. Debris accumulated during cleaning operations shall be removed from the utility and disposed offsite.

B. Inspection and Scoping:

1. If during inspection of the utility section, the wastewater flow depth exceeds 20% of the inside pipe diameter, reduce the flow depth to an acceptable level by performing the inspection during minimum flow hours, bypass pumping, plugging or by pulling the camera with swab, high velocity jet nozzle or other acceptable dewatering device.

2. Video inspections performed while floating the camera is not acceptable.

3. Documentation of Television Inspection

   a. All inspections shall be documented using a data logger and reporting system.
   b. Inspection Logs: Computer printed location records shall be kept by the Contractor and shall clearly show the location and orientation in relation to an adjacent manhole. Other points of significance such as locations and orientations or service connections, building sewers, unusual conditions, roots, cross connections, broken pipe, presence of scale and corrosion, and other discernible features shall be recorded, and a copy of such records shall be supplied to the Owner.
   c. Video Recordings: Video recordings shall include an audio track recorded by the inspection technician during the actual inspection work describing the parameters of the line being inspected (i.e. location, depth, diameter, pipe material, pipe slope, etc.), as well as describing connections, defects and unusual conditions observed during the inspection. Video recording playback shall be at the same speed that it was recorded. Once inspected, the video logs and files shall be labeled and become the property of the Owner.

4. Perform inspection immediately after line cleaning.

5. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the utilities condition. In no case will the camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with the proper documentation of the utility conditions shall be used to move the camera through the utility line.

6. During the inspection, the camera shall be temporarily stopped at each defect along the line. The nature, location, and orientation of the defect shall be recorded by the contractor. Where defects are also active infiltration sources, the rate of infiltration in gallons per minute shall be estimated by the Contractor and recorded. The camera shall also be stopped at all service connections and identified by footage and clock orientation.

7. The camera operator shall slowly pan and tilt and beginning and ending manhole connections, each service connection, joints, visible defects and at pipe material transitions.

8. Inspections shall be continuous for pipe segments between manholes.

9. All videos, notes, file names, etc. shall be cross referenced to the project site plan.

10. Should at any interval during the inspection and scoping the camera becomes unmovable, non-functioning, or unresponsive it shall be the Contractor’s sole responsibility to retrieve the camera, at no additional cost to the Owner. Any

damage done to the site or sanitary system retrieving the camera shall be corrected immediately by the Contractor to match existing conditions.

3.8 PROVIDE CERTIFICATION

Provide written certification from the Contractor's licensed plumber that the sanitary work in the public right of way has been installed in a manner satisfactory to the governing agency having jurisdiction over the work. Provide certification prior to Architect issuing final acceptance.

3.9 CLEAN UP

During the contract and at intervals as directed by the Architect and as the sanitary sewer system is completed, clear the site of pipe, trench and backfill material, stone, concrete and debris. Leave the site in a clean, safe, well-drained, and neat condition.

END OF SECTION 33 30 01

SECTION 33 40 01 - STORM DRAINAGE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of the storm drainage is shown on the drawings.

B. Storm drainage work includes, but is not limited to:

1. Trenching, backfilling and compaction
2. Storm structures, castings, and appurtenances
3. Piping, jointing and fittings
4. Connection(s) to other storm system(s)
5. Adjusting existing storm structures and other utilities
6. Storm Water Management Trench (SMT)
7. Flat Drains
8. Quality Control Testing and Submittals
9. Clean Up

C. Provide materials, labor, equipment, and services required to accomplish related work in accordance with the drawings and specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 12 01 - Site Preparation

B. Section 31 25 01 - Erosion, Sediment and Pollution Control

C. Section 31 22 01 - Site Earthwork: For Elaboration of Shoring and Bracing, Dewatering, Backfilling, Compaction and Field Quality Control Testing.

