SECTION 02200
GENERAL EARTHWORK FOR PAVILION

PART 1 GENERAL

1.1 REQUIREMENTS, CODES

A. The following are minimum requirements and shall govern except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

1.2 REFERENCES

A. The Contract Drawings indicate and show limits of construction for this project. These Specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work. Plans govern over technical specifications.

1.3 GENERAL DESCRIPTION

A. The Contractor shall make excavations of normal depth in earth for establishment of subgrade for Construction of Pavilion and shall backfill and compact such excavations to the extent necessary, shall furnish the necessary material and construct fills, and shall make miscellaneous earth excavations and do miscellaneous grading.

B. Provide all labor, materials, and equipment to perform the following work of the Contract, including incidentals related to that work and coordination and support of other work specified elsewhere in the Contract Documents:

1. Protection of Existing Features and Work in Progress.
2. Survey for horizontal and vertical control of all work of the Contract.
3. Grading and compaction as required achieving lines and grades on Drawings.
4. Dust, erosion, siltation and environmental controls.
5. Soil and boulder excavation, fill, backfill, refill and subgrade preparation as indicated or required, using specified materials.
6. Installation of Sub-grade Geotextile if necessary over unstable areas as directed by the Owner's Representative.
7. Excavation and legal off-site disposal of unsuitable or excess materials, including existing fill materials, boulders, excess topsoil, boulders, and overburden soils
8. Import and Placement of base materials.
9. Dewatering, pumping, bailing and control of all groundwater and surface water for all work under this Contract.
10. Removing materials from the site which are in excess of that required.
11. Coordinate Earthwork operations with other work of the project.

B. Law and Regulations

1. All work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.

2. Secure all necessary permits from municipal, county and state departments having jurisdiction prior to the start of construction and furnish proof of acceptance upon completion of the work.

1.4 QUALITY ASSURANCE

A. Comply with all the requirements of this section and with all applicable local, state and federal regulations having jurisdiction.

B. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

1.5 PROTECTION OF EXISTING UTILITIES

A. The Contractor shall protect existing underground utilities, if any. Utilities whose location is not known shall be protected insofar as possible. All costs for repair of broken or damaged utilities will be the responsibility of the Contractor.

B. Visit the site to review all details of the work and working conditions and to verify dimensions in the field including headroom and interference's from adjacent structures. Notify the Owner in writing of any discrepancy before performing any work.

C. Consult official records of existing utilities, both surface and subsurface, and their connections to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work. The Contractor shall contact Call before you Dig" at 1-800-922-4455 to assist in locating utilities at least 4 working days prior to performing any earthwork operations on the site.

D. Make a personal inspection of the site to evaluate the conditions affecting the work. No claim for additional costs will be allowed because of lack of knowledge of any existing conditions discernible from observation of the site, adjoining properties, or other available sources of information.

1.6 SITE PREPARATION

A. The Contractor shall verify existing grades prior to beginning general earthwork. If existing grades are at variance with the Drawings, notify the Owner and receive instructions prior to proceeding.

PART 2 PRODUCTS

2.1 MATERIALS

A. Onsite Fill - This material shall consist of on-site excavated soil from the Fill stratum. It shall consist of sand, gravel, rock fragments, or a mixture thereof. On-Site materials may be reused provided that rocks larger than 6 inches are removed and it is placed and compacted to create a stable subgrade. On-site Fill will need to be well-graded for compaction and structural support, and to maximize on-site reuse.

On-site excavated fill may not be used in areas sensitive to drainage and may need to be screened to segregate unsuitable materials.

B. Processed Gravel for under slab fill for pavilion structure shalll consist of hard, durable processed gravel, free from ice snow, sand, clay, loam or other deleterious material, should be uniformly blended, conforming to the requirements of the Connecticut Department of Transportation Form 816, Section M.05.01 and the following gradation:

Sieve Size	Percent Passing by Weight
2-1/4-inch	100
2-inch	90 - 100
3/4-inch	50 - 75
1/4-inch	25 - 45
No. 40	5 - 20
No. 100	2 - 12

At least 70 percent of the materials retained on the 1-inch sieve should have a fractured face.

C. Topsoil shall consist of suitable organic soil, free from ice and snow, clay, large stones, or debris.

2.2 USE OF MATERIALS

A. On-site Fill shall consist of on-site, excavated fill and sand and is for use as backfill for the building and pavements, and where specified. These materials may be reused provided the soil is free of organic and other deleterious matter, materials and rocks larger than 6 inches are to be removed within 2 feet of subgrade and limited to less than 12" in size more than 3 feet below the subgrade or two-thirds the lift thickness, whichever is smaller.
On-site, excavated fill may not be used in areas sensitive to drainage and may need to be screened to segregate unsuitable materials.

B. Processed Gravel use this material for under slab fill for pavilion structure.

C. Topsoil Use topsoil for final grading of proposed Pavilion Structure areas.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Notify Owner in writing of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

C. Identify and flag known utility locations. Maintain and protect existing utilities to remain and which pass through the work areas.

D. Verify fill material to be reused are acceptable.

3.2 PROTECTION OF WORK IN PROGRESS:

A. It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic. Alert the Owner to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.

B. Do not work frozen soils.

C. Protect soils from excessive moisture. During periods of prolonged precipitation, take aggressive steps to avoid over-saturation, erosion, or homogenization of soils by covering with protective plastic sheeting, collection and controlled dewatering, detention for sediment removal, and allowing excessively wetted soils to remain fallow until approved by the Owner as appropriate for continued work.

3.3 EXCAVATION AND REMOVAL OF TOPSOIL AND MISCELLANEOUS FILL AND MISCELLANEOUS MATERIAL

A. All topsoil, subsoil, unsuitable fill and miscellaneous materials shall be stripped to their entire depths within the locations of Pavilion Structure. All such unsuitable materials will be excavated below finish grades until suitable natural soils are encountered. Materials suitable for reuse as determined by the Owner shall be stored in designated locations that will not interfere with building operations. Topsoil to be reused shall be free from clay, large stones and debris.

B. The Contractor shall excavate all topsoil, unsuitable fill and any other unsuitable materials to firm natural ground below all footings and within the area as sloping downward and outward on a one horizontal to one vertical (1H:1V) line to firm natural groundr. Unsuitable material is herein classified as existing fill, topsoil, organic silt, peat, branches, logs, stumps, boulders, cobbles, existing structures (i.e. footings, foundations, floor slabs, etc.) and any trash, (i.e., snow, roots, sod, rubbish or other deleterious or organic matter).

C. Excavated topsoil, unusable boulders, unusable excavated rock and unsuitable materials shall be removed and stockpiled at a designated location or otherwise removed from the project at the Contractor’s expense.

3.5 SITE EXCAVATION

A. All areas within the limits of work shall be excavated or filled with suitable material to the subgrade lines and elevations as shown on the plans and cross sections in accordance with these specifications

The Contractor shall not excavate below top of suitable in-place natural soil subgrades except for utility installation without the authorization of the Owner. The Contractor shall follow a construction procedure which permits visual identification of firm natural ground.

Surplus material, if any, shall be disposed of off-site in a legal manner at the Contractor's expense.

B. The Contractor shall follow a construction procedure which permits visual identification of natural subgrade soils.

In the event that groundwater is encountered, the Owner may require that the size of the open excavation be limited to that which can be handled by the Contractor's chosen method of dewatering and allow visual observation of the bottom and placement of all fill in the dry.

C. If subgrade soils become loose and saturated, the Contractor shall be required to excavate such loose and saturated soils and replace them, at no additional cost to the Owner, with compacted sand-gravel fill in order to stabilize areas which may become disturbed due to surface runoff, construction disturbances by the Contractor, and subsurface seepage pressure and also to expedite pumping. Particular areas of concern are within new building areas and under all pavement areas.

D. Prior to placement of the initial layer of fill over the natural ground, proofrolling of the exposed subgrades, if above the groundwater table, shall be performed as specified herein. This requirement may be waived by the Owner based on actual conditions encountered.

E. Protect all subgrade soils. Excavate subgrade soils which become disturbed, and backfill in accordance with specifications at Contractor's expense.

F. Do not excavate to full depth when freezing temperatures may be expected unless subgrade is protected from freezing, or footings or slabs can be placed immediately after excavation is completed and are protected from freezing.

G. Maintain safe and stable excavation walls in accordance with OSHA requirements.

3.6 PROOFROLLING

A. Proofroll existing natural soil subgrade and fill subgrades within grass pavement areas prior to placement of fill in all grass pavement areas or installation of utilities, in two perpendicular directions. Proofrolling shall be accomplished with a minimum of 4 passes of a vibratory steel drum roller or plate compactor. Any soft, weaving or deleterious areas shall be locally excavated and replaced with

compacted structural fill. This work shall be performed under the direct observation of the Owner. The Owner may elect to waive this work within wet areas, if excessive disturbance is being created.

