February 4, 2022

Mr. Chris Monaco, P.G.
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7016

Re: Remedial Design for Oak Mitsui Site, 80 First Street, Hoosick Falls, New York
NYSDEC Site No. 442052
CHA Project No. 31861

Dear Mr. Monaco:

CHA Consulting, Inc. (CHA) is pleased to submit this Remedial Design (RD) for 80 First Street on behalf of Oak Mitsui Technologies LLC and Honeywell (the Parties). The RD includes engineering drawings and technical specifications. The RD has been prepared in accordance with the approved RD Work Plan with several changes outlined below.

The approved RD Work Plan identified a 1-foot soil cover would be placed over the existing asphalt/concrete surfaces on the site. After discussions with the Village of Hoosick Falls, and in consideration of potential redevelopment in the future, the design now includes a 2-foot cover. The 2-foot cover includes a 0.5-foot gravel underdrain, and then a 1.5-foot soil cover, with the upper 6 inches consisting of topsoil.

The approved RD Work Plan showed that a retaining wall on the east side of the site would be preserved with fall protection installed along the top. After further consideration, we are proposing to bury the wall with a 4:1 slope. This will create a safer site condition.

The Parties have reached an agreement with Pan Am Railroad which will allow the former coal chutes, which lie on railroad property, to be backfilled and graded into the existing soil cover.

The Parties have reached an agreement with the Village of Hoosick Falls that the Village will provide all the materials for the storm sewer and the Parties will install the storm sewer.

As we have communicated in a previous email, the Parties would plan on implementing the RD in the Spring of 2022 so we would appreciate your timely review of these documents.

Should you have any questions, please feel free to contact me at (804) 412-8841.

Sincerely,

Christopher Burns, Ph.D., P.G.
Vice President

cc: Larry Vosh (Oak Mitsui)
John Fatcheric (Oak Mitsui)
Sasa Jazic (Honeywell)
Ian Beilby (NYSDEC)

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TECHNICAL SPECIFICATIONS

Oak-Mitsui

Site # 442052
80 First Street
Hoosick Falls, New York

CHA Project Number: 31861

Prepared for:

Oak-Mitsui
80 First St
Hoosick Falls, New York

Prepared by:

III Winners Circle
Albany, New York 12205
Phone: (518) 453-4500

February 2022

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OAK-MITSUI

SITE #442052

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

SECTION 023219 – EXPLORATORY EXCAVATIONS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes exploratory excavations for the purpose of verifying the exact locations of underground utilities, structures, and other subsurface conditions.

1.2 SUBMITTALS

A. Sketches: Submit a sketch showing the location of the subsurface features which were uncovered in excavation, including the following information:
   1. Horizontal location of the subsurface feature relative to three individual surface features.
   2. Depth of feature below ground surface.
   3. Diameter, type, material, and condition of pipe or conduit.
   4. Orientation of pipe, conduit, or structure relative to other site features.
   5. Other pertinent dimensions.
   6. Exploratory excavation identification number.
   7. Discrepancies from design plan.

1.3 JOB CONDITIONS

A. Perform exploratory excavations only within the limits of the work, easements, and rights of way.

B. Excavate exploratory excavations with care to avoid damage to structures and utilities. Excavate by hand if necessary. Promptly repair any damaged utilities and structures at no cost to the Owner.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 GENERAL

A. Exploratory excavations shall be performed in advance of construction, where necessary, at the locations shown on the Drawings or where directed by the Engineer. Determine the exact location of all pipes, conduits, duct, or other interfering structures in both horizontal and vertical locations. Excavate to the depth and width necessary to accurately determine the locations of the utilities of interest.

B. Upon satisfactory execution of the required exploratory excavations the Engineer shall adjust pipe elevations, alignment, or design he feels necessary to minimize interferences.

C. Backfill exploratory excavations in accordance with Division 31 Section "Trenching and Backfilling."

D. Exploratory excavations performed in areas to be further disturbed shall be graded for temporarily traffic or use.

E. Exploratory Excavations performed in areas not to be further disturbed shall be restored to pre-construction conditions.

END OF SECTION

SECTION 023313 – UNDERGROUND UTILITY LOCATOR SERVICE

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes provisions for the underground locating services.

B. Underground utilities shall be located prior to any underground excavation work including, but not limited to, trenching, utility installation/repair, landscaping, post hole digging, and installation of signs.

1.2 REFERENCES

A. All published standards of the following associations/organizations, as mandated by specific state standards, shall be followed and applied as a minimum:
   1. American Society of Civil Engineers, CI/ASCE 38-02, “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data.”
   2. “American Public Works Association, Uniform Color Code.”

1.3 DEFINITIONS

A. Utility Quality Levels:
   1. Level A: Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Accuracy is typically set to 15 mm vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.
   2. Level B: Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality level B data should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.

1.4 DESCRIPTION

A. Retain an independent utility locator service company to field locate and mark existing underground utilities and service connections. The word "independent" as used above means a person not in the regular employment of the Contractor or having any vested interest in the Contractor's business.
   1. Level B locator service shall be performed in all project areas where excavations, regrading of the ground surface, and penetrations of the ground surface are to be performed.

B. Contractor shall include a minimum of 8 hours of Level A locator service to locate underground utilities as identified on the Contract Drawings or as identified during the Level B investigation that require more specific location, invert elevation, size, etc. Level A investigation shall only be performed at locations where shown or as directed.

C. Support and protect all utilities and service connections to remain in place.

D. The locator service shall field locate and mark underground utilities and service connections prior to excavation.

E. The Contractor shall be responsible for coordinating the extent of the areas of subsurface investigation required to locate all underground utilities and service connections in the areas of excavation.

F. All costs associated with the repair of underground utilities and service connections hit/damaged during the investigative work shall be the responsibility of the Contractor.

G. Utility location services shall be in accordance with the provisions of CIASCE 38-02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

1.5 SUBMITTALS

A. Quality Control Submittals:
   1. Submit detailed experience and qualification information about the underground utility locator service company and the persons that will be performing the Work. Detailed experience and qualification information shall include:
      a. Minimum of 5 years of experience in field locating, marking, and staking out of existing underground utilities and service connections.
         1) Qualifying Experience: Project information of 5 similar projects, which the locator service company, had worked on during the past 5 years. Information shall include for each project:
            a) Name and address of project.
            b) Dates worked on project.
            c) Name and telephone number of contact person at the project site for which the locator service was performed.
      b. Description of types of utility locator equipment (investigation equipment) that company will utilize to perform the underground utility investigation.
      c. Names of persons that the persons that will be performing the Work including the number of years of experience and training that the persons have in the use of the equipment. Include copy of training certificates for locator equipment proving the person performing the locator service are trained on the equipment being used.
   2. Submit Quality Control Submittals within 10 days of contract award and before any excavation occurs.

B. Schedules:
   1. Provide a schedule for the Underground Utility Locator Service Work required to the Engineer for approval. Upon approval of the schedule, notify the Engineer a minimum of 3 working days prior to performing the Work.

C. Investigative Report:
   1. Submit detailed written report and scaled drawings of the subsurface investigation, documenting all underground utilities and service connections located and identified.
      a. All documentation shall be referenced to existing data (horizontal and vertical) previously established.
   2. Submit Investigative Report at least 1 week prior to advancing construction within the scheduled areas of excavation within the Project Site.

1.6 COORDINATION AND SCHEDULING

A. Coordinate the Work to determine the extent of the areas of subsurface investigation required to locate all underground utilities and service connections in the areas of excavation.

B. Coordinate the Work with the Engineer to minimize utility disruptions and facility operations.

C. Within the areas of excavation, all underground utilities and service connections shall be field located and their locations marked at least 1 week prior to the performance of the required excavation work.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 WORK AREAS AND PERFORMANCE

A. If any underground utilities and service connections are hit or damaged during the Work, immediately inform the Engineer for directions on how to proceed.

B. The utility locator service investigative work, field location, and marking of underground utilities and service connections and submission of the Investigative Report must be completed before any excavation work can begin.
   1. Contractor shall maintain markings throughout the contract duration or until a time when directed (in writing) by the Engineer that maintaining of the markings are no longer required.

C. Provide subsurface investigation information, detailed written report, and drawings of the subsurface investigation, documenting all underground utilities and service connections located and identified prior to the performance of the required excavation work.

D. If during the Level B investigations, unknown underground utilities are discovered, the Engineer shall be notified as soon as possible or before the close of that business day.

E. Field marking of underground utilities shall follow the American Public Works Association (APWA) uniform color code:
   1. White: Proposed excavation.
   2. Pink: Temporary survey markings.
   3. Red: Electric power lines, cables, conduit and lighting cables.
   4. Yellow: Gas, oil, steam, petroleum and gaseous material.
   5. Orange: Communications, alarm, signal lines, cables, or conduit.
   6. Blue: Potable water.
   7. Purple: Reclaimed water, irrigation, and slurry lines.
   8. Green: Sewer and drain lines.

F. Surplus soils generated as part of the utility location activities and not utilized as backfill shall be placed beneath the cover system prior to the installation of the underdrain layer.

END OF SECTION

SECTION 024119 – SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of a building or structure.
   2. Demolition and removal of selected site elements.
   3. Repair procedures for selective demolition operations.
   4. Abandonment of monitoring and production wells.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 SUBMITTALS

A. Proposed Dust and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

B. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work with starting and ending dates for each activity.
   2. Interruption of utility services.
   3. Coordination for shutoff, capping, and continuation of utility services.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA and NYSDEC notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: New York State Department of Environmental Conservation CP-43 – Groundwater Monitoring Well Decommissioning Policy.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to Owner and to authorities having jurisdiction.

3.3 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.
   3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

3.4 POLLUTION CONTROLS

A. Dust Control: Use water mist, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
   1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain using power-driven saw then remove masonry between saw cuts.

D. Well to be Abandoned: Perform well abandonment work in accordance with the requirements of New York State Department of Environmental Conservation CP-43 – Groundwater Monitoring Well Decommissioning Policy.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Do not allow demolished materials to accumulate in on-site stockpiles. Crush concrete, asphalt and other materials deemed suitable by Engineer for use as grading fill under the remedial cover system.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials deemed unsuitable by the Engineer for on-site use in the construction and legally dispose off Owner's property.

END OF SECTION

SECTION 310513.14 – COVER SOIL LAYER

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes furnishing, placing, compacting, and testing the cover soil layer as shown on the Contract Drawings and as specified herein.

B. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.

C. The Engineer will determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. The latest edition of the following standards and regulations, as referenced herein, shall be applicable.
   1. American Society for Testing and Materials (ASTM).
   2. Standard Specification for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO).
   3. 6 NYCRR Part 360 Solid Waste Management Facilities.
   4. New York State of Environmental Conservation (NYSDEC) Division of Environmental Remediation Policy 10 (DER-10), Technical Guidance for Site Investigation and Remediation.
   5. Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

B. The Contractor shall comply with the requirements for soil erosion and sedimentation control, and other requirements of governmental authorities having jurisdiction, including the State of New York.

C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils with the specifications.

1.3 SUBMITTALS

A. The Contractor shall furnish representative earth materials to the testing laboratory for analysis and report, as directed by the Engineer or as outlined in the specifications.

B. Descriptive information on compaction equipment to be used for construction of the cover soil layer, including equipment proposed for use in confined areas.

C. Plan detailing proposed borrow source, borrow source prequalification testing data, and estimated borrow source quantity. A copy of the NYSDEC mining permit for the borrow source shall be included in the plan.

D. Schedule of placement.

E. Test reports for prequalification and construction quality control/quality assurance testing shall be submitted to both the Contractor and Engineer.

1.4 PRODUCT HANDLING

A. Soil materials shall be excavated from the borrow source, transported, conditioned, placed, and stockpiled in such a manner so as to prevent contamination, segregation, and excessive wetting. Materials that have become contaminated, excessively wet, or segregated shall not be used and shall be removed from the site.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cover Soil: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic, frozen or other deleterious materials, conforming to the following requirements:

SIEVE	PERCENT PASSING
1"	100
No. 40	10 - 70
No. 200	10 - 20

1. Fines passing No. 200 sieve shall be non-plastic.
2. Particle size analysis shall show no gap grading.
3. Maximum particle size of material shall be classified as sub-rounded to well-rounded.

B. Cover Soil shall meet the Unrestricted Use Soil Cleanup Objectives included in NYSDEC Division of Environmental Remediation DER-10, Technical Guidance for Site Investigation and Remediation; and Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

PART 3 – EXECUTION

3.1 BORROW SOIL PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. General:
1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of material and analytical tests. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed in this section shall be performed on samples obtained. Composite samples shall be obtained as required in this section for analytical testing. Test results shall be provided to the Engineer a minimum of 2 weeks prior to start of cover soil layer construction for approval of borrow source by Engineer and NYSDEC.

B. Material Testing:
1. Particle Size Analysis:
   a. Method: ASTM D422.
   b. Number of Tests: One (1) per sample; three samples per potential source.
   c. Acceptance Criteria: Gradation within specified limits.
2. Atterberg Limits Determinations:
   a. Method: ASTM D4318.
   b. Number of Tests: One per sample; three samples per potential source.
   c. Acceptance Criteria: Plasticity index within specified limits.

3. Moisture Content:
    a. Method: ASTM D2216.
    b. Number of Tests: One per sample; three samples per potential source. Test shall be performed on sample specimen preserved at natural (undisturbed) moisture condition.
4. Maximum Density Determination:
    a. Method: ASTM D698 - Standard Proctor.
    b. Number of Tests: One per sample, equaling three samples per potential source.
5. Internal angle of soil friction and cohesion:
    a. Method: ASTM D3080 - Direct shear test.
    b. Number of Tests: One test series per sample. Test series shall consist of three identical specimens from each sample subjected to direct shear test using normal (vertical) stresses of approximately 1 pounds per square inch (psi), 2 psi and 4 psi. Test specimens shall be compacted to 90 percent of standard Proctor maximum dry density.
        1) Total number of specimens shear tested per sample: 3.
        2) Total number of specimens shear tested per potential borrow source: 3.
    c. Acceptance Criteria: Friction angle greater than or equal to 27 degrees.

C. Analytical Testing:
1. All cover soil to be imported for use as backfill shall be sampled and analyzed for the parameters listed below:
    a. Target Compound List (TCL) Volatile Organic Compounds (VOCs) via USEPA Method 8260.
    b. TCL Semivolatile Organic Compounds (SVOCs) via USEPA Method 8270.
    c. TCL Pesticides via USEPA Method 8081.
    d. TCL Herbicides via USEPA Method 8151.
    e. Polychlorinated Biphenyls (PCBs) by USEPA Method 8082.
    f. Target Analyte List (TAL) Metals by USEPA Method 6010.
    g. Per- and polyfluoroalkyl substances (PFAS) by USEPA Method 537.1.
    h. 1,4-Dioxane by USEPA Method 8270 SIM.
2. Sampling shall include a combination of discrete and composite samples. Discrete/grab samples shall be taken directly from the soil material and shall be analyzed for VOCs only. Composite samples shall consist of collecting discrete samples from 4 to 5 random locations and be mixed/homogenized. Composite samples shall be analyzed for the remaining above-referenced parameters.
3. Sampling Frequency:
        1) Soil imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above.
        2) 2. Material sources other than a virgin mine/pit in accordance with the following:

Number of Soil Samples Required for Imported Soil			
Contaminant	**VOCs**	**All Other Parameters**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	

Number of Soil Samples Required for Imported Soil			
Contaminant	**VOCs**	**All Other Parameters**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

4. Soil with less than 10 percent by weight passing a standard No. 80 sieve shall not be subject to the above sampling requirements if a letter from the source owner is provided which states that the source is a virgin material and the source area was never utilized for commercial or industrial purposes.

3.2 PLACEMENT AND COMPACTION

A. General:

1. Remove or recompact any soft or loose soils as determined by the Engineer prior to filling. Particular emphasis shall be placed on obtaining a firm, compacted surface on slopes.
2. Do not place fill material on surfaces that are muddy, frozen, or contain frost, ice, ponded water, or extraneous debris.
3. When work is suspended during periods of freezing weather, measures shall be taken to prevent fill already in place from freezing. Upon resumption of work after any inclement weather, prepare the exposed surface by proof rolling to identify any zones of soft/loose soils. Soft/loose materials or frozen soils shall be removed and replaced.
4. The distribution of materials throughout the cover soil layer shall be such that the layer will be free from lenses, pockets, streaks, and layers of materials differing substantially from the surrounding materials.
5. The placing of material shall be done to obtain a layer of uniform thickness without spaces between successively deposited loads.
6. Compaction of each layer shall proceed in a systematic, orderly, and continuous manner to ensure the specified coverages by the compaction equipment.
7. Materials which cannot be compacted by the approved rolling compaction equipment because of interferences shall be compacted with smaller approved compactors to a density at least equal to the density achieved in adjacent areas by the rolling compaction equipment and methods. Single pad vibratory base plate compactors shall weigh not less than 200 pounds and have a vibration frequency not less than 1600 cycles per minute.
8. Should the fill surface become rutted or uneven subsequent to compaction, it shall be releveled and recompacted before placing the next layer of material.
9. Fill on side slopes shall be placed in lifts parallel with the sloping surface.

B. Cover Soil Layer Placement and Compaction:

1. Place fill material in layers not less than 12 inches in depth. Lift height shall be governed by the ability of the compaction equipment to obtain the required compaction with 12 inches as a maximum lift height.
2. Moisture content of the material during compaction shall be between 3 percent dry and 3 percent wet of optimum moisture content as determined by ASTM D698 (Standard Proctor).
3. All fill shall be thoroughly and satisfactorily compacted to at least 90 percent of the Standard Proctor maximum dry density of the material used (ASTM D698).

4. Where fill must be moisture conditioned before compaction, uniformly apply water to the surface of each layer of fill. Prevent ponding or other free water on the surface subsequent to, or during, compaction operations.
5. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to the specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.
6. Rolling compaction equipment shall be heavy smooth drum in vibratory equipment capable of achieving the intended result. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be approved. Furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment and necessary to determine its classification and performance characteristics.
7. Compaction equipment shall make a minimum of four (4) complete passes over the entire area of each lift.
8. The Contractor shall grade partially completed fill areas for drainage and thoroughly compact and smooth the surface at the end of each workday.
9. For areas not accessible to heavy rolling compaction equipment, fill materials shall be placed in horizontal layers not to exceed 12 inches in loose thickness and compacted with smaller rolling compaction equipment or hand operated equipment, as approved by the Engineer.
10. The final surface of the cover soil layer shall be uniform and suitable for placement of the next subsequent layer.

3.3 FIELD QUALITY CONTROL

A. The Contractor's Testing Laboratory shall perform testing of cover soil layer fill materials to ensure compliance with these specifications."

B. In-place density and moisture content tests shall be performed on in-place fill material in accordance with ASTM D1556, D2167 or D2922. In-place density shall be determined at a depth of 6 inches below grade. At least 9 tests shall be performed per acre per lift of material placed and at least one test shall be performed each day. Field test locations shall be subject to approval or relocation by the Engineer.

C. Tests for moisture content shall be performed on the in-place fill at a rate of nine tests per acre per lift. If nuclear methods or microwave methods are used to determine field moisture content, one oven-dry moisture content determination (ASTM D2216) shall be performed per acre per lift for calibration. Sample shall be obtained from a location immediately adjacent to an in-place density location.

D. One particle size analysis (ASTM D422) and one standard Proctor compaction test (ASTM D698) shall be completed for every 2,500 cubic yards of material placed.

E. The Engineer may direct additional tests to establish gradation, Atterberg limits, permeability, maximum density, in-place density, and water content as required by working conditions, or changes in borrow source material at the Contractor's expense.

F. Acceptance Criteria:
1. Acceptance Criteria: The criteria for acceptability of in-place fill shall be in situ dry density and moisture content. Minimum dry density for all fill shall be 90 percent of the standard Proctor maximum dry density. The in-place moisture content shall be between 5 percent dry and 5 percent wet of optimum as determined by the standard Proctor compaction method

(ASTM D698). If a test fails to qualify, the fill shall be further reworked, compacted, and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

3.4 CLEAN UP

A. Provide and maintain protection of newly filled areas against damage. Upon completion or when directed, correct all damaged and deficient work by building up low spots and remove temporary protections, fencing, shoring and bracing if any.

B. Remove all surplus excavated material not required for filling and backfilling and legally dispose of same away from premises.

C. Leave the premises and work in clean, satisfactory condition, ready to receive subsequent operations.

END OF SECTION

SECTION 310519.13 – GEOTEXTILES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the installation of separation/stabilization fabric as shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. The latest edition of the following standards, as referenced herein, shall be applicable.
   1. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

A. Product Data:
   1. Submit Manufacturer's material specifications, product literature and installation instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Deliver sufficient materials to the site to prevent interruption of the work.
   2. All materials shall be inspected by Contractor upon delivery. Contractor shall notify Engineer of any damage. Products received at the site torn, with holes, deteriorated, or otherwise damaged will not be approved and shall be returned and replaced at no expense to the Owner.

B. Storage:
   1. All material shall be stored in strict accordance with the manufacturer's recommendations and as approved by the Engineer.
   2. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements, if stored outdoors, elevate, and protect geotextile with waterproof cover.

C. Handling:
   1. All material shall be handled in strict accordance with the manufacturer's recommendations and as approved by the Engineer.

PART 2 – PRODUCTS

2.1 WOVEN GEOTEXTILE

A. Stabilization Fabric: To be used as demarcation of the bottom of corridors of clean soil backfill.

B. Composed of polymeric yarn interlaced to form a planar structure with uniform weave pattern.

C. Calendared or finished so yarns will retain their relative position with respect to each other.

D. Polymeric Yarn: Long-chain synthetic polymers (polyester or polypropylene) with stabilizer or inhibitors added to make filament resistant to deterioration due to heat and ultraviolet light exposure.

E. Sheet Edges: Selvaged or finished to prevent outer material from separating from sheet.

F. Unseamed Sheet Width: Minimum 12 feet.

G. Physical Properties: Conform to requirements noted below:

PROPERTY	DESIGN VALUE	TEST METHOD
Tensile Strength	315 pounds	ASTM D4632
Elongation	12 percent	ASTM D4632
Trapezoidal Tear	113 pounds	ASTM D4533
CBR Puncture Strength	900 pounds	ASTM D6241
A.O.S.	40 (US Sieve)	ASTM D4751
Permittivity	.05 sec^{-1}	ASTM D4491

2.2 NONWOVEN GEOTEXTILE

A. Separation/Filtration Fabric: To be used for separation of dissimilar materials.

B. Pervious sheet of polyester, polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous fibers held together through needle-punching, spun-bonding or resin-bonding.

C. Geotextile Edges: Selvaged or otherwise finished to prevent outer material from pulling away from geotextile.

D. Unseamed Sheet Width: Minimum 12 feet.

E. Physical Properties: Conform to the minimum requirements noted below:

PROPERTY	DESIGN VALUE	TEST METHOD
Tensile Strength	160 pounds	ASTM D4632
Elongation	50 percent	ASTM D4632
Trapezoidal Tear	60 pounds	ASTM D4533
CBR Puncture Strength	400 pounds	ASTM D6241
A.O.S.	70 (US Sieve)	ASTM D4751
Permittivity	1.4 sec^{-1}	ASTM D4491

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall be responsible for the installation and seaming of geotextile fabric in accordance with the specifications and the manufacturer's recommendations, as approved by the Engineer.

3.2 SUBGRADE PREPARATION

A. Surfaces to be covered with geotextile fabric shall be smooth and free of rocks, sticks, roots, sharp objects, and all debris that may damage the fabric. The surface to be covered shall be firm and unyielding, with no sudden changes or breaks in grade. There shall be no standing water or excessive moisture on the surface when the fabric is placed.

B. The compacted subgrade shall be maintained in a smooth, uniform, and compacted condition during installation of the fabric.

3.3 GEOTEXTILE INSTALLATION

A. The fabric shall be cleaned of all debris or other materials that may negatively affect the fabric's performance.

B. Mechanical equipment shall not be permitted to operate directly on the fabric unless authorized to do so by the manufacturer and approved by the Engineer.

C. Geotextile Placement:
   1. Fabric shall be placed as recommended by the manufacturer and approved by the Engineer on surfaces which have been prepared to conform with these Specifications and found acceptable for fabric installation.
   2. The fabric shall be placed as smooth and wrinkle-free as possible.
   3. When installing geotextile in trenches, swales, ditches, etc., overlap geotextile in the direction of flow.
   4. All areas of fabric damaged during installation as determined by the Engineer shall be repaired or replaced by the Contractor as specified at no additional cost to the Owner. Should the fabric be damaged during any step of the installation, the damaged section shall be repaired by covering it with a piece of fabric which extends at least 24 inches in all directions beyond the damaged area. The fabric shall be secured by sewing or bonding as approved by the Engineer.
   5. At time of installation, fabric will be rejected if it has defects, ribs, holes, flaws, deterioration, or damage incurred during manufacture, transportation, handling, or storage. Damaged materials shall be removed and replaced at no additional cost to the Owner.
   6. Fabric shall be placed with long dimension down slope.
   7. Fabric shall be protected at all times during construction from contamination by surface run-off and any fabric so contaminated shall be removed and replaced with uncontaminated fabric.

D. Seams and Overlaps of Geotextile:
   1. All overlaps shall be a minimum of 18 inches (450 mm).
   2. Sewn seams shall be overlapped a minimum of three inches.

3.4 COVER MATERIALS OVER GEOTEXTILES

A. Materials shall be placed on geotextiles as shown on the Drawings. During back-dumping and spreading, a minimum depth of 12 inches of material shall be maintained at all times between the fabric and wheels of trucks or spreading equipment. All equipment used in spreading or traveling on the cover layer for any reason shall exert low ground pressures and shall be approved by the manufacturer and Engineer. Dozer blades, etc., shall not make direct contact with the fabric; however, if tears occur in the fabric during the spreading operation, the granular material shall be cleared from the fabric and the damaged area repaired as previously described.

B. The material shall be spread in the direction of fabric overlap. Large fabric wrinkles which may develop during the spreading operations shall be folded and flattened in the direction of the spreading. Occasionally, large folds may reduce the fabric overlap width. Special care shall be given to maintain proper overlap and fabric continuity.

C. All equipment spreading cover material or traveling on the cover layer shall avoid making sharp turns, quick stops, or quick starts.

D. Fabric shall be covered as soon as possible after placement to minimize exposure to sunlight. Fabric shall not be exposed for more than 5 days.

3.5 DISPOSAL OF SCRAP MATERIALS

A. On completion of installation, the Contractor shall legally dispose of all trash and scrap material off-site or in a location approved by the Owner and Engineer, remove equipment used in connection with the work herein, and shall leave the premises in a neat acceptable manner.

END OF SECTION

SECTION 311000 – SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Protecting existing trees, shrubs, groundcovers, plants, and grass to remain.
   2. Removing existing trees, shrubs, groundcovers, plants, and grass.
   3. Clearing and grubbing.
   4. Removing above-grade and below-grade site improvements.

1.2 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots.

1.3 MATERIAL OWNERSHIP

A. Except for excess stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 QUALITY ASSURANCE

A. Stake limits of clearing, grubbing, and stripping, prior to commencing of work.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Protect areas outside limits of disturbance from encroachment by construction personnel or equipment, regardless of property Ownership. Access shall be by specific, written permission or easement only.

C. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
   1. Do not proceed with work on adjoining property until directed by Engineer.

D. Utility Locator Service: Properly notify utility locator service for area where Project is located before site clearing in accordance with local protocol.

E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

F. Contractor shall verify existing grades prior to performing work under this section. If existing grades are at variance with the drawings, notify the Owner and receive instructions prior to proceeding. No additional compensation will be considered resulting from grade variances once site clearing has commenced.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag, fence and protect trees and vegetation to remain or to be relocated.

C. Remove branches from trees that are to remain, if required to clear new construction and only if specifically approved by Engineer.
   1. Where directed by Engineer, extend pruning operation to restore natural shape of entire tree.
   2. Cut branches and roots, if required, with sharp pruning instruments; do not break or chop.

D. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

A. Erect and maintain temporary fencing around tree drip line before starting site clearing. Remove fence when construction is complete.
   1. Do not store construction materials, debris, or excavated material within fenced area.
   2. Do not permit vehicles, equipment, or foot traffic within fenced area.
   3. Maintain fenced area free of weeds and trash.

B. Do not machine excavate within tree drip line.

C. Where excavation for new construction is required within tree drip line, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

D. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth.
   1. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
   2. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.

3. Backfill with soil as soon as possible.
4. Where trenching for utilities is required within drip line, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots; cut only smaller roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.

E. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Engineer and acceptable to the Owner.

3.3 UTILITIES

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Engineer and Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer written permission.

B. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

A. Completely remove obstructions, trees, shrubs, stumps, roots, grass, and other vegetation to permit installation of new construction.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Use only hand methods for grubbing within tree protection zone.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations in accordance with Section "Earth Moving" unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding a loose depth of 12 inches and compact each layer to a density equal to adjacent original ground.

3.5 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated on the Drawings.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.6 DISPOSAL

A. Burning of debris onsite is not permitted.

B. Remove surplus unsuitable materials, and legally dispose of them off Owner's property.

C. Dispose of all diseased Elmwood within 4 days after cutting by burning or by other methods approved by the Department of Environmental Conservation.

END OF SECTION

SECTION 312000 – EARTH MOVING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the preparation of the site, protection, excavation, embankment, drainage, dewatering, for site grading, as shown on the Drawings, and as herein specified.

B. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.

C. The Engineer shall determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. Reference Standards:
   1. The latest edition of the following standards, as referenced herein, shall be applicable.
      a. "Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering."
      b. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
      c. New York State of Environmental Conservation (NYSDEC) Division of Environmental Remediation Policy 10 (DER-10), Technical Guidance for Site Investigation and Remediation.
      d. Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

B. The Contractor shall comply with the requirements for soil erosion and sedimentation control, and other requirements of governmental authorities having jurisdiction, including the State of New York.

C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications.

1.3 SUBMITTALS

A. Samples:
   1. The Contractor shall furnish earth materials to the testing laboratory for analysis and report, as directed by the Engineer, or as outlined in the specifications.

B. Test Results:
   1. The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and the Engineer.

1.4 PROJECT REQUIREMENTS

A. Notify the Engineer of any unexpected subsurface condition.

B. Protection of Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate support and protection during earthwork operations, comply with OSHA requirements.
2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.
3. Provide a minimum of 48 hours' notice to the Owner and receive written notice to proceed before interrupting any utility.
4. Demolish and completely remove from the site any existing underground utilities designated to be removed as shown on the Drawings or as specified in Section "Site Clearing."
5. Repair any damaged utilities as acceptable to the Engineer, at no additional cost to the Owner.

C. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work.
2. Operate warning lights as recommended by authorities having jurisdiction.
3. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
4. Perform excavation within drip-line of large trees to remain by hand and protect the root system from damage or dry-out to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint root cuts of 1-inch diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic, frozen or other deleterious materials.

SIEVE	PERCENT PASSING
2"	100
No. 40	0 - 70
No. 200	0 - 30

1. Fines passing No. 200 shall be non-plastic.
2. Particle size analysis shall show no gap grading.

B. Imported General Fill required for the project shall meet the Unrestricted Use Soil Cleanup Objectives included in NYSDEC Division of Environmental Remediation DER-10, Technical Guidance for Site Investigation and Remediation; and Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

C. Coarse aggregates as specified on the Drawings shall meet the requirements of the "Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering."

PART 3 – EXECUTION

3.1 BORROW SOIL PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. General:
1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of material and analytical tests. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed in this section shall be performed on samples obtained. Composite samples shall be obtained as required in this section for analytical testing. Test results shall be provided to the Engineer a minimum of 2 weeks prior to start of cover soil layer construction for approval of borrow source by Engineer and NYSDEC.

B. Material Testing:
1. Particle Size Analysis:
   a. Method: ASTM D422.
   b. Number of Tests: One (1) per sample; three samples per potential source.
   c. Acceptance Criteria: Gradation within specified limits.
2. Atterberg Limits Determinations:
   a. Method: ASTM D4318.
   b. Number of Tests: One per sample; three samples per potential source.
   c. Acceptance Criteria: Plasticity index within specified limits.
3. Moisture Content:
   a. Method: ASTM D2216.
   b. Number of Tests: One per sample; three samples per potential source. Test shall be performed on sample specimen preserved at natural (undisturbed) moisture condition.
4. Maximum Density Determination:
   a. Method: ASTM D698 - Standard Proctor.
   b. Number of Tests: One per sample, equaling three samples per potential source.

C. Analytical Testing:
1. All general fill to be imported for use as backfill shall be sampled and analyzed for the parameters listed below:
   a. Target Compound List (TCL) Volatile Organic Compounds (VOCs) via USEPA Method 8260.
   b. TCL Semivolatile Organic Compounds (SVOCs) via USEPA Method 8270.
   c. TCL Pesticides via USEPA Method 8081.
   d. TCL Herbicides via USEPA Method 8151.
   e. Polychlorinated Biphenyls (PCBs) by USEPA Method 8082.
   f. Target Analyte List (TAL) Metals by USEPA Method 6010.
   g. Per- and polyfluoroalkyl substances (PFAS) by USEPA Method 537.1.
   h. 1,4-Dioxane by USEPA Method 8270 SIM.
2. Sampling shall include a combination of discrete and composite samples. Discrete/grab samples shall be taken directly from the soil material and shall be analyzed for VOCs only. Composite samples shall consist of collecting discrete samples from 4 to 5 random locations and be mixed/homogenized. Composite samples shall be analyzed for the remaining above-referenced parameters.

3. Sampling Frequency:

1) Soil imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above.

2) 2. Material sources other than a virgin mine/pit in accordance with the following:

Number of Soil Samples Required for Imported Fill			
Contaminant	**VOCs**	**All Other Parameters**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

4. Soil with less than 10 percent by weight passing a standard No. 80 sieve shall not be subject to the above sampling requirements if a letter from the source owner is provided which states that the source is a virgin material, and the source area was never utilized for commercial or industrial purposes.

3.2 PREPARATION

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

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to the Owner.

C. Establish location and extent of utilities before commencement of grading operations.

3.3 EXCAVATION

A. Excavation shall consist, in general, of the excavation of whatever substance is encountered to the lines, grades, and sections shown on the Drawings including excavation as necessary for grading and other similar features.

B. All suitable materials removed in excavation shall be used in the construction of embankments, subgrade, slopes, and at such other places as directed. The Engineer shall be the sole judge of what constitutes suitable material.

C. During construction, the grading operations shall be executed in such a manner that the excavation will be well drained at all times. All grading shall be finished on neat, regular lines conforming to the sections and contours shown on the Plans.

D. Removal of materials beyond the indicated subgrade elevations, without authorization by the Engineer, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

E. Excavation shall be performed in proper sequence with all other associated operations.

F. Maintain the slopes of excavation in a safe condition until completion of the grading operation.

G. All excavation work shall be inspected and approved by the Engineer before proceeding with construction.

H. Any excess excavation shall be removed from the site to disposal areas at the Contractor's expense.

3.4 FILL

A. All site fill shall be “general fill” unless otherwise shown on the Drawings or directed by the Engineer.

B. Before depositing fills, the surface of the ground shall be cleared of all refuse, brush, and large stones. Conform to Section "Site Clearing."

C. Prior to placing fill over undistributed material, scarify to a minimum depth of 6 inches.

D. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply or where the slope ratio of the original ground is steeper than 2 horizontal to 1 vertical, the bank shall be stepped or benched.

E. The original ground shall be proof rolled until the underlying soil is thoroughly compacted to the satisfaction of the Engineer before any filling is begun. A steel-wheel tandem roller weighing 8 to 10 tons or equipment capable of obtaining the same effort shall be used to obtain a thoroughly compacted subgrade. Remove or recompact any soft or loose soils as determined by the Engineer prior to filling.

F. A thoroughly and satisfactorily subgrade is defined as having a minimum dry density of 9 percent of the maximum density of the material used. The subgrade material shall be compacted at a moisture content suitable for obtaining the required density.

G. Place backfill and fill materials in layers not more than 12 inches in loose depth unless shown otherwise on the Drawings. Lift height shall be governed by the ability of the compaction equipment to obtain the required compaction with 12 inches as a maximum lift height. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost, ice, ponded water, or extraneous debris.

H. When work is suspended during periods of freezing weather, measures shall be taken to prevent fill already in place from freezing. Upon resumption of work after any inclement weather, prepare the exposed surface by proof rolling to identify any zones of soft/loose soils. Soft/loose materials or frozen soils shall be removed and replaced by compacted granular fill.

I. Moisture Control:
   1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, or during, compaction operations.
   2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing

until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.

J. All fill shall be thoroughly and satisfactorily compacted to 90 percent of the maximum density of material used.

3.5 GRADING

A. The present and finished grade lines are shown on the Drawings. Grade over the entire area, as shown on the drawings, shall be to the finished subgrade levels. Upon completion of this work, all unsuitable debris shall be cleaned out and removed from the premises.

B. All cutting, filling, backfilling and grading necessary shall be done to bring the area to the following grade or subgrade levels:
   1. For areas to be topsoiled and seeded to within 6 inches of the finished grade.
   2. For other surface treatments as detailed on the Drawings.

C. Sufficient grading must be done during the progress of the work so that the entire site shall be well drained and free from water pockets.

D. Finish grading to prepare the site for topsoil and seeding shall be done after construction of structures and other improvements is substantially complete.

3.6 COMPACTION EQUIPMENT

A. Compaction equipment used for the Work is subject to approval by the Engineer. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be approved. Furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment and necessary to determine its classification and performance characteristics.

3.7 DRAINAGE AND DEWATERING

A. Prevent surface, subsurface or ground water from flowing into excavation and from flooding project area, as well as surrounding areas.

B. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to the stability of subgrades.

C. Provide and maintain the pumps, well points, sumps, suction and discharge lines, and other dewatering components necessary to convey water away from excavations.

D. Provide and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations by dewatering, to collection or run-off areas.

3.8 FIELD QUALITY CONTROL

A. Notify the Engineer at least one (1) working day in advance of all phases of filling and backfilling operations.

B. Compaction testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:

1. In-place relative density:
    a. Method: ASTM D1556, D2167 or D2922.
    b. Number of Tests: One (1) per vertical lift.

C. The Engineer may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.

D. Acceptance Criteria: The sole criterion for acceptability of in-place fill shall be in situ dry density. Minimum dry density for all fill or backfill shall be 90 percent of the maximum dry density. If a test fails to qualify, the fill shall be further compacted and retested. Subsequent test failures shall be followed by removal and replacement of the material.

3.9 CLEAN UP

A. Provide and maintain protections or newly filled areas against damage. Upon completion or when directed, correct all damaged and deficient work by building up low spots and remove any temporary protections.

B. Leave the premises and work in clean, satisfactory condition, ready to receive subsequent operations.

END OF SECTION

SECTION 312333 – TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the excavation of trenching, backfilling, compacting, dewatering, excavation support and disposal, as shown on the Contract Drawings, and as herein specified.

B. The Engineer will determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. Reference Standards:
   1. The latest edition of the following standards, as referenced herein, shall be applicable.
      a. "Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering."
      b. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
      c. American Society for Testing and Materials (ASTM).
      d. National Electric Code (NEC).
      e. New York State of Environmental Conservation (NYSDEC) Division of Environmental Remediation Policy 10 (DER-10), Technical Guidance for Site Investigation and Remediation.
      f. Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

B. The Contractor shall comply with the requirements for soil erosion and sedimentation control and other requirements of governmental authorities having jurisdiction, including the State.

C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications.

1.3 SUBMITTALS

A. Samples:
   1. The Contractor shall furnish representative earth materials to the testing laboratory for analysis and report, as directed by the Engineer, or as outlined in the specifications.

B. Test Results:
   1. The testing laboratory shall submit written reports of all tests, investigations, findings, and recommendations to the Contractor and the Engineer.

1.4 PROJECT REQUIREMENTS

A. Notify the Engineer of any unexpected subsurface condition.

B. Protect excavations by shoring, bracing, sheet piling, or by other methods, as required to ensure the stability of the excavation. Comply with OSHA requirements.

C. Underpin or otherwise support structures adjacent to the excavation, which may be damaged by the excavation. This includes service lines.

D. Protection of Existing Utilities:
   1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Comply with OSHA requirements.
   2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.
   3. Provide a minimum of 48 hours' notice to the Owner and receive written notice to proceed before interrupting any utility.

E. Demolish and completely remove from the site any existing underground utilities designated to be removed, as shown on the Drawings or as specified.

F. Repair any damaged utilities as acceptable to the Owner, Engineer, and utility company at no additional cost to the Owner.

G. Contractor shall comply with maintenance and protection requirements as approved by the authority having jurisdiction.

H. Protection of Persons and Property:
   1. Barricade open excavations occurring as part of this work and post with warning lights, if required.
   2. Operate warning lights as recommended by authorities having jurisdiction.
   3. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
   4. Perform excavation within dripline of trees to remain by hand and protect the root system from damage or dry-out to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint cut roots of 1-inch diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Pipe Zone Bedding: Select mixture of graded crushed stone, free from organic, frozen or other deleterious materials, conforming to the requirements of NYSDOT Section 703-02 and meeting the following gradation requirements (NYSDOT Size 2):

SIEVE	PERCENT PASSING
1-1/2"	100
1"	90 – 100
1/2"	0 – 15

B. Pipe Zone Backfill: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, conforming to the requirements of NYSDOT Section 304 and meeting the following gradation requirements (NYSDOT Subbase Type 4):

SIEVE	PERCENT PASSING
2"	100
1/4"	30 – 65

No. 40	5 – 40
No. 200	0 – 10

C. Suitable Material: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, conforming to the requirements of NYSDOT 203-2.02C and meeting the following gradation requirements:

SIEVE	PERCENT PASSING
4"	100
No. 40	0 – 70
No. 200	0 – 15

D. Imported materials required for the project shall meet the Unrestricted Use Soil Cleanup Objectives included in NYSDEC Division of Environmental Remediation DER-10, Technical Guidance for Site Investigation and Remediation; and Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

PART 3 – EXECUTION

3.1 BORROW SOIL PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. General:
1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of material and analytical tests. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed in this section shall be performed on samples obtained. Composite samples shall be obtained as required in this section for analytical testing. Test results shall be provided to the Engineer a minimum of 2 weeks prior to start of cover soil layer construction for approval of borrow source by Engineer and NYSDEC.

B. Material Testing:
1. Particle Size Analysis:
   a. Method: ASTM D422.
   b. Number of Tests: One (1) per sample; three samples per potential source.
   c. Acceptance Criteria: Gradation within specified limits.
2. Maximum Density Determination:
   a. Method: ASTM D698 - Standard Proctor.
   b. Number of Tests: One per sample, equaling three samples per potential source.

C. Analytical Testing:
1. All soil material to be imported for use as bedding and backfill shall be sampled and analyzed for the parameters listed below:
   a. Target Compound List (TCL) Volatile Organic Compounds (VOCs) via USEPA Method 8260.
   b. TCL Semivolatile Organic Compounds (SVOCs) via USEPA Method 8270.
   c. TCL Pesticides via USEPA Method 8081.
   d. TCL Herbicides via USEPA Method 8151.
   e. Polychlorinated Biphenyls (PCBs) by USEPA Method 8082.
   f. Target Analyte Metals (TAL) Metals by USEPA Method 6010.
   g. Per- and polyfluoroalkyl substances (PFAS) by USEPA Method 537.1.

h. 1,4-Dioxane by USEPA Method 8270 SIM.

2. Sampling shall include a combination of discrete and composite samples. Discrete/grab samples shall be taken directly from the soil material and shall be analyzed for VOCs only. Composite samples shall consist of collecting discrete samples from 4 to 5 random locations and be mixed/homogenized. Composite samples shall be analyzed for the remaining above-referenced parameters.

3. Sampling Frequency:

   1) Soil imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above.

   2) 2. Material sources other than a virgin mine/pit in accordance with the following:

Number of Soil Samples Required for Imported Materials			
Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

4. Soil with less than 10 percent by weight passing a standard No. 80 sieve shall not be subject to the above sampling requirements if a letter from the source owner is provided which states that the source is a virgin material, and the source area was never utilized for commercial or industrial purposes.

3.2 PREPARATION

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

B. Maintain benchmarks and other elevation control points; re-establish if disturbed or destroyed at no additional cost to the Owner.

C. Establish location and extent of existing utilities prior to commencement of excavation.

3.3 EXCAVATION

A. All excavation shall be made to such depth as required and of the width shown on the Drawings to provide suitable room for building the structures and laying the pipe(s) they are to contain and for sheeting, shoring, pumping and draining as necessary, and for removing peat, silt, or any other materials which the Engineer may deem unsuitable. Hand trench excavation may be required to protect existing utilities and structures.

B. Trench excavation for pipes shall be made by open cut to accommodate the pipe or structure at the depths indicated on the Drawings. Excavation shall be made to such a depth and to the width

indicated on the Drawings so as to allow a minimum of 8 inches of pipe zone bedding to be placed beneath the bottom of all structures and barrels, bells or couplings of all pipes installed unless otherwise specified on the Drawings.

C. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material as required for each section of pipe. Trim and shape trench bottoms and leave free of irregularities, lumps, and projections.

D. Over excavation/undercut: If, in the opinion of the Engineer, existing material below the trench grade is unsuitable for properly placing bedding material and laying pipe, the Contractor shall excavate and remove the unsuitable material and replace the same with an approved pipe zone bedding material properly compacted.

E. Stability of Excavation: Slope sides of excavations shall comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavation in safe condition until completion of backfilling.

F. Removal of materials beyond the indicated subgrade elevations, without authorization by the Engineer, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

3.4 DEWATERING

A. The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry until the work is completed and excavation is backfilled or have sufficient weight to resist uplift pressures. No pipe or structure is to be laid in water and water shall not be allowed to rise on or flow over any pipe or structure until such time as approved by the Engineer.

B. Provide a suitable point of discharge from dewatering operations shall be conveyed in a non-erosive manner satisfactory to the Engineer.

C. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipe lines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected.

3.5 BEDDING AND BACKFILLING

A. All pipe trenches backfill (pipe zone bedding, pipe zone backfill and trench backfill) shall be compacted by tamping or rolling to achieve a minimum dry density of 90 percent of the standard Proctor maximum dry density of the material used (ASTM D698). Backfill in pipe trenches to be covered with pavement shall be compacted to a minimum of 95 percent of standard Proctor maximum dry density. Backfill materials shall be placed with water content within plus or minus 4 percent of optimum moisture content per the standard Proctor method (ASTM D698). Any water used for compaction shall be provided by the Contractor at his own expense. The Contractor is responsible for the repair of any trench settlement at no expense to the owner.

B. Bedding and backfilling shall be accomplished in three stages unless otherwise specified on the Contract Drawings. The first stage shall involve placement of "pipe zone bedding" as a layer(s) of selected material required to support, or to stabilize unsound or unsatisfactory foundation conditions. The second stage shall involve placement of "pipe zone backfill" from the top of the bedding material up to 1 foot above the pipe. The third stage involves the placement of "trench backfill" in the

remainder of the trench up to the surface of the ground or the bottom of any special surface treatment subgrade elevation.

C. The bedding material shall be placed in the trench after the trench has been excavated a minimum of 8 inches below the bell of the pipe to permit the placing of not less than 8 inches of bedding material unless otherwise specified on the Drawings. Where, in the opinion of the Engineer, more than 8 inches of bedding material shall be required, the excavation shall be performed, and bedding placed to the depth ordered by the Engineer.

D. Provide uniform bearing and support for each section of pipe at every point along the entire length except where necessary to excavate for bell holes, pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make the joint connection properly.

E. The bedding material shall be placed to the full width of trench. The bedding material shall be placed in loose lifts not exceeding 6 inches to the elevation shown on the Drawings or directed by the Engineer. The bedding material shall be tamped and compacted to form a firm and even bearing surface.

F. Pipe zone backfill shall be placed to the elevation shown on the Drawings in loose lifts not-to-exceed 6 inches in thickness, before compaction. The backfill shall be placed on both sides of the pipe at the same time and to approximately the same elevation. Any pipe that is damaged or moved out of alignment, regardless of cause, shall be replaced or realigned at the Contractor's expense. Each layer shall be thoroughly compacted by hand-tamping or mechanical means being careful not to damage the pipe. When the pipe zone backfill reaches 1 foot over the top of the pipe, the entire surface shall be compacted by mechanical means.

G. The remainder, if any, of the trench above the pipe zone backfill shall be backfilled with suitable material in loose lifts not exceeding 6 inches in thickness before compaction. Each layer shall be thoroughly compacted by mechanical means.

3.6 BACKFILLING AROUND STRUCTURES

A. The Contractor shall not place backfill against any structure without obtaining the approval of the Engineer. No dumping shall be allowed where materials would flow against or around such structures. Backfill material shall be deposited in horizontal layers not exceeding 6 inches in loose thickness or as shown on the Drawings and thoroughly compacted by hand or by mechanical means to the satisfaction of the Engineer.

3.7 SUSPENSION OF WORK

A. Whenever the work is suspended, excavations shall be protected and the roadways, if any, left unobstructed. Within or adjacent to private property, material shall be stored at such locations as will not unduly interfere with traffic of any nature and in no case shall materials be stored in locations which will cause damage to existing improvements.

3.8 DISPOSAL OF MATERIAL

A. Excess and unsuitable materials shall be disposed of by the Contractor on the site in an area approved by the Engineer or legally disposed of off- site at the Contractor’s expense.

3.9 FIELD QUALITY CONTROL

A. Notify the Engineer at least 3 working days in advance of all phases of filling and backfilling operations.

B. In-place density testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:
   1. In-place relative density:
      a. Method: ASTM D1556, D2167 or D2922.

C. Perform initial density testing to verify that contractors proposed compaction effort will obtain the minimum required densities.

D. In-place density tests on trench backfills shall be provided for every 500 cubic yards of fill or in vertical lifts not exceeding 2 feet and at least once daily.

E. One particle size analysis (ASTM D422) and one standard Proctor compaction test (ASTM D698) shall be competed for every 2,500 cubic yards of material placed.

F. The Engineer may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.

G. Acceptance Criteria: The criteria for acceptability of in-place fill shall be in-situ dry density and moisture content. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION

SECTION 312500 – EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. This Section covers work necessary for stabilization of soil to prevent erosion and sedimentation during and after construction and land disturbing activities. The work shall include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified and as indicated on the Drawings. This shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures. All erosion and sediment control methods and devices used shall conform to the latest requirements imposed by federal, state, and local authorities.

B. Comply with SPDES General Permit GP-0-20-001 for stormwater discharges from construction activities and the Stormwater Pollution Prevention Plan prepared for the project.

C. Comply with the latest version of the New York State Standard Specifications for Erosion and Sediment Control (November 2016).

D. The minimum areas requiring soil erosion and sediment control measures are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Engineer considers to be the best interest of the Owner.

E. The Contractor shall be responsible for repair of any damage caused and shall be financially responsible for any penalties imposed.

1.2 QUALITY ASSURANCE

A. Soil erosion and sediment control measures shall be implemented in accordance with the requirements and procedures outlined in this Specification, Contract Drawings and documents, state standards or guidelines for soil erosion and sediment control, and all regulatory authorities having jurisdiction. Where conflicts between requirements exist, the more restrictive rules shall govern.

B. The Contractor shall provide all temporary control measures shown on the Drawings, or as directed by the Owner, Engineer, or soil conservation district for the duration of the contract. Additional measures not specified on the Drawings may be necessary and shall be implemented to address intermediary stages of work and any conditions that may develop during construction at no cost to the Owner.

C. Temporary control provisions shall be coordinated with permanent erosion control features to the extent practical to assure economical, effective, and continuous erosion and sediment control throughout the construction and post-construction period.

D. Soil erosion and sediment control measures shall be satisfactory to the Engineer. Engineer will inform the Contractor of unsatisfactory construction procedures and operations if observed. If the unsatisfactory construction procedures and operations are not responded to and corrected within 48 hours, the Engineer may suspend the performance of any or all other construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for additional compensation nor for an extension of time to complete the work. Any complaints, fines, etc. relating to ineffective erosion control, shall be the sole responsibility of the Contractor.

E. The Contractor shall inspect all soil erosion and sediment control measures at least at the beginning and end of each day to ascertain that all devices are functioning properly during construction. Maintenance of all soil erosion and sediment control measures on the project site shall be the responsibility of the Contractor until final stabilization is complete, and until the permanent soil erosion controls are established and in proper working condition.

F. The Contractor shall protect adjacent properties and watercourses from soil erosion and sediment damage throughout construction.

1.3 GENERAL

A. Soil erosion stabilization and sediment control measures consist of the following elements:
   1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.
   2. Installation and maintenance of stabilized construction entrance(s).
   3. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
   4. Construction of temporary erosion control facilities such as silt fences, check dams, etc.
   5. Topsoil and Seeding: Placement and maintenance of Temporary Seeding on all areas disturbed by construction. Placement of permanent topsoil, fertilizer, and seed, etc., in all areas not occupied by structures or pavement unless shown otherwise.
   6. Soil Stabilization Seeding: Placement of fertilizer and seed, etc., in areas as Specified hereinafter.

B. The Contractor shall he responsible for phasing Work in areas allocated for his exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.

C. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for his exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall he done in a manner to both control all sediment transport away from the area.

D. Stockpiles remaining in place longer than 14 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.

E. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences completely surrounding stockpiles and located within 10 feet of the toes of the stockpile slopes.

F. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance.

G. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of his activities on this Project.

H. Formal inspections made jointly by the Contractor and the Engineer shall be conducted every 2 weeks to evaluate the Contractor's conformance to the requirements of these Specifications.

I. Replacement or repair of failed or overloaded silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor within 24 hours after receiving written notice from the Engineer.

J. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Engineer within 2 working days after receiving written notification from the Engineer, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor's monthly partial payment the costs for such efforts in accordance with the General Conditions of the Contract.

1.4 SUBMITTALS

A. Submittals shall he made in accordance with Section "Submittal Procedures."

B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

C. Results of all tests and investigations, including recommendations.

D. Submit product data, samples, specifications and manufacturer's installation procedures for approval as directed by Engineer prior to use.

PART 2 – PRODUCTS

2.1 GENERAL

A. Contractor shall provide all materials necessary to perform the work in accordance with the SWPPP or as shown on the Drawings or specified herein.

2.2 PERMANENT SEED

A. Refer to Section "Seeding".

2.3 SOIL STABILIZATION AND TEMPORARY SEED

A. Temporary Seed: Rye grass, cereal grasses, or other quick growing species suitable to the area as a temporary cover, which will not compete with the grasses specified for permanent cover or as specified in the SWPPP or on the Drawings.

2.4 TOPSOIL

A. Topsoil shall be as specified under Section "Topsoil".

2.5 FERTILIZER

A. Refer to Section "Seeding".

2.6 LIME

A. Ground dolomite limestone not less than 85 percent total carbonates and magnesium, ground so that 50 percent passes through a No. 100 mesh sieve and 90 percent passes a No. 20-mesh sieve. Coarser

material will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the No. 100-mesh sieve.

2.7 STRAW MULCH

A. Threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds or clean salt hay.

2.8 EROSION CONTROL BLANKET

A. Erosion Control (Mulching) Blanket shall be constructed with a layer of 70 percent straw and 30 percent coconut fiber stitched with degradable thread between a heavyweight UV stabilized polypropylene top net (3 pounds) and a lightweight photodegradable polypropylene bottom net (1.50 pounds). Both the netting and fiber material shall be green in color. Acceptable products shall include SC150 Double Net Straw-Coconut Blanket as manufactured by North American Green; Curlex Double Net (Curlex II) as manufactured by American Excelsior Company or an approved equal.

2.9 TURF REINFORCEMENT MATS

A. Permanent Synthetic Turf Reinforcement Mat (TRM) shall be constructed of UV stabilized polypropylene fiber (0.70 pounds per square yard) stitched with permanent polypropylene thread between heavyweight UV stabilized polypropylene top net (5 pounds per 1000 square feet approximate weight) and bottom net (3 pounds per 1000 square feet approximate weight). Both the netting and fiber material shall be green in color.

B. Acceptable products shall include P300 Permanent Turf Reinforcement Mat as manufactured by North American Green; Recyclex TRM by American Excelsior Company or an approved equal.

2.10 HAY BALE

A. Bales shall be tightly bound, staked with 1 inch by 1 inch hardwood stakes. Hay shall be from mowings of acceptable herbaceous growth free from noxious weeds.

2.11 STONE CHECK DAM

A. The gradation of stone check dam material identified on the plans shall meet the following requirements:

NCSA ROCK SIZE*	**PERCENT PASSING BY WEIGHT**
12"	100
6"	15 – 50
3"	0 – 15

*National Crushed Stone Association

B. Geotextile fabric for stone check dam shall meet the requirements non-woven fabric found in Section "Geotextiles."

2.12 SILT FENCE

A. Silt Fence shall consist of woven geotextile fabric, posts, and fasteners meeting the requirements shown on the Drawings.

B. The woven geotextile fabric shall meet the following specifications.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs.)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2.13 COMPOST FILTER SCOCK

A. Compost infill shall consist of decomposed (matured at least 3 months), weed-free, organic material that is aerobically composted, possess no odors, and contain less than 1%, by dry weight, of man-made material. The compost infill should meet the following specifications. All biosolids compost produced in New York State must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements or more stringent than 40 CFR Part 503 to ensure safe standards for pathogen reduction and heavy metal content.

Organic Matter Content	25% - 100% (dry weight)
Organic Portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture Content	30% - 60%
Particle Size	100% passing a 1" screen and 10-50% passing a 3/8" screen
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) maximum

B. Compost filter sock fabric material shall meet the minimum requirements and specifications listed in the following tables.

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12",18"	12", 18",24", 32"	12", 18",24", 32"	12", 18",24", 32"	12", 18",24", 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

2.14 MANUFACTURED INSERT INLET PROTECTION

A. The sack structure shall consist of woven geotextile fabric equal to or exceeding the performance standard for the silt fence fabric.

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall comply with and implement the Stormwater Pollution Plan provided in the contract documents.

B. Review the Drawings as they apply to current conditions. Any deviation from the Drawings must be submitted for approval to the site Engineer in writing at least 72 hours prior to commencing that work.

C. Initial soil sediment and erosion control devices shall be in place prior to any land disturbing activity in their proper sequence and maintained until permanent protection is established.

D. The limit of the area of any earthwork operations in progress shall be commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding, and other such permanent control measures current and in accordance with the accepted schedule for construction phasing. Should seasonal limitations make such coordination unrealistic, as determined by the Engineer, temporary erosion control measures shall be provided immediately by the Contractor at no expense of the Owner.

E. Temporary erosion control measures shall be used to correct conditions which develop during construction that are needed prior to installation of permanent control features, or that are temporarily needed to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

F. The Contractor shall incorporate all permanent erosion control features (stabilization) into the project at the earliest practical time to minimize the need for temporary controls.

G. A stabilized construction entrance (SCE) shall be installed and maintained at any point where construction vehicles enter a public right-to-way, street, or parking area. The SCE shall be used to eliminate mud from the construction area onto public right-of-way. The SCE shall be constructed as shown on the Drawings. Any mud or debris tracked on streets shall be cleaned up immediately.

H. Dust Control: The Contractor shall provide a commercial grade; enclosed broom mechanical street sweeper to control sediment and/or dust that is tracked on to the adjacent streets. The street sweeper shall be equipped with a water storage tank to wet the area prior to sweeping. Where on site controls do not prevent material from being tracked on to adjacent streets, the street sweeper shall be used to clean the adjacent streets immediately. In addition, at a minimum, the adjacent streets shall be swept at the end of each day or as directed by the Engineer.

I. Any disturbed or stockpiled areas that will be left exposed more than 14 days or less according to State NPDES General Stormwater Permits shall immediately receive temporary or permanent seeding. Mulch/straw shall be used if the season prevents the establishment of a temporary cover. Disturbed areas shall be limed and fertilized prior to temporary seeding.

J. Permanent vegetation shall be established as specified on all exposed areas within 7 days or less according to State NPDES General Stormwater Permits after final grading. Mulch as necessary for seed protection and establishment. Lime and fertilize seedbed prior to permanent seeding.

K. Slopes shall be permanently seeded and mulched. Any slopes that erode easily shall be temporarily seeded and mulched. Any slopes deeper than 3:1 or steeper or as indicated on Drawings shall be protected with Erosion Control (Mulching) Blanket per specifications.

L. All storm drainage outlets must be stabilized, as specified, before the discharge points become operational. Equip all inlets with inlet protection immediately upon construction.

M. Manufactured insert inlet protection shall be installed and anchored in accordance with the manufacturer's recommendations and design details. The Contractor shall maintain all manufactured insert inlet protection units until the project is stabilized and shall remove and dispose of the sediment accumulation properly when the units are more than 1/3 full. Replace and reinstall the unit if necessary.

N. Discharge from dewatering operations for the excavated areas shall not be directed to surface waters without first properly removing the suspended sediment through filtration and/or settlement. The Contractor shall obtain any required permits associated with dewatering activities.

O. Silt fence shall be installed at locations on the Drawings and any additional locations necessary for proper sediment control. The Contractor shall maintain the silt fence until the project is stabilized and shall remove and dispose of the silt fence and silt accumulation when 1/3 the height of the fence is reached.

P. Filter Socks shall be place at locations indicated on plans or as directed by the Engineer. They should be installed parallel to the base of the slope or other affected area. The Contractor shall maintain the Filter Socks and they shall be inspected weekly and after each rain event. If the Filter Sock requires repair, it shall be repaired in accordance with the manufacture's recommendations or replaced within 24 hours of inspection notification. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

Q. Soil erosion and sediment control shall include but not be limited to the approved measures. The Contractor shall be responsible for providing all additional measures that may be necessary to accomplish the intent of the Drawings.

R. Comply with all other requirements of authorities having jurisdiction.

S. Soil Stabilization and Temporary Seeding:

1. Soil stabilization seeding shall consist of the application of the following materials in quantities as further described herein for stockpiles and disturbed areas left inactive for more than 14 days.
    a. Lime.
    b. Fertilizer.
    c. Seed.
    d. Mulch.
    e. Maintenance.
2. Hydroseeding will be permitted as an alternative method of applying seed and associated soil conditioning agents described above. Should the Contractor elect to apply soil stabilization seeding by hydroseeding methods, he shall submit his operational plan and methods to the Engineer.
3. Temporary Seeding is to be placed and maintained over all disturbed areas prior to Permanent Seeding. Maintain Temporary Seeding until such time as areas are approved for Permanent Seeding. As a minimum, maintenance shall include the following:
    a. Fix-up and reseeding of bare areas or re-disturbed areas.
    b. Mowing for stands of grass or weeds exceeding 6 inches in height.

T. Topsoil and Permanent Seeding: conform to the requirements of Section "Topsoil" and Section "Seeding".

END OF SECTION

SECTION 321216 – ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes provisions for hot-mixed asphalt concrete paving over prepared subbase.

B. This section includes provisions for replacing pavement removed during the course of the Work, or damaged resulting from Contractor's operations.

1.2 REFERENCES

A. The latest edition of the following standards, as referenced herein, shall be applicable:
   1. "Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering".
   2. Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO).
   3. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

A. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

B. Field Test Reports: Submit results of field testing directly to the Engineer.

C. Request for placement of Top Course HMA: If applicable, request Owner/Engineer approval for placement of Top Course HMA outside of seasonal limitations noted herein. Include a copy of the Limited Warranty for approval.

1.4 SITE CONDITIONS

A. Weather Limitations:
   1. Do not place HMA plant mix on any wet surface or when surface temperature is less than specified in Table 402-1, Temperature and Seasonal Requirements in the latest edition of the NYSDOT Standard Specifications.
   2. Apply tack coats when ambient temperature is above 50 DegF (10 DegC) and when temperature has not been below 35 DegF (1 DegC) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
   3. Place HMA Top Course between April 15 and October 31. Placing Top Course HMA outside the limitations will require Owner/Engineer approval and approval of a limited warranty against defects in such work prior to implementation. Perform the warranty work in accordance with Materials Procedure (MP) 402-01, Warranty Requirements for Hot Mix Asphalt (HMA) Top Course. Unless specified elsewhere in this specification or contract documents, these seasonal limits do not apply for any other HMA course placement.

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

C. In no instance shall the materials and thicknesses of pavement and subbase courses replaced be less than that removed, unless approved by the Engineer.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate the placement of asphalt concrete pavement with the completion of underground work by other trades.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Asphalt concrete and all related items shall meet the requirements of NYSDOT Section 400.

B. Base Course:
1. NYSDOT, 402.378904.

C. Binder Course:
1. NYSDOT 402.258904.

D. Top Course:
1. NYSDOT 402.128304

E. Shim Course:
1. NYSDOT 402.058904.

F. Truing and Leveling Course:
1. NYSDOT 402.018904.

G. Tack Coat:
1. Emulsified asphalt, ASTM D977 NYSDOT Table 702-8.

PART 3 – EXECUTION

3.1 SURFACE PREPARATION

A. General: Remove loose material from compacted subbase surface immediately before commencing paving operations.

B. Proof-roll prepared subbase surface with a 10-ton static, steel-wheel roller to check for unstable areas and areas requiring additional compaction, witnessed by the Engineer at least 48 hours prior to scheduled paving operations.

C. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

D. Sawcut edges of existing pavement to achieve straight line transitions between old and new pavement. Make a second sawcut through the top course of existing pavement, 18 inches from the first cut to provide a staggered joint.

E. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.03 to 0.07

gallons per square yard of surface. Tack coat shall be applied between each layer of the pavement section.

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

F. Joint Adhesive:

1. Apply joint adhesive to all pavement edges in accordance prior to placing the asphalt mixture in order to provide bonding with the newly laid pavement. The application of joint adhesive is for Top Course only.
2. Apply the joint adhesive when surface temperature is 40 DEGF and rising. Use an applicator wand fitted with a sealing shoe to strike-off the adhesive. Strike-off the joint adhesive to provide a 1/4 inch to 3/8 inch thick band. The finished bands are to be approved by the Engineer.
    a. Wedge Joints:
        1) Apply the joint adhesive to the entire vertical face and the upper 2 inches of the wedge joint.
    b. Butt Joints:
        1) Apply the joint adhesive to the entire vertical face of the butt joint.
3. The joint adhesive will be considered cured when construction and/or vehicular traffic does not track or pick up the material. Reapply joint adhesive to any areas damaged by construction and/or vehicular traffic prior to placing the adjacent asphalt pavement.

G. Exercise care in applying bituminous materials to avoid smearing of adjoining surfaces. Remove and clean damaged surfaces.

H. Do not commence pavement replacement operations until all buried work beneath pavement repair has been completed to the satisfaction of the Engineer.

I. Where trench dimensions preclude the use of proof rolling equipment, demonstrate the stability of the subgrade and subbase through other means, as acceptable to the Engineer.

3.2 PLACING AND COMPACTING MIX

A. General: Place and compact asphalt pavement courses in accordance with NYSDOT Section 402-3 unless otherwise specified.

B. Place inaccessible and small areas by hand, and compact with hot hand tampers or vibrating plate compactors.

C. Chamfer edges of walks at 45-degree angle where walks do not abut curb.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

E. Place tack coat between successive courses if more than 48 hours have elapsed after placing the preceding course. Apply tack coat at a rate of 0.03 to 0.07 gallons per square yard of surface.

F. Remove and patch areas of any asphalt concrete course deemed unsatisfactory by the Engineer, at the Contractor’s expense. Remove hardened or set asphalt by saw cutting.

G. Adhere to NYSDOT compaction requirements. This, however, shall not relieve the Contractor of his responsibility to provide a well densified pavement. It shall be the Contractor's obligation to recognize difficulties in compacting the mix, and to make appropriate corrections.

H. Roll and compact the asphalt concrete course until the finished surface is free from depressions, waves or other defects that would prevent proper drainage. The finished surface shall be uniform in texture and appearance.

I. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

J. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

K. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D979orAASHTO T168.
   1. Reference maximum theoretical density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041, and compacted according to job-mix specifications.
   2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D1188 or ASTM D2726.
      a. One core sample will be taken for every 1000 square yard (836 square meter) or less of installed pavement with no fewer than 3 cores taken.

L. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726.
   1. Replace and compact hot-mix asphalt where core tests were taken.
   2. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.3 FIELD QUALITY CONTROL

A. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Thickness: In-place compacted thickness tested in accordance with ASTM D3549 will not be acceptable if exceeding following allowable variations:
   1. Base Course: Plus or minus 1/2 inch.
   2. Binder and Surface Course: Plus or minus 1/4 inch.
   3. Cumulative Thickness Tolerances: Plus or minus 1/4 inch for nominal cumulative thicknesses less than or equal to 4 inches. Plus or minus 1/2 inch for nominal cumulative thicknesses greater than 4 inches.

C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
   1. Base and Binder Course Surfaces: 1/4 inch.
   2. Wearing Course Surface: 3/16 inch.
   3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

D. Check surface areas at intervals as directed by Engineer.

E. Scuff Resistance: If, in the opinion of the Engineer, the pavement does not demonstrate reasonable resistance to deformation by punching loads and scuffing under horizontally applied shearing loads, after the pavement has cooled and hardened, the Engineer may require laboratory testing of cored pavement samples to determine the properties of the pavement; including aggregate gradation, asphalt content, air void ratio, density and any others deemed appropriate. If laboratory testing indicates that any parameters substantially deviate from the design mix tolerances specified by NYSDOT, replace the affected areas of pavement at no additional cost, and reimburse the Owner for all costs incurred in procurement and testing of cores.

END OF SECTION

SECTION 323113 – CHAIN LINK FENCE AND GATES

PART 1 – GENERAL

1.1 DESCRIPTION

A. The Contractor shall provide all labor, materials, equipment, and services necessary for, and incidental to, the installation of chain link fence and gates, as shown on the Drawings and as specified herein.

B. All chain link fence shall be galvanized.

1.2 QUALITY ASSURANCE

A. Comply with standards of the Chain Link Fence Manufacturer's Institute.

B. Provide steel fence and related gates as a complete system produced by a single manufacturer, including necessary erection accessories, fittings and fastenings.

C. Comply with ASTM A53 for requirements of Schedule 40 piping.

D. Comply with ASTM F1043 Specification for Strength and Protective Coatings of Metal Industrial Fence Framework.

E. Height of fence shall be measured from the top of concrete footing to the top of post.

F. Manufacturer: Company shall be headquartered in the US having US manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years of experience.

G. Fence contractor: Company with demonstrated successful experience installing similar projects and products in accordance with ASTM F567.

H. Tolerances: Current published edition of ASTM specifications tolerances apply. ASTM specification tolerance supersede any conflicting tolerance.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
   1. Fence and gate posts, rails and fittings
   2. Chain link fabric, reinforcements, and attachments.
   3. Gates and hardware.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections details of post anchorages, attachment, bracing, and other required installation and operational clearances.

C. Samples for Verification: For each type of chain-link fence and gate indicated:
   1. Galvanized steel wire (for fabric) in 6-inch (150-mm) lengths on shapes for posts, rails, wires and gate framing.

D. Product Certificates: For each type of chain-link fence and gate, signed by product manufacturer:
   1. Strength test results for framing according to ASTM F1043.
   2. Material certifications, made in USA, Buy America Act or Buy America when required.

E. Qualification Data: For installer.

F. Field quality-control test reports.

G. Maintenance Data: For the following to include in maintenance manuals:
   1. Galvanized finishes.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 – PRODUCTS

2.1 STEEL FRAME WORK

A. Unless noted otherwise on the Drawings, minimum Nominal Framework Sizes shall be the following:

FENCE HEIGHT	LINE POSTS	END, CORNER & PULL POSTS	RAILS & BRACES	GATE FRAMES	*GATE POSTS	CONCRETE FOUNDATION DIA.		DEPTH
						Diameters	Corner/ End	
						LINE POSTS	PULL & GATE POSTS	
3'	1-1/2"	2"	1-1/4"	1-1/2"	3"	12"	12"	4'
3'-6"	2"	3"	1-1/4"	1-1/2"	4"	12"	12"	4'
4'	2”	3"	1-1/4"	1-1/2"	4"	12"	12"	4'
4'-6"	2”	3"	1-1/4"	1-1/2"	4"	12"	12"	4'
5'	2”	3"	1-1/4"	1-1/2"	4"	12"	12"	4'
6'	2”	3"	1-1/4"	1-1/2"	4"	12"	18"	4'
8'	2”	3"	1-1/4"	1-1/2"	4"	12"	18"	4'
10'	3"	4"	1-1/4"	1-1/2"	4"	12"	18"	4'
12'	3"	4"	1-1/4"	1-1/2"	4"	12"	18"	5'
16'	3-1/2"	4"	1-1/4"	1-1/2"	4"	12"	18"	5'

SCHEDULE 40 S/L PIPE TABLE		
NOMINAL SIZE (IN.)	ACTUAL OUTSIDE DIAMETER (IN.)	WEIGHT *(LB/FT)
1	1.315	1.67
1-1/4	1.660	2.27
1-1/2	1.900	2.71
2	2.375	3.65
2-1/2	2.875	5.79
3	3.500	7.58
3-1/2	4.000	9.11

50,000 PSI HOT DIPPED GALVANIZED STEEL TUBING		
NOMINAL SIZE (IN.)	ACTUAL OUTSIDE DIAMETER (IN.)	WEIGHT *(LB/FT)
1	1.315	
1-1/4	1.660	1.83
1-1/2	1.900	2.28
2	2.375	3.12
2-1/2	2.875	4.64
3	3.500	5.71
3-1/2	4.000	6.56

B. Pipe must comply with ASTM F1043 Group 1A or 1C

C. Round Steel Pipe and Rail: Schedule 40 standard weight pipe, in accordance with ASTM F1043, materials design Group 1A minimum steel yield strength 30,000 psi. Type A, 1.8 oz/ft^2 hot dipped galvanized zinc exterior and 1.8 oz/ft^2 hot dipped galvanized zinc interior coating.

OR

D. Round Steel Pipe and Rail: Round steel pipe and rail to be cold-rolled electric resistance welded pipe in accordance with ASTM 1043 materials group 1C, minimum steel yield strength 50,000 psi. Type B external coating, hot dip galvanized zinc 1.0 oz/ft^2 with a clear polymeric overcoat, Type D interior 90% by weight zinc-rich coating having a minimum thickness of 0.30 mils.

2.2 CHAIN LINK FABRIC

A. General: Height indicated on Drawings. Provide fabric in one-piece heights for fence heights up to 10 feet measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A392, CLFMI CLF 2445, and requirements indicated below:
   1. Steel Chain Link Wire Fabric:
      a. Zinc-coated steel fabric: ASTM A392 hot dipped galvanized before or after weaving.
         1) Class 2 – 2.0 oz/ft^2
            a) 9-gauge core diameter for fences and gates.
            b) 6-gauge core diameter for backstops.

B. Mesh Size:
   1. 2 inches for fences.
   2. 1-3/4 inches for tennis court fencing or end line fencing.

C. Selvages: Knuckled top and bottom.

2.3 SWING GATES

A. Assemble gate frames with fully coped welds as shown on the Drawings or on Shop Drawings approved by the Engineer.
   1. All ferrous metal components shall be blast cleaned to and SSPC-6 commercial blast clean.

B. Galvanized steel welded fabrication in compliance with ASTM F900. Frame members spaced no greater than 8 ft. apart vertically and horizontally. Welded joints protected by applying zinc-rich paint in accordance with ASTM Practice A780. Positive locking gate latch, pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge press steel post and frame hinges. Match gate fabric to that of the fence system.

2.4 GATE HARDWARE

A. Hinges: Non-lift-off type, offset to permit 180-degree swing, and of suitable size and weight to support gate. Provide 1-1/2 pair of hinges for each leaf over 6 feet high.

B. Latch: Provide plunger bar type complete with flush plate set in concrete for all double gates and single gates over 10 feet. Padlock eye shall be an integral part of latch construction.
   1. Provide plunger bar complete with flush plate set in concrete on each gate leaf
   2. Provide flush plate set in concrete for both the fully open position and full closed position

C. Keeper for Vehicle Gates: Provide keeper which automatically engages the gate leaf and holds it in open position until manually released.

2.5 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Post Tops: Steel, wrought iron, or malleable iron.

B. Stretcher Bars: One piece equal to full height of fabric, minimum cross-section 3/16 inch by 3/4 inch.

C. Metal Bands (for stretcher bars): Steel, wrought iron, or malleable iron, to secure stretcher bars to end, corner, pull and gate posts.

D. Wire Ties:
   1. For tying fabric to line posts, rails and braces: 9-gauge steel wire.
   2. For tying fabric to tension wire: 11-gauge steel hog rings.

E. Truss Rods: 3/8-inch diameter.

F. Tension Wire (only if shown on plans):
   1. Metallic Coated Steel Marcelled Tension Wire: 7-gauge marcelled wire complying with ASTM A824 (match coating type to that of the chain link fabric).
      a. Type II zinc-coated, ASTM A817 Class 4 – 1.2 oz/ft2

G. Angle Beams, I Beams and Steel Shapes: ASTM A36.

H. Bolts and Nuts: ASTM A307, Grade A.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work and other conditions affecting performance:

1. Begin installation in general site areas or those not directly adjacent to the playing field only after final grading including topsoiling and paving is completed in that area or as otherwise permitted by Engineer.
2. For installation directly adjacent to the playing field, coordinate footing installation timing with final installation of playing field materials so as not to contaminate, destroy or displace these playing field materials.
3. If unsatisfactory conditions are present, proceed with installation only after they have been corrected.

3.2 PREPARATION

A. Coordinate fence and gate installation with completion of finished grading and installation of adjacent finish field materials.

B. Stake locations of fence lines, gates and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, irrigation system, underground structures, benchmarks and property monuments.

3.3 INSTALLATION

A. Space posts equidistant in the fence line with a maximum of 10 feet on center or as shown on Drawings.

B. Footings: Excavate holes as indicated for fence and gate posts. Excavate footings to depths and widths as noted in Specifications or on drawings. Install gravel drainage material in bottom of hole as shown on the drawings.

C. Setting Posts and Footings at Concrete Areas: Set posts in center of hole. Embed post so that bottom of post is flush with the bottom of concrete footing and in gravel drainage layer. Fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish elevation on top of footing to be coordinated with construction of concrete adjacent to posts or as shown on drawings. Do not attach fabric to posts until concrete has cured a minimum of 7 days.

D. Setting Posts and Footings at Warning Track Areas: Set posts in center of hole. Embed post so that bottom of post is flush with the bottom of concrete footing and in gravel drainage layer. Fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish elevation on top of footing to be set below finish grade. Do not attach fabric to posts until concrete has cured a minimum of 7 days.

E. Setting Posts and Footings in Grass Areas: Set posts in center of hole. Embed post so that bottom of post is flush the bottom of concrete footing and in gravel drainage layer. Fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above ground to shed water. Do not attach fabric to posts until concrete has cured a minimum of 7 days.

F. Locate corner posts at corners and at changes in direction. Use pull posts at all abrupt changes in grade and at intervals no greater than 500 feet. On runs over 500 feet, space pull posts evenly between corner or end posts. On long curves, space pull posts so that the strain of the fence will not bend the line posts.

G. Install top rail continuously through post caps or extension arms, bending to radius for curved runs. Install expansion couplings as recommended by fencing manufacturers.

H. Install intermediate rails in one piece between posts and flush with post on fabric side using special offset fittings where necessary.

I. Diagonally brace corner posts, pull posts, and terminal posts to adjacent line posts with truss rods and turnbuckles.

J. Attach fabric to security side of fence. Bottom of fabric to be set on finished grade of curb, track or playing field except when indicated otherwise. Thread stretcher bars through fabric using one bar for each gate and end post and two for each corner and pull post. Pull fabric tight so that the maximum deflection of fabric is 2 inches when a 30-pound pull is exerted perpendicular to the center of a panel. Maintain tension by securing stretcher bars to posts with metal bands spaced 15 inches on center. Fasten fabric to steel framework with wire ties spaced 12 inches on center for line posts and 24 inches on center for rails and braces. Bend back wire ends to prevent injury. Tighten stretcher bar bands, wire ties, and other fasteners securely.

K. Attach fabric to security side of fence for lawn areas. Maintain a maximum 1 inch clearance above finished grade except when indicated otherwise. Thread stretcher bars through fabric using one bar for each gate and end post and two for each corner and pull post. Pull fabric tight so that the maximum deflection of fabric is 2 inches when a 30-pound pull is exerted perpendicular to the center of a panel. Maintain tension by securing stretcher bars to posts with metal bands spaced 15 inches on center. Fasten fabric to steel framework with wire ties spaced 12 inches on center for line posts and 24 inches on center for rails and braces. Bend back wire ends to prevent injury. Tighten stretcher bar bands, wire ties, and other fasteners securely.

L. Position bolts for securing metal bands and hardware so nuts are located opposite the fabric side of fence. Tighten nuts and score excess threads.
   1. Secure post tops, extension arms, and caps with one-way cadmium plated steel screws.

M. Tension Wire (only if shown on plans): Support bottom edge of fabric with coil spring tension wire. Weave tension wire through fabric or fasten with hog rings spaced 24 inches on center. Tie tension wire to posts with 9-gauge wire ties.

N. Install gates plumb and level and adjust for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary. Attach fabric as for fencing. Install ground-set items in concrete as shown on the drawings.

O. Touch Up: Small nicks or other blemishes shall be touched up with paint materials suitable for and matching the finish of the damaged material. Severely damaged fencing/gates deemed as unacceptable at the sole discretion of the Owner or its representatives shall be replaced at the contractor's expense.

END OF SECTION

SECTION 329000 – PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Trees.
   2. Planting accessories.
   3. Planting soil mixes.
   4. Landscape edging.
   5. Mulch.
   6. Maintenance and warranty of exterior plants.

1.2 REFERENCES

A. ANSI Z60: American Standard for Nursery Stock

B. ASTM B221: ASTM International Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

1.3 DEFINITIONS

A. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.

B. Balled and Potted Stock: Exterior plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of exterior plant required.

C. Bare-Root Stock: Exterior plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for kind and size of exterior plant required.

D. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of exterior plant required.

E. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted exterior plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of exterior plant.

F. Root collar (root crown, root flare, trunk flare, flare): The region at the base of the trunk where the majority of the structural roots join the plant stem, usually at or near ground level.

1.4 SUBMITTALS

A. Before plant material is shipped to the project site, submit the following:
   1. A complete itemized list of all plants including the source of supply and nursery certificates.
   2. Photographs of plant material.

B. Product Data: For each type of product indicated.
   1. Peat moss (including certification).
   2. Fertilizer (including certification).
   3. Top mulch.
   4. Guying and staking material.
   5. Weed control barriers.
   6. Landscape edging.
   7. Antidesiccant (including certification).

C. Photographs: Submit photographs of plants and mulches prior to Observation, as listed in Quality Assurance below. Photographs shall include a person holding a clearly marked measuring rod next to plants and mulches. Photographs shall exhibit the size, growth habit, and general visual quality of plants. Photographs of dense clusters of plants, in which one plant is not distinguishable from another, are not acceptable. Digital photographs submitted via email are acceptable.
   1. At the request of the Owner, the Landscape Architect/Engineer may observe the plant and mulch material at place of growth in lieu of photographs.

D. Material Test Reports: For existing surface soil and/or imported topsoil as required by Section “Soil Preparation.”

E. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:
   1. Manufacturer's certified analysis for standard products.
   2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

F. Qualification Data: For Landscape Installer.

G. Planting Schedule: Indicating anticipated planting dates for exterior plants.

H. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

I. Maintenance bond: Contractor shall provide list of items, quantities, and cost to be performed during the maintenance period. Once approved by the owner, the contract shall submit a formal performance bond.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of exterior plants on similar projects:
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time, English-speaking, supervisor on Project site when exterior planting and regular maintenance is in progress.
   2. Installer must have a minimum of three (3) years experience in this type of landscaping.

3. Installer must have installed previous projects in similar size and scope as this project and provide a listing of projects including name and contact person with phone number or email address.

B. Provide quality, size, genus, species, and variety of exterior plants indicated on the plans, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
   1. Substitutions of plants will not be permitted unless authorized in writing by the Landscape Architect/Engineer prior to purchase for this Project.

C. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes.

D. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

E. Observation: Landscape Architect/Engineer may observe trees and shrubs at site before planting for compliance with requirements for genus, species, variety, size, and quality. Landscape Architect/Engineer retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site. Notify Landscape Architect/Engineer of sources of planting materials seven days in advance of delivery to site.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

G. Planting Schedule: Indicating anticipated planting dates for exterior plants.

H. Maintenance Instructions: Recommended procedures to be established by owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

I. Topsoil Analysis: Furnish soil analysis as required in Section “Topsoil.”

J. Report suitability of topsoil for plant growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to product a satisfactory topsoil.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store, irrigate, maintain, and otherwise protect balled and burlapped trees in a manner that prevents mechanical injury and physiological stress between the time of digging and delivery. The trees and shrubs shall be balled with firm, natural balls of soil and wrapped with burlap and tied in accordance with ANSI Z60.1.

B. All container grown shrubs shall be healthy, vigorous, well rooted, and established in the container in which they are growing. They shall have tops of good quality and be in a healthy growing condition. A container shrub shall be in that container a sufficient time that fibrous roots are formed so the shape will remain and the medium will hold together when removed from the container. All shrubs sold in containers shall meet Contract Documents for both plant size and container size. The plant size shall agree with sizes specified in the American Standard for Nursery Stock.

C. Groundcovers/perennials shall be supplied in pots or flats; plants shall be 1-year old cuttings (minimum) with well-established root systems.

D. Deliver exterior plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

E. Do not prune trees and shrubs before delivery, except as approved by Landscape Architect/Engineer. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Irrigate balled and burlapped plants thoroughly immediately prior to transport. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery.

F. Handle planting stock by root ball. Planting stock with cracked or broken root balls will not be accepted.

G. Furnish the following with each planting material delivery:
   1. An invoice indicating sizes, quantity, genus, species and variety of exterior plant material.
   2. All certificates of inspection required by State and Federal agencies.
   3. Labels for each plant or bundles of plants indicating name and size.

H. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants trees in shade, protect from weather and mechanical damage, and keep roots moist.
   1. Heel-in bare-root stock. Soak roots in water for two hours if dried out.
   2. Set balled stock on ground and cover ball with woodchip mulch or other acceptable material.
   3. Do not remove container-grown stock from containers before time of planting.
   4. Water root systems of exterior plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

I. Deliver fertilizer in manufacturer's standard sized bags showing weight, analysis, and manufacturer's name. Store under a waterproof cover or in a dry place as approved by the Landscape Architect/Engineer.

1.7 COORDINATION

A. Contractor is responsible for verifying plant quantities shown on the planting plan. Contractor is responsible for filling all areas on plans shown to be planted on planting plan. Contractor shall prepare his or her own quantity list from the plan(s). All ground cover, perennial, and annual beds are to be filled at the specified spacing.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion:

Spring:	**Deciduous**	**April 15 to June 15**
	Evergreen	**April 15 to June 15**
Fall:	**Deciduous**	**September 1 to October 31**
	Evergreen	**Only on approval of the Landscape Architect/Engineer**

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

D. Coordination with Other Work: Coordinate planting with all other work of the project, including site utilities and flatwork.

E. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns, unless otherwise acceptable to Landscape Architect/Engineer. When planting trees and shrubs after lawns, protect lawn areas and promptly repair damage caused by planting operations.

