

- A. Before final acceptance, the site, property adjacent to the site, and grounds occupied by the Contractor in connection with the work, shall be cleaned of all rubbish, excess materials, temporary structures and equipment. All parts of the work shall be left in acceptable condition in the opinion of the Owner.

1.12 SAFETY

- A. This work will (will not) be carried out adjacent to an energized lines or equipment. The Contractor, after consultation with the Owner, shall insure that all equipment shall be operated in such a manner that safety clearances, as outlined in the "CMP Safety Manual" and required by OSHA are maintained. Safety matters must be coordinated through the Owner's field representative.
- B. All employees or the Contractor that will be working on this project shall read the Rules and Regulations of Appendix E - CMP Working Rules for Contractors. The Contractor shall submit the sign-off sheet signifying that the employees have read Appendix E before proceeding with any work. Only those personnel whom the Contractor has listed to the Owner will be allowed to work.
- C. Hard Hats, Steel Toe Boots and Safety Glasses will be worn by all personnel working on the project.

1.13 MEASUREMENT AND PAYMENT

- A. All work associated with this Section will be paid for on a lump sum basis under the appropriate Division 1 bid item on the Proposal Form.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 01560

ENVIRONMENTAL MANAGEMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Environmental management work.

1.02 RELATED SECTIONS AND DOCUMENTS.

- A. Loaming, Seeding, and Mulching: Landscape Development -Section 02483.
- B. Aggregate Materials: Earthwork - Section 02200.
- C. Drawings 956-3-3-SH3, 956-3-3-SH5, and 956-3-3-SH6.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with local, state, and federal governing regulations regarding water quality and disposal of material.
- B. Comply with Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices for Material Installation and Maintenance. (1991)
- C. Submittals: Furnish samples, manufacturer's product data, test reports, and materials' certifications substantiating that materials comply with specified requirements.

1.04 MEASUREMENT & PAYMENT

- A. Work for this Section will be paid for on a lump sum basis under the appropriate Division 1 bid item on the Proposal Form.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Silt Fence: Provide silt fence conforming to the following:
 - 1. Mullen Burst Strength - 200 psi. Grab strength - 120 lbs. min.
 - 2. Support Posts - 6' length - wood, spaced 7'-0" o.c. max.

3. Acceptable Manufacturer:

Envirofence as manufactured by Mirafi Inc.

B. Hay Bale Dike: Provide clean, seed free hay bales which are locally available.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Silt Fence/Hay Bale Dike: Install where required in accordance with manufacturers' recommendations prior to beginning clearing operations in the affected areas.

1. Maintenance - The Contractor shall remove accumulated sediment from the silt fence when the accumulation reaches 60% of the capacity of the fence. The hay bale dike shall be removed/replaced when deterioration of the effluent quality is evident. The silt fence and hay bale dike shall be maintained until 75% or more of the seeding has been established.

3.02 INSPECTION:

- A. Contractor shall inspect all environmental management measures at least once per week and immediately following rainstorms or other periods of heavy runoff.
- B. Contractor shall provide an individual to inspect environmental management measures.
- C. Contractor shall have adequate workers, equipment, and extra materials at the site to facilitate immediate repairs during rainstorms to the specified environmental management measures.
- D. The Contractor shall maintain a weekly log of the condition of the environmental management measures noting deficiencies, additional repair/replacement work necessary, and dates and times of inspection. If corrective work is required, the weekly log shall indicate dates of observance and completion of corrective work.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 02060

DEMOLITION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawing 956-3-3 SH1, drawings and general provisions of the contract, including General and Supplementary Conditions (if any) and Division 1 specifications apply to the work of this section.

1.02 DESCRIPTION OF WORK

- A. Demolish and removal of existing buildings.

1.03 RELATED WORK

- A. Section 01000 – General Requirements

1.04 EXISTING CONDITIONS

A. General

1. Physical clearances shall be maintained to protect existing structures at the site.
2. Contractor shall conduct demolition to minimize interference with adjacent structures.
3. Provide, erect, and maintain temporary barriers and security devices as designated by the Owner.
4. Conduct operations with minimum interference to roadways. Maintain egress and access at all times.
5. Demolition area is expected to contain oil-stained soil. If encountered, this soil shall be handled as listed in 3.02. A. of this Section prior to removal.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 PREPARATION

- A. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as required.
- B. Protect existing structures that are not to be demolished.

3.02 EXECUTION

- A. Completely remove indicated equipment, materials, and buildings in an orderly and careful manner.

NOTE: All visible traces of oil-stained soil shall be removed and placed in properly labeled drums supplied by the Owner. The drums shall be transported to and off the site by the Owner.

- B. Cease operations and notify Owner immediately if adjacent structures appear to be endangered. Do not resume operations until corrective measures have been taken.
- C. Except where noted otherwise, immediately remove demolished material from the site. Relics, antiques, and similar objects remain the property of the Owner. Notify the Project Manager prior to removal and obtain acceptance regarding method of removal.
- D. Locate materials to be re-installed or retained in a separate area to prevent damage.
- E. All salvageable materials shall be removed from the site by the Owner.
- F. Remove and promptly dispose of contaminated, vermin infested or dangerous materials encountered.
- G. Do not burn or bury materials on site.
- H. Existing ground wires for foundations and/or fence and structures may be disconnected from the demolished item and left in place such that no portion of it is exposed above the subbase grade.
- I. Backfill excavated areas resulting from demolition shall be refurbished using subgrade fill, subbase, and base fill as specified in Section 02200.
- J. Rough grade and compact areas affected by the demolition to maintain site grades and contours.

K. Remove demolished materials from the site as the work progresses. The site shall be left in a clean condition.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and Division-1 Specification Sections, apply to work of this Section.

1.02 SECTION INCLUDES

- A. Remove surface debris.
- B. Clear site of plant life and grass.

1.03 RELATED SECTIONS

- A. Section 02200: Earthwork.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable state and local codes for disposal of debris.
- B. Coordinate clearing work with utility companies.

1.05 MEASUREMENT & PAYMENT

- A. Work for this Section will be paid on a lump sum basis under the Appropriate Division 2 bid item on the Proposal Form.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 PREPARATION

- A. The Contractor shall verify that existing plant life and features designated to remain are tagged or identified by the Owner.

3.02 PROTECTION

- A. Protect utilities that remain from damage.

3.03 CLEARING AND GRUBBING

- A. Clear areas required for access to site and execution of work.
- B. Grub substation yard and any required access roadway areas not currently gravelled to a minimum depth of 12 inches.

3.04 STRIPPING

- A. Topsoil shall be stripped to a minimum of 12 inches or as required to remove all vegetative matter within the areas to receive gravelled surfaces. The existing topsoil on-site should be determined to be adequate for reuse on the site as topsoil by the City Inspector and the Project Engineer.

3.05 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.

END OF SECTION

V.

TECHNICAL SPECIFICATIONS

SECTION 02200

EARTH WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and Division 1 Specification Sections apply to work of this Section.
- B. Refer to other Division 2 specifications that apply to, or must be coordinated with this work.

1.02 DESCRIPTION OF WORK

- A. The Contractor shall provide earthwork as shown on Drawings.
- B. Earthwork may include, but is not limited to, the following:
 - 1) Excavation and Grading
Preparation of subgrades and bearing surfaces
Benching
Soil removal
Location, protection, maintenance, repair, and removal of existing underground utilities and structures
Handling, storage, reuse, and disposal of excavated materials
 - 2) Backfilling
Subgrade fill, gravel fill, common borrow
Stone Topping
Sand
Crushed stone
Rip rap
Stone Topping
Geotextiles
Culverts
(topsoil and seeding are specified elsewhere)

- C. Excavation for Mechanical/Electrical Work: Excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances are included as work of this Section.
- D. Excavation for piping: Excavation and backfill required in conjunction with underground piping and appurtenances is included as work of this Section.

1.03 DEFINITIONS

- A. Earth: All Excavated materials not classified as rock. Earth includes pavements, obstructions visible on ground surface, underground structures and utilities, boulders and loose rock fragments less than three (3) cubic yards in volume.
- B. Excavation: Consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Earthwork testing service: Employ, at Contractor's expense, a testing laboratory acceptable to Owner to perform material evaluation.
 1. The Contractor will employ a separate testing laboratory acceptable to Owner to perform quality control testing, proctor and compaction tests and submit test reports.
 2. Four (4) tests each lift, in fill areas, plus one (1) test of subgrade for each foundation constructed on fill.
 3. Materials and installed work may require testing and retesting, as directed by the Owner, at anytime during the progress of the work. Allow free access to material stockpiles and facilities at all times. Tests, not specifically indicated to be done at the Owner's expense, including the retesting of rejected materials and installed work, shall be done at the Contractor's expense.

1.05 JOB CONDITIONS

- A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, contact the Owner immediately for directions. Cooperate with Owner in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the Owner.
- C. Do not interrupt existing utilities servicing facilities occupied and used by Owner or adjacent property owners, during occupied hours, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.
- D. Protection of Persons and Property: Protect structures, utilities, and sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earth work operations. Barricade open excavations occurring as part of this work and post warning lights.
- E. Conduct operations with minimum interference to public or private thoroughfares. Coordinate egress with adjacent business owners. Operate warning lights as recommended by the authorities having jurisdiction.
- F. Utilization of Materials:
 - 1. Excavated materials suitable for use as fill; or backfill, shall be utilized as project fills, with the approval of the Owner.
 - 2. Excavated material, where utilized by the Contractor as fill or backfill, shall meet the specified requirements for the intended use.
 - 3. Excavated materials unsuitable for use as fill or backfill, shall be disposed of off-site in an area approved by Regulatory bodies.
 - 4. Provide materials from off-site borrow sources or suppliers, as required, when materials excavated from the site do not meet specified fill, nor backfill requirements.

1.05 MEASUREMENT & PAYMENT

- A. Earthwork for the substation yard and surrounding site will be paid on a lump sum basis under the appropriate Division 2 bid item on the Proposal Form.
- B. Excavation and backfilling of foundations, slabs and appurtenances shall be included in the lump sum price under the appropriate Division 3 bid item for foundations and slabs on the Proposal Form.

- C. Excavation and backfilling of conduits, grounding and cable trench shall be included in the lump sum price under the appropriate Division 16 bid item on the Proposal Form.

PART 2 PRODUCTS

2.01 SUBGRADE FILL

A. MDOT 703.06 TYPE G

Aggregate for subgrade fill shall be sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3-inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Aggregates (Type G)
¼ inch	--
No. 40	0-70
No. 200	0-10.0

Aggregate for subgrade shall not contain particles of rock, which will not pass the 6-inch square mesh sieve.

2.02 GRAVEL FILL

A. MDOT 703.06 TYPE A

Aggregate for gravel fill shall be screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3-inch sieve shall meet the grading requirements of the following table:

Sieve Designation	Aggregates (Type A)
½ inch	45-70
¼ inch	30-55
No. 40	0-20
No. 200	0-5.0

Type A aggregate for gravel fill shall only contain particles of rock, which will pass the 2 inch square mesh sieve.

- B. It is not anticipated that materials excavated for the project will be suitable for use as gravel fill; therefore, gravel fill will be required from off-site borrow sources.

2.03 COMMON BORROW

A. MDOT 703.18

Common borrow shall consist of earth, suitable for embankment construction. It shall be free from frozen material, perishable rubbish, peat and other unsuitable material.

The moisture content shall be sufficient to provide the required compaction and stable embankment. In no case shall the moisture content exceed 4 percent above optimum, which shall be determined in accordance with AASHTO T180, Method C or D.

2.04 STONE TOPPING

A. Crushed stone topping shall be obtained from rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or other objectionable matter.

B. The stone topping shall meet the following blend requirements:

Sieve Designation	Blend Ratio
1 ½ inch	50% by weight
¾ inch	50% by weight

2.05 SAND

A. MDOT 703.05

Aggregate for sand shall be of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation shall meet the grading requirements of the following table:

Sieve Designation	Percent by Weight
3/8 inch	Passing Square Mesh Sieve
No. 200	85-100
	0-5.0

2.06 CRUSHED STONE

A. Crushed stone shall be obtained from rock of uniform quality and consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or objectionable matter. Stone size as indicated on drawings.

2.07 RIP RAP

- A. Stones shall consist of sound durable rock, which will not disintegrate by exposure to water or weather. Either field stone or rough, unhewn quarry stone may be used. Exposed stones shall be angular and as nearly rectangular in cross-section as practicable. Rounded boulders or cobbles will not be permitted. Stone sizes shall be as indicated on drawings.

2.08 GEOTEXTILE FABRIC

- A. Geotextile fabric for soil stabilization shall be made from biologically inert materials that are resistant to soil chemicals, rot, mildew and acids and alkalis in a pH range from 3 to 12. The fabric shall be designed to resist plugging with soil.

Fabric Properties

Grab tensile strength (lb)	200
Mullen burst strength (psi)	475
Water permeability coefficient (cm/sec)	0.01
Weight (oz./sq/ yd.)	4.4
Trapezoidal tear strength (lb)	150

Fabric shall be Terratex-GS as manufactured by Webtec, Inc. or approved equal. Installation shall be in accordance with manufacturer's recommendations.

- B. Geotextile fabric for drainage shall be nonwoven composed of polypropylene fibers inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids.

Fabric Properties

Grab tensile strength (lb)	120
Mullen burst strength (lb)	225
Water permeability coefficient (cm/sec)	0.21
Weight (oz./sq/ yd.)	4.8
Trapezoidal tear strength (lb)	50

Fabric shall be Mirafi 14ON as manufactured by TC Mirafi, Inc. or approved equal. Installation shall be in accordance with manufacturer's recommendations.

2.09 CULVERT

- A. Culverts and/or extensions shall be concrete sized to accommodate the conditions.

PART 3 EXECUTION

3.01 EXCAVATION

- A. Excavation consists of removal and disposal of material encountered when establishing required finish grade elevations. Minor demolition of culverts is included as excavation.
- B. Excavation Classifications: The following classifications of excavation will be made when excavation is encountered in work:
1. Earth Excavation (Overburden): Includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures, and other materials encountered that are not classified as rock or unauthorized excavation.
 - a. Coordinate the rate of excavation with ground conditions encountered in the field as necessary to prevent movement and loss of ground adjacent to excavations.
 - b. Control the inflow of water into the excavation.
 2. Unauthorized excavation: consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Owner. Unauthorized excavation, as well as remedial work directed by Owner, shall be at Contractor's expense.
 - a. Under footings, foundation bases, or slabs, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be acceptable to Owner.
 - b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Owner.
 3. Additional Excavation: When excavation has reached required subgrade elevations, notify Owner who will make an inspection of conditions on all foundations.
 - a. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Owner. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions.

- C. **Stability of Excavations:** Slope sides of excavations to 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.
- D. **Maintain sides and slopes of excavations in safe condition until completion of backfilling.**
- E. **Material Storage:** Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
- F. **Dispose of excess soil material and waste materials as herein specified.**
- G. **Excavation for Structures:** Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
- H. **For excavation of footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.**
- I. **Excavation for Trenches:** Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.
- J. **Excavate trenches to depth indicated. Carry depth of trenches for piping to establish indicated flow lines and invert elevations.**
- K. **If rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone prior to installation of pipe.**
- L. **Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.**
- M. **Do not backfill trenches until tests and inspections have been made and backfilling authorized by Owner. Use care in backfilling to avoid damage or displacement of pipe systems.**
- N. **Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 34°F (1°C).**

3.02 SUBGRADE PREPARATION AND PROTECTION

A. General:

1. Complete the excavations to the required grades allowing for subgrade material bedding layers (if any).
2. Remove any additional materials below subgrade levels, which were not naturally deposited, where directed by the Owner.
3. Backfill all holes, swales and low points, which will not otherwise be removed in the course of the work to the subgrade, level indicated on the Drawings.

B. Granular Soil Subgrades:

1. Upon completion of excavation, the natural soil subgrade shall be smoothed out by blading and compacted by at least two (2) coverages with the compaction equipment acceptable to the Owner.
2. Soft spots detected during compaction shall be removed and replaced with compacted gravel fill.

C. Geotextile Fabric

1. Fabric shall be installed in accordance with manufacturer's instructions.

D. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 34°F (1°).

3.03 PLACEMENT AND COMPACTION OF MATERIALS

A. General:

1. Fills and backfills of the various types specified shall generally be placed and compacted within the limits and to the thickness indicated on the Drawings unless otherwise specified.

B. Placement:

1. Placement of all specified fill and backfill materials shall be systematically conducted in the specified uniform layer thickness which is measured, in all cases, prior to compaction.

2. All backfill material shall be placed "in-the-dry" on subgrades acceptable to the Owner. The Contractor shall dewater excavated areas as required to perform the work, and in such a manner as to preserve the undisturbed state of the approved subgrade material.
3. Control groundwater by ditches, sumps, sloped surfaces to permit collection and removal efficiently and with minimal disturbance to materials being placed.
4. Prior to placing fill and backfill materials, complete the specified ground surface and subgrade preparation for materials encountered at ground surface and at subgrade levels, respectively.
5. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
6. Place backfill and fill materials evenly adjacent to structures to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

C. Compaction:

1. Compaction of fill and backfill materials, except drainage fill, shall be conducted with a minimum of four (4) complete coverages with acceptable compaction equipment and to a minimum specified density which is expressed as a percentage of maximum dry density as determined by ASTM D1557.
2. Compaction by puddling is prohibited.
3. During compaction operations, incidental compaction due to traffic by construction equipment other than used specifically in compaction operations will not be credited toward the required minimum coverages specified.

D. Compaction Equipment:

1. In all cases, the character and efficiency of the Contractor's compaction equipment shall be acceptable to the Owner based on observed or documented field performance.
2. Compaction in open areas shall be conducted with heavy equipment such as vibratory rollers or by other acceptable equipment.

3. Compaction in confined areas (against walls, footings, piers, in trenches and on berms) shall be conducted with acceptable equipment such as hand-guided vibratory compactors or tampers.

E. Moisture Control:

1. The amount of moisture in any one layer of fill or backfill material shall be as uniform as practicable throughout.
2. The upper limit of water content in materials shall be that which will permit handling and placing and will permit proper compaction with the Contractor's equipment. In no case shall the water content during compaction exceed a value of three (3) percentage points on the wet side of optimum water content as determined by ASTM D1557.
3. The lower limit of water content shall not be less than two (2) percentage points below optimum water content.
4. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, and work the water into the material by mechanical means until a uniform distribution of moisture is obtained.
5. Prevent free water appearing on surface during or subsequent to compaction operations.
6. Should excess water be applied to any part of the material, such that materials are too wet to obtain the specified compaction, the compaction operations and all work on that section of placed material shall be suspended until the water content of the material is reduced to a value within the specified limits.
7. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
8. Soil material 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 satisfactory value.

F. Subgrade Fill:

1. Place in layers not to exceed twelve (12) inches.
2. Compact to at least 92 percent of maximum dry density.

G. Gravel Fill, Common Borrow and Sand:

1. Place in layers not to exceed eight (8) inches when utilizing heavy compaction equipment and in six (6) inch layers when utilizing light hand-operated compaction equipment.
2. Sand under footings, conduit and pipe will be compacted by light, hand-operated equipment only.
3. Compact to at least 95 percent of maximum dry density.

H. Crushed Stone and Stone Topping:

1. Place in layers not to exceed (eight) 8 inches when utilizing heavy compaction equipment and six (6) inches when utilizing light hand-operated compaction equipment.
2. Compact with a minimum of four (4) coverages of compaction equipment. Tamp firmly in place.

3.04 BACKFILL AND FILL

- A. General: Place specified soil material in layers to required subgrade elevations.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Acceptance of construction below finish grade.
 2. Inspection, testing, approval, and recording locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of trash and debris.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
- D. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

- E. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

3.05 GRADING

- A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Grading Outside Substation Fence Lines: Grade areas adjacent to substation fence lines to drain away from substation yard and to prevent ponding.
- C. Finish surfaces free from irregular surface changes, and as follows:
 - 1. Graveled Areas: Shape surface of areas to line, grade, and cross-section, with finish surface not more than 1/2" above or below required finish grade elevation.
 - 2. Loamed area: Finish areas to receive topsoil to within not more than 0.10' above or below required finish grade elevations.

3.06 FIELD QUALITY CONTROL

- A. During earthwork operations, the Owner will be present on the site to monitor and document the Contractor's activities relative to Contract compliance.
- B. Acceptable materials placed and compacted to below the specified density shall alternatively be:
 - 1. Recomacted as required to achieve the specified density, or
 - 2. Removed and replaced with properly placed and acceptably compacted material.
- C. Materials placed and compacted that do not conform to project Specifications for the area placed shall be removed and replaced with suitable material when directed by the Owner.

3.07 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.08 DISPOSAL OF EXCESS AND WASTE MATERIAL

- A. Removal from Owner's Property: Remove waste materials including unacceptable excavated material, trash and debris, and dispose of it off the Owner's property.

END OF SECTION

V.

TECHNICAL SPECIFICATIONS

SECTION 02202

ROCK REMOVAL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. Drilling, blasting, removal and disposal of rock to the lines and grades shown on the drawings.

1.02 RELATED WORK

- A. Site Clearing – Section -2110
- B. Earth Work – Section 02200

1.03 REFERENCES

- A. NFPA 495 – Code for the Manufacture, Transportation, Storage, and Use of Explosive Materials
- B. State of Maine, Department of Public Safety – Rules and Regulations for the Keeping, Dispensing or Transporting of Explosives.
- C. Occupational Safety and Health Act (OSHA)

1.04 PERMITS

- A. All required federal, state, and local permits for blasting and explosives shall be obtained and paid for by the CONTRACTOR. Copies of such permits shall be furnished to the OWNER before any blasting operations may be started.
- B. All blasters and blasting foreman shall be properly qualified and licensed in accordance with the applicable laws and regulations of federal, state, and local governments.

PART 2 PRODUCTS

2.01 EXPLOSIVES

- A. The explosives used shall be of such quality and power and shall be used in such locations as will neither open seams nor crack or damage the rock outside of the prescribed limits of excavation.

PART 3 EXECUTION

3.01 EXPLOSIVES AND BLASTING

- A. General – The CONTRACTOR shall use the utmost care in the use of explosives necessary for the prosecution of the work so as not to endanger life or property. All blasting operations shall be conducted by experienced personnel only. The CONTRACTOR's blasting supervisor shall be subject to the OWNER's approval. No explosives shall be stored on the job site overnight. All vehicles used to transport explosives and such storage places as powder magazines shall be clearly marked "Danger – Explosives" and shall be in the care of competent watchmen at all times. No battered holes, other than where indicated by the drawings shall be used without the approval of the OWNER. No battered holes are to be loaded without the prior inspection of the OWNER.

Before conducting electric blasting operations in the vicinity of transmission lines, the CONTRACTOR shall check for stray currents. Care should be exercised when conducting the stray current tests to avoid contacting the high-voltage lines with test wires or equipment.

If hazardous stray and/or induced currents above 50 milliamperes are detected, or if the shot point cannot be relocated to insure that the blast wiring will not be thrown over power lines, detonating cord with MS connectors or cap and fuse should be used.

- B. Submittals – The CONTRACTOR shall submit to the OWNER prior to the commencement of blasting operations, plans and methods of operation for rock removal. The CONTRACTOR shall be required, before each blast, to submit a shot proposal in rock excavation work to the OWNER. The proposal shall be made on an OWNER approved form that shows for each blast the number of holes, the depth of each hole, and the delay number max. lbs. per delay and the amount of explosive for each hole. Review of the method of blasting, the strength and amount of explosives, and provisions for protection of life and property will not relieve the CONTRACTOR of his responsibility in blasting operations.
- C. Explosives – Caps or other exploders or fuses in no case shall be stored, transported, or kept in the same place in which dynamite or other explosives are

stored, transported, or kept. The methods of transporting and handling explosives and the precautions taken to prevent accidents shall be subject to the provisions of these specifications and review by the OWNER. However, such review by the OWNER shall not relieve the CONTRACTOR of liability in accordance with the Purchase Terms and Conditions herein, for injuries to, or deaths of persons, or damage to property caused by blasts, blasting, or explosives.

- D. All necessary precautions shall be taken in blasting operations to preserve the rock outside the lines of excavation in the soundest possible condition. Blasting shall be done only to the lines and grades shown on the drawings or approved by the OWNER. Blasting operations shall not be carried out within 10 feet of the existing structure(s). Rock removal within 10 feet of the existing structure(s) shall be by mechanical methods. Particle velocities due to blasting shall be limited to a maximum of 2 inches per second, as measured at the structure(s).
- E. The firing of systems or blasts shall be controlled by the use of delay exploders. Millisecond delay firing shall be used in all blasting operations except in holes for presplitting, unless otherwise approved by the OWNER. As the excavation for the structure(s) approaches the final lines, the depth of holes for blasting and the amount of explosives used per hole shall be progressively reduced. Whenever, in the opinion of the OWNER, further blasting may injure the rock or existing structures, the use of explosives shall be discontinued and the excavation shall be completed by wedging, barring, channeling, line drilling, broaching, or other suitable methods.
- F. Records – In addition to the requirements of the Specifications for handling and storing explosives, the CONTRACTOR shall maintain an inventory for storage and withdrawal of powder stock and detonators and the OWNER shall be notified immediately of the loss or theft of explosives. The CONTRACTOR shall provide such reasonable and adequate protective facilities as may be necessary to prevent the theft of explosives and to minimize hazards of subversive action or sabotage to property. Only experienced persons subject to the OWNER's approval, shall be permitted to handle explosives. The CONTRACTOR shall not leave explosives on the jobsite at the end of the workday. The CONTRACTOR shall bring a one-day supply of explosives to the site at the beginning of the day.
- G. Blasting – Blasting will be permitted only when proper precautions are taken for the protection of persons, the work, and public or private property. Any damage to the work, or to public or private property by blasting shall be repaired by the CONTRACTOR, to the satisfaction of the OWNER, at the CONTRACTOR's expense. Due to the close proximity of existing structures the CONTRACTOR will be required to take the following protective measures in blasting:

1. Prior to the start of blasting operations, the CONTRACTOR shall make, or have made an inspection of all properties within the area to determine pre-

existing deterioration and damage. Accurate records with written description and photographs of all potential problem areas shall be made so as to provide a record against future damage claims. One copy of the survey shall be provided to the OWNER for record purposes. The CONTRACTOR shall be liable for all damage to property caused by his blasting operations.

2. All blasting shall be done in such a manner as to minimize vibrations that reach surrounding structures. Particle velocity limit measured at the existing structure(s) shall not be greater than previously specified herein. Particle velocities shall be limited to 1.5 in./sec. within 24 hours after placing fresh concrete.
 3. The CONTRACTOR will take seismograph records of blasts for the records that will be maintained in the OWNER's project office. This monitoring of blasts by the CONTRACTOR will not preclude the OWNER from taking his own seismograph records or relieve the CONTRACTOR of his insurance responsibility. All costs incurred by the CONTRACTOR in taking seismographs of his blasting or other investigations shall be borne by the CONTRACTOR.
 4. Owing to the close proximity of existing structures to the excavations, and the necessity of keeping blasting vibration to a minimum, the CONTRACTOR, prior to the start of excavation work, shall obtain the service of a blasting expert to determine hole sizes, hole spacing and the amount and distribution of explosive charges within the holes. Trial blasts shall be made to determine the most satisfactory blasting pattern.
 5. The CONTRACTOR shall provide and use approved blasting mats.
 6. Millisecond delay firing shall be used in all blasting operations except presplitting.
 7. No blasting shall be allowed between 6:00 PM and 7:00 AM.
- H. Blasting Warning – The CONTRACTOR, at his own expense, shall erect proper signboards of adequate size stating that blasting operations are taking place in the area, and such signs shall be clearly visible to all traffic entering the area. The CONTRACTOR shall establish a reliable warning system, incorporation the standard audible signals adopted for the site, to insure that all personnel in the area are properly warned of the impending detonation of explosives.
- I. Radio Transmitters – Radio transmitters shall not be permitted in the immediate area of blasting operations, unless properly locked and sealed. (Refer to table of minimum distances recommended and published by the Institute of Makers of Explosives, 250 East Forty-third Street, New York 17, New York).

J. Measurement and Payment – No separate measurement and payment for drilling, blasting, powder, exploders or caps, including storage and protection of watchmen for same shall be made. Compensation for this work and these items shall be included in the Division 2 unit price for ledge/rock removal.

Payment Limit Lines – The payment limit lines for ledge/rock excavation are as follows:

Open Excavation in substation yard:

- Horizontal: 4'-0" outside fence line
- Vertical: 4'-6" below finished grade

Open Excavation outside substation yard:

- Horizontal: 1'-0" beyond 1:2 slope line projected from top of ditch
- Vertical: 4'-6" below finished grade

Foundations:

- As indicated on individual foundation detail drawings

3.02 PRESPLITTING

- A. The presplitting technique of controlled blasting may be required along the finished vertical and sloped planes of all bedrock excavation in open-cut, as shown on the drawings. Test blasting at the site along exterior surfaces to be presplit shall be conducted to determine the hole size or sizes, hole spacing, the amount and distribution of explosive charges within the holes, and the amount and locations of stemming that will produce satisfactory bedrock faces with a minimum of drill holes and explosives. Experimentation shall be done initially by the CONTRACTOR and may be required by the OWNER at any time as the work progresses if satisfactory results are not being obtained. Holes for presplitting shall be drilled along the outside neat dimension lines for bedrock excavation. All charges in the presplit hole shall be detonated simultaneously before the rock mass inside the excavation line in the same lift is blasted or otherwise loosened. Presplitting at all times shall be completed 50 feet or more ahead of the loosening of the bedrock mass to be excavated.
- B. The holes shall be drilled to final grade of benches, insofar as possible. Where the vertical faces are too high to drill in a single lift, insets will be permitted, but the inset distance shall be the minimum practicable in each instance. The lowest points of the inset drill holes shall be at the required dimensions of the excavation. The locations and amounts of insets for holes for sloping surfaces shall be approved by the OWNER for each case before presplitting operations are started. Care shall be exercised at all times to insure that drill holes are in the required finished excavation surface.

- C. Measurement for payment for presplitting will be made of the neat surface areas of bedrock presplit as shown on the drawings or as directed by the OWNER.
- D. Payment for presplitting will be made at the unit price per square foot bid in the schedule, which payment shall cover all costs for drilling, blasting, and trimming the bedrock faces. Payment for removal of bedrock adjacent to presplit faces, including removal of bedrock materials scaled from bedrock faces, will be made under the unit price for ledge/rock removal.

3.03 DRILLING NOISE AND DUST CONTROL

- A. Noise from drilling operations shall be minimized as much as possible. Pneumatic drills using a muffled system or hydraulic drills shall be used.
- B. Low noise, sound enclosed, or “whisperized” compressors shall be used at all times with pneumatic drilling equipment.
- C. All drilling equipment shall utilize water or a dry filter dust control system to control the dust originating from drilling operations.
- D. Dust from drilling operations shall also be controlled in accordance with the applicable provisions of the Department of Labor; Safety and Health Regulations for Construction.
- E. Sufficient precautions shall be taken to prevent drill dust from entering the neighboring buildings where damage to existing operations might result.

3.04 SCALING OR ROCK FACES

- A. The CONTRACTOR shall be required to remove individual protruding rock slabs and other semi-detached masses of rock from previously approved excavated faces as directed by the OWNER. The actual areas over which such rock slabs and loose rock are to be removed and the depths thereof shall be as directed by the OWNER.
- B. Nothing contained in this paragraph shall be construed to relieve the CONTRACTOR of full responsibility for the safety of persons or damage to property in any operations under these specifications. Nothing in this paragraph shall prevent the CONTRACTOR from taking any suitable steps to protect life or property or from removing material in addition to that ordered by the OWNER. No additional payment will be made for the removal of any material on account of the nature, conditions, or position of the material, or on account of the number of times the material is handled.

C. No special payment will be made for scaling of rock faces. Payment for all work described in this paragraph shall be included in the Division 2 unit price for the ledge/rock removal.

END OF SECTION

02202-7

TECHNICAL SPECIFICATIONS

SECTION 02368

STEEL H-SECTION PILES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and Division-1 Specification Sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Furnish all plant labor, equipment, material, and perform all operations in connection with the furnishing and installation of steel H-section bearing piles with tip reinforcement of the dimensions indicated herein, at the locations shown on the drawings in accordance with these contract documents.

1.03 RELATED WORK

- A. Earthwork – Section 02200
- B. Concrete – Section 03310
- C. Construction Dewatering and Drainage – Section 01000

1.04 LINES AND GRADES

- A. The CONTRACTOR shall be responsible for the correct location of piles, keeping a record of piles driven as well as a record of the amount of uplift of individual piles. Records of uplift measurements shall be provided to the OWNER's representative.
- B. Piles shall be located and staked out by the CONTRACTOR and the CONTRACTOR shall maintain all location stakes and shall establish all elevations required, including the elevation of the top of the pile prior to cutting off any length of pile.
- C. Within one working day after a pile has been driven, the CONTRACTOR shall provide the OWNER with a written tabulation indicating the following information:
 1. Pile number
 2. Elevation of top of pile prior to cutting (measured to the nearest 0.01 ft.)

3. Deviation from plan (measured to nearest 0,01 ft.)
- D. After the completion of driving of all piles, and before removing the pile driving equipment from a structure site, the CONTRACTOR shall provide the OWNER with a plan showing the as-driven location of all piles driven to the tolerances indicated above.

1.05 PILE INSTALLATION MONITORING AND TESTING

- A. Full-time monitoring of pile driving operations will be conducted by the OWNER's Representative. The CONTRACTOR shall fully cooperate to facilitate monitoring. No piles shall be driven except in the presence of the OWNER's Representative.
- B. Inspection of welding and welds may be performed from time to time by an independent testing agency representing and employed by the OWNER or the OWNER's inspector. The CONTRACTOR shall fully cooperate with the agency or the OWNER's inspector to facilitate inspection, notifying the OWNER's Representative in advance when welding operations are to be performed. Welds that do not conform to applicable specifications shall be gouged and repaired as directed by the OWNER's Representative.
- C. Approvals given by the OWNER's Representative or by inspection agencies shall not relieve the CONTRACTOR of his responsibility for performing the work in accordance with the plans and specifications.
- D. See Part 4, DYNAMIC TESTING for additional details concerning testing methods to be used.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All piles shall be new, rolled steel H-sections of structural steel conforming to ASTM A572 Grade 50 Specification for Structural Steel. Mill certificates shall be furnished to the OWNER's Representative, prior to driving, that shall state the chemical composition, yield point, and ultimate strength of the steel proposed for use. The H-section used for the steel piles shall be a HP10 X42 shape and weight. The tips of all steel H-pile shall be reinforced by either a prunyn point 75600 (or equivalent) or a minimum 0.25-in. thick plate welded across the full width of the H-pile web in the bottom 2-ft. section from the pile tip. Deformations, defects, camber, and sweep of piles placed in the leads shall be no more than allowed by ASTM Specification A6.

PART 3 EXECUTION

3.01 INSTALLATION OF PILES

- A. Piles shall be driven with approved modern equipment. The leads shall extend down to the lowest point at which the hammer must operate. The use of followers will not be permitted.
1. All proposed driving equipment and methods shall be subject to the approval of the OWNER and shall be obtained before the start of pile driving.
 - B. Pile driving shall be continuous, without interruption, for the final 5 feet of penetration.
 1. As part of the preparation for pile driving, the CONTRACTOR shall mark each pile at one-foot intervals along its entire length. In addition, the footage shall be marked and designated at five-foot intervals, starting from the pile tip.
 2. Each pile shall be driven through the overlying soils to bearing in glacial till or bedrock underlying the site. The average penetration resistance for the final six inches of driving shall be a minimum of five hammer blows per inch for 65-ton capacity piles. If an abrupt increase in driving resistance is encountered, the driving shall be terminated when the pile penetration is less than $\frac{1}{2}$ inch in five successive blows.
 3. Immediately after the pile is driven, the CONTRACTOR shall establish a reference point and its elevation on the pile. After all piles in any one group have been driven, the CONTRACTOR shall determine the elevation of the reference points on each of the piles in the group. If uplift of $\frac{1}{2}$ inch or more has occurred for any pile, then that pile shall be re-driven to its original elevation, and deeper if necessary, to the required final driving resistance. After re-driving each such pile, the CONTRACTOR shall re-check the elevation of the reference points on all piles in the group and shall re-drive any other uplifted piles.
 - C. Where necessary, steel piles shall be spliced by continuous butt joint, level, full-penetration, arc welding to produce joints developing 100 percent of the section strength. No splices shall be made in the lower 9 feet of the driven pile. The pile shall show no knee or bend at the splice. The use of mechanical splices or sleeves will not be allowed.
 1. All welding shall be performed by operators who have been previously qualified by tests as prescribed in the "Standard Code for Welding in Building Construction" of the American Welding Society. The CONTRACTOR must submit evidence to the OWNER that welders meet qualifications and requirements before welding is begun.

2. Since pile sections are to be welded while the pile is in the leads, proper facilities for inspection of the welded splice must be provided.
- D. Installation of piles will not be near existing energized lines or equipment. All work shall be done in accordance with Section 01000 – CMP Safety Requirements.

3.02 TOLERANCES AND CRITERIA FOR ACCEPTANCE

- A. If upon comparing a pile's driving performance with that of other driven piles, and based on his knowledge of subsurface conditions, the OWNER's representative determines that the pile has been damaged sufficiently to make it unacceptable, he may reject the pile. The CONTRACTOR may, at his option, extract the pile for examination. Piles that are pulled and found to be damaged shall be rejected. Those that are not damaged will be re-driven at a location designated by the OWNER's Representative. In such a case, the CONTRACTOR will be paid at the full contract unit price per foot for the reinstallation of the original pile, if the re-installation is acceptable.
- B. All piles shall be driven as close as practicable to the plan location. A maximum lateral deviation from the correct location at cutoff elevation permitted shall be three (3) inches.
- C. Where piles as installed exceed the specified tolerance, the OWNER shall then analytically determine the total loads on individual piles, based on survey information. If the load on any pile exceeds the specified load capacity, corrections shall be made in accordance with a design provided by the OWNER. Additional piles required to compensate for production piles or replacement piles driven out of design location will be installed at no cost to the OWNER. If a rejected pile interferes with the placement of other piles, the rejected pile shall be removed at the CONTRACTOR's expense.
- D. Whenever misalignment or rejection of a pile or piles necessitates structural redesign of the pile cap, and the redesigned pile cap requires greater quantities of concrete and reinforcing steel than the quantities required for the pile cap as originally designed, then the additional cost for pile cap concrete, reinforcing steel, and formwork shall be at the CONTRACTOR's expense.

3.03 CUTTING OFF PILES

- A. The tops of piles shall be cut off at the elevations shown on the drawings. The CONTRACTOR shall perform all excavations necessary to cut off the piles at the elevations shown on the drawings.

3.04 OBSTRUCTIONS