B. If the exposed subgrade is wet or otherwise susceptible to disturbance, the Owner may waive proofrolling requirements.

C. Comply with OSHA and local safety regulations.

3.7 PLACEMENT AND COMPACTION OF FILL

A. All areas within the limits of work shall be filled or excavated and filled with suitable materials to the subgrade lines and elevations as shown on the plans as herein specified. The use of on-site materials shall be permitted only if such materials meet the respective requirements of the Section 2.1, MATERIALS section of these Specifications and only when authorized by the Owner.

Off-site borrow material necessary to achieve design subgrades shall be provided at the Contractor's expense and shall also meet the requirements of the sub-part 2.1 section of these specifications. All fill materials, including existing suitable on-site materials and off-site borrow materials, shall be in conformance with the sub-part 2.1 section of these specifications.

. Grade and compact fill surface to readily shed water. Slope fill surfaces away from buildings a minimum of two inches in 10 feet, unless otherwise noted. Make grade changes gradual. Blend slope into level areas.

B. At completion of work, leave site completely free of excess fill materials.

C. The degree of compaction shall be based on a maximum dry density as determined by ASTM D-1557. Compaction of silt and clays and of fine sand and silty sand shall be per materials at moisture contents within the percentages of acceptable optimum moisture contents. The degree of compaction for fill placed in various areas shall be as follows:

	Areas	Maximum Degree of Compaction
1.	Controlled On-Site Fill	92%
2.	Processed Gravel under Pavilion Structure Areas	95%
3.	All fill outside and pavement bearing zones	92%
4.	General Landscaping (Topsoiling) Areas	90%

D. After all excavation has been completed, unless indicating otherwise herein, all new fill materials shall be deposited in loose lift thickness not exceeding twelve (12) inches in depth over the areas to be filled. In exceptional cases, the Owner may permit the first layer to be thicker than twelve (12) inches.

The entire area of each layer shall be compacted with the specified equipment to the specified degree as outlined herein. No subsequent layer shall be deposited until the specified compaction is achieved for the previous layer. If necessary to obtain the required compaction due to fill becoming to dry, water shall be added if authorized by the Owner.

Compacted fills shall be prevented from freezing by use of approved admixtures or by use of approved protection on the surface, or both.

E. Excavated material containing rock or stone greater than 6" in largest dimension is unacceptable as fill to within 24 inches of subgrade elevation in the proposed paving area.

Rock or stone less than 6" in largest dimension is acceptable as fill to within 24" of surface of proposed subgrade when mixed with suitable material.

Rock or stone less than 2" in largest dimension and mixed with suitable material is acceptable as fill within the upper 2' of proposed subgrade.

F. Procedures

1. Protect both fill and cut areas by grading surface topography to promote drainage away from these areas and by providing smooth surfaces which readily shed water.

   To the extent that it is practicable, each layer of fill shall be compacted to the specified density the same day it is placed.

2. Fill that is too wet for proper compaction shall be diced, harrowed, or otherwise dried to a proper moisture content for compaction to the required density. If the fill material cannot be dried within forty-eight (48) hours of placement, it shall be removed and replaced with drier fill.

   New fill shall have a moisture content which is within 5% of the optimum moisture content per ASTM D-1557 for Clay and Silt placed greater than 6 feet below pavement or embankment grades. (Within 3% of the optimum moisture content within the top six feet below pavement subgrades).

3.8 REUSE OF EXCAVATED MATERIALS

A. Inorganic on-site soils (i.e. glacial till and portions of existing fill materials) and broken rock which are excavated during site grading and installation of utilities may be reused as fill materials providing that the excavated materials meet the requirements of sub-part 2.1 of these specifications.

3.9 DEWATERING

A. General

1. This section specifies the designing, furnishing, installing, maintaining, operating and removing of a complete temporary dewatering system as required to lower and control water levels, hydrostatic pressures during construction; disposing of pumped water; construction, maintaining, observing and, except where indicated or required to remain in place, removing or filling of dewatering tubing and observation well; and instrumentation for control of the system.

2. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to keep the excavate areas sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures or cause excessive disturbance of underlying natural ground. The drainage of all water resulting from pumping shall be arranged so as not to cause damage to adjacent property. All requirements of local environmental or conservation authorities shall be satisfied with respect to discharge of pumped water.

3. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation, thereby decreasing the stability of excavated slopes, causing loss of material from beneath the slopes or bottom of the excavation and hauling characteristics of soil, and/or causing rupture or heaving of the bottom of an excavation.

B. Design Criteria

1. Design of dewatering system which will:

   a) Develop a substantially dry and workable subgrade for the execution of subsequent operations;

   b) Cause no damage due to the loss of ground from incompletely drained soils or removal of soil particles in the discharge.

2. Relocate dewatering procedures which cause, or threaten to cause, damage to new or existing facilities. These modifications will be at no additional expense to the Owner.

   Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities. These modifications will be at no additional expense to the Owner.

3. Maintain the artificially lowered groundwater table at least 2 feet below the proposed excavation levels.

C. Job Conditions

1. The Contractor shall repair damage, disruption or interference to existing properties, buildings, structures, utilities and other work resulting directly or indirectly from operations conducted under this contract, loss of ground due to incompletely drained soils, or removal of soil particles in discharge from the dewatering operations, to the Owner's satisfaction at no cost to the Owner.

2. Provide means for sampling dewatering system discharge so that water quality can be determined on a routine basis.

3. All dewatering tubing to be left in-place below building areas shall be pressure grouted with neat cement to prevent long-term loss of soil fines into the tubing with subsequent potential for advanced structure settlements.

D. Execution

1. Surface Drainage

a) Intercept and divert surface drainage away from the excavations and observation wells.

b) Design surface drainage systems so that they do not cause erosion on or off the site or cause unwanted flow of water.

c) Remove the surface drainage system when no longer required.

d) Remove debris and restore the site or sites to original conditions.

e) Surface drainage may be discharged into storm sewers provided that any necessary permits are obtained by the Contractor.

2. Drainage of Excavated Area

a) Collect surface water and seepage which may enter the excavation, and divert the water into a sump so that it can be drained or pumped away from the work area.

b) Install settling basins or other approved apparatus as required to reduce the amount of soil fine particles which may be carried by water diverted or pumped during construction.
Dispose of water in a manner approved by the Owner.

c) Backfill sumps and settling basins when no longer required with structural fill material, concrete or other material as approved by the Owner.

3. Dewatering of Subsurface Water

a) Dispose of subsurface water collected in a manner approved by the Owner in work areas.

b) Maintain continuous and complete effectiveness of the installation at all times.

c) Maintain water levels at such elevations that no damage to the structure can occur because of excessive or deficient hydrostatic pressure.

3.10 GRADING AND ELEVATIONS

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces shall be free from irregular surface changes.

1. Grassed areas: Finished areas scheduled to receive topsoil to within not more than 1” above or below the required subgrade elevations.

2. Pickleball Court Areas: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 1” above or below the required subgrade elevation.

B. The Drawings indicate, in general, the alignment and finished grade elevations of site structures, the Owner’s representative, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interference and other special conditions encountered. Grading between indicated final grades shall provide smooth, even surfaces, except as otherwise required. Minimum cover over pipes shall, in any case, conform to requirements of local and state agencies having jurisdiction.

C. Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities. These modifications will be at no additional expense to the Owner.

D. Maintain the artificially lowered groundwater table at least 2 feet below the proposed excavation levels.

3.11 REMOVAL OF SURPLUS MATERIALS

A. Remove all surplus earth, boulders, and rock materials including unsuitable miscellaneous fill materials and building debris, not needed to complete filling and grading to an approved area off-site and outside of the work limits. No on-site area shall be approved by the Owner. All surplus materials removed off-site and outside of the work limits shall become the property of the Contractor. Costs for transportation and disposal of surplus on-site and off-site materials shall be included in the Contractor’s Lump Sum Bid Price.

3.12 FIELD QUALITY CONTROL

A. Provide for observation by the Owner of bottom excavation and of bearing surfaces.

B. If tests indicate work does not meet specified requirements, remove work or recompact where appropriate, replace and retest at no cost to Owner.

3.13 PROTECTION

A. Protect excavations to prevent cave-in or loose soil or debris from falling into excavation. Observe OSHA standards for trenching and excavation.

B. Protect bottom of excavation and soil adjacent to and beneath foundations from freezing. Do not place fill over frozen soil.

C. Recompact fills subjected to vehicular traffic or other disturbances.

END OF SECTION 02200