1.8 WARRANTY

A. Warranty: Warrant all exterior plants covered by this Section, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from abuse by Owner, or incidents that are beyond Contractor's control.
   1. Warranty Period for Exterior Plants:
      a. From date of Installation to Substantial Completion.
      b. Two (2) years from date of Substantial Completion.
   2. Remove dead exterior plants immediately. Replace immediately unless required to plant in the succeeding planting season.
   3. Replace without cost to Owner, as soon as weather and soil conditions permit, exterior plants that are more than 25 percent dead or in an unhealthy condition as determined by the Landscape Architect/Engineer at end of warranty period.

1.9 MAINTENANCE

A. Maintenance Period for all exterior plants covered by this Section: Concurrent with Warranty Period and same duration as Warranty Period. Maintenance requirements are itemized in Part 3 of this Section. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.

B. Owner will assume maintenance following completion of Maintenance Period.

C. Maintenance Period: 1 year (12 months) from the date of planting completion and acceptance and approval by the Owner.

D. The contractor shall provide a performance bond for the value of the labor and materials provided during the maintenance period.

PART 2 – PRODUCTS

2.1 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs in accordance with good horticultural practices under climatic conditions similar to those of the Project for at least two years, unless specifically noted otherwise. Trees and shrubs shall comply with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Trees and shrubs shall exceed American Association of Nurseryman standards for quality by being exceptionally heavy, uniform, so trained or favored in development and appearance as to be superior in form, density and spread of branches, compactness, and symmetry. Determination of quality shall be made by the Landscape Architect/Engineer.

B. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, leaf spotting, injuries, abrasions, and disfigurement.

C. Trees shall be planted such that the root flare is 1 inch above adjacent grade unless the Drawings indicate otherwise. Tree planting height shall be dictated by the actual root flare rather than the top of rootball as received from growers or nurseries:

1. Tops of tree rootballs shall be no higher than 2 inches above the tops of main order tree roots.
2. If main order roots are buried greater than 2 inches but less than 4 inches below the top of tree rootballs, Contractor must trim rootballs by carefully removing soil from the top of the rootballs so that main order roots are within 2 inches of the top of rootball.
3. If main order roots are buried greater than 4 inches below the top of rootball, the tree will be rejected, and the Contractor must remove the tree from the job site.
4. The Contractor is responsible for ensuring that trees received on site and planted on site meet the aforementioned specifications regarding tree root flare and rootball. The Contractor is responsible for ensuring that the Landscape Architect/Engineer has an opportunity to review the tree root flares of trees in the grower's field or nursery yard. If tree root flares are obscured (due to trunk wrap or burlap or other obstructions), Landscape Architect/Engineer's acceptance of trees in the grower's yard or nursery shall constitute acceptance of trees WITH THE EXCEPTION of trees whose root flare is buried greater than 4 inches below top of rootball. In the event that Contractor does not allow Landscape Architect/Engineer to visually observe tree root flares during tree selection at grower's yard or nursery, Landscape Architect/Engineer reserves the right to reject any tree delivered to the site if tree's root flare is buried greater than 4 inches below top of rootball, even if Landscape Architect/Engineer previously accepted said trees at the grower's yard or nursery.

D. Grade: Provide trees and shrubs of sizes and grades complying with ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Landscape Architect/Engineer with a proportionate increase in size of roots or balls.

E. Label each tree and shrub with securely attached waterproof tag bearing legible designation of botanical and common name.

F. Label at least one tree and one shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.

G. If formal arrangements or consecutive order of trees or shrubs is shown, select stock for uniform height, branching height, and spread, and number label to assure symmetry in planting.

H. Comply with the "PLANTING SCHEDULE" as shown on the Drawings.

2.2 SHADE AND FLOWERING TREES

A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader of height and caliper indicated complying with ANSI Z60.1 for type of trees required. Provide balled and burlapped, balled and potted, or container-grown trees. Branching Height: One-third to one-half of tree height. For street trees, branching height shall be one half of tree height.

B. Small Upright or Spreading Trees: Branched or pruned naturally according to species and type with relationship of caliper, height, and branching according to ANSI Z60.1. Stem form as follows: Stem Form: Multistem, clump, with two or more main stems. Provide balled and burlapped trees.

C. Multistem Trees: Branched or pruned naturally according to species and type with relationship of caliper, height, and branching according to ANSI Z60.1. Stem form as follows: Stem Form: Clump. Provide balled and burlapped trees.

D. Comply with the "PLANTING SCHEDULE" as shown on the Drawings.

2.3 PLANTING SOIL MIX

A. Planting Soil Mix: Mix three (3) parts acceptable topsoil with one (1) part peat moss.

2.4 MULCHES

A. Shredded hardwood mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs.
   1. Color: Natural.
   2. Size: Range between 3/8 inch to 8". Fine particles (3/8 inch or less) shall make up to 25% of total volume. Large particles (1 to 1 ½ inch in diameter and 4 to 8 inches in length) shall make up to 20% of total volume. Pieces larger than 8 inches long that are visible on the surface of the mulch after installation shall be removed.

2.5 STAKES AND GUYS

A. Install Stakes and Guys per methods and locations as shown on the Drawings.

B. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.

C. Guy Ties and Guards:
   1. Guy and Tie Wire: ASTM A641/A641M, Class 1, galvanized-steel wire, 2-strand, twisted.
   2. 0.106 inch in diameter.
   3. Guy Cable: For large trees: 5-strand, 3/16-inch diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
   4. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch in diameter, black, cut to lengths required to protect tree trunks from damage.
   5. Woven Fabric Guy Ties: Flat, woven, non-fraying, polypropylene material, 3/4-inch wide, white. Arbor Tie or approved equivalent.

2.6 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs, designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Topsoil: Refer to Section "Topsoil."

C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

D. Fertilizer:
   1. Bonemeal: Commercial, steamed finely ground material with a minimum of 1.0 percent nitrogen and a minimum of 11 percent phosphoric acid.
   2. Commercial Fertilizer (10-6-4): Containing not less than 10 percent nitrogen, 6 percent available phosphoric acid, and 4 percent water soluble potash.

E. Water: Clean, potable.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify final grades have been established prior to beginning planting operations.

B. Inspect trees and ground covers for injury, insect infestation, or improper pruning. Do not begin planting until deficiencies have been corrected, or plants replaced.

C. Examine areas to receive exterior plants for compliance with requirements and conditions affecting installation and performance. Notify Landscape Architect/Engineer, in writing, of any conditions that might prevent satisfactory completion. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Test drainage of pits and planting beds. Notify Landscape Architect/Engineer of potential poor drainage of tree and shrub pits and planting beds. Recommend a program for correction of poor drainage conditions and submit proposal to Landscape Architect/Engineer. Do not proceed with planting operations in areas of poor drainage until conditions are corrected, or direction is given by the Landscape Architect/Engineer.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.

B. Lay out individual tree and shrub locations and areas for multiple exterior plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect/Engineer's acceptance of layout before planting. Make minor adjustments as required.

C. Lay out exterior plants at locations directed by Landscape Architect/Engineer. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

D. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage to protect during digging, handling, and transportation. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

3.3 PLANTING BED ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section “Topsoil” and Part 2 above.

B. Place planting Soil: Blend planting soil in place.

C. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

D. Restore planting beds if eroded or otherwise disturbed after finish grading and before planting.

3.4 TREE AND SHRUB PIT/TRENCH EXCAVATION

A. Pits and Trenches: Excavate circular pits with sides sloped inward, so that top of pit is larger than bottom of pit. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
   1. Excavate approximately three times as wide as ball diameter for planting stock.
   2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
   3. If drain tile is shown or required under planted areas, excavate to top of porous backfill over tile.

B. Subsoil removed from excavations may be used as backfill.

C. Drainage: Notify Landscape Architect/Engineer if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

D. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE AND SHRUB PLANTING

A. Set balled and burlapped stock plumb and in center of pit or trench with root flare 1 inch above adjacent finish grades:
   1. Cut burlap and wire baskets from top half of root balls, but do not remove from under root balls. Discard removed burlap and wire baskets; do not turn down baskets and leave in tree or shrub pits. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
   2. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, install transplant inoculants per manufacturer's directions and water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
   3. Prepare surface of planting bed as shown on the Drawings.

B. Set balled and potted or container-grown stock plumb and in center of pit or trench with root flare 1 inch above adjacent finish grades:
   1. Carefully remove root ball from container without damaging root ball or plant.
   2. Make four (4) evenly spaced vertical cuts in the sides of the root ball with a clean, sharp utility knife. Cuts are to be 1-inch deep and are to extend the full height of the rootball.
   3. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, install transplant inoculants per manufacturer's directions and water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
   4. Prepare surface of planting bed as shown on the Drawings.

C. Set fabric bag-grown stock plumb and in center of pit or trench with root flare 1 inch above adjacent finish grades:
   1. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
   2. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, install transplant inoculants per manufacturer's directions and water thoroughly before placing remainder of backfill. Repeat

watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

3. Prepare surface of planting bed as shown on drawings.

D. Mulching: Mulch per planting detail.

3.6 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as directed by Landscape Architect/Engineer.

B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise indicated by Landscape Architect/Engineer, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.

3.7 GUYING AND STAKING

A. Guy and Stake trees as indicated on the drawings. Installation of tree support systems shall be completed within 48 hours of planting, utilizing applicable methods as indicated.

B. Remove tree Guys and Stakes at end of warranty period.

3.8 GROUNDCOVER AND PERENNIAL PLANTING

A. Set out and space ground cover and plants as indicated.

B. Dig holes large enough to allow spreading of roots and backfill with planting soil.

C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING BED MULCHING

A. Mulch backfilled surfaces of planting beds and other areas indicated. Apply 3-inch average thickness of mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.

3.10 INITIAL ACCEPTANCE

A. When all work except maintenance and guarantee program of this contract has been completed, Landscape Architect/Engineer will perform a Substantial Completion inspection. Provide notification at least ten (10) working days before inspection date. If required a “punch list” of items to be completed by an agreed upon date will be issued by the Landscape Architect/Engineer after the Substantial Completion inspection.

B. Work will be considered Substantially Complete after all “punch list” items are complete. Notify the Landscape Architect/Engineer at least five (5) working days before re-inspection date, to verify completion of the “punch list” items.

C. Substantial Completion certificate will be issued and dated by the Landscape Architect/Engineer following the “punch list” verification inspection.

3.11 MAINTENANCE

A. Maintain all exterior plants covered by this Section, as required to establish healthy, viable plantings, including the following maintenance requirements during the maintenance period indicated in Part 1 of this Section:
   1. Mowing.
   2. Edging.
   3. Pruning.
   4. Cultivating.
   5. Watering including filling tree water bags if used; do not allow plants to wilt at any time.
   6. Weeding.
   7. Fertilizing.
   8. Mulching.
   9. Restoring plant saucers for trees.
   10. Maintaining trees support systems at correct tension.
   11. Resetting plants to proper grade and vertical position.
   12. Insect and pest control as required to keep plants free of insects and disease.
   13. Removal of trash and debris.
   14. Removal of dead or dying plants.

3.12 FINAL ACCEPTANCE

A. Inspection to determine Final Acceptance of planted areas will be made by the Landscape Architect/Engineer upon Contractor’s request at completion of the one-year Warranty Period. Provide notification at least fifteen (15) working days before requested inspection date.
   1. Planted areas will be acceptable provided all requirements, including plant replacements and maintenance, have been complied with and healthy, thriving, and growing plants are established.
   2. Remove all Tree Staking and Guying materials prior to Final Acceptance inspection.
   3. Knock down, regrade, and remulch all tree pit saucers prior to Final Acceptance inspection.

3.13 CLEANUP AND PROTECTION

A. During exterior planting, keep adjacent pavings and construction clean and work area in an orderly condition.

B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting.

3.14 DISPOSAL

A. Disposal: Remove materials deemed unsuitable by the Engineer for use in the construction, and legally dispose of off Owner's property.

END OF SECTION

SECTION 329119.19 - TOPSOIL

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the placement of topsoil in conformance with the lines, grades and thicknesses as shown on the Drawings and as herein specified.

B. Minimum thickness is 6 inches, for all areas disturbed during construction and not receiving other surface treatment.

1.2 SUBMITTALS

A. Samples: The Contractor shall furnish earth materials to the testing laboratory for analysis and report, as directed by the Engineer or as outlined in the specifications.

B. Quality Control Submittals:
   1. Test Reports: The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and the Engineer. The test results should include gradation, pH, organic content, U.S.D.A soil texture classification and chemical make-up.
   2. Submit manufacturer's or vender's certified analysis for soil amendments.

1.3 QUALITY ASSURANCE

A. Reference Standards: The latest edition of the following standards, as referenced herein, shall be applicable.
   1. Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering.
   2. Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO).
   3. New York State of Environmental Conservation (NYSDEC) Division of Environmental Remediation Policy 10 (DER-10), Technical Guidance for Site Investigation and Remediation.
   4. Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

B. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils with the specifications, in accordance with Section "Quality Requirements".

1.4 PROJECT CONDITIONS

A. Coordinate the placement of topsoil with the completion all underground work including that of the other trades.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Topsoil: Fertile, friable, natural non-contaminated loam free of subsoil, clay lumps, brush, stones, or other deleterious materials larger than 2 inches in greatest dimension, meeting the following gradation requirements:

SIEVE SIZE	PERCENT PASSING
2"	100
1"	95 – 100
1/4”	70 – 95
No. 40	20 – 65
No. 200	10 – 20

1. pH range: 5.5 - 7.6.
2. Organic Content: 5% - 25%.
3. U.S.D.A Soil Texture: Sand loam, loam, clay loam, silt loam, or sandy clay loam.

B. The Contractor may amend natural topsoil with approved materials and by approved methods to meet the above specifications.

C. Imported topsoil required for the project shall meet the Unrestricted Use Soil Cleanup Objectives included in NYSDEC Division of Environmental Remediation DER-10, Technical Guidance for Site Investigation and Remediation; and Technical Guidance for Sampling, Analysis, and Assessment of PFAS (NYSDEC, June 2021).

2.2 ACCESSORIES

A. Soil Amendments:
1. Soil amendments are not to be made without review and authorization by the Engineer.
2. Lime: Natural limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve.
3. Aluminum Sulfate: Commercial grade.
4. Peat Humus: FS Q-P-166 and with texture and pH range suitable for intended use.
5. Bonemeal: Commercial, raw, finely ground; 4% nitrogen and 20% phosphoric acid.
6. Superphosphate: Soluble mixture of treated mixtures; 20% available phosphoric acid.
7. Sand: Clean, washed sand, free of toxic materials.
8. Perlite: Conforming to National Bureau of Standards PS 23.
9. Vermiculite: Horticultural grade, free of toxic substances.
10. Sawdust: Rotted sawdust, free of chips, stones, sticks, soil or toxic substances and with 7.5 lbs. nitrogen uniformly mixed into each cubic yard of sawdust.
11. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25% by volume of straw, sawdust or other bedding materials and containing no chemicals or ingredients harmful to plants.
12. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing available plant nutrients.
13. Commercial Compost: Containing no chemical or ingredients harmful to plants.

2.3 MATERIAL ACCEPTANCE

A. Topsoil may be acquired from approved sites that are designated on the Drawings or in the Proposal. If no sites are designated, material proposed for use as topsoil must be stockpiled, sampled, and tested prior to use.

B. Topsoil containing foreign or contaminated material may be rejected on the basis of visual examination by the Engineer, prior to testing.

C. Acceptance of topsoil shall be based upon test results. Tested topsoil must be approved in writing by the Engineer before any material is used.

PART 3 – EXECUTION

3.1 BORROW SOIL PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. General:
   1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of material and analytical tests. Samples may be obtained from stockpiles or from borrow pit faces. Tests listed in this section shall be performed on samples obtained. Composite samples shall be obtained as required in this section for analytical testing. Test results shall be provided to the Engineer a minimum of 2 weeks prior to start of cover soil layer construction for approval of borrow source by Engineer and NYSDEC.

B. Material Testing:
   1. Particle Size Analysis of Soils.
      a. Method: ASTM D 422.
      b. Number of Tests: One per sample; Three per borrow source.
   2. Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
      a. Method: ASTM D 4318.
      b. Number of Tests: One per sample; three per borrow source.
   3. Moisture Ash, and Organic Matter of Peat and Other Organic Soils.
      a. Method: ASTM D 2974.
      b. Number of Tests: One per sample; three per borrow source.
   4. pH of Soils.
      a. Method: ASTM D 4972.
      b. Number of Tests: One per sample; three per borrow source.

C. Analytical Testing:
   1. All topsoil to be imported for use as backfill shall be sampled and analyzed for the parameters listed below:
      a. Target Compound List (TCL) Volatile Organic Compounds (VOCs) via USEPA Method 8260.
      b. TCL Semivolatile Organic Compounds (SVOCs) via USEPA Method 8270.
      c. TCL Pesticides via USEPA Method 8081.
      d. TCL Herbicides via USEPA Method 8151.
      e. Polychlorinated Biphenyls (PCBs) by USEPA Method 8082.
      f. Target Analyte List (TAL) Metals by USEPA Method 6010.
      g. Per- and polyfluoroalkyl substances (PFAS) by USEPA Method 537.1.

h. 1,4-Dioxane by USEPA Method 8270 SIM.

2. Sampling shall include a combination of discrete and composite samples. Discrete/grab samples shall be taken directly from the soil material and shall be analyzed for VOCs only. Composite samples shall consist of collecting discrete samples from 4 to 5 random locations and be mixed/homogenized. Composite samples shall be analyzed for the remaining above-referenced parameters.

3. Sampling Frequency:

    1) Soil imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above.

    2) 2. Material sources other than a virgin mine/pit in accordance with the following:

Number of Soil Samples Required for Imported Fill			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

4. Soil with less than 10 percent by weight passing a standard No. 80 sieve shall not be subject to the above sampling requirements if a letter from the source owner is provided which states that the source is a virgin material, and the source area was never utilized for commercial or industrial purposes.

3.2 STOCKPILING

A. Topsoil shall be provided from off-site sources.

B. Stockpiles shall contain not less than 200 cu. yds. or the minimum required for the project.

C. Stockpiles shall have a height of at least 4 feet and shall be trimmed to uniform surfaces and slopes.

D. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded and put into an acceptable condition by seeding as directed by the Engineer.

3.3 PREPARATION

A. Place topsoil on compacted subgrade conforming to Section “Earth Moving” only after subgrades have been accepted by the Engineer.

B. Subgrades shall conform to the specified lines and grades.

C. Scarify the subgrade parallel to the contours to permit sufficient bonding with the topsoil. Do not scarify to the extent that the subgrade stability or density is disrupted.

D. Mix approved soil amendments into 6" inches of topsoil at necessary rates, if necessary.

3.4 TOPSOILING

A. Do not place topsoil when subsoil or topsoil is frozen, excessively wet, or otherwise detrimental to the Work.

B. Mix soil amendments, lime, and fertilizer with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days.

C. Place topsoil in areas where seeding is to be performed. Place a 6" minimum depth to the finished grade elevations as shown on the Drawings.

D. Fine grade topsoil to eliminate uneven areas and to ensure proper drainage. Maintain finished grade elevations required.

E. Remove all stones in excess of 2" in diameter, roots, grass, weeds or other foreign matter while placing.

F. Lightly compact the topsoil to ensure its stability.

G. Topsoil in an unworkable condition due to excessive moisture, frost, or other conditions shall not be placed until it is suitable for placement.

3.5 FIELD QUALITY CONTROL

A. Contractor shall perform the following tests each time 1,000 cubic yards of topsoil is brought on site and placed.
   1. Moisture, Ash, and organic content of peat and other organic soils.
      a. Method: ASTM D 2974.
      b. Acceptance Criteria: Within specified limits.
   2. pH of Soils.
      a. Method: ASTM D 4972.
      b. Acceptance Criteria: Within specified limits.
   3. Particle Size Analysis of Soils.
      a. Method: ASTM D 422.
      b. Acceptance Criteria: Within specified limits.

3.6 CLEANING

A. Remove all surplus subsoil and topsoil from project site.

B. Leave the site in clean, satisfactory condition ready to receive subsequent operations.

END OF SECTION

SECTION 329219.20 – SEEDING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes preparation of ground surfaces, fertilizing, seeding, mulching, and maintenance of seeded areas as shown on the Drawings or as specified herein.

B. Seed shall be sown from April 1st to June 1st or from September 1st to October 15th, unless otherwise approved by the Engineer.

1.2 SUBMITTALS

A. Quality Control Submittals:
   1. Certification:
      a. Submit manufacturer's or vendor's certified analysis for fertilizer materials.
      b. Submit vendor's certified analysis for each grass seed mixture required, stating botanical and common name, percentages by weight, percentages by purity, germination, and weed seed.
   2. Maintenance Instructions: Submit instructions recommending procedures to be established for maintenance of landscaped work for one (1) full year. Submit prior to expiration of Contractor's maintenance period.
   3. Submit description of planned mulching techniques and corresponding manufacturer's installation recommendation for approval by the Engineer.

1.3 QUALITY ASSURANCE

A. All landscaping work shall be performed by one (1) Contractor, with proven experience in this field.

B. Package standard products with the manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of materials with the specifications, in accordance with Section "Quality Requirements."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Fertilizer:
   1. Commercial fertilizer (5-10-5) inorganic, or organic, containing not less than five (5) percent nitrogen, ten (10) percent available phosphoric acid, and five (5) percent water soluble potash.

2. If, as an alternative, the Contractor wishes to substitute for commercial fertilizer 5-10-5, another commercial fertilizer with a 1- 2-1 ratio, such as 10-20-10 or 6-12-6, he may do so with the approval of the Engineer and the rate of fertilizer to be used shall be whatever amount is required to furnish the same amount of nitrogen as would be supplied by the 5-10-5.

B. Seed:
1. Seed shall be fresh, clean, new-crop seed mixed in the proportions specified for species and variety, conforming to Federal and State Standards.
2. Use the following mixture:

SPECIES	% BY WEIGHT	% BY PURITY	% GERMINATION
Intermediate Ryegrass	25	95	85
Perennial Ryegrass	25	95	85
Annual Ryegrass	20	95	85
Creeping Red Fescue	20	95	85
Kentucky Bluegrass	10	95	85

3. Weed seed content shall not exceed 0.25%.

C. Water: Clean, potable.

D. Mulch:
1. Provide and install a mulch adequate to protect the seeding during its growing period. It shall be the responsibility of the Contractor to determine the appropriate mulching techniques for the particular site conditions and acquire approval of the same from the Engineer.
2. Clean straw for gentle slopes, consisting of stalks of oats, wheat, rye, or other approved crops which are free of noxious weed seeds. Weight shall be based on a fifteen (15) percent moisture content.
3. Mulching blanket for steep slopes and drainage swales in accordance with Section "Erosion and Sediment Control".

PART 3 – EXECUTION

3.1 PREPARATION OF TOPSOIL

A. Mix fertilizer into top 2 inches of topsoil at a rate of 20 lbs. per 1000 square feet.

B. Water dry topsoil to depth of 4 inches at least 48 hours prior to seeding to obtain a loose friable seed bed.

3.2 SEEDING

A. Apply seed only when wind velocities are less than five (5) miles per hour.

B. Sow half the seed with mechanical seeder.

C. Sow remaining half of seed at right angles to first seeding pattern, using the same method.

D. Apply seed at 5 lbs. per 1000 square feet.

E. Cover seed to a depth of 1/8 inch by raking, harrowing or cultipacking.

F. Roll seeded area with roller weighing no more than 150 lbs. per foot of roller width.

G. Water seeded areas to a depth of four (4) inches.

3.3 MULCHING

A. Spread straw uniformly over seeded area with 75% ground coverage and at least 1 1/2 inches loose depth.
   1. If, in the opinion of the Engineer, wind will disrupt the mulching, apply asphalt emulsion at a rate of 10 gallons per 1000 square feet.

B. Place mulching blanket in accordance with submitted manufacturer's recommendations.

3.4 HYDROSEEDING

A. Mix specified seed, fertilizer and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

B. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed sowing rate.

3.5 PROTECTION

A. Immediately after seeding and sodding, erect barricades and warnings to protect seeded areas from traffic until grass is established.

B. Repair or replace damaged landscape work as directed by Engineer.

3.6 MAINTENANCE

A. Maintain and protect all seeded areas until final acceptance of the Contract. Final acceptance of "Seeding" will not be made until an acceptable uniform stand of grass is obtained, except that the Engineer at his discretion may accept a portion or portions of the "Seeding" at various times. Upon acceptance by the Engineer of a seeded area, the Owner will immediately assume responsibility for maintenance and protection of that portion of the Contract Seeding.

END OF SECTION

SECTION 330500 – COMMON WORK RESULTS FOR UTILITIES

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the installation of buried piping.

1.2 REFERENCES

A. The following references shall be applicable: American Society of Testing and Materials (ASTM).
   1. American National Standards Institute (ANSI).
   2. American Water Works Association (AWWA).
   3. Uni-Bell Plastic Pipe Association.

1.3 SUBMITTALS

A. Submit for approval a schedule for all proposed testing. Include proposed testing procedures indicating the sequence in which pipe sections will be tested and description of methods and equipment to be used.

B. Field Test Reports: Submit results of field testing directly to Engineer with copy to Contractor.

1.4 STORAGE, AND HANDLING

A. Deliver and store materials within the Contract limits as approved by Engineer.

B. Handle materials carefully with approved handling devices in accordance with manufacturer's recommendations. Special care shall be exercised during delivery and storage to avoid damage to the materials.

C. Do not drop or roll products off trucks. Products are not to be otherwise dragged, rolled, or skidded.

D. Materials shall be stored on heavy wood blocking or platforms in accordance with the manufacturer's instructions and recommendations. Materials shall not be in contact with the ground and their interiors shall be maintained free from dirt and other foreign matter.

E. Products cracked, gouged, chipped, dented, or otherwise damaged will not be approved and are to be removed and replaced at the Contractor's expense, unless the product can be repaired in a manner acceptable to the manufacturer and the Engineer. All repairs shall be at the Contractor's expense.

1.5 COORDINATION

A. Contractor shall be responsible for coordinating site utility work with other trades to ensure building service connection locations are verified and coordinated prior to commencing site construction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Conform to individual pipe specification(s).

B. Pipe transition fittings: Shall be as indicated on the drawings. If not specifically indicated selection shall be based on pressure requirements of the system and types of materials being joined. Product selection shall be approved by the engineer.

C. Grout:
   1. Description: ASTM C1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
      a. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
      b. Design Mix: 5000 psi (34.5 MPa), 28-day compressive strength.
      c. Packaging: Premixed and factory packaged.

D. Flowable Fill:
   1. Description: Low-strength-concrete, flowable-slurry mix.
      a. Cement: ASTM C150, Type I, Portland.
      b. Density: 115 to 145 pounds/cubic foot (1840 to 2325 kg/cu. m).
      c. Aggregates: ASTM C33, natural sand, fine and crushed gravel or stone, coarse.
      d. Aggregates: ASTM C33, natural sand, fine.
      e. Admixture: ASTM C618, fly-ash mineral.
      f. Water: Comply with ASTM C94/C94M.
      g. Strength: Greater than 40 psig at 28 days and no more than 150 psig at one year.

PART 3 – EXECUTION

3.1 UTILITY DEMOLITION

A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
   1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
   3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
   5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.2 BURIED PIPE INSTALLATION

A. General:
   1. Installation of all pipe, fittings, valves, specials, and appurtenances shall be subject to the review and/or approval of the Engineer.
   2. Install piping valves and fittings as shown, specified and as recommended by the manufacturer and in conformance with referenced standards, and approved Shop Drawings.
   3. Request instructions from Engineer before proceeding if there is a conflict between the manufacturer's recommendations and the Drawings or Specifications.
   4. All piping and appurtenances shall be inspected by the Engineer prior to installation. Engineer's inspection will not relieve Contractor or manufacturer from responsibility for damaged products.

5. Present all conflicts between piping systems and equipment, structures or facilities to Engineer for determination of corrective measures before proceeding.
6. Take field measurements prior to installation to ensure proper fitting of Work. Uncover the existing pipelines sufficiently in advance of the proposed Work in order that the type and location of the existing pipes and joints and other information required to fabricate the proposed piping can be determined. Obtain whatever information is required to complete the connections of the proposed pipelines to the existing pipelines.
7. Carefully examine all piping for cracks, damage, or other defects before installation. Immediately remove defective materials from the site, unless the defective materials can be repaired in a manner acceptable to the manufacturer and Engineer. Remove, replace, or repair at the Contractor's expense piping found to be broken or defective.
8. Inspect interior of all piping and mating surfaces and remove all dirt, gravel, sand, debris, or other foreign material before installation. Maintain the interior of all piping clean until acceptance of the completed Work. Prevent foreign matter from entering joint space.
9. Install buried piping accurately to line and grade shown, specified or directed, unless otherwise approved by the Engineer. Use accurate means of determining and checking the alignment and grade subject to the approval of the Engineer. Remove and relay piping that is incorrectly installed at Contractor's expense.
10. Do not lay piping in water, unless approved by the Engineer. Ensure that the water level in the trench is at least 6 inches below the bottom of piping. Maintain a dry trench until jointing and backfilling are complete, unless otherwise specified in these Specifications or approved by the Engineer.
11. Pipe laying work shall be conducted so that trenching operations are not advanced too far ahead of the pipe laying operation resulting in excessive lengths of open trench. In general, open trench ahead of pipe laying shall not exceed 50 feet.
12. Start laying piping at lowest point and proceed toward the higher elevations, unless otherwise approved by the Engineer. Slope piping uniformly between elevations shown on the Drawings or as otherwise provided by the Engineer.
13. Where pipe crossings occur, the lower pipe shall be laid first and all backfill thoroughly compacted to the level of the higher pipe before the higher pipe is installed. Backfill material under such conditions may be earth, broken stone, or 2500 psi concrete.
14. Install piping so that the barrel of the piping and not the joints receives the bearing pressure from the trench bottom, or other bedding condition.
15. No piping shall be brought into position until the preceding length, valve, fitting, or special has been bedded and secured in place.
16. Whenever pipe laying is not actively in progress, the open ends of the piping shall be closed by a temporary plug or cap to prevent soil, water and other foreign matter from entering the piping.
17. Where required for inserting valves, fittings, special appurtenances, and closures, shall be made with a machine specially designed for cutting piping and in accordance with the manufacturer's instructions for field cutting of pipe. Make cuts carefully, without damage to piping, so as to leave a smooth end at right angles to the axis of the piping. Taper cut ends and file off sharp edges until smooth. Flame cutting will not be permitted. Replace and repair damaged piping.
18. Blocking under piping will not be permitted unless specifically approved by Engineer for special conditions.
19. Touch up protective and linings and coatings prior to installation.
20. Rotate piping to place outlets in proper position.

B. Bedding and Backfilling:
1. Bedded and installed piping in conformance with Section "Trenching and Backfilling" and as shown except as otherwise specified.

2. No piping shall be laid until Engineer approves the bedding condition.
3. Excavation in excess of that required as shown on the Drawings or specified, which is not authorized by the Engineer, shall be at the Contractor's expense. Backfilling and compaction of the over-excavated areas shall be at the Contractor's expense.
4. Carefully and thoroughly compact all pipe bedding and fill up to the pipe centerline with hand-held pneumatic compactors.

C. Transitions from One Type of Pipe to Another:
1. Provide all necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

D. Work Affecting Existing Piping:
1. Location of Existing Piping:
a. Locations of existing piping shown shall be considered approximate. Contractor shall perform all necessary subsurface investigation to verify actual locations in the field.
b. Determine exact location of existing piping to make connections, relocate, replace or which may be disturbed during earth moving operations, or which may be affected by work in any way.
c. Coordinate all excavations with utility companies, Owner and Engineer.
2. Taking Existing Pipelines Out of Service:
a. Do not take pipelines out of service unless specifically approved by Engineer.
b. Notify Engineer at least 48 hours prior to taking any pipeline out of service.

3.3 SPECIFIC PIPE INSTALLATION

A. High Density Polyethylene Gravity Piping (HDPE):
1. Install in accordance with the pipe manufacturer's specifications.
2. Completely clean all jointing surfaces and adjacent areas prior to making joints.
3. Field cut pipe for shorter than standard pipe lengths. Cut ends square and perpendicular to the pipe axis. Remove and smoothly bevel ends.
4. Assemble all joints in accordance with recommendations of the manufacturer. If a lubricant is required to facilitate assembly, it shall not have a detrimental effect on the gasket or on the pipe when subjected to prolonged exposure.

3.4 FIELD QUALITY CONTROL

A. General:
1. Notify Engineer at least 48 hours in advance of all testing.
2. Provide all testing apparatus including pumps, hoses, gauges, fittings, temporary bulkheads, plugs, compressors and miscellaneous other required items.
3. Provide temporary blocking and bracing or approved thrust and joint restraint to prevent joint separation and pipe movement during testing.
4. Unless otherwise approved, conduct all tests in the presence of the Engineer and in the presence of local authorities having jurisdiction.
5. Water Source:
a. Provide all water for testing, flushing, and other water uses. The source of the water shall be subject to the approval of the Engineer.
b. The point of introduction of water for conducting tests shall be subject to the approval of the Engineer.
6. All costs for tests shall be included in the Contractor's bid.

7. Locate, and repair or replace, section of piping which fail the test and retest until acceptance.

B. Required Tests for Storm Sewers:
   1. Perform the following tests after the storm drainage pipe has been installed and prior to final acceptance:
      a. Alignment Test for all pipe.
   2. Based upon visual observations, the Engineer may order additional testing including the following:
      a. Television Inspection, if required by the Engineer.
      b. Deflection Test, if required by the Engineer.
      c. Water-tight field test ASTM F1417 if required by the Engineer.
   3. Perform tests prior to placement of pavement, or other construction which may, in the opinion of the Engineer, be detrimentally affected by excavation required for repairs.
   4. Submit details prior to making tests of proposed testing procedures with a description of methods and equipment to the Engineer for approval.
   5. Alignment Test:
      a. All storm drainage pipe will be subject to a visual inspection in order to identify proper alignment, grade, and excessive deflection.
      b. The Engineer may choose to perform an alignment test using the hand-lamp method, in which case the full diameter of the pipe shall be visible when viewed between consecutive structures.
   6. Television Inspection:
      a. The Engineer will notify the Contractor in writing which completed sewers shall be inspected by closed-circuit television.
      b. The Contractor shall commence the television inspection within 15 days of the Engineer's written notification. The Contractor shall notify the Engineer at least 5 days prior to commencement of television inspection.
      c. No television inspection shall be performed without the Engineer or his representative present to witness the inspection.
      d. The Contractor shall provide the Engineer with 3 copies of a report of the televising inspection of each section of completed sewer inspected. Show the exact location and extent of all cracks, loose joints, holes, vertical and horizontal, misalignment, faulty service connections, caved-in pipe, points of infiltration, obstructions, debris and all else detrimental to the proper functioning and service of the completed sewer. The Contractor shall provide the actual television inspection video with the report showing all the above conditions found, at all wyes, tees and laterals and as directed by the Engineer.
      e. The Engineer will review the report and will instruct the Contractor, to repair any conditions which, in the opinion of the Engineer, are detrimental to the proper function and service of the storm pipe.
   7. Deflection Test:
      a. The Engineer will notify the Contractor in writing which completed sewers shall be tested by the deflection method.
      b. The Contractor shall commence the deflection test within 15 days of the Engineer's written notification. The Contractor shall notify the Engineer at least 5 days prior to commencement of television inspection.
      c. No Deflection testing shall be performed without the Engineer or his representative present to witness the test.
      d. The deflection test shall be performed on flexible drainage pipe with a "go/no-go" mandrel with a diameter equal to 95 percent of the inside diameter of the pipe being tested.

e. The maximum pipe deflection shall be 5 percent.

f. The Engineer will review the Deflection Test results and will instruct the Contractor, to repair any conditions which, in the opinion of the Engineer, are detrimental to the proper function and service of the storm pipe.

8. Visual Inspection: Prior to final acceptance, a visual inspection of all appurtenance structures (i.e., manholes, chambers, etc.) will be required. Repair visual leaks, regardless of their magnitude.

END OF SECTION

SECTION 330513 – MANHOLES AND STRUCTURES

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the following:
   1. Installation of, catch basins, precast concrete structures, frames, grates, covers, and steps as provided from the Village of Hoosick Falls. Also includes piping connections as shown on the Drawings and as specified herein.
   2. Alteration of existing structures as needed to affect the work shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
   1. American Society of Testing and Materials (ASTM).
   2. American National Standards Institute (ANSI).
   3. Occupational Health and Safety Administration (OSHA).

1.3 SUBMITTALS

A. Product Data:
   1. Manufacturer's catalog cuts, specifications, and installation instructions.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Offloading and storage of Village provided materials to the site to prevent interruption of the Work.

B. All materials shall be inspected by the Contractor upon delivery to the site. The Contractor shall notify the Engineer of any loss or damages. Replace loss or repair damage to new condition at the Contractor's expense.

C. Store materials to allow easy access for inspection and identification.

PART 2 – PRODUCTS

2.1 PRECAST CONCRETE DRAINAGE STRUCTURES

A. Catch basins as provided by the Village of Hoosick Falls.

2.2 FRAMES AND COVERS/GRATES

A. As provided by the Village of Hoosick Falls.

2.3 GRADE ADJUSTMENTS

A. Grade Rings: Reinforced-concrete rings, 3- to 12-inch (75- to 300-mm) total thickness, to match diameter of manhole frame and cover.

2.4 GROUT

A. Description: ASTM C1107, Grade B. non-shrink and nonmetallic, dry hydraulic-cement grout.
   1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5,000 psi (34.5 MPa), 28-day compressive strength.
   3. Packaging: Premixed and factory packaged.

2.5 DROP INLET

A. Drop inlets for manholes shall be constructed where shown on the Drawings and shall conform with the details shown on the Drawings.

B. Pipe and fittings shall be the same type and class as the sewer pipe beings installed.

C. Concrete for pipe encasement shall be 3,000 psi.

PART 3 – EXECUTION

3.1 EARTHWORK

A. Earthwork shall be in accordance with Section “Trenching and Backfilling” or Section “Earth Moving.”

3.2 GRADE RINGS

A. Grade rings placed upon the eccentric cone or slab shall be used for all manholes to provide the potential for future adjustment.

B. Grade rings shall be placed in a combined thickness of at least 4 inches but not more than 12 inches in order to bring the manhole frame to proper grade.

C. Consecutive grade ring layers shall be laid on an even mortar bed.

3.3 PIPE CONNECTIONS

A. Pipe connections to manholes shall be installed true to line and grade as shown on the Drawings. Wall fittings shall be watertight, compatible with the sewer pipe joint. Connections shall conform to the details shown on the Drawings.

3.4 FRAMES

A. Frames shall be firmly set and bonded at the proper grade to conform with the finished grade shown on the Drawings.

B. Frames for manholes in unpaved areas shall be set at an elevation higher than finished grade as shown on the Drawings or as directed by the Engineer.

3.5 CONNECTION TO EXISTING STRUCTURES

A. The Contractor shall make connections to existing structures as shown on the Drawings or as specified herein.

B. For connections to precast or cast-in-place concrete manholes, the Contractor shall core drill a hole 1 inch larger than the O.D. of the sewer pipe into the existing manhole at the location and elevation shown on the Drawings.

C. For connections to masonry manholes, the Contractor shall open the sidewall of the existing manhole by removing masonry units no more than necessary to accommodate the sewer pipe.

D. Connection methods shall be in accordance with the details shown on the Drawings. Any open spaces around the new pipe entry shall be sealed with non-shrink grout to prevent leakage.

END OF SECTION

OAK MITSUI SITE #442052
REMEDIAL CLOSURE DESIGN
80 FIRST STREET
HOOSICK FALLS, NEW YORK
FEBRUARY 2022

Prepared by:

CHA

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CHA Project # 031861

VILLAGE OF HOOSICK FALLS
RENSSELAER COUNTY, NEW YORK

DRAWING INDEX

LEGEND

EXISTING

- 124 / 125 — ELEVATION CONTOURS
- CB — SQUARE CATCH BASIN
- CB — ROUND CATCH BASIN
- MH — MANHOLE
- MHST — STORM MANHOLE
- MHE — ELECTRIC MANHOLE
- WV — WATER VALVE
- HYD — HYDRANT
- MW — MONITORING WELL
- MH — PRODUCTION WELL
- LIGHT — LIGHT POLE
- CO — CLEANOUT
- MHT — TELEPHONE MANHOLE
- POLE — UTILITY POLE
- IRON PIPE — IRON PIPE FOUND
- IRON ROD — IRON ROD FOUND
- AOR — ALUMINUM CAPPED IRON ROD FOUND
- YOR — YELLOW CAPPED IRON ROD FOUND

PROPOSED

- 200 — ELEVATION CONTOURS
- 253 x — SPOT ELEVATION
- MULCHING BLANKET
- SF — SILT FENCE
- SELECTIVE DEMOLITION
- HDPE SEWER PIPE
- 1 / GT-601 — DETAIL IDENTIFICATION NO. / SHEET NO. WHERE DETAIL IS SHOWN
- 1 TITLE NOT TO SCALE — DETAIL IDENTIFICATION NO.
- CATCH BASIN
- X — X — CHAIN LINK FENCE
- 1 – PA — PLANTINGS

NOTES

1. EXISTING CONTOURS AND PLANIMETRIC FEATURES ARE BASED ON A FIELD SURVEY COMPLETED BY CONTROL POINT ASSOCIATES, DATED MARCH 31, 2021. THE SITE IS INACTIVE, HOWEVER, IT IS RECOMMENDED THAT THE CONTRACTOR INSPECT THE SITE PRIOR TO BID SO THAT THE EXTENT OF VARIANCE OF ACTUAL CONDITIONS WITH THOSE SHOWN ON THE PLANS MAY BE REFLECTED IN THE BID.
2. LOCATION OF UNDERGROUND UTILITIES, IF ANY, ARE APPROXIMATE. LOCATIONS AND SIZES ARE BASED ON ABOVEGROUND STRUCTURES THAT WERE VISIBLE & ACCESSIBLE IN THE FIELD, AND MAP REFERENCES AVAILABLE AT THE TIME OF THE SURVEY. AVAILABLE AS-BUILT PLANS AND UTILITY MARK-OUT DOES NOT ENSURE MAPPING OF ALL UNDERGROUND UTILITIES AND STRUCTURES. BEFORE ANY EXCAVATION IS TO BEGIN, DIG SAFELY NEW YORK SHALL BE NOTIFIED AND ALL UNDERGROUND UTILITIES SHOULD BE VERIFIED AS TO THEIR LOCATION, SIZE AND TYPE BY THE PROPER UTILITY COMPANIES. NO GUARANTEE IS MADE THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA EITHER IN SERVICE OR ABANDONED.
3. ALL MATERIALS USED, AND ALL CONSTRUCTION METHODS EMPLOYED FOR WORK WITH REFERENCE TO NYSDOT ITEMS SHALL BE IN ACCORDANCE WITH THE "MATERIALS" AND "CONSTRUCTION DETAILS" SECTIONS OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS".
4. MATERIAL AND ANALYTICAL TESTS RESULTS REQUIRED BY THE TECHNICAL SPECIFICATIONS SHALL BE SUBMITTED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BY THE ENGINEER AND NYSDEC FOR ALL SOILS TO BE IMPORTED TO THE SITE FOR USE IN THE CONSTRUCTION.
5. THE SITE SHALL BE CLEARED AND GRUBBED TO THE PROPOSED LIMITS SHOWN ON DRAWING GT-002. ALL CLEARING DEBRIS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED. ALL STRUCTURES AND FEATURES DESIGNATED FOR DEMOLITION, AND MISCELLANEOUS SHALLOW MATERIALS SUCH AS CONCRETE AND ASPHALT, SHALL BE REMOVED TO A DEPTH OF TWO FEET BELOW THE PROPOSED GRADES SHOWN ON DRAWING GT-101 UNLESS SPECIFIED OTHERWISE. DEMOLITION MATERIALS SHALL BE CRUSHED AND USED ON THE SITE AS GRADING FILL UNDER THE COVER SYSTEM.
6. CONTRACTOR SHALL IMPLEMENT A COMMUNITY AIR MONITORING PLAN AS DETAILED IN THE PROJECT SPECIFICATIONS DURING EXCAVATION AND GRADING OF EXISTING SITE SOILS AND DEMOLITION WORK.
7. THE SITE SHALL BE GRADED SUCH THAT THE TOP OF THE FINAL REMEDIAL COVER IS CONSTRUCTED IN GENERAL ACCORDANCE WITH THE GRADES SHOWN ON SHEET GT-101, PROVIDING FOR RUNOFF AND THE PREVENTION OF PONDING WATER OVER THE SITE SURFACE AT ALL TIMES. THE FINAL SLOPES MAY BE ADJUSTED DURING CONSTRUCTION, AS APPROVED BY THE ENGINEER, PROVIDED THAT ALL FINAL SLOPES ARE BETWEEN TWO AND TWENTY-FIVE PERCENT AND THE OVERALL DRAINAGE PATTERNS ARE NOT SUBSTANTIALLY CHANGED. CONTRACTOR SHALL NOTE ALL VARIATIONS FROM DESIGN PLANS ON RECORD DRAWINGS.
8. MATERIALS EXCAVATED DURING GRADING OF THE SITE ARE TO BE PLACED WHERE FILL IS REQUIRED TO MEET PROPOSED ELEVATIONS. EXCESS EXCAVATED MATERIALS SHALL BE PLACED ON-SITE AND REGRADED AS DIRECTED BY OWNER AND ENGINEER. NO MATERIALS SHALL BE PLACED OUTSIDE THE EXISTING LIMITS OF THE SITE.
9. FINAL PREPARATION OF THE EXISTING SITE SHALL CONSIST OF COMPACTION OF THE RE-GRADED SURFACE TO CREATE A UNIFORM SURFACE FOR FINAL REMEDIAL COVER CONSTRUCTION.
10. THE UNDER-DRAIN LAYER OF THE REMEDIAL COVER SHALL BE CONSTRUCTED ABOVE THE RE-GRADED AND COMPACTED SITE SURFACE, AND SHALL CONSIST OF SIX INCHES OF CRUSHED STONE MEETING THE REQUIREMENTS OUTLINED IN THE TECHNICAL SPECIFICATIONS.
11. THE COVER SOIL LAYER OF THE REMEDIAL COVER SHALL BE CONSTRUCTED ABOVE THE UNDER-DRAIN LAYER, AND SHALL CONSIST OF 12 INCHES OF COVER SOIL MEETING THE REQUIREMENTS OUTLINED IN THE TECHNICAL SPECIFICATIONS.
12. THE COVER SOIL LAYER SHALL BE COVERED BY SIX INCHES OF TOPSOIL MEETING THE REQUIREMENTS OF TECHNICAL SPECIFICATIONS. THIS LAYER SHALL BE PLACED, LIGHTLY TAMPED, FERTILIZED, SEEDED AND MULCHED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS; AND SHALL BE CAPABLE OF SUPPORTING VEGETATIVE GROWTH TO COMPLETE THE CLOSURE COVER SYSTEM.
13. ALL COVER LAYER THICKNESSES SHALL BE MEASURED PERPENDICULAR TO THE GROUND SURFACE.
14. SEED MIXTURE SHALL BE NEW CROP SEED MIX AS SPECIFIED IN CONTRACT DOCUMENTS. SEED AND FERTILIZER SHALL BE APPLIED AT THE RATES REQUIRED BY THE TECHNICAL SPECIFICATIONS.
15. ALL CONSTRUCTION SHALL BE PERFORMED UNDER THE OBSERVATION OF A REPRESENTATIVE OF A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW YORK. THE ENGINEER WILL PREPARE A CONSTRUCTION CERTIFICATION REPORT TO INCLUDE THE RESULTS OF ALL QUALITY ASSURANCE / QUALITY CONTROL TESTING AND DOCUMENTATION.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF COVER SYSTEM STABILITY, EROSION CONTROL, REPAIR OF DAMAGE, AND ESTABLISHMENT OF VEGETATIVE GROWTH DURING CONSTRUCTION AND APPLICABLE WARRANTY/CORRECTION PERIOD REQUIRED BY THE PROJECT SPECIFICATIONS. THIS INCLUDES CONTROL OF SOIL EROSION DURING ANY SEASONAL SUSPENSION IN THE WORK, AND RECOVERY AND REPLACEMENT OF ERODED SOILS AT NO ADDITIONAL COST TO THE OWNER.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR FINES, PENALTIES, OR LEGAL ACTIONS RESULTING FROM THEIR NEGLIGENCE ON THE PROJECT.
18. CONTRACTOR TO RETURN CONSTRUCTION STAGING AREA AND OTHER AREAS UTILIZED BY CONTRACTOR TO ORIGINAL CONDITION PRIOR TO FINAL COMPLETION OF CONSTRUCTION.
19. CONTRACTOR TO MAINTAIN EXISTING ACCESS ROADWAY FOR OWNERS OPERATIONS. CONTRACTOR TO COORDINATE ACCORDINGLY TO MINIMIZE IMPACTS TO OWNERS SITE OPERATIONS.
20. PROTECT ALL EXISTING MONITORING WELLS THAT ARE NOT DESIGNATED FOR REMOVAL FROM DAMAGE DURING CONSTRUCTION. REPAIR OR REPLACE ANY DAMAGED WELLS DURING CONSTRUCTION AT NO ADDITIONAL COST TO OWNER.
21. EXISTING MONITORING WELLS AND PRODUCTION WELLS DESIGNATED FOR REMOVAL SHALL BE ABANDONED IN ACCORDANCE WITH THE REQUIREMENTS OF NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CP-43: GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY. REMOVALS TO BE PERFORMED BY OTHERS.
22. THE CONTRACTOR SHALL COORDINATE ANY UTILITY INTERRUPTIONS WITH THE OWNER TO AVOID IMPACTS TO OWNER'S OPERATIONS.
23. ALL INSTALLATION PROCEDURES AND QA/QC TESTING FOR MATERIALS USED IN THE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS FOR THE PROJECT. ALL QA/QC TESTING SHALL BE PROVIDED BY THE CONTRACTOR WHO SHALL COORDINATE THEIR SCHEDULE AND COOPERATE FULLY WITH ALL TESTING REQUIREMENTS.

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STATE OF NEW YORK
SAMANTHA J. MILLER
103303
LICENSED PROFESSIONAL ENGINEER

OAK MITSUI SITE # 442052
REMEDIAL CLOSURE DESIGN
80 FIRST STREET
HOOSICK FALLS, NEW YORK

No.	Submittal / Revision	App'd.	By	Date
0	REGULATORY REVIEW SUBMITTAL	SJM	TRG	02/04/22

PROJECT TITLE, LOCATION, AND DRAWING INDEX

Designed By:	Drawn By:	Checked By:
DMF	TRG	SMS
Issue Date:	Project No:	Scale:
02/2022	031861.000	AS SHOWN

Drawing No.:

T-001

File: V:\PROJECTS\ANY\K4\31861\CADD_ACADD\T-001_31861_TITLE SHEET.DWG
Saved: 2/2/2022 5:41:19 PM Plotted: 2/3/2022 2:54:11 PM Current User: Gray, Timmolyn LastSavedBy: 3511

NOTES:

1. THIS SURVEY MAP IS BASED ON INFORMATION PROVIDED BY A SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC. ON MARCH 31, 2021.

2. LOCATION OF UNDERGROUND UTILITIES IF ANY ARE APPROXIMATE. LOCATIONS AND SIZES ARE BASED ON ABOVE GROUND STRUCTURES THAT WERE VISIBLE & ACCESSIBLE IN THE FIELD, AND AVAILABLE AS–BUILT PLANS AT THE TIME OF THE SURVEY. AVAILABLE AS–BUILT PLANS AND UTILITY MARK–OUT DOES NOT ENSURE MAPPING OF ALL UNDERGROUND UTILITIES AND STRUCTURES. BEFORE ANY EXCAVATION IS TO BEGIN, DIG SAFELY NEW YORK SHALL BE CONTACTED AND ALL UNDERGROUND UTILITIES SHOULD BE VERIFIED AS TO THEIR LOCATION, SIZE AND TYPE BY THE PROPER UTILITY COMPANIES. THERE IS NO GUARANTEE THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA EITHER IN SERVICE OR ABANDONED.

3. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO THE RESTRICTIONS, COVENANTS AND/OR EASEMENTS THAT MAY BE CONTAINED THEREIN.

4. ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON GPS OBSERVATIONS UTILIZING THE KEYSTONE VRS NETWORK (KEYNETGPS).

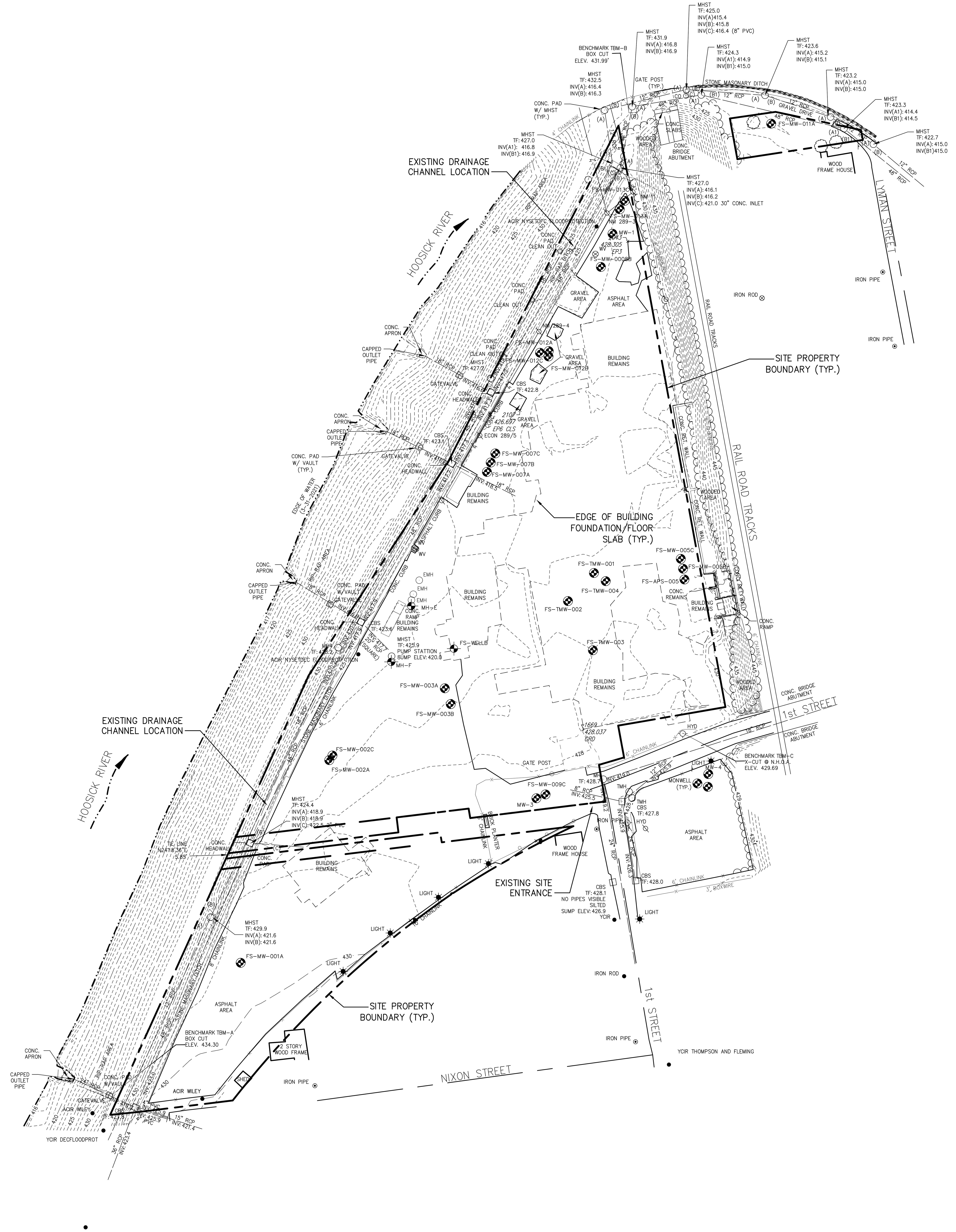
5. TEMPORARY BENCH MARKS SET:

   TBM–A: BOXCUT AT NORTHEAST CORNER OF CONC PAD.
   ELEVATION= 434.30

   TBM–B: BOXCUT SET AT SOUTHWEST CORNER CONC PAD.
   ELEVATION= 431.99

   TBM–C: XCUT ON BONNET BOLTOF HYDRANT AT HEAD OF ARROW.
   ELEVATION= 429.69

6. PRIOR TO CONSTRUCTION IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE BENCHMARKS ILLUSTRATED ON THIS DRAWING HAVE NOT BEEN DISTURBED AND THEIR ELEVATIONS HAVE BEEN CONFIRMED. ANY CONFLICTS SHALL BE REPORTED PRIOR TO CONSTRUCTION.



N

0 60 120
Scale in feet

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Saved: 2/3/2022 2:43:56 PM Plotted: 2/3/2022 2:55:31 PM Current User: Gray, Timmolyn LastSavedBy: 3511

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OAK MITSUI SITE # 442052
REMEDIAL CLOSURE DESIGN
80 FIRST STREET
HOOSICK FALLS, NEW YORK

No.	Submittal / Revision	App'd.	By	Date
0	REGULATORY REVIEW SUBMITTAL	SJM	TRG	02/04/22

EXISTING
CONDITIONS PLAN

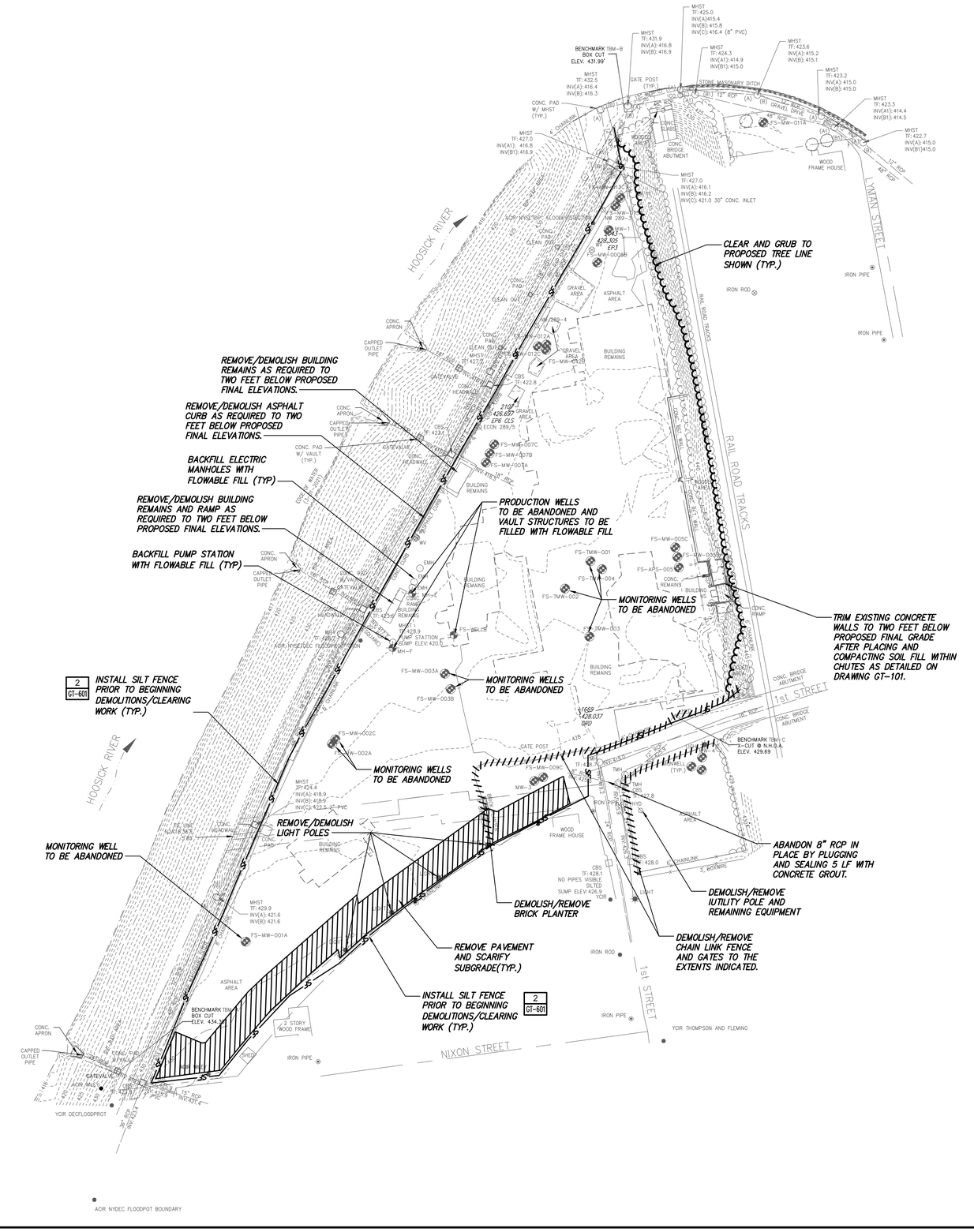
Designed By:	Drawn By:	Checked By:
DMF	TRG	SMS
Issue Date:	Project No:	Scale:
02/2022	031861.000	AS SHOWN

Drawing No.:

GT-001

DEMOLITION/REMOVAL NOTES:

1. A CONSTRUCTION EASEMENT WILL BE OBTAINED FROM PAN AM RAILROAD BY THE OWNER FOR WORK SHOWN BEYOND THE SITE PROPERTY BOUNDARY ON THE EAST SIDE OF THE SITE.
2. LOCATE, DISCONNECT AND REMOVE UTILITY SERVICE WITHIN ANY REMAINING STRUCTURE TO BE DEMOLISHED/REMOVED. COORDINATE UTILITY DISCONNECTION AND REMOVAL WITH OWNER AND WITH UTILITY COMPANY AS REQUIRED.
3. MARK OUT UTILITIES USING UTILITY LOCATOR SERVICE AND PERFORM EXPLORATORY EXCAVATIONS TO CONFIRM UTILITY LOCATIONS WITHIN 50 FEET OF EXCAVATIONS FOR PROPOSED UTILITIES, FENCE REMOVAL AND INSTALLATION, AND ASPHALT REMOVAL & RE-SURFACING.
4. DEMOLITION/REMOVAL OF ITEMS INDICATED, AND MISCELLANEOUS SHALLOW MATERIALS SUCH AS CONCRETE AND ASPHALT, SHALL INCLUDE REMOVAL OF ELEMENTS DOWN TO 2' BELOW PROPOSED FINAL ELEVATIONS. DEMOLITION MATERIALS SHALL BE CRUSHED AND USED ON THE SITE AS GRADING FILL UNDER THE COVER SYSTEM.
5. CLEAR TREES AND VEGETATION TO LIMITS SHOWN TO FACILITATE CONSTRUCTION. STRIP ALL EXISTING VEGETATION FROM THE SITE AND MINIMIZE DISTURBANCE TO THE GROUND SURFACE. ALL TREE AND BRUSH CLEARING DEBRIS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED.
6. PROTECT AND PRESERVE ALL MONITORING WELLS NOT INDICATED FOR ABANDONMENT/REMOVAL DURING CONSTRUCTION.
7. EXISTING MONITORING WELLS AND PRODUCTION WELLS DESIGNATED FOR REMOVAL SHALL BE ABANDONED IN ACCORDANCE WITH THE REQUIREMENTS OF NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CP-43: GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY.
8. PROTECT AND PRESERVE ALL OVERHEAD UTILITIES, UTILITY POLES, AND GUY WIRES DURING CONSTRUCTION.
9. CONTRACTOR SHALL REPAIR OR REPLACE ANY ON-SITE STRUCTURES NOT DESIGNATED FOR REMOVAL AT NO COST TO THE OWNER.
10. CONTRACTOR SHALL IMPLEMENT A COMMUNITY AIR MONITORING PLAN AS DETAILED IN THE PROJECT SPECIFICATIONS DURING EXCAVATION AND GRADING OF EXISTING SITE SOILS AND DEMOLITION WORK.



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STATE OF NEW YORK
SAMANTHA J. MILLER
LICENSED PROFESSIONAL ENGINEER
103303

OAK MITSUI SITE # 442052
REMEDIAL CLOSURE DESIGN
80 FIRST STREET
HOOSICK FALLS, NEW YORK

No.	Submittal / Revision	App'd.	By	Date
0	REGULATORY REVIEW SUBMITTAL	SJM	TRG	02/04/22

DEMOLITION PLAN

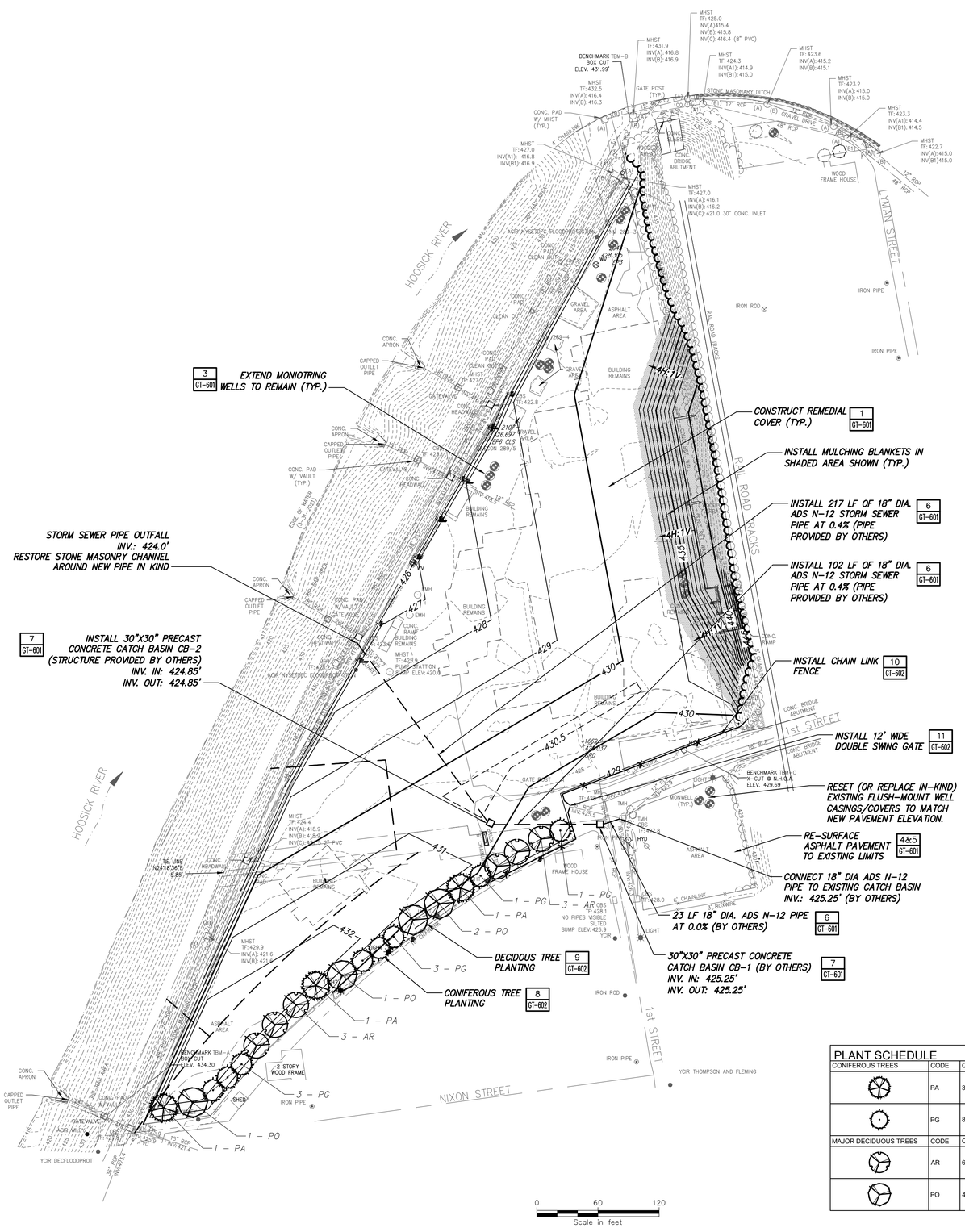
Designed By:	Drawn By:	Checked By:
DMF	TRG	SMS
Issue Date:	Project No:	Scale:
02/2022	031861.000	AS SHOWN

Drawing No.:
GT-002

File: V:\PROJECTS\ANY\K4\31861\CADD_ACAD\GT-002_31861_DEMO PLAN.DWG
Saved: 2/3/2022 2:45:32 PM Plotted: 2/3/2022 2:56:55 PM Current User: Gray, Timmalyn LastSavedBy: 3511

CONSTRUCTION NOTES:

1. A CONSTRUCTION EASEMENT WILL BE OBTAINED FROM PAN AM RAILROAD BY THE OWNER FOR WORK SHOWN BEYOND THE SITE PROPERTY BOUNDARY ON THE EAST SIDE OF THE SITE. ADDITIONAL CONSTRUCTION EASEMENTS, AGREEMENTS, AND PERMITS SHALL BE OBTAINED BY CONTRACTOR, IF NECESSARY.
2. MATERIALS EXCAVATED DURING SITE RE-GRADING SHALL BE PLACED WHERE NECESSARY TO MEET THE REMEDIAL COVER DESIGN SUBGRADE ELEVATIONS PRIOR TO CONSTRUCTING REMEDIAL COVER.
3. NO EXCAVATED MATERIALS SHALL BE PLACED BEYOND THE PROPERTY LIMITS SHOWN.
4. ELEVATIONS SHOWN ARE PROPOSED TOP OF REMEDIAL COVER.
5. PROTECT ALL MONITORING WELLS NOT DESIGNATED FOR ABANDONMENT/REMOVAL AND OVERHEAD UTILITIES DURING CONSTRUCTION.
6. CONTRACTOR SHALL IMPLEMENT A COMMUNITY AIR MONITORING PLAN AS DETAILED IN THE PROJECT SPECIFICATIONS DURING EXCAVATION AND GRADING OF EXISTING SITE SOILS AND DEMOLITION WORK.
7. SOIL FILL SHALL BE PLACED, COMPACTED AND GRADED WITHIN EXISTING COAL CHUTES TO WITHIN TWO FEET OF PROPOSED FINAL GRADE PRIOR TO TRIMMING EXISTING CONCRETE WALLS TO THE ELEVATIONS SPECIFIED.
8. SOIL FILL SHALL BE PLACED, COMPACTED AND GRADED ON THE LOWER SIDE OF THE EXISTING CONCRETE WALL PRIOR TO PLACING SOIL FILL ON THE UPPER SIDE.
9. STORM CATCH BASIN CB-1 AND 18" ADS N-12 SEWER PIPE CONNECTION TO EXISTING CATCH BASIN TO BE INSTALLED BY OTHERS. CATCH BASIN CB-2 STRUCTURE AND REMAINDER OF 18" ADS N-12 SEWER PIPE TO BE PROVIDED BY OTHERS, AND INSTALLED BY CONTRACTOR.
10. THE 18" ADS N-12 SEWER PIPE TO BE INSTALLED IS A REPLACEMENT FOR THE EXISTING 8" RCP SHOWN (CONDITION UNKNOWN). DESIGN CALCULATIONS FOR PROPOSED SEWER PIPE SIZE HAVE NOT BEEN COMPLETED.



PLANT SCHEDULE

PLANT SCHEDULE

CONIFEROUS TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	REMARKS
	PA	3	PICEA ABIES	NORWAY SPRUCE	6'-7' HT.	B&B	
	PG	8	PICEA GLAUCA	WHITE SPRUCE	6'-7' HT.	B&B	
MAJOR DECIDUOUS TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	REMARKS
	AR	6	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	3" CAL.	B&B	
	PO	4	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	3" CAL.	B&B	

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103303

OAK MITSUI SITE # 442052
REMEDIAL CLOSURE DESIGN
80 FIRST STREET
HOOSICK FALLS, NEW YORK

No.	Submittal / Revision	App'd.	By	Date
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CLOSURE GRADING PLAN

Designed By:	Drawn By:	Checked By:
DMF	TRG	SMS
Issue Date:	Project No:	Scale:
02/2022	031861.000	AS SHOWN

Drawing No.:
GT-101

File: V:\PROJECTS\ANY\K4\3186\\CADD_ACAD\GT-101_31861_GRADING PLAN.DWG
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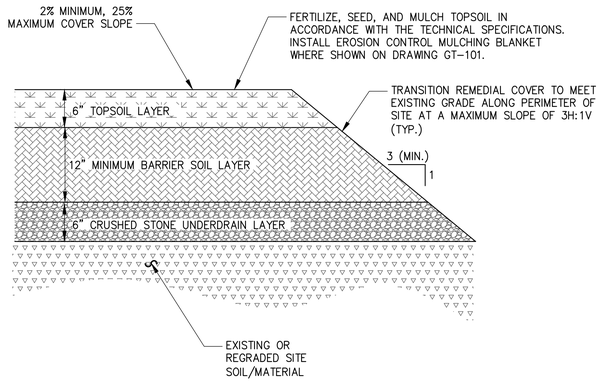
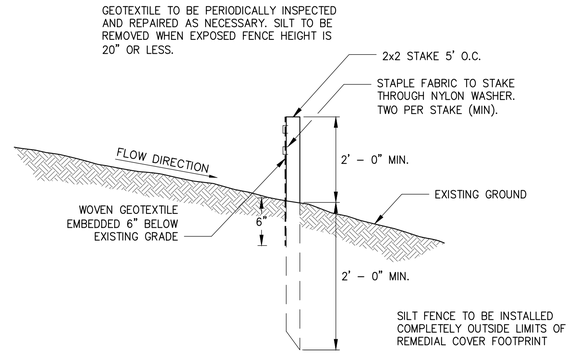


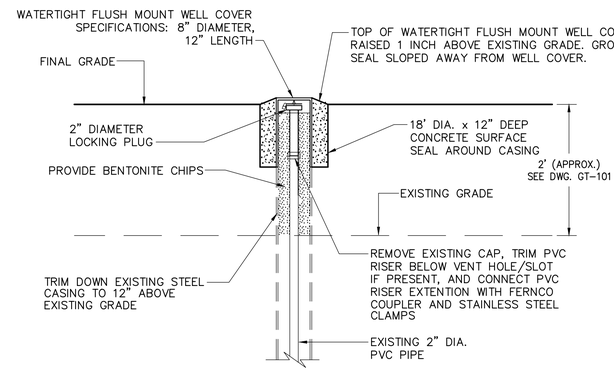
1 REMEDIAL COVER DETAIL
SCALE: N.T.S.



NOTE

1. THE ENGINEER WILL REVIEW AND APPROVE PRE-MANUFACTURED SILT FENCE PRODUCTS THAT MEET THE MINIMUM REQUIREMENTS SHOWN, AND THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS.

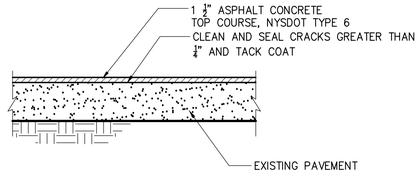
2 SILT FENCE DETAIL
SCALE: N.T.S.



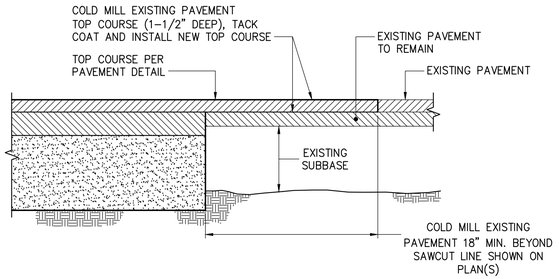
NOTES:

1. DETAIL SHOWS TYPICAL WELL CONSTRUCTION. CONSTRUCTION OF SOME EXISTING WELLS MAY DIFFER. ALTERNATE WELL EXTENSION METHODS SHALL BE APPROVED BY THE ENGINEER AS REQUIRED. SEE EXISTING WELL CONSTRUCTION LOGS FOR BIDDING INFORMATION.
2. HANDTAMP MATERIAL WITHIN A RADIUS OF 2'-0" OF THE WELL.
3. USE FERNCO COUPLER WITH STAINLESS STEEL CLAMPS FOR PVC CONNECTION.
4. DO NOT USE PVC GLUE TO CONNECT PVC PIPE COUPLING OR EXTENSIONS. ALL JOINTS SHALL BE THREADED.
5. PVC TO BE SCHEDULE 40.
6. SURVEY ELEVATION OF TOP OF PVC BEFORE AND AFTER EXTENSION.

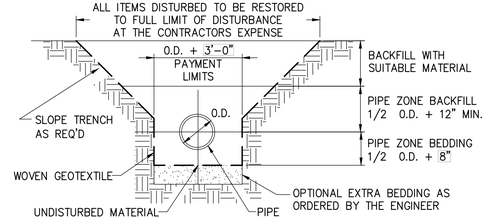
3 TYPICAL FLUSH-MOUNT WELL EXTENTION DETAIL
SCALE: N.T.S.



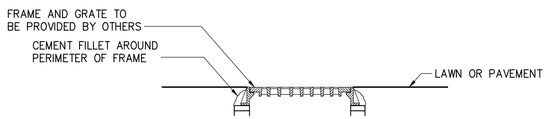
4 SEAL AND TOP ASPHALT PAVEMENT DETAIL
SCALE: N.T.S.

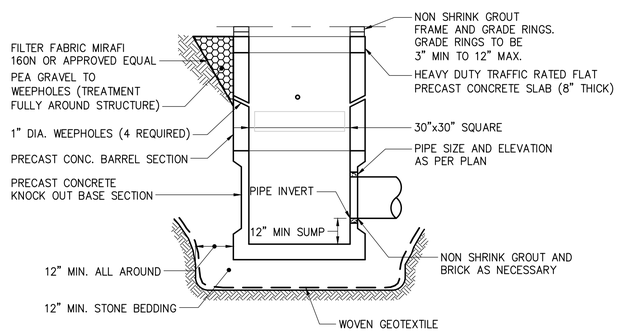


5 PAVEMENT TRANSITION DETAIL
SCALE: N.T.S.



6 TYPICAL TRENCH DETAIL
SCALE: N.T.S.





*NOTE: BASIN STRUCTURE TO BE PROVIDED BY OTHERS

7 30"X30" KNOCKOUT STRUCTURE DETAIL
SCALE: N.T.S.

OAK MITSUI SITE # 442052
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80 FIRST STREET
HOOSICK FALLS, NEW YORK

No.	Submittal / Revision	App'd.	By	Date
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TYPICAL DETAILS

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02/2022	031861.000	AS SHOWN

Drawing No.:
GT-601

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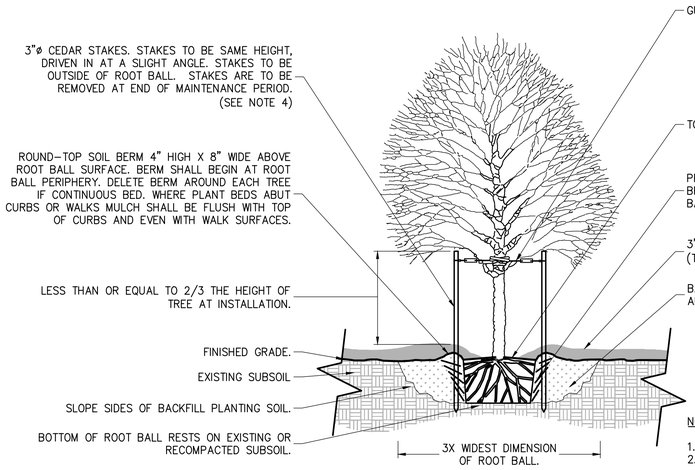
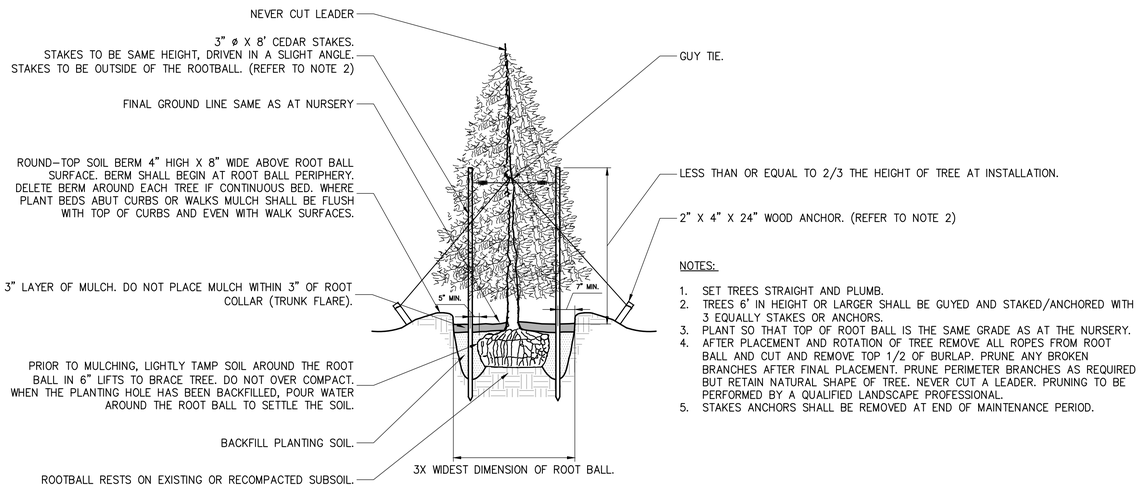


NOTES:

1. TREE SHALL BARE SAME RELATIONSHIP TO FINISH GRADE AS IN THE NURSERY.
2. PRUNE ANY BROKEN BRANCHES AFTER FINAL PLACEMENT. PRUNE PERIMETER BRANCHES AS REQUIRED BUT RETAIN NATURAL SHAPE OF TREE. NEVER CUT A LEADER. PRUNING TO BE PERFORMED BY A QUALIFIED LANDSCAPE PROFESSIONAL.
3. TREE SHALL BE PLUMB AND STRAIGHT.
4. TREES 2 1/2" CAL. OR GREATER SHALL BE GUYED AND STAKED WITH 3 EQUALLY SPACED STAKES.
5. AFTER PLACEMENT AND ROTATION OF TREE, REMOVE ALL ROPES FROM ROOT BALL AND CUT AND REMOVE TOP HALF OF BURLAP. COMPLETELY REMOVE BURLAP IF IT IS MADE OF SYNTHETIC MATERIAL.

8 DECIDUOUS TREE PLANTING DETAIL

SCALE: N.T.S.

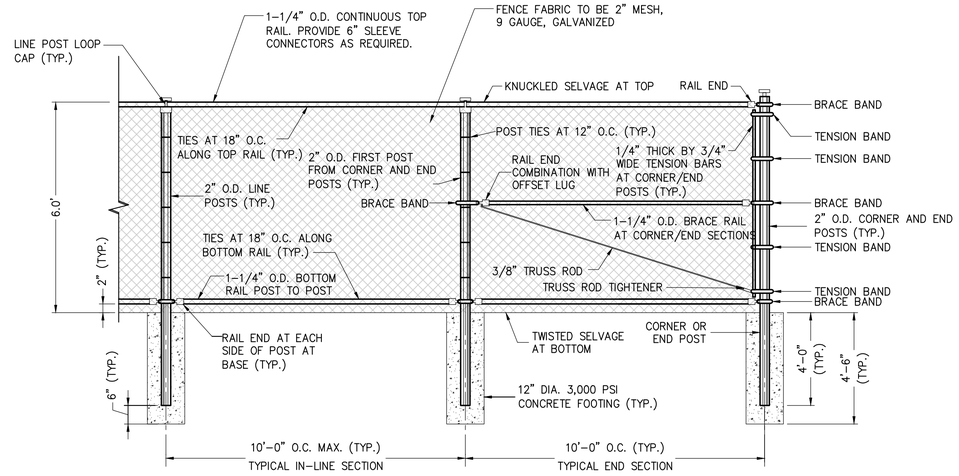


NOTES:

1. SET TREES STRAIGHT AND PLUMB.
2. TREES 6' IN HEIGHT OR LARGER SHALL BE GUYED AND STAKED/ANCHORED WITH 3 EQUALLY STAKES OR ANCHORS.
3. PLANT SO THAT TOP OF ROOT BALL IS THE SAME GRADE AS AT THE NURSERY.
4. AFTER PLACEMENT AND ROTATION OF TREE REMOVE ALL ROPES FROM ROOT BALL AND CUT AND REMOVE TOP 1/2 OF BURLAP. PRUNE ANY BROKEN BRANCHES AFTER FINAL PLACEMENT. PRUNE PERIMETER BRANCHES AS REQUIRED BUT RETAIN NATURAL SHAPE OF TREE. NEVER CUT A LEADER. PRUNING TO BE PERFORMED BY A QUALIFIED LANDSCAPE PROFESSIONAL.
5. STAKES ANCHORS SHALL BE REMOVED AT END OF MAINTENANCE PERIOD.

9 CONIFEROUS TREE PLANTING DETAIL

SCALE: N.T.S.

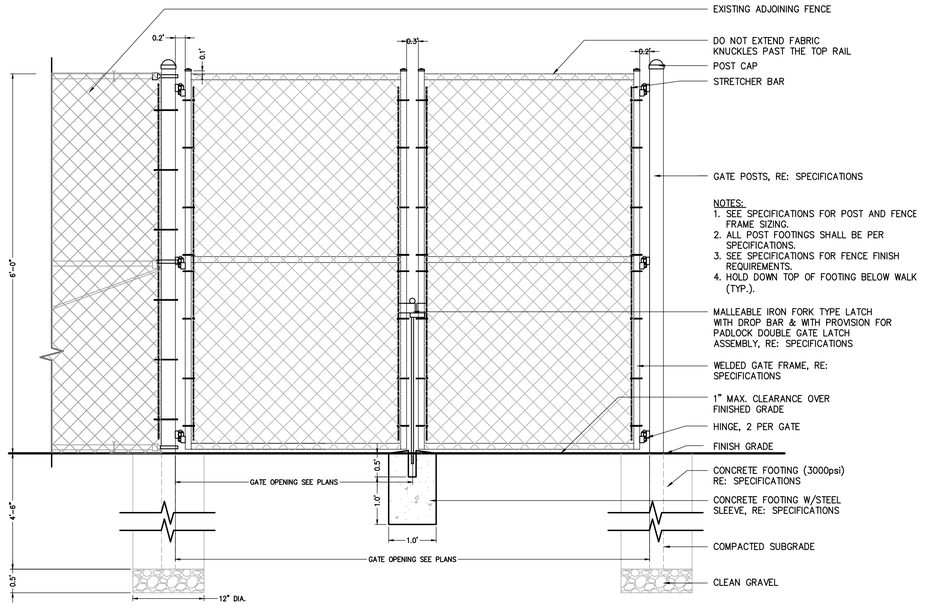


NOTES:

1. ALL POSTS, RAILS, HARDWARE, AND COMPONENTS TO BE GALVANIZED STEEL.
2. ALL TIES TO BE 9 GAUGE.
3. INSTALL BRACE RAIL ASSEMBLIES IN EACH DIRECTION FROM CORNER POSTS, AND AT ALL END POSTS
4. BRACE/TENSION BANDS TO BE 1/8"X1" AND FASTENED WITH 3/8"X1-1/2" CARRIAGE BOLTS.

10 6' HIGH CHAIN LINK FENCE DETAIL

SCALE: N.T.S.



NOTES:
1. SEE SPECIFICATIONS FOR POST AND FENCE FRAME SIZING.
2. ALL POST FOOTINGS SHALL BE PER SPECIFICATIONS.
3. SEE SPECIFICATIONS FOR FENCE FINISH REQUIREMENTS.
4. HOLD DOWN TOP OF FOOTING BELOW WALK (TYP.).

11 6' HIGH CHAIN LINK GATE DETAIL

SCALE: N.T.S.

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TYPICAL DETAILS

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Drawing No.:
GT-602