D. Section 32 12 01 - Asphalt Paving

E. Section 32 13 01 - Site Concrete

1.3 REFERENCES

A. ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity Flow Applications.

1.4 SUBMITTALS:

A. Shop Drawings (SD) required for:

1. Precast concrete drainage structures showing sizes, elevations for openings and, HS20 loading certification.

B. Manufacturer's Product Data (MPD) required for:

1. Drainage structures and castings
2. Pipe, joints, and fittings
3. Flat Drains
4. Stormwater Management Trench for Pipes and Geotextiles

C. Quality Control Submittals:

1. Provide a list of completed projects including Owner's contact information for each project, demonstrating compliance with applicable "Experience Requirements" specified in "Quality Assurance" of this specification section.

2. Provide Infiltration Testing Report(s) for infiltration trenches and drywells as described in "Quality Assurance" of this specification section in locations as determined by the Architect. Stormwater facility design may be adjusted by Architect depending on results of tests.

1.5 QUALITY ASSURANCE

A. Drainage Contractor Experience Requirements:

1. Submit business name, business owner(s) name(s), business address, telephone number, website and/or email address signed by the Contractor/Subcontractor who meets the qualifications set forth in this specification and is proposed by the Contractor to perform the Drainage for this Project.

2. Provide a list of at least four (4) Drainage work projects of comparable size, scope and quality completed successfully by the proposed Contractor/Subcontractor within the past three (3) years that includes the date completed, project Owner's name and current contact information, including telephone numbers and email addresses.

B. Infiltration Testing Required by Contractor: (Drywells)

1. Perform six (6) infiltration tests in locations as directed by the Architect and as detailed.

2. May be done through a boring or open excavation as described in NYSDEC, Division of Water, published in Standards of Wastewater Treatment Works, 1988 or latest revision.

3. Install casing (solid 4-6 inch diameter, 30" length) to 24" below finished grade.

4. Remove any solid surface and provide a natural soil interface into which water may percolate. Remove all loose material from the casing. Upon the tester's discretion, a two (2") inch layer of coarse sand or fine gravel may be placed to

protect the bottom from scouring and sediment. Fill casing with *clean* water to a depth of 24" and allow to pre-soak for twenty-four hours.

5. Twenty-four hours later, refill casing with another 24" of clean water and monitor water level (measured drop from the top of the casing) for 1 hour. Repeat this procedure (filling the casing each time) three additional times, for a total of four observations. Upon tester's discretion, the final field rate may either be the average of the four observations, or the value of the last observation. The final rate shall be reported in *inches per hour*.

6. Upon completion of the testing, the casing shall be immediately pulled, and the test pit shall be backfilled and site restored.

1.6 JOB CONDITIONS

A. Job conditions in Section 31 22 01 apply.

B. Plan and execute piping work so that trenches are not opened for more than two hundred (200') feet in advance or left unfilled more than one hundred (100') feet behind. No overnight open excavation is permitted.

C. CERTIFICATION OF STORM SYSTEM: The storm system must be installed and certified by a licensed County Plumber when required by municipal code or state law.

D. CONSTRUCTION REVIEW: Notify the Architect when the storm system is approximately 25%, 50% and 95% complete.

1.7 SUBSTITUTIONS

A. Contractor is responsible for design of any substituted structures, systems or units in Section 33 40 01 by a NYS licensed engineer. Submit to Architect for approval.

B. If a product is being submitted as a substitution to the specified product; the the Prime Contractor shall submit and request a product material substitution with his/her bid. The Prime Contractor shall at a minimum provide the following for review by the Architect and Owner:

1. All submittals as specified herein

2. Product comparison

3. Cost Information (including proposal of change in Contract Sum)

4. Contractor’s certification that proposed substitution complies with requirements in the Contract Documents

5. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

PART 2 - PRODUCTS

2.1 BACKFILL

A. Backfill for pipes, Stormwater Management Trenches (SMT), drainage structures, and drywells shall be as specified in Section 31 22 01.

2.2 STORM STRUCTURES AND CASTINGS

A. Storm Inlets, Manholes and Catch Basins:

1. Shall be precast reinforced portland cement concrete conforming to the size(s) and shape shown on drawings, designed for AASHTO HS-20 loading. The materials and structural design of the structures shall be per ASTM C478 and ASTM A497, Grade 60. The minimum compressive strength of the concrete in the structure base, riser, and top section shall be 5,000 psi. The minimum wall thickness shall be one twelfth of the internal diameter of the riser or largest cone diameter. All joints shall be waterproofed with O-ring rubber gaskets and sealed with a mastic treatment in accordance with ASTM C990. Any grout used within the system shall meet the ASTM C 1107. Manhole connector holes shall be equipped with a seal gasket that meets or exceeds material specification of ASTM C-923 or other locally approved methods. Base units shall be extended. Standard of quality shall be as manufactured by Zeiser Wilbert, Jefferson Concrete, Fort Miller or Architect approved equal.

2. Castings: Provide HS20 loading and bike safe grates, ductile iron meeting grade 65-45-12 as determined by ASTM A536-84, sizes as noted on the plans. Frames, covers and grates shall be machined to prohibit rocking. Standard of Quality shall be Neenah Foundry, East Jordan Iron Works, US Foundry, or Architect approved equal.

B. Dry Wells:

1. Shall be pre-cast reinforced portland cement concrete with reinforcement conforming to ASTM C478 and ASTM A615 with AASHTO HS20 Loading. Openings shall be precast in each unit at the factory. Size(s) as shown on drawings and constructed of reinforced Portland Cement concrete; as manufactured by Zeiser Wilbert, Jefferson Concrete, Fort Miller or Architect approved equal.

2. When the size of a manufacturer's product differs from the item as detailed on the drawings, provide the manufacturer's next larger size than detailed unless approved by the Architect in writing.

3. Castings: Provide HS20 loading and bike safe grates, ductile iron meeting grade 65-45-12 as determined by ASTM A536-84, sizes as noted on the plans. Frames, covers and grates shall be machined to prohibit rocking. Standard of Quality shall be Neenah Foundry, East Jordan Iron Works, US Foundry, or Architect approved equal. Refer to drainage details on drawings for model numbers and other information on castings.

C. Area Drain(s): Shall be a watertight PVC, HS-20 loaded drain basin with drop-in integral grates. Structures shall be able to accommodate all connecting pipes watertight. Refer to drawings for sizes and grate styles.

1. 10” Standard light-duty drop-in grate.
2. Standard of quality shall be Nyloplast as distributed by Advanced Drainage Systems, Inc., 800-821 6710, or Architect approved equal.

2.3 STORM STRUCTURE APPURTENANCES

A. Precast Concrete Adjustment Rings: Shall be square or round depending on structure. Built in accordance to ASTM C478, and made of 5,000 psi concrete and reinforced steel, meeting ASTM A615 Grade 60, as manufactured by Fort Miller, Zeiser Wilbert, Jefferson Concrete or Architect approved equal.

B. Steps: Shall be copolymer polypropylene plastic reinforced with 1/2" diameter grade 60 steel as manufactured by M.A. Industries or Architect approved equal.

C. Mortar: Shall be lime, cement, and clean sand, 1:1:3 measured by volume, meeting ASTM C1107.

2.4 PIPING

A. High Density Polyethylene Pipe (HDPE): Shall be heavy duty dual wall, high density polyethylene (HDPE) pipe conforming to ASTM F2648 for 4" to 60" pipe with a smooth inner wall, annular corrugations, "n" flow rating of 0.012, and HS-20 loading capability with minimum one (1') foot cover for 4" to 48" pipe and two (2') foot cover for 6-" pipe. Joint couplings for pipe shall be connected using a bell &spigot joint, meeting AASHTO M252, AASHTO M294, or ASTM F2306. The joint shall be soil tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Standard of quality shall be N-12 Mega Green ST IB pipe as manufactured by Advanced Drainage Systems, Inc., 800-821 6710, or Architect approved equal.

2.5 STORM WATER MANAGEMENT TRENCH

A. 4" to 10" Pipe: Shall be flexible, heavy duty, corrugated interior and exterior, perforated (or slotted) polyethylene pipe meeting requirements ASTM F-667 for 4" to 10" diameters. Standard of quality shall be ADS with prefabricated snap fittings as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.

B. 12" to 24" Pipe and Fittings: Shall be heavy duty polyethylene (HDPE), corrugated interior and exterior, perforated pipe meeting requirements AASHTO M252, AASHTO M294, Type C. Standard of quality shall be ADS with prefabricated fittings as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.

C. 4" to 12" Fittings: Shall be injection molded fittings with a smooth interior and exterior meeting requirements AASHTO M252 for 4" to 10" diameters, and ASTM M294 or ASTM F2306 for 12" diameter. Standard of quality as manufactured by Advanced Drainage Systems, Inc., (614) 457-3051 or Architect approved equal. Size pipe(s) as noted on drawings.

D. Backfill: Shall be clean, washed No. 1 stone as indicated in Section 31 22 01.

E. Soil Separation Fabric: Shall be a commercially manufactured non- woven polypropylene filter fabric. Standard of quality shall be Mirafi 140N as manufactured by TenCate or Architect approved equal.

2.6 FLAT DRAINS

A. Shall be perforated filter-wrapped, oblong, 13" wide x 1.5" thick with internal bracing meeting ASTM D7001. All fittings shall be made of polyethylene with a min. cell classification of 424420C as defined and described in ASTM D 3350.

B. Standard of quality shall be ADS Advanedge as manufactured by Advanced Drainage Systems, Inc., (Tel. 800-821-6710) or Architect approved equal.

C. Provide the 12-4 Endout to connect the Flat Drain to a 4" perforated pipe that wye couples to the storm water management trench piping.

D. Secure all connections using manufacturer recommended PVC tape at all joints.

PART 3 - EXECUTION

3.1 CONNECTIONS TO OTHER STORM SYSTEM

A. Connections at Building(s):

1. Locate accurately per site and plumbing drawings. Verify invert and sizes. Notify Architect of any discrepancies immediately, prior to installation.

2. Install pipe and jointing to within five (5') feet of each building exterior. Install temporary plugs, cap end, mark above grade, and protect. Coordinate with Plumbing Contractor. Connection will be made by Plumbing Contractor.

3. The Plumbing Contractor shall be responsible for connecting the building drains and leaders to the site storm system.

4. Make connections securely, watertight and as detailed. Provide all necessary couplers and fittings to make connections.

B. Connections to existing Storm Systems:

1. Coordinate with the Municipality and other agencies having jurisdiction. Notify governing agency in writing a minimum of two (2) weeks prior to anticipated date of connection so that field procedures and installation can be reviewed by a representative of the Municipality. Copy letter to Architect.

2. Locate accurately per drawings. Verify inverts and sizes. Notify Architect of any discrepancies immediately, prior to installation.

3. Make connections securely, watertight and as detailed. Provide all necessary couplers and fittings to make connections.

3.2 TRENCHING AND BACKFILL

A. Reference: Refer to Section 31 22 01 for elaboration of shoring and bracing, supporting, rock, dewatering, and backfilling.

B. Trenching:

1. Remove material encountered to the depth shown on drawings and with a maximum width of fourteen (14") inches and a minimum of nine (9") inches each side of conduit springline as detailed. Provide safe shoring, sheeting, and bracing. Remove before backfilling. Backfill excess or over excavation as described in Section 31 22 01 to proper line and grade. Compact to 95% density.

2. When unsatisfactory soil materials are encountered at design elevations, immediately notify the Architect in writing via email. Continue as directed by the Architect. When conditions are not a result of Contractor's negligence, additional excavation may be directed by the Architect and paid for as a Change Order on a unit price basis in accordance with specification Section 31 22 01.

C. Water: Remove from trenches; drain trenches and/or provide sump pits and pumping equipment as necessary to keep trenches stabile and dry at no additional cost to the Owner.

D. Soft Material in Trench Bottom: Dry out and stabilize or remove and replace with imported granular backfill material to achieve firm, stable foundation at no additional cost to the Owner.

E. Rock: Remove boulders and rock within one (1'-0") foot of pipe. Provide one (1'-0") foot of granular backfill between rock and conduits at no additional cost to the Owner.

F. Backfill: Conform to details on drawings and as specified. Compact backfill to a minimum 95% of optimum density.

3.3 STORM STRUCTURES INSTALLATION

A. Pre-Cast Structures:

1. Install with corresponding extended precast base section. Precast base units shall be modified in the factory to have the correct size openings for piping.

2. Provide drainage structures as detailed, built to finished grades given. Backfill with imported granular backfill material around drainage structure and compact to 95% density to avoid settlement.

3. Mortaring: Thoroughly wet concrete risers before laying. Mortar joints. Joints shall be completely full and struck flush.

4. Install any required steps in a continuous flight, avoiding any conflict with piping.

5. Construct channels in base of storm structures for positive flow from inlet to outlet piping where detailed.

6. Build completed structure to avoid any infiltration or exfiltration of water except at underdrains or storm water management trenches.

B. Dry Well Units: Install as detailed, built to finished grades given. See masonry details for installation of casting. Build drywells to facilitate exfiltration of water. Line drywells with soil separation fabric and backfill with No. 1 stone as specified.

3.4 CASTINGS

A. Provide the type specified and shown on drawings. Build to the finish grade as shown on drawings.

B. Set castings firmly. Loose or rocking castings shall be rejected by the Architect.

C. Paint all installed castings (inside and outside) with two (2) coats of black rust inhibitive paint as directed by the Architect.

3.5 ADJUSTING EXISTING UTILITIES

Adjust existing utilities as necessary to maintain utility service and meet finished grade conditions. Existing utilities include but are not limited to; hydrants, water valves, gas valves, electric pull boxes and manholes, storm drainage structures, cable and telephone markers, fiber optic cables, sanitary cleanouts and manholes, and guy wires.

3.6 PIPE LAYING

A. Shall be in accordance with ASTM D2321 and pipe manufacturer requirements.

B. Bed pipe in granular backfill or concrete as shown on drawings, compact under springline of pipe to assure firm support. Align pipe to line and grade given in plan and profile. Set batter boards or set by laser level.

C. Pipe joints shall be made using the flexible gaskets specified. Clean bell end of any debris and lubricate. Remove protective wrap from gasket. Do not allow lubricated section to touch dirt or backfill. Foreign matter could adhere to surface and compromise joint integrity. Push together pipes so that the gasket is firmly seated in the socket. Always push spigot end into bell, not bell end into spigot.

D. Place backfill around pipes to equal depths on both sides as work progresses.

E. Attach flared end sections as detailed to pipe outlets, draw up bolts tight to provide firm anchorage.

F. "Lamp" pipes to check for misalignment and breakage after backfilling has been completed. Replace pipes deviating more than 1/2" from line or grade at no additional cost to the Owner.

3.7 STORM WATER MANAGEMENT TRENCH

A. Use only pipe which is undamaged and flexible (have not been exposed to direct sunlight for more than six (6) months causing brittleness, cracking or splitting prior to placement). Pipe shall be stored for at least twenty-four (24 hrs.) hours in an area having a minimum temperature of fifty (50) degrees F.

B. Trenching: Remove material encountered to the depth shown on the drawings. Provide shoring, sheeting, and bracing as necessary for safety; remove before backfilling.

C. Install continuous envelope of soil separation fabric around the backfill up to subgrade of finish material. Fill stone to proper elevation and wrap top. Overlap fabric minimum twenty-four (24") inches at top and joints. Secure fabric joints to prevent separation and infiltration of adjacent materials and separation of fabric.

D. Install pipe sloped as shown on drawings.

E. Compact backfill to maximum density of adjacent materials.

3.8 FLAT DRAINS

A. Install the Flat Drains at the intervals noted on the drawings. Securely attach ends of these composite drains into the perimeter collector header system with specified fittings.

B. Secure all connections with PVC tape.

3.9 FIELD QUALITY CONTROL

A. Density Testing: Perform all density testing for piping trenches and structure backfill as indicated in Section 31 22 01.

3.10 CLEAN UP

A. During the contract and at intervals as directed by the Architect and as storm drainage is completed, clear the site of pipe, trench and backfill material, stone, concrete and debris. Leave the site in a clean, safe, well draining, neat condition.

B. Clean drainage structures, storm water management trenches and pipes: Clean out sediment, rubbish, construction debris, and foreign objects thoroughly, immediately prior to final acceptance.

END OF SECTION 33 40 01