JORDAN BROOK CULVERT REPAIR

96, 97 & 101 Twiss Street

Meriden, Connecticut

Project Specifications

Prepared for the

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Table of Contents

Cover Page

Item 1 – Earthwork, Demolition & Mobilization

Item 2 – Wire Mesh Gabions

Item 3 – Reconstruction of Existing Stonewalls

Item 4 – Erosion and Sedimentation Control

Item 5 – Chain Link Fence

Item 6 – Clearing & Grubbing

ITEM 1

EARTHWORK, DEMOLITION & MOBILZATION

PART 1 - GENERAL

1.1 REFERENCES

A. The Geotechnical report prepared by GEI Consultants "Geotechnical Recommendations Jordan Brook Channel Wall Repairs Meriden, Connecticut", dated July 23, 2020.

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

1.2 SECTION INCLUDES

A. Protection, modification, or installation of utilities as site work progresses with particular attention to grade changes and necessary staging or phasing of work.

B. Cutting, filling, and grading to required lines, dimensions, contours, and elevations for proposed improvements.

C. Scarifying, compacting, drying, dewatering and removal of unsuitable material to ensure proper preparation of areas for proposed improvements.

D. Without limiting the generality thereof, furnish all labor and materials to complete all earthwork within the limits of work as shown on the contract drawings and/or herein specified including, but not necessarily limited to:

1. Excavation and backfilling to provide access to all work areas.
3. Excavation and stockpiling of materials suitable for reuse.
4. Excavation and legal off-site disposal of unsuitable or excess materials, including existing fill materials, peat, boulders, excess topsoil, boulders, and overburden soils.
5. Soil and rock excavation, fill, backfill, refill and subgrade preparation as indicated or required, using specified materials.
6. Soil and rock structure excavation, unsuitable soil excavation, placement of bedding and backfilling of utility trenches.
7. Furnishing and placing specified materials required to balance site cuts and fills as close as feasible.
8. Excavation, over excavation and backfills for foundations and slabs, and for utilities and drainage systems.
9. Preparation of subgrade for structures and landscaping.
10. Furnishing and installing sheeting, shoring, bracing and sand bags for excavations as required by Federal, State and Local laws, regulations and ordinances.
11. Removal of unsuitable materials from beneath proposed gabions.
12. Furnishing and placing crushed stone, structural fill and related materials in areas designated on the plan.

14. Rough and fine grading including compaction for existing materials, backfills and refills, and crushed stone.
15. Dewatering, pumping, bailing and control of all groundwater and surface water for all work under this Contract.
16. Dust, erosion, siltation and environmental controls.
17. Subbase and base course for the gabion wall shall be furnished, placed and rough graded by the Contractor.
18. Removal and disposal of debris materials and surplus excavated soils.
19. Providing geotextile fabric for gabion wall installation subgrade.
20. Providing polyethylene between gabion walls and constructed stonewalls.
21. Demolition and removal of existing stonewalls and vegetation in the area of the gabion wall installation.
22. Placing of topsoil, seed & mulch on all disturbed surfaces at the completion of gabion & stonewall construction.
23. Re-grading of existing gravel driveway at 96 Twiss Street due to disturbance from construction access. Re-establishment of disturbed surfaces due to construction activity.

E. Related Work Described Elsewhere:

1. "Erosion and Sedimentation Controls"
2. "Wire Mesh Gabion Wall"
3. "Chain Link Fence"

F. Law and Regulations

1. All work shall be accomplished in accordance with regulations of the City of Meriden and State of Connecticut standards as they apply.

1.3 QUALITY ASSURANCE

A. Comply with all the requirements of this section and with the City of Meriden, State of Connecticut and federal regulations having jurisdiction.

1.4 SUBMITTALS

A. Test Reports:

1. Provide sieve analysis of the crushed stone and structural fill to the Engineering Department at least 48 hours prior to installation.

B. Geotextile Fabric information shall be submitted for approval to the Engineering Department.

C. Polyethylene product information shall be submitted for approval to the Engineering Department.

1. 6 SITE INVESTIGATION

A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work, the general and local conditions, particularly those bearing upon transportation, disposal,

handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, groundwater table or similar physical conditions at the site, the conformation of subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work.

B. The contractor shall perform excavated testpits at the locations shown on the plan to determine the exact location of the existing sewer lateral to the rear building at 96 Twiss Street.

1.7 PROTECTION OF EXISTING STRUCTURES

A. The Contractor shall protect the existing property adjacent to the construction area. All costs for repair of broken or damaged utilities will be the responsibility of the Contractor.

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

C. Protect existing above ground structures, landscaping, and appurtenances from movement or settlement. Provide bracing and shoring as needed.

D. Consult official records of existing utilities, both surface and subsurface, and their connections to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work. The Contractor shall contact **Call Before You Dig (800) 922-4455** to assist in locating utilities at least 3 working days prior to performing any earthwork operations on the site.

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

1.8 SUBSURFACE DATA

A. Hand auger information is included in the Geotechnical report prepared by GEI Consultants "Geotechnical Recommendations Jordan Brook Channel Wall Repairs Meriden, Connecticut", dated July 23, 2020.

Such data is offered in good faith solely for the purpose of placing the Contractor in receipt of all information available. The Contractor must interpret such data according to his own judgment and acknowledges that he is responsible for his own determinations regarding the subsurface conditions which may be found to exist.

The Contractor further acknowledges that he assumes all risk contingent upon the nature of the subsurface conditions, including rock, to be actually encountered by him in performing the work covered by the Contract, even though such actual conditions may result in the Contractor

performing more or less than he originally anticipated. No warranty, either expressed or implied, is made as to the accuracy of the subsurface information presented.

B. Variations in existing ground or subsurface soil conditions differing from those indicated on the test boring and test pit logs shall not under any conditions constitute grounds for changes in Contract Price or completion dates of this Contract.

1.9 APPLICABLE STANDARDS

A. ASTM D-422 - Method for sieve analysis of fine and coarse aggregates.

1.10 SITE PREPARATION

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

PART 2 – PRODUCTS

2.1 MATERIALS

A. Structural Fill shall be free from ice and snow, roots, stumps and other deleterious materials. Structural fill shall have a liquid limit and plasticity index not exceeding 40 and 10, respectively, and shall conform to the following gradation requirements:

Sieve Size	Percent Passing by Weight
3-1/2-inch	100
3/4-inch	50 to 100
No. 4	25 – 75

The fraction passing the No. 4 sieve shall have less than 15%, passing the No. 200 sieve.

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

C. Crushed Stone shall be free from ice and snow, roots, stumps, rubbish and other deleterious materials and should consist of hard durable sand and gravel conforming to the following gradation requirements:

Sieve Size	Percent Passing by Weight
Pass 1-1/2 inch	100
Pass 3/4 inch	45-80
1/4-inch	25 to 60
No. 10	15 - 45
No. 40	5 - 25

No. 100	0 - 10
No. 200	0 - 5

D. Geotextile Filter Fabric shall be a non-woven needle punched Geotextile such as "Mirafi N-Series" 140N or approved equal and meeting the following requirements:

Property	Test Method	Average Minimum Value
Ultimate Strength	ASTM D 4632	90 pounds
Grab Elongation	ASTM D 4632	40-60%
Trap. Tear Strn.	ASTM D 4355	35 pounds
Puncture Resist.	ASTM D 483	55 pounds
Permittivity	ASTM D 4491	2.0 sec^{-1}
Appar. Open Size	ASTM D 4751	70 (US Sieve)
U.V. Resistance	ASTM D 4355	70 (%Str. >500 Hrs)

2.2 USE OF MATERIALS

A. Structural Fill

Use this material behind the crushed stone material for the gabion wall installation.

B. Crushed Stone

Use this material as backfill behind the gabion wall installation.

C. Suitable Native Material

Use this material for fill slopes, backfill behind the existing stonewall and the stonewall returns.

D. Topsoil

Use topsoil for final grading of proposed grass areas.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

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

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

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

D. Verify fill material to be reused are acceptable.

3.2 PROTECTION OF ADJACENT WORK

A. Protect all adjacent structures which may be damaged by dewatering and excavation work. All damage caused by construction activities shall be repaired by the Contractor at no additional expense to the Owner.

B. Grade excavations and fills to prevent surface water runoff into the work area or to adjacent properties.

C. Protect all structures and surfaces to remain undisturbed during construction.

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

A. All topsoil, peat, subsoil, unsuitable fill and miscellaneous materials (i.e. stonewalls, vegetation) shall be stripped to their entire depths within the area of the gabion wall construction. All such unsuitable materials will be excavated to one foot below existing site grades within gabion wall areas. Materials suitable for reuse as determined by the Geotechnical Engineer shall be stored in designated locations that will not interfere with building operations. As previously specified, topsoil to be reused shall be free from clay, large stones and debris. All materials not suitable for reuse shall be legally disposed of off-site as directed by the Engineering Department.

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

3.4 SITEWORK EXCAVATION

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

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

All gabion footing excavations shall be made to the proper depths. All excavations shall be approximately level, and clear of loose material. Any debris or vegetable matter or unsuitable soil or material encountered in the excavation shall be removed as directed by the Geotechnical Engineer. All debris, not usable for rough grading below grass areas, excluding slope areas, shall be removed from the excavated material and shall be disposed of off-site.

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

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

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

C. If sub-grade soils become loose and saturated, the Contractor shall be required to excavate such loose and saturated soils and replace them, at no additional cost to the City, with compacted sand-gravel fill in order to stabilize areas which may become disturbed due to surface runoff, construction disturbances by the Contractor, and subsurface seepage pressure and also to expedite pumping.

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

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

H. Excavate in a manner that will not disturb existing foundations to remain. Plans for excavating near existing remaining foundations shall be submitted to the Geotechnical Engineer for approval prior to beginning such excavation.

I. Correct unauthorized excavation at no additional cost to the Owner.

3.5 TRENCH EXCAVATION

A. Excavate for sewer at locations indicated on the Drawings. Dewater trenches to permit work to be performed in dry conditions. Over excavate and remove unsuitable material and replace and compact with foundation stone or material approved by the City Engineer.

B. Support pipe and conduit during placement and compaction of bedding fill.

C. Backfill trenches with specified material according to the specifications contained herein and the Contract Drawings to required contours and elevations.

D. Place and compact fill materials in accordance with specifications contained hereinafter.

E. Dispose of unsuitable materials, rock not to be used, etc. in a legal manner offsite.

3.6 SHORING, SHEETING AND BRACING

A. Provide shoring, sheeting and/or bracing of excavations as required to assure complete safety against collapse of earth at side of excavations. Alternatively, lay back excavations to a stable slope.

B. Excavations shall be adequately sheeted, shored and brace as necessary to permit proper execution of the work and to protect all slopes and earth banks until walls are acceptable for backfill. Sheet piling shall be installed if required to prevent cave-ins or settlement and to protect workmen and utilities. Shoring and bracing may be removed as the backfilling progresses, but only when banks are safe against caving, taking all necessary precautions to prevent collapse of excavation sides.

C. Comply with OSHA and local safety regulations.

D. Remove sheeting or shoring, etc. as backfilling operations progress, taking all necessary precautions to prevent collapse of excavation sides.

E. Temporary bracing to eliminate movement during backfilling may be required except in cases where the wall have been integrated into the permanent superstructure and derive support there from. The design and proposed construction procedure for bracing systems shall be submitted to the City Engineer for approval at least one week prior to commencing backfill operations.

3.8 PLACEMENT AND COMPACTION OF FILL

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

Off-site borrow material necessary to achieve design sub-grades shall be provided at the Contractor's expense and shall also meet the requirements of the sub-part 2.1 section of these specifications. All fill materials, including existing suitable on-site materials and off-site borrow materials, shall be in conformance with the sub-part 2.1 section of these specifications. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice. Remove and replace or scarify and air dry satisfactory soil materials that are too wet to compact to specified density.

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

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

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

	Areas	Max. Degree of Compaction
1.	Free Draining Sand/Gravel And wall backfill	95%
2.	Structural	95%
3.	Controlled Native Fill	95%
4.	Crushed Stone	95%
6.	Trench backfill	92%
7.	Trench backfill beyond wall material envelope	95%

E. After all excavation has been completed, unless indicating otherwise herein, all new fill materials shall be deposited in loose lift thickness not exceeding eight (8) inches in depth over the areas to be filled.

1. The entire area of each layer shall be compacted with the specified equipment to the specified degree as outlined herein. No subsequent layer shall be deposited until the specified compaction is achieved for the previous layer. If necessary to obtain the required compaction due to fill becoming too dry, water shall be added if authorized by the Geotechnical Engineer.
2. Compacted fills shall be prevented from freezing by use of approved admixtures or by use of approved protection on the surface, or both.

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

J. Procedures

1. Protect both fill and cut areas by minimizing water flow within the area.
2. To the extent that it is practicable, each layer of fill shall be compacted to the specified density the same day it is placed.
3. Fill that is too wet for proper compaction shall be diced, harrowed, or otherwise dried to a proper moisture content for compaction to the required density. If the fill material cannot be dried within forty-eight (48) hours of placement, it shall be removed and replaced with drier fill.

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

3.9 FILL PLACEMENT IN SEWER TRENCH

A. As soon as practicable after the pipe has been placed, inspected and approved by the Engineering Department, backfilling shall be performed. The Contractor shall be held responsible for the satisfactory execution of pipe line construction.

B. Bedding shall be as specified for the particular type of pipe installation and as shown on the Drawings. Backfill shall be placed simultaneously on either side of the pipe alignment. In placing material, care shall be taken that stones do not strike the pipe.

C. For applications requiring crushed stone bedding, the bedding shall be placed to the springline of the pipe and so shaped that the pipe shall be firmly supported across its diameter for the full length of the barrel. Particular care shall be taken to provide recesses in the bedding or trench bottom, as required, to relieve each bell of any load.

D. Placement of bedding shall be done manually by persons skilled in this operation and shall precede the laying of pipe by no more than a few feet.

E. No stone or rock fragment greater than 3 inches shall be placed into the trench. Large masses of backfilling materials shall not be dropped into the tamped layers of backfill until at least one foot of backfill has been placed over the top of the pipe. Backfilling shall be placed in 8 inch maximum loose lifts.

F. No compaction shall be done when the material is too wet to be compacted properly; at such times, the compaction work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction, or such other precautions shall be taken as may be necessary to obtain proper compaction. Water jetting or flooding to attain compaction is not permitted.

3.10 REUSE OF EXCAVATED MATERIALS

A. Inorganic on-site soils (i.e. portions of existing fill materials) excavated during site grading and installation of utilities may be reused as fill materials providing that the excavated materials and are of suitable moisture content. Rock which is excavated during site grading and installation of utilities may be reused as fill materials providing that the excavated materials meet the requirements of these specifications.

3.11 DEWATERING

A. General

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

2. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom and/or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a “quick” or “boiling” condition. System shall not be dependent solely upon sumps and/or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation’s stability.

   a. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow all Work to be installed in a dry condition.
   b. Control, by acceptable means, all water regardless of source and the Contractor is fully responsible for disposal of the water.
   c. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary to these purposes, lower water level in advance of excavation, utilizing wells, wellpoints, jet educators, or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.

d. Commence dewatering prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
e. Install wells, if required, with suitable screens and filters, so that continuous pumping of fines does not occur. During normal pumping, and upon development of well(s), levels of fine sand or silt in the discharge water shall not exceed 5 ppm.
f. Control grading around excavations to prevent surface water from flowing into excavation areas.
i. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.

3. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to keep the excavate areas sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures or cause excessive disturbance of underlying natural ground. The drainage of all water resulting from pumping shall be arranged so as not to cause damage to adjacent property. All requirements of local environmental or conservation authorities shall be satisfied with respect to discharge of pumped water.
4. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation, thereby decreasing the stability of excavated slopes, causing loss of material from beneath the slopes or bottom of the excavation and hauling characteristics of soil, and/or causing rupture or heaving of the bottom of an excavation.

B. Design Criteria

1. Contractor shall be solely responsible for the installation, operation, maintenance, and any failure of any component of the system.
2. Damages:

a. Contractor shall be responsible for and shall repair without cost to the City any damage to work in place, or other contractor's equipment, utilities, residences, adjacent structures, natural resources, habitat, and the excavation. Including, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.
b. Remove sub-grade materials rendered unsuitable by excessive wetting and replace with approved backfill material at no additional cost to the Owner.

3. Maintaining Excavation in Dewatering Condition:

a. Dewatering shall be a continuous operation. Interruptions due to power outages, or any other reason will not be permitted.
b. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of sub-grade, installation of pipe, and construction of structures until the critical period of construction and/or backfill is completed to prevent damage of sub-grade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.

c. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.
d. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components, and any other work required to maintain excavation in dewatered condition.

4. System Removal:

a. Remove dewatering equipment from the site.
b. Wells shall be removed or cut off below final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction as required.

5. Dewatering system shall:

a. Develop a substantially dry and workable sub-grade for the execution of subsequent operations;
b. Cause no damage due to the loss of ground from incompletely drained soils or removal of soil particles in the discharge.
c. Relocate dewatering procedures which cause, or threaten to cause, damage to new or existing facilities. These modifications will be at no additional expense to the City.
d. Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities. These modifications will be at no additional expense to the Owner.

C. Job Conditions

1. The result of subsurface investigations are available in the Geotechnical report prepared by GEI Consultants “Geotechnical Recommendations Jordan Brook Channel Wall Repairs Meriden, Connecticut”, dated July 23, 2020.

a. The Contractor shall repair damage, disruption or interference to existing properties, buildings, structures, utilities and other work resulting directly or indirectly from operations conducted under this contract, loss of ground due to incompletely drained soils, or removal of soil particles in discharge from the dewatering operations, to the Geotechnical Engineer’s satisfaction at no cost to the Owner.
b. Provide means for sampling dewatering system discharge so that water quality can be determined on a routine basis.
c. All dewatering tubing to be left in-place below building areas shall be pressure grouted with neat cement to prevent long-term loss of soil fines into the tubing with subsequent potential for advanced structure settlements.

D. Execution

1. Surface Drainage

a. Intercept and divert surface drainage away from the excavations and observation wells.
b. Design surface drainage systems so that they do not cause erosion on or off the site or cause unwanted flow of water.
c. Remove the surface drainage system when no longer required.
d. Remove debris and restore the site or sites to original conditions.
e. Surface drainage may be discharged into storm sewers provided that any necessary permits are obtained by the Contractor.

2. Drainage of Excavated Area

a. Collect surface water and seepage which may enter the excavation, and divert the water into a sump so that it can be drained or pumped away from the work area.
b. Install settling basins or other approved apparatus as required to reduce the amount of soil fine particles which may be carried by water diverted or pumped during construction.
c. Dispose of water in a manner approved by the Owner and Geotechnical Engineer.
d. Backfill sumps and settling basins when no longer required with structural fill material, concrete or other material as approved by the Geotechnical Engineer.

3. Dewatering of Subsurface Water

a. Dispose of subsurface water collected in a manner approved by the Owner and Engineer in work areas.
b. Maintain continuous and complete effectiveness of the installation at all times.
c. Maintain water levels at such elevations that no damage to the structure can occur because of excessive or deficient hydrostatic pressure.

3.12 GRADING AND ELEVATIONS

A. Grading shall consist of grading areas adjacent to the gabion and stonewalls. Finish ground surfaces shall be free from irregular surface changes, and meet the following requirements:

1. Grassed areas: Finish areas scheduled to receive topsoil to within not more than 2” above or below the pre-construction existing grade elevations.

B. The finished grade of the gabion and stonewalls shall match the existing adjacent grade prior to construction. The Engineering Department, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interference and other special conditions encountered. Grading between indicated final grades shall provide smooth, even surfaces, except as otherwise required. Minimum cover over pipes shall, in any case, conform to requirements of local and state agencies having jurisdiction.

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

3.13 REMOVAL OF SURPLUS MATERIALS

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

3.14 PROTECTION

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

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

C. Re-compact fills subjected to vehicular traffic or other disturbances.

3.15 TEMPORARY WATER MANAGEMENT

A. Prior to construction of the gabion wall, the contractor shall coordinate with the City Engineer options and implementation procedures for the temporary management of water (flow of water within the Jordan Brook).
B. The Water Management Plan provides options for handing the water during construction. All options shall be approved by the City Engineer.
C. The options may include the use of sand bags, large diameter drainage pipes and pumps.

METHOD OF MEASUREMENT

The work under this item will not be measured for payment. All work shall be considered on a lump sum basis.

3.16 BASIS FOR PAYMENT

Monthly payments will be made in proportion to the amount of work done. The Unit Price (Lump Sum) for "Earthwork, Demolition & Mobilization" shall include all the work as described above and which may be necessary to complete the project and all materials, tools, equipment and labor incidental to or necessary for Earthwork, Demolition & Mobilization.

ITEM 2

Wire Mesh Gabions

1.0 Work Included

The work under this Item shall consist of furnishing, assembling and installing rock filled wire mesh gabion baskets and anchor mesh.

1.1 Materials

Gabions shall consist of rectangular wire mesh formed containers filled with rock. Gabions will conform to one of the following mesh types: Woven Mesh - Non-raveling double twisted hexagonal wire mesh, consisting of two wires twisted together in two 180 degree turns. Welded Mesh - Welded-wire mesh with a uniform square or rectangular pattern and a resistance weld at each intersection. The welded wire connections shall conform to the requirements of ASTM A 185, including wire smaller than W1.2 (0.124 in.); except that the welded connections shall have a minimum average shear strength of 70% and a minimum shear strength of 60% of the minimum ultimate tensile strength of the wire. Gabions shall be furnished as baskets, as shown on the Contract Drawings. Baskets shall have a height of 36 inches. Baskets shall be fabricated within a dimension tolerance of plus or minus 5 percent.

Gabions shall be fabricated, assembled and installed in accordance with 0.118 nominal wire size and a maximum 3 ¼" x 4 ½" mesh size for woven mesh and 3" x 3" for welded mesh. Spiral binders or approved alternate fasteners shall be used to construct the gabion baskets. Fasteners shall be formed from wire meeting the same quality and coating thickness requirements as specified for the gabions. The anchor mesh shall have a minimum tensile strength of 3,000 pounds per foot and be properly attached to the gabion wall in accordance with the manufacturer's instructions.

The wire shall be hot dipped galvanized after fabrication with a galvanized coating of not less than 0.80 ounce per square foot. Wire for fabrication and assembly shall have a minimum tensile strength of 60,000 psi. Galvanized steel wire shall conform to ASTM A 641, Class 3, Soft Temper. The galvanized wire shall be coated by extruded and bonded PVC material. The wire coating shall be colored black. The initial properties of the PVC coating shall meet the following requirements:

- Specific Gravity. In the range of 1.25 to 1.35, ASTM D 792.
- Abrasion Resistance. The percentage of weight loss shall be less than 12%, when tested according to ASTM D 1242, Method B at 200 cycles, CSI-A Abrader Tape, 80 Grit.
- Brittleness Temperature. Not higher than 15 ^{O}F, ASTM D 746.
- Tensile Strength. Extruded Coating (not less than 2,980 psi, ASTM D 412). Fusion Bonded Coating (not less than 2,275 psi, ASTM D 638).
- Modulus of Elasticity. Extruded Coating (not less than 2,700 psi. at 100 percent strain, ASTM D 412). Fusion Bonded Coating (not less than 2050 psi. at 100 percent strain, ASTM D 638).
- Ultraviolet Light Exposure. A test period of not less than 3000 hours, using apparatus Type E at 63 ^{O}C, ASTM G 23.
- Salt Spray Test. A test period of not less than 3000 hours, ASTM B 117.

Suitable rock from the remains of the existing stone walls removed may be used to fill the gabion baskets unless otherwise directed by the City Engineer. The gabions shall be filled with rock 4 to 8 inches

in size with the maximum dimension being 9 inches.

Filter fabric shall be a non-woven polyester fabric with a minimum weight of 6 ounces per square yard and shall be Geotex Model # 801 as manufactured by Synthetic Industries, Amoco Model # 4551 as manufactured by Amoco Fabrics and Fiber Company, or approved equal.

1.2 Foundation Preparation

The foundation/leveling pad on which the gabions are to be placed shall be cut and graded to the lines and grades shown on the Contract Drawings. Surface irregularities, loose material, vegetation, and all foreign matter shall be removed from foundations. Gabions and bedding or specified filter fabric shall not be placed until the foundation preparation is completed, and the subgrade surfaces have been inspected and approved by the Engineering Department. The surface of the finished material shall be to grade and free of mounds, dips or windrows. Filter fabric shall be installed in accordance with the requirements of the filter fabric manufacturer.

1.3 Assembly and Placement

Gabions shall be assembled and installed in accordance with the following procedures: Assembly - Rotate the gabion panels into position and join the vertical edges with fasteners for gabion assembly. Where lacing wire is used, wrap the wire with alternating single and double half-hitches at intervals between four (4) to five (5) inches. Where spiral fasteners are used for welded-wire mesh, crimp the ends to secure the spirals in place. Where ring type fasteners are used for basket assembly, install the fasteners at a maximum spacing of six (6) inches. Use the same fastening procedures to install interior diaphragms where they are required. Interior diaphragms will be installed to assure that no open intervals are present that exceed three (3) feet. Placement - Place the empty gabions on the foundation and interconnect the adjacent gabions along the top, bottom, and vertical edges using lacing wire, spiral fasteners, or ring fasteners. Wrap the wire with alternating single and double half-hitches at intervals between four (4) and six (6) inches. Ring fasteners shall not be spaced more than six (6) inches apart. Spirals shall be screwed down at the connecting edges, then each end of the spiral is crimped to secure it in place. Lacing wire shall be used as needed to supplement the interconnection of welded mesh gabions, and the closing of lids. Interconnect each layer of gabions to the underlying layer of gabions along the front, back, and sides. Stagger the vertical joints between the gabions of adjacent rows and layers by at least one-half of a cell length.

1.4 Filling Operation

After adjacent empty woven wire gabion units are set to line and grade and common sides properly connected, they shall be placed in straight line tensioned and stretched to remove any kinks from the mesh and to gain a uniform alignment. Staking of the gabions may be done to maintain the established proper alignment prior to the placement of rock. No stakes shall be placed through filter fabric.

Internal connecting cross-tie wires shall be placed in each unrestrained gabion cell greater than 18 inches in height, including gabion cells left temporarily unrestrained. Two internal connecting wires shall be placed concurrently with rock placement, at each 12- inch interval of depth.

In woven mesh gabions, these cross-ties shall be placed evenly spaced along the front face and connecting to the back face. All cross-tie wires shall be looped around two mesh openings and each wire end shall be secured by a minimum of five 180 degree twists around itself after looping.

In welded mesh gabions, these cross-ties or stiffeners will be placed across the corners of the gabions (at

12 inches from the corners) providing diagonal bracing. Preformed hooked wire stiffeners will be used.

The gabions shall be carefully filled with rock, either by machine or hand methods, maintaining alignment, avoiding bulges, and providing a compact mass that minimizes voids. Machine placement shall be supplemented with hand work to ensure the desired results. The cells in any row shall be filled in stages so that the depth of rock placed in any one cell does not exceed the depth of rock in any adjoining cell by more than 12 inches. Along the exposed faces, the outer layer of stone shall be carefully placed and arranged by hand to ensure a neat, compact placement with a uniform appearance. The last layer of rock shall be uniformly overfilled 1-2 inches to allow for rock settlement. Lids shall be stretched tight over the rock fill using only approved lid closing tools. The use of crowbars or other single point leverage bars for lid closing is prohibited. The lid shall be stretched until it meets the perimeter edges of the front and end panels. The gabion lid shall then be secured to the sides, ends, and diaphragms with spiral binders or lacing wire wrapped with alternating single and double half-hitches in the mesh openings. Ring fasteners spaced not more than six (6) inches apart may be used for lid closure.
Any damage to the wire or coatings during assembly, placement and filling shall be repaired promptly in accordance with the manufacturer's recommendations or replaced with undamaged gabion baskets.

1.5 Measurement

The quantity paid for under Item 2, Wire Mesh Gabions, shall be the actual number of square yards of surface area as measured within the neat lines of the face of the gabion wall constructed as shown and directed.

1.6 Payment

The unit price bid per square yard under Item 2, Wire Mesh Gabions, shall be full payment for all labor, tools, materials and equipment necessary for the construction of the wire mesh gabion wall including rock fill, ties, anchor mesh, crushed stone and structural backfill material and appurtenances, complete as shown on the Contract Drawings or directed by the Engineer Department and specified herein.

ITEM 3

RECONSTRUCTION OF EXISTING STONEWALLS

The limits of the stonewall reconstruction is depicted on the Site Plan. The Contractor shall reconstruct stonewalls to match the dimensions of the existing stonewalls adjacent to the brook. The reconstructed stonewall shall match the existing stonewall in height, stone size, mortared joints and appearance unless otherwise directed by the City Engineer.

The end of the stonewall that intersects the new gabion wall shall match in thickness to the gabion wall. Stonewall returns shall be constructed at the end of the existing stonewalls and the new gabion walls. The intent is to limit the flow of water from the brook behind the stonewall.

The mortaring of the stonewalls shall not be done in freezing weather of when the stone contains frost. The joints shall be thoroughly cleaned of all loose mortar, dirt or other foreign material to a depth of about 2 inches unless otherwise directed. The joints shall be thoroughly wet with water and filled with mortar. The mortar shall be driven into the joints and finished with an approved pointing tool. The wall shall be kept wet while pointing is done. In hot or dry weather, the pointed masonry shall be protected from the sun and kept wet for a period of at least three days after completion.

After the pointing is completed and the mortar set, the wall shall be thoroughly cleaned and left in a neat and workmanlike condition.

METHOD OF MEASUREMENT

The work under this item will be measured for payment by the square foot of wall surface area.

BASIS FOR PAYMENT

The Unit Price per square foot of wall surface area for "Reconstruction of Existing Stonewalls" shall include all the work as described above and which may be necessary to complete the project and all materials, tools, equipment and labor incidental to or necessary for the Reconstruction of Existing Stonewalls.

ITEM 4

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. 2002 Guidelines for Soil Erosion and Sediment Control (Connecticut Department of Environmental Protection, Bulletin #34).

1.2 SUMMARY

A. The work under this section shall consist of any and all temporary to control water pollution and soil erosion as may be required, specified herein, shown on the Contract Drawings or directed by the City, during the construction of the work.

B. This work applies to, but is not limited to, any construction work resulting in water pollution or soil erosion.

C. The work shall consist temporary erosion control protection measures to control water pollution and soil erosion through the use of temporary seeding, netting, gravel, mulches, grasses, fabric fences, filter socks, compost blankets, geo-fabric, hay bales, silt sacks and grading to control surface runoff and other erosion control devices or methods.

D. Site Work Improvement construction shall not proceed until the erosion and sedimentation controls have been placed and have been approved by the City.

1.3 RELATED SECTIONS

1. Item 3 – Earthwork, Demolition & Mobilization
2. Construction Drawings

1.4 ENVIRONMENTAL REQUIREMENTS

A. Protect adjacent properties and water resources from erosion and sediment damage throughout life of contract.

B. Fabrics shall consist of durable polypropylene, polyethylene or other material approved by the Owner or as shown on the Contract Drawings.

C. Hay bales shall be made of hay with 40 pounds minimum weight and 120 pounds maximum weight. Wood stakes shall be a minimum of 1 inch by 1-inch nominal size by a minimum of 3 feet long.

D. Silt Fence shall consist of 3-foot wide Geosynthetic fabric with prefabricated wood posts as manufactured by “Mirafi” or equal.

PART 2 – EXECUTION

2.1 GENERAL

A. Prior to the commencement of any work, the Contractor shall submit to the City the proposed methods of water pollution and soil erosion control to be incorporated in the work.

B. Every effort shall be made by the Contractor to immediately provide permanent or temporary pollution control measures to prevent contamination of adjacent streams, watercourses, lakes, ponds, or other areas of water impoundment. Every effort shall be made by the Contractor to prevent erosion on the site and abutting property.

C. The Owner has the authority to direct the Contractor to divert surface water runoff away from exposed raw earth surfaces through the use of temporary berms, dikes, and diversion channels.

2.2 IMPLEMENTAION AND INSTALLATION OF CONTROL MEASURES

A. The erosion control features shall be installed and maintained by the Contractor, and shall be checked daily and after each severe rain storm for damage, until such features are no longer needed.

B. All slopes of stockpile material and other disturbed areas shall be stabilized and protected by surrounding with silt fencing, mulching, seeding, or otherwise protected as the work progresses to comply with the intent of this specification. All damaged areas shall be repaired as soon as possible. The Owner shall limit the surface area of each material exposed if the Contractor fails to sufficiently protect the slopes to prevent pollution.

C. The Contractor shall at all times have on hand the necessary materials and equipment to provide for early slope stabilization and corrective measurements to damaged slopes.

D. The erosion control features installed by the Contractor shall be maintained by the Contractor and he shall remove such installations if ordered by the Owner.

E. The Contractor shall operate all equipment and perform all construction operations so as to minimize pollution. The Contractor shall cease any of his operations which will increase pollution during rainstorms.

H. Hay Bales shall be placed as shown on the plans or as directed by the Owner. They shall be held in place by two wooden stakes in each bale. Bales shall be maintained or replaced as ordered by the Owner until they are no longer necessary for the purpose intended or are ordered removed by the Owner.

I. When filter fabric is used it shall be mounted on posts with or without fence backing as recommended by the fabric manufacturer. The bottom six inches of fabric shall be buried by either trenching or laying the six-inch section horizontally across the trench and burying or by laying the six inch section horizontally on the ground and burying by ramping the topsoil up to the control fence.

J. Filter fabric shall be non-rotting, acid and alkali resistant and have sufficient strength and permeability for the purpose intended, including handling and backfilling operations. Fibers shall

be low water absorbent. The fiber network must be dimensionally stable and resistant to delamination. The fabric shall be free of any chemical treatment or coating that will reduce its permeability. The fabric shall also be free of any flaws or defects, which will alter its physical properties. Torn or punctured fabrics shall not be used. For each specific use, only commercially available fabric which is certified in writing by the manufacturer for the purpose intended shall be used. The Contractor shall submit a two-foot square sample of each type of fabric to be used along with, technical data sheets, certified test reports, materials, certificates and certificates of compliance. The Engineer reserves the right to reject any fabric which he deems unsatisfactory for a specific use. The brand name shall be labeled on the fabric or the fabric container. Fabrics, which are susceptible to damage from sunlight or heat, shall be so identified by suitable warning information on the packaging material.

Fabric susceptible to sunlight damage shall not be used in any installations where exposure to light will exceed 30 days, unless specifically authorized in writing by the Owner.

K. Temporary Seeding shall be applied by any agronomically acceptable procedure. The rate of application shall be no less than 220 pounds per acre. Fertilizer may be either fluid or dry formulations of commercial carriers of available plant nutrients. Fertilizers shall be Type No. 3 10-6-4 (50% N/UF). 50% of total nitrogen shall be derived from ureaform furnishing a minimum of 3.5% water insoluble nitrogen (3.5% WIN). The balance of the nitrogen shall be present as methylene urea, water soluble urea, nitrate and ammoniacal compounds.

3.3 DURATION, REMOVAL AND CLEANUP

A. The installations shall be maintained or replaced until they are no longer necessary for the purpose intended or are ordered removed by the Owner.

B. The filter fabric fence systems will be completely removed from the project at the completion of the project, unless specifically authorized by the Owner to be left in place.

C. Hay bale systems will be allowed to remain in toe of slope areas unless ordered removed by the Owner.

D. Temporary erosion control systems installed by Contractor shall be maintained as directed by Owner to control siltation during life of contract. Contractor must respond to maintenance or additional work ordered by Owner within 24 hours.

E. Permanent Seeding shall be applied in accordance with permanent seeding schedule on the plans.

F. Removal and Disposal of all erosion and sediment controls, temporary structures, haybales, filter fabric, silt fences, stakes, etc. as areas are accepted and stabilized and as approved by Owner and governing agencies.

3.4 METHOD OF MEASUREMENT

The work under this item will not be measured for payment. All work shall be considered on a lump sum basis.

3.5 BASIS FOR PAYMENT

Monthly payments will be made in proportion to the amount of work done. The Unit Price (Lump Sum) for "Erosion and Sedimentation Control" shall include all the work as described above and which may be necessary to complete the project and all materials, tools, equipment and labor incidental to or necessary for Erosion and Sedimentation Control.

ITEM 5

CHAIN LINK FENCE

PART I - GENERAL

1.1 SUMMARY

A. Installation of chain link fences and gate units provided by single source including erection accessories, fittings, and fastenings.

B. Removal of existing fence, posts, storage and re-installation as required by the City.

C. Related Sections

1. Construction Drawings.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition

1. A 116 Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric
2. A 53/A 53 M Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses
3. A 121 Zinc-Coated (Galvanized) Steel Barbed Wire
4. A 123 Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
5. A 153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
6. A 392 Zinc-Coated Steel Chain-Link Fence Fabric
7. A 428 Weight of Coating on Aluminum-Coated Iron or Steel Articles
8. A 491 Aluminum-Coated Steel Chain Link Fence Fabric
9. A 1011 Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled, Sheet and Strip Commercial Quality
10. A 585 Aluminum Coated Steel Barbed Wire
11. C 94 Ready-Mixed Concrete
12. F 668 Polyvinyl Chloride (PVC) Coated Steel Chain Link Fence Fabric
13. F 567 Installation of Chain-Link Fence
14. F 573 Residential Zinc-Coated Steel Chain Link Fence Fabric

D. Chain Link Fence Manufacturers Institute (CLFMI) latest edition Product Manual

E. FS RR-F-191 – Fencing Wire and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories)

1.3 SUBMITTALS

A. Product Data: Submit manufacturers specifications and installation instructions for each item which is factory fabricated.

B. Shop Drawings: Submit shop drawings showing location of each item dimensions, plans, and elevations, large scale details, attachment device and other components and compliance with ADA requirements for gate latches and hinge systems, and ASTM standards and specified bending strengths. PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of following or approved equal:

1. Allied Tube and Conduit Corp.
2. Master-Halco
3. Anchor Fence, Inc.
4. United States Steel

2.2 MATERIALS

A. Fabric:

1. No. 9 gage, 0.148" ± 0.00", finished size galvanized steel wires, 2-inch mesh, top and bottom selvages twisted and barbed conforming to ASTM A392, A491, F668, or F573.
2. **Fence Fabric shall be Class 2b (fused) Polyvinyl Chloride-Coated steel fabric conforming to the requirements of ASTM F 668 Specification RR-F-00191**. **Color shall be as selected by Architect from manufacturer's full range, complying with ASTM F 934.**
3. Furnish 1-piece fabric widths for fencing.

B. End, Corner, and Pull Posts: Galvanized steel, minimum sizes and weights conforming to ASTM A120 as follows:

1. Up to 6'-0" Fabric Height: 2.5" pipe (2.375-inch OD), 3.12 pounds per lineal foot, or 3.5-inch x 3.5-inch roll-formed section, 4.85-pounds per lineal foot.
2. Over 6'-0" Fabric Height: 3.0" pipe (2.875-inch OD), 4.85 pounds per lineal foot, or 3.5-inch x 3.5-inch roll-formed section, 4.85 pounds per lineal foot.

C. Line Posts: Galvanized steel, minimum sizes and weights conforming to ASTM A120 as follows:

1. Up to 6'-0" Fabric Height: 2.0" pipe (1.90-inch OD), 2.28 pounds per lineal foot or 1.875-inch x 1.625-inch C-section, 2.28 pounds per lineal foot.
2. Over 6'-0" to 8'-0" Fabric Height: 2.5" pipe (2.375-inch OD), 3.12 pounds per lineal foot or 2.25-inch x 1.875-inch H-section, 2.64 pounds per lineal foot.
3. Over 8'-0" Fabric Height: 3.0" pipe (2.875-inch OD), 4.85 pounds per lineal foot or 2.25-inch x 1.875-inch H-section, 3.26 pounds per lineal foot.

D. Top Rail: Rails 1.66-inch OD, 1.84-pounds per lineal foot or 1.625-inch x 1.25-inch roll-formed sections, 1.35 -pounds per lineal foot; galvanized steel, manufacturers longest lengths conforming to ASTM A120.

E. Couplings: Expansion type, approximately 6-inches long, for each joint.

F. Attaching Devices: Provide means for attaching top rail securely to each gate corner, pull, and end post.

G. Sleeves: Galvanized steel pipe not less than 6-inches long with inside diameter not less than ½ inch greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1 inch greater than outside diameter of sleeve.

H. Tension Wire: 7 gage galvanized steel, coated coil spring wire, located at bottom of fabric conforming to ASTM A116.

I. Wire Ties: Class 1 galvanized steel, no less than 9 gage.

J. Post Brace Assembly: Manufacturer's standard adjustable brace at end of gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.

K. Post Tops: Galvanized steel, weather tight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.

L. Stretcher Bars: Galvanized steel, 1 piece lengths equal to full height of fabric, with minimum cross-section of 3/16-inch x 3/4-inch. Provide 1 stretch bar for each gate and end post, and 2 for each corner and pull post.

M. Stretch Bar Bands: Manufacturer's standard

N. Gate Cross-bracing: 3/8-inch diameter galvanized steel adjustable length truss rods.

O. Ready Mix Concrete: ASTM C94, mix design as follows:

1. Mix concrete and deliver in accordance with ASTM C94.
2. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:

    a. Compressive Strength: 3,500 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
    b. Slump Range: 1 to 3 inches at time of placement
    c. Air Entrainment: 5 to 8 percent

P. Water: Clean

PART 3 - EXECUTION

3.1 GATE FABRICATION

A. Fabricate swing gate perimeter frames of 1.90-inch OD pipe, galvanized steel. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8'-0" apart.

B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross-bracing on gates as required ensuring rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15 inches o.c. maximum.

C. Attach hardware to provide security against removal or breakage.

3.2 FINISH

A. Fabric Finish: Galvanized, ASTM A 392, Class I, with not less than 1.2 oz zinc/sq. ft of surface.

B. Framing: Galvanized steel, ASTM A 120 or A 123, with not less than 1.8 oz zinc/sq. ft of surface.

C. Hardware and Accessories: Galvanized, ASTM A 153 with zinc weights in accordance with Table I.

3.3 CONCRETE MIXING

A. Mix materials to obtain concrete with minimum 28-day compressive strength of 2,500 psi; 1-inch maximum size aggregate, maximum 3-inch slump, and 5 -8 percent entrained air.

3.4 INSTALLATION

A. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10'-0" o.c. maximum.

B. Grade Set Posts: Drill or hand excavate using posthole digger in firm undisturbed or compacted soil.

C. Excavate hole for each post to minimum diameter recommended by fence manufacturer but not less than 4 times the largest cross-section of post. Excavate hole depths not less than 36 inches below finish grade surface.

D. Center and align posts in holes with bottom of posts 3-inches above bottom of excavation.

E. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2-inches above grade and trowel crown to shed water.

F. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with nonshrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

G. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.

H. Center Rails: Provide center rails where indicated. Install in 1 piece between posts and flush with post on fabric side, using special offset fittings where necessary.

I. Brace Assemblies: Install braces so posts are plumb when diagonal rod are under proper tension.

J. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gauge galvanized wire. Fasten fabric to tension wire using 11 gauge galvanized steel hog rings spaced 24-inches o.c.

K. Fabric: Leave approximately 2 inches between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

L. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4 inches o.c. and secure to posts with metal bands spaced at 15 inches o.c.

M. Tie Wires:

1. Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly when ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
2. Tie fabric to line posts with wire ties spaced 12 inches o.c. Tie fabric to rails and braces with wire ties spaced 24 inches o.c. Tie fabric to tension wires with hog rings spaced 24-inches o.c.
3. Manufacturer's standard procedure will be accepted if of equal strength and durability.

N. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

O. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

3.5 MISCELLANEOUS INSTALLATION

A. Use U-shape tie wires, conforming to the diameters of pipe, that clasp the pipe and fabric firmly with ends twisted at least 2 full turns.

1. Bend ends of exposed wires to minimize hazards to persons or clothing.
2. Install nuts for fasteners on tension bands and hardware bolts on the side of the fence opposite the fabric. The ends of bolts, once secure and checked for smooth operation, shall be peened to prevent removal of nuts.
3. Repair coatings damaged in the field with methods and techniques as recommended by the manufacturer.

3.6 WARRANTY

A. A guarantee shall be furnished for all materials, installation, and workmanship to be free of defects for a period of 1 year from date of acceptance unless noted otherwise in the contract documents. Any defect in installation or workmanship shall be repaired, and defective materials shall be replaced during the guarantee period without any cost to the Owner.

3.7 METHOD OF MEASUREMENT

The work under this item will be measured for payment by the linear foot.

3.5 BASIS FOR PAYMENT

The Unit Price per linear foot for "Chain Link Fence" shall include all the work as described above and which may be necessary to complete the project and all materials, tools, equipment and labor incidental to or necessary for Chain link fence installation.

ITEM 6

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 REQUIREMENTS, CODES

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

1.2 SUMMARY

A. Clearing the land within the limits of construction areas (five feet on either side of the existing stonewalls) which are a part of the contract, of trees, bushes, grass, and other plant life, brush piles, wood piles, rubbish and all objectionable material as indicated or directed and in strict accordance with the contract documents.

The limits of clearing and grubbing is the area with 5 feet on either side of the existing stonewalls unless otherwise directed by the Engineering Department and shall be approved by the City Engineer prior to beginning clearing and grubbing operations.

B. Work shall also include the following:

1. Protection of existing structures, trees, or vegetation indicated on the Construction Drawings to remain.
2. Protection of existing trees and shrubs designated to remain.
3. Topsoil Stripping
4. Clearing, tree cutting: tree removal, grubbing and removal of other vegetation in areas so designated.
5. Disposal of existing site material not otherwise stockpiled, stored or salvaged.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain by the City Engineer, cleared materials shall become Contractor’s property and shall be removed from Project site.

1.5 DEFINITIONS

A. Topsoil: Topsoil is defined as friable loam surface soil found in a depth of not less than 3". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots and other objectionable material.

PART 3 - EXECUTION

3.1 PREPARATION

A. Locate and clearly flag trees and vegetation to remain during construction.

B. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to City.

3.2 CLEARING AND GRUBBING

A. The Contractor shall provide and maintain staking throughout the construction period required for accurate construction of each stage of the work, adequate for Engineers inspection.

1. Prior to commencing clearing and grubbing operations, the Contractor shall walk the job with the City Engineer in order to determine the limits of clearing & grubbing.

B. Construction

1. Remove within the excavation and fill lines all trees, except otherwise noted on contract drawings, cut off trees, and remove stumps and root systems.
2. Remove all debris as necessary within the limits of construction indicated.
3. Dispose of all timber, stumps, woodchips and vegetation offsite at Contractors expense or as directed by the City.
4. Protect existing trees, shrubs, vegetation, fences etc. to remain outside the work area and within the work area not to be affected by earthwork construction activity. Protection shall include barricades, construction fencing, silt fences, and other means as ordered and approved by the Engineer and as specified herein or as indicated on the Construction Drawings. Remove protection devices once construction activity has terminated within the work area. If trees or shrubs designated to remain are removed erroneously or damaged beyond satisfactory repair, they shall be replaced with as directed by the City.
6. Conduct operations with minimum interference to public or private accesses and facilities. Maintain ingress and egress at all times and clean or sweep roadways daily as required. Dust control shall be provided with sprinkling systems or equipment provided by Contractor.

3.3 TOPSOIL STRIPPING

A. Topsoil shall consist of organic surficial soil found in depth of not less than 6-inches. Satisfactory topsoil shall be reasonably free of subsoil, clay lumps, stones and other objects over 2-inches in diameter, weeds, roots, and other objectionable material.

B. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

Remove heavy growths of grass from areas before stripping.

C. Stockpile topsoil in storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust.

1. Do not stockpile topsoil within tree protection zones.
2. Dispose of excess topsoil as specified for waste material disposal.

3. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.

3.4 SITE IMPROVEMENTS

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

3.5 DISPOSAL

A. Disposal: Remove surplus soil materials, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

1. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.6 METHOD OF MEASUREMENT

The work under this item will not be measured for payment. All work shall be considered on a lump sum basis.

3.7 BASIS FOR PAYMENT

Monthly payments will be made in proportion to the amount of work done. The Unit Price (Lump Sum) for "Clearing & Grubbing" shall include all the work as described above and which may be necessary to complete the project and all materials, tools, equipment and labor incidental to or necessary for clearing & Grubbing.