

Addendum #1

Date Jan 5, 2024

BSPARK PROJECT NO.: 22045

PROJECT TITLE: **Great Falls Police Department Evidence Expansion**

112 1st Street South

Great Falls, MT

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated, 12 Dec. 2023 as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of 3 pages, and includes 7 attachments as outlined herein, for a total of 34 pages.

A. CHANGES TO PRIOR ADDENDUM

1. None

B. CHANGES TO BIDDING REQUIREMENTS

1. **CHANGE** Bid Date FROM 17 Jan 2024 TO **23 Jan 2024 @ 3:00pm**.
2. **REPLACE** Invitation to Bid in its entirety.
 - a. Pay particular attention to items highlighted in **RED**

C. CHANGES TO AGREEMENT AND OTHER CONTRACT FORMS:

1. **CHANGE:** 3. Time of Performance: FROM 450 calendar days **TO 360 calendar days**.
2. **ADD:** 15. Representatives, a. City's Representative - fill blank to read: Keith Ballantyne, BSPARK Architecture.
3. **CHANGE:** 15. Representatives, b. Contractor's Representative - REMOVE Keith Ballantyne, BSPARK Architecture and infill with Contractor's Representative.
4. **REVISE:** Exhibit C, Construction Schedule - "The Bidder proposed and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and shall fully complete the Work within **360 calendar days. Should final completion be delayed due to long-lead time items, all other work will be completed within the designated performance period.**
5. **REVISE:** Exhibit G - Required Insurance Coverage - **OMIT** requirement for line item #6. Professional Liability (E&O)

D. CHANGES TO THE CONDITIONS OF THE CONTRACT

1. None.

E. CHANGES TO SPECIFICATIