

ATTACHMENT 1
TECHNICAL SPECIFICATIONS

SECTION 32 31 00

FENCES AND GATES

PART 1 – GENERAL

1.01 WORK INCLUDED:

Under this Section, the Contractor shall furnish all necessary labor, materials, equipment, transportation and services necessary to install new fence/gate and/or remove and salvage existing fence/gate as specified herein, as shown the drawings, or both.

1.02 RELATED WORK:

Carefully examine all the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but not limited to the following:

A. Section 31 23 00 – EARTHWORK

1.03 QUALITY ASSURANCE:

- A. Installer must review installation procedures of all fencing and sequence of Work with the General Contractor to ensure proper coordination with other subcontractors and suppliers whose work is affected by the delivery schedule and installation of fencing.
- B. Installation shall be done by a contractor and crew whose sole expertise is installation of Fencing and Gates, and with at least five years' experience installing fencing on projects of similar size and scope.
- C. The Contractor shall conform to all local, state licensing and bonding requirements.
- D. The Contractor shall contact Dig-Safe a minimum of 72 hours prior to commencing excavation work.
- E. The Contractor shall obtain an excavation permit from the City of Portsmouth prior to commencing excavation work within the City Right-of-Way or on City property.
- F. The company and/or crew installing the fencing shall be certified by the American Fence Association and demonstrate expertise in current industry standards.

1.04 REFERENCES:

- A. The following standards, latest revision thereof, form a part of this specification as referenced:

American Society for Testing and Materials (ASTM)

ASTM A116 Standard Specification for Metallic-Coated, Steel-Woven Wire

		Fence Fabric
ASTM	A121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM	A392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM	A491	Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM	B211	Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire
ASTM	F537	Standard Specification for Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials

American Association of State Highway and Transportation Officials (AASHTO)

ASTM	M111	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings On Iron and Steel Products
ASTM	M133	Standard Specification for Preservatives and Pressure Treatment Process for Timber
ASTM	M181	Standard Specification for Chain-Link Fence
ASTM	M232	Standard Specification for Zinc-Coating (Hot-Dip) on Iron and Steel Hardware
ASTM	M281	Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought

1.05 SUBMITTALS:

- A. Manufacturer's Product Data: Manufacturer's product data shall consist of manufacturer's scale drawings, cuts or catalogs including descriptive literature and complete characteristics and specifications, and code requirements. The Contractor shall clearly identify on the manufacturer submittal what items are being submitted.
- B. Fence Material – Contractor shall provide visual cut sheets or provide examples of previous installations of similar style and type fence nearby for the City to review and approve prior to ordering materials.
- C. Hardware – Contractor shall submit samples of hardware to be used for approval.

PART 2 – PRODUCTS

2.01 TIMBER FENCE: All timber materials for new fencing shall be as indicated on the Drawings.

- A. Timber: Unless otherwise specified on the Drawings, all wood products shall be Cedar Grade 1 (Select) or better.
- B. Metal: All metal materials including but not limited to, posts, fasteners, hardware, etc. shall be galvanized.

- C. Horizontal Rails: Wood stockade fences shall have a minimum of three horizontal 2x4 rails evenly spaced.
- D. Vertical wood fence boards or pickets shall be a minimum of 1 inch in thickness.
- E. Post Minimum Requirements:
 - I. Fence Height up to and including 6 feet – Posts shall be either 4x4 timber or 2-3/8” SCH-40 steel pipe. Posts shall be embedded into the ground a minimum of 36”.
 - II. Fence Height greater than 6 feet - Posts shall be either 6x6 timber or 2-7/8” SCH-40 steel pipe. Posts shall be embedded into the ground a minimum of 42”.
 - III. All metal posts shall be encased in a 12” (minimum) diameter concrete pier.

2.02 CHAIN-LINK FENCE:

- A. Chain-Link Fabric: Fabric and all required fittings and hardware shall conform to the requirements of AASHTO M181 for the kind of metal, size of wire and mesh specified. Zinc coating for steel fabric shall conform to ASTM A392, Class I and aluminum coating for steel fabric to ASTM A491, Class I.
- B. Unless otherwise specified, fencing material shall be 9 gauge, 2” mesh, Type II or Type IV fabric. The specific diameter for Type IV fabric is the metallic coated diameter and the PVC coating shall not be used when determining wire size. All vinyl-coated fabric used in the project shall be the same shade of color called for on the Drawings.
- C. Fabric up to and including 60” in height shall be knuckled at the top and bottom selvages. Fabric over 60” in height shall be twisted and barbed on the bottom selvage and knuckled on the top selvage.
- D. Tension bands shall not be less than 0.25 by 0.75” with a maximum spacing of 12” on center. Bottom tension wire shall be 7 gage (minimum).
- E. Wire ties and clips for fastening fabric to posts and top rail shall be of the same material and the same or larger gauge as the fabric. Wire ties at top rail shall be spaced evenly with a minimum of 5 ties between posts.
- F. Top rail shall be a minimum of 1-5/8” diameter (O.D.) with a wall thickness of 0.047”.
- G. Post Minimum Requirements:
 - I. Fence Height up to and including 6 feet – Terminal Post shall be 2-3/8” diameter (O.D.) with a wall thickness of 0.110”. Terminal post shall be embedded into the ground a minimum of 36” encased in a 10” (minimum) diameter concrete pier. Line Post shall be 1-7/8” diameter (O.D.) with a wall thickness of 0.065”. Line post shall be embedded into the ground a minimum of 24” encased in a 8” (minimum) diameter concrete pier.
 - II. Fence Height greater than 6 feet - Terminal Post shall be 2-7/8” diameter (O.D.) with a wall thickness of 0.160”. Terminal post shall be embedded into the

ground a minimum of 42" encased in a 12" (minimum) diameter concrete pier. Line Post shall be 2-3/8" diameter (O.D.) with a wall thickness of 0.095". Line post shall be embedded into the ground a minimum of 36" encased in a 10" (minimum) diameter concrete pier.

- 2.03 WOVEN WIRE: Woven wire shall conform to the details and requirements shown in the DRAWINGS and to the following:
- A. Zinc-coated steel woven wire shall conform to the requirements of ASTM A116, Coating Class I.
 - B. Aluminum-coated steel woven wire shall conform to the requirements of ASTM A116, Coating Class I.
 - C. Fittings and attachments shall be zinc coated to conform to the requirements of AASHTO M232M/M232.
- 2.04 SNOW FENCE: Wire-bound picket fence shall conform to the requirements of ASTM F537. Posts shall conform to the requirements of AASHTO M281.
- 2.05 CONSTRUCTION FENCE: Construction fence shall be bright orange woven plastic mesh, four feet (4') minimum in height. Mesh shall be supported by 2"x2" wood post hammered into the ground a minimum of 18". Posts shall be provided every six feet (6') minimum.
- 2.06 FENCE POSTS:
- A. Wood posts shall conform to the details and dimensions shown on the Drawings and Details. Wood post shall be straight, sound, and seasoned with ends sawed off square or as indicated. All knots shall be trimmed flush with the surface. Wood posts shall be peeled and treated with preservatives in accordance with AASHTO M133. When native cedar posts are called for on the Drawings, the requirements for peeling and for treating may be omitted.
 - B. All dimension timber and lumber required for fences or gates shall be sound, straight, and free from knots, splits, and shakes. It shall be of the species and grades indicated on the Drawings.
 - C. Concrete posts shall be made of concrete of the class specified and shall contain steel reinforcement as shown on the Drawings.
 - D. Steel posts shall be galvanized in accordance with AASHTO M111M/M111. Fittings, hardware, and other appurtenances not specifically covered by the Drawings and Specifications shall be standard commercial grade, and in accordance with current standard practice. Pipe material for fence posts shall conform to the requirements shown on the Drawings and the requirements of Class 1 Pipe, Grade A or Grade B, of FED FCGS-02-01.
 - E. Construction fence posts shall be 2"x2" wood post hammered into the ground a minimum of 18". Posts shall be provided every six feet (6') minimum.

- 2.07 HARDWARE: Unless otherwise shown on the Drawings, all hardware, fasteners, etc. shall be galvanized.

PART 3 – EXECUTION

3.01 REMOVAL OF EXISTING FENCE:

- A. All portions of the fence shall be removed (including, but not limited to: rails, braces, posts, fabric, gates, hardware, backfill, etc.) and disposed of or salvaged by the Contractor to the extent shown in the Drawings.
- B. Post removal shall include the removal of any concrete footing / foundation at the post.
- C. Contractor shall place compacted gravel as backfill for post holes created during removal.

3.02 CONSTRUCTION OR REPLACEMENT OF FENCE:

- A. Clearing and Grubbing: The Contractor shall perform such clearing and grubbing as may be necessary to construct or replace the fence to the required grade and alignment as shown on the Drawings.
- B. Breaks in Fence: At locations where breaks in a run of fencing are required, appropriate adjustments in fence alignment and/or post spacing shall be made to satisfy requirements or conditions encountered.
- C. Alignment: Posts shall be installed plumb, firm and to the required grade, spacing and alignment shown in the Drawings. Post shall be placed within 1/2" of the alignment line.
- D. Posts (Concrete Embedment): When specified in the Drawings, the posts shall be embedded in concrete to the size and depths shown. Posts and rails shall be held in proper positions by secure bracing until such time as the concrete has set sufficiently to hold the posts. Minimum 3 days.
- E. Materials shall not be installed on posts, or stress placed on bracing until the posts have been backfilled and compacted or concrete (3 days minimum) has set sufficiently to withstand the stress.
- F. When new fence is to connect to an existing fence, the new fence shall be permanently connected to the existing fence.
- G. The portions of aluminum posts which will be in Contact with concrete shall be coated both inside and outside with protective coating to 1" above the top of concrete. The coating shall be allowed to dry for at least 24 hours prior to concrete placement.
- H. At locations where an electric transmission, distribution, or secondary line crosses any of the types of metal fences covered by these specifications, the fence shall be grounded as required by the electric utility company. Such grounding is considered incidental to the pay item.

- I. The Contractor shall notify the Engineer when rock has been encountered that will not provide the required depth on the posts.
- J. All holes within 2 feet of the fence shall be filled in with suitable approved material and compacted properly.

3.03 WOOD FENCE:

- A. The fence shall be erected so that the bottom is between 1" and 2" above the ground.
- B. The fence panels shall follow the grade, stepping up/down of panels will not be allowed without prior written approval from the Engineer.

3.04 CHAIN LINK FENCE:

- A. The fence shall be erected so that the bottom is between 1" and 2" above the ground.
- B. The top rail shall pass through the post tops to form a continuous brace from end to end of each section of fence and shall be securely fastened to the posts at post assemblies by suitable clamps.
- C. Post assemblies as shown on the Drawings shall be installed at ends, at corners or changes in line where the angle of deflection is 30-degrees or more, at abrupt changes in vertical grades where pull posts are required, and at gates. Moreover, at least one post assembly shall be installed every 500 feet of run.
- D. Braces shall be spaced approximately midway between the top and the ground and extend to the first line post. Braces shall be securely fastened to posts by suitable clamps.
- E. Truss rods shall be installed as shown on the Drawings.
- F. Unless otherwise shown on the Drawings, when barbed wire is required, arms shall be installed outward.
- G. Fabric shall be fastened to the post with suitable fabric bands, stretcher bar bands, and hook bolts and to the top rail with tie wires as shown on the Drawings. The fabric shall be free from sags and bends.

3.05 CONSTRUCTION FENCE:

- A. Construction fence posts shall be installed at six feet (6') on center and the plastic mesh be attached to each post at top, bottom, and center using plastic ties. Construction fencing shall be installed along the limits of disturbance and shall remain in place throughout construction. The Contractor is required to maintain the construction fence for the duration of the Project and must make repairs within 24 hours when deficiencies are identified by the Engineer.

PART 4 – PAYMENT

4.01 METHOD OF MEASUREMENT:

- A. Fence shall be measured by the Linear Foot to the nearest 0.1 foot inclusive of end posts.
- B. Gates shall be measured by the Linear Foot to the nearest 0.1 foot exclusive of the posts on either side of the gate.

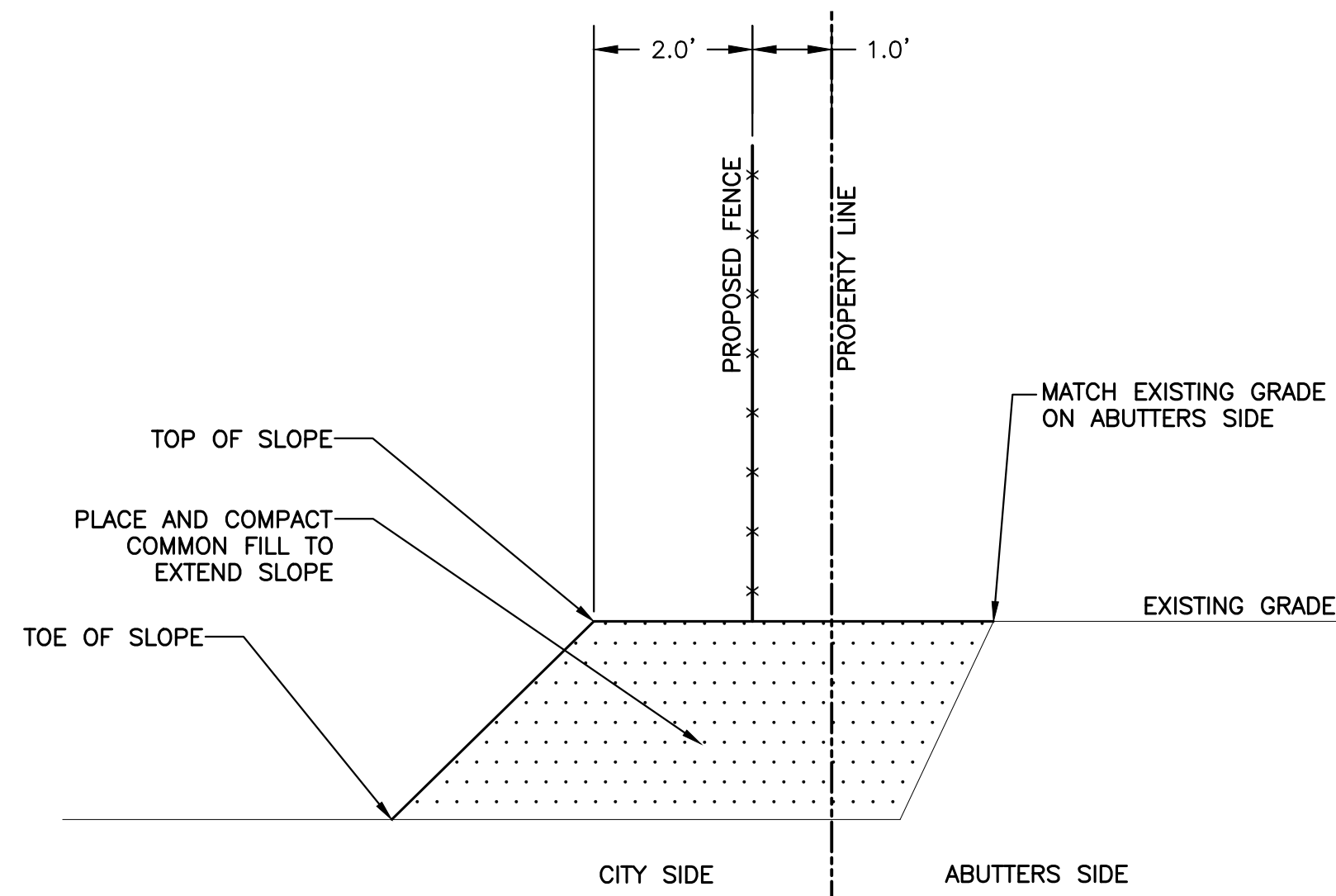
4.02 BASIS OF PAYMENT:

- A. Installation fence and gates shall include all labor, supplies, materials, equipment necessary to construct complete fence system to the extents and details shown on the Drawings. This shall include, but not limited to, clearing/grubbing, excavation, posts and post supports, concrete and reinforcing, rails, fabric, and hardware.
- B. Removal of Existing Fence shall be paid at the Contract unit price.
- C. New Fence shall be paid the Contract unit price complete in place for the material, height specified.
- D. New Gates shall be paid the Contract unit price complete in place for the material, height specified.

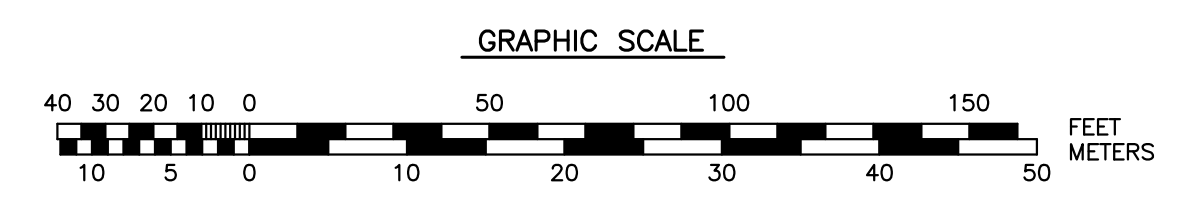
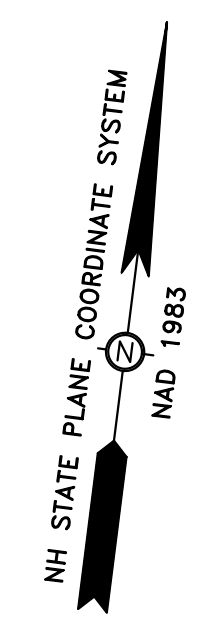
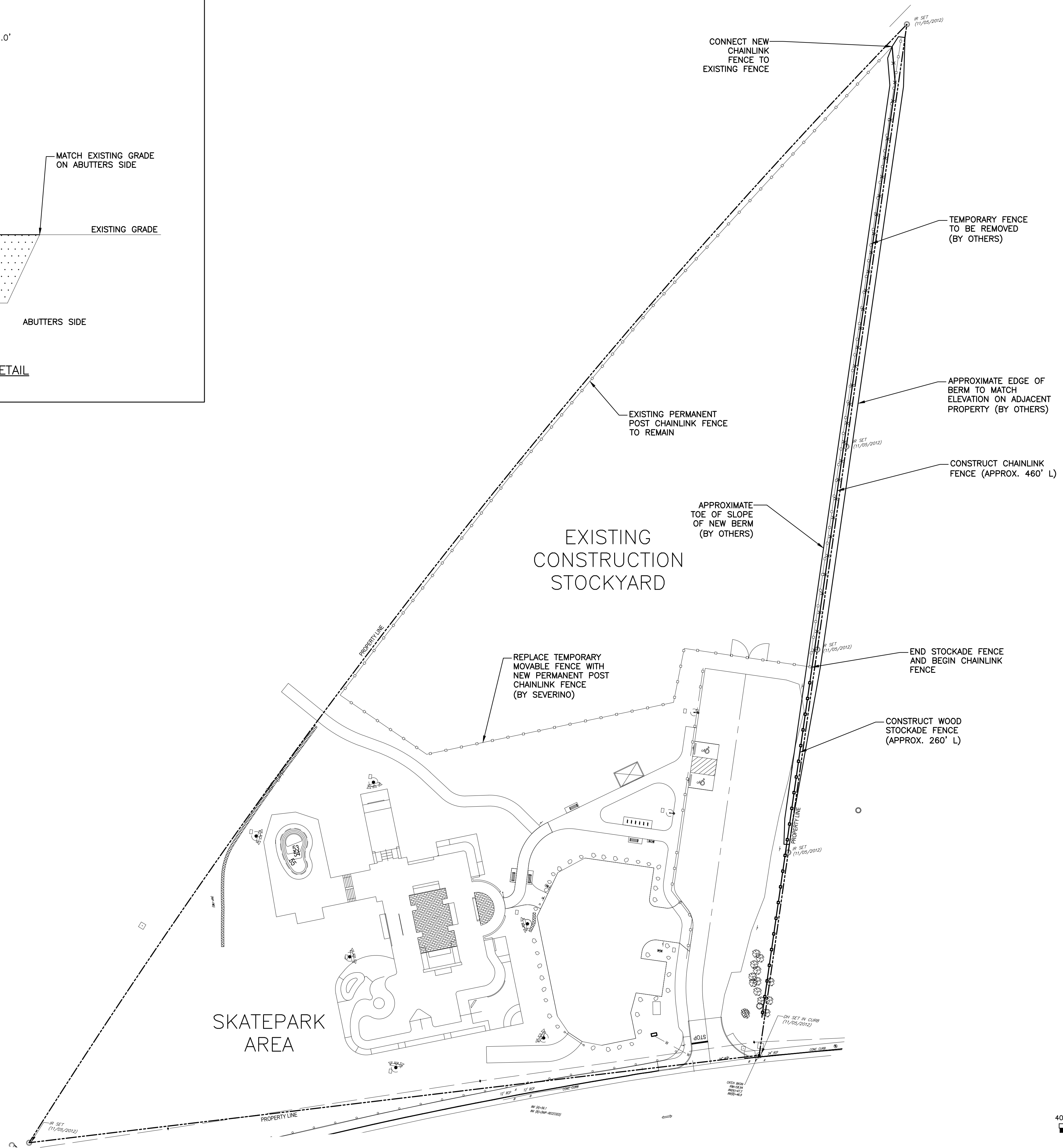
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ATTACHMENT 2
PROJECT PLANS AND DETAILS



BERM / FENCE DETAIL
SCALE: N.T.S



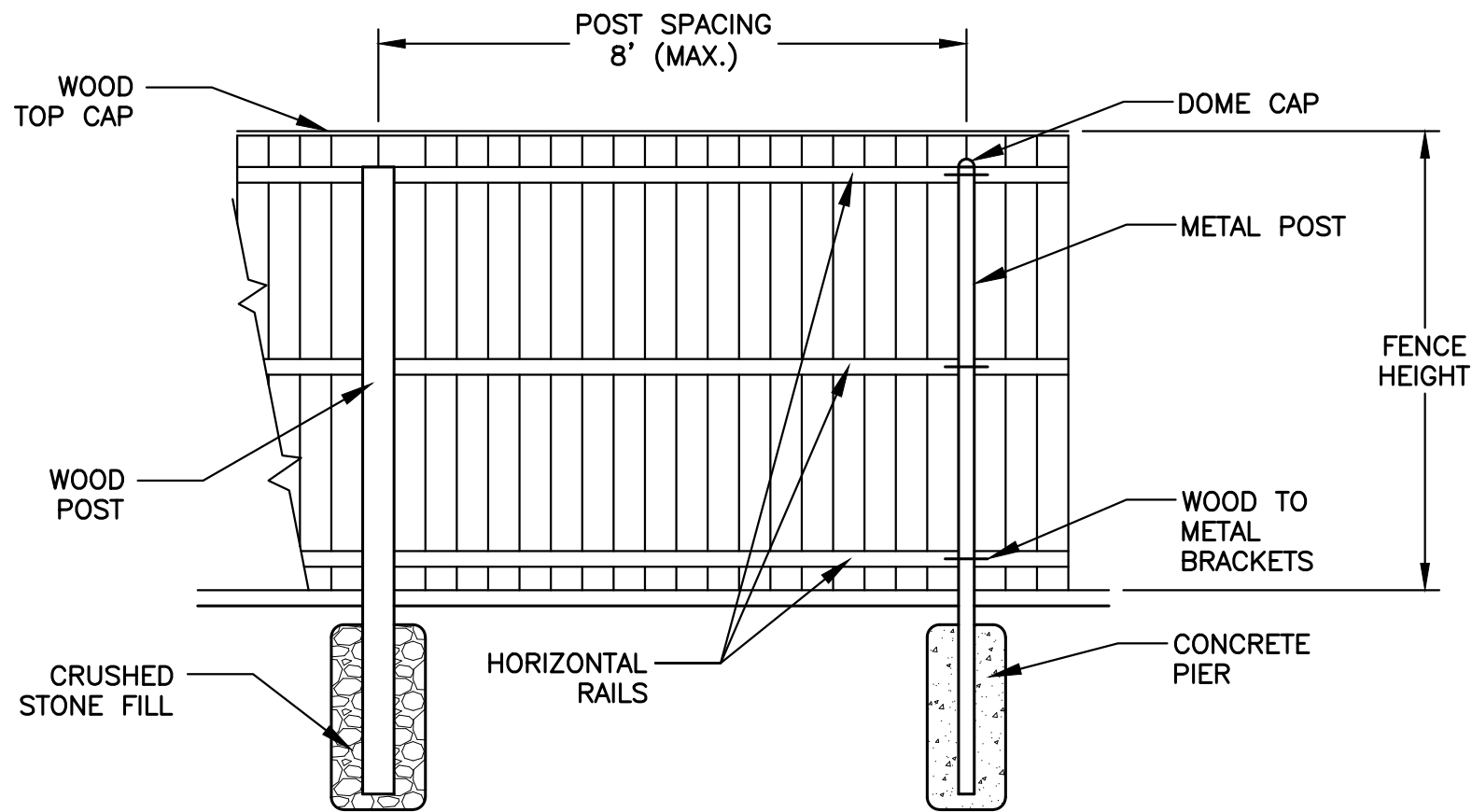
NO.	0	ISSUED FOR BID	MRB	07/15/24
REVISIONS				DATE

DEPARTMENT OF
PUBLIC WORKS
CITY OF PORTSMOUTH, NH
680 PEVERLY HILL ROAD
603-427-1530



DATE: MARCH 6, 2024
SCALE: AS SHOWN
PROJ. NO.: 1195
APVD BY: MRB

PROJECT: 305 GREENLAND ROAD
TITLE: PROPOSED FENCING PLAN
SHEET: C-104



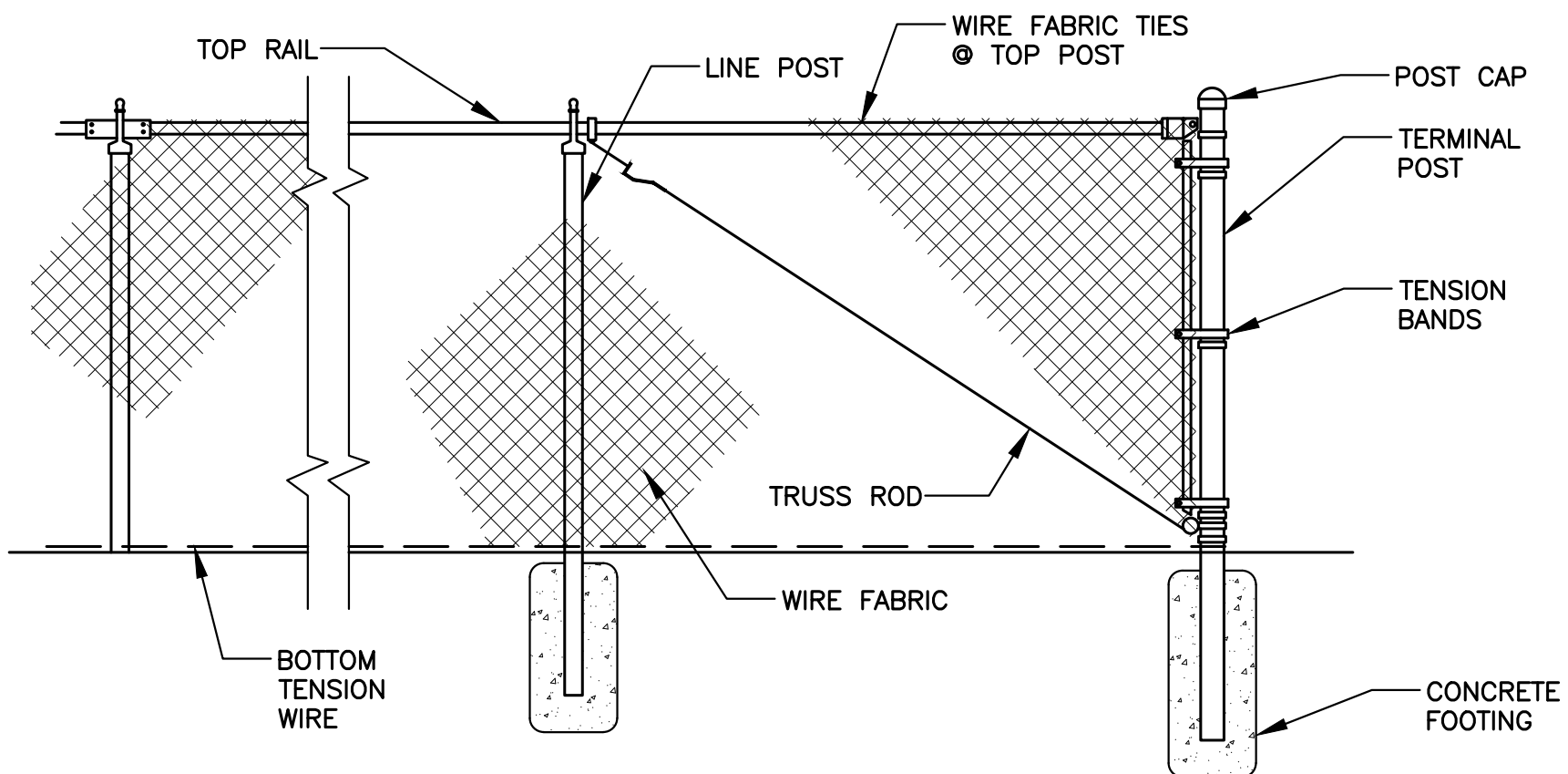
NOTES:

1. REFER TO SPECIFICATION SECTION 32 31 00 FOR ALL REQUIREMENTS OF MATERIALS AND CONSTRUCTION OF THE FENCE.
2. CONCRETE FOOTING (PIER) SHALL BE 3000psi (MIN).
3. REFER TO BID DOCUMENTS FOR VERTICAL BOARD STYLE (I.E. T&G, FLAT, ROUGH OR SMOOTH, ETC.)

WOOD STOCKADE FENCE
SCALE: N.T.S

REFERENCES:
SPEC SECTION: 32 31 00
SPEC SECTION:
SPEC SECTION:
DETAIL:
DETAIL:

DEPARTMENT OF
PUBLIC WORKS
CITY OF PORTSMOUTH, NH
680 PEVERLY HILL ROAD
603-427-1690



NOTES:

1. REFER TO SPECIFICATION SECTION 32 31 00 FOR ALL REQUIREMENTS OF MATERIALS AND CONSTRUCTION OF THE FENCE.
2. CONCRETE FOOTING (PIER) SHALL BE 3000psi (MIN).
3. REFER TO BID DOCUMENTS FOR SCREENING, COATINGS AND OTHER FINISHES.

CHAINLINK FENCE
SCALE: N.T.S

DATE: 07/15/2024
SCALE: NONE
PROJ. NO.: N/A
APVD BY: MRB

PROJECT:
CITY OF PORTSMOUTH
STANDARD DETAILS

TITLE:
FENCE DETAILS

SHEET:
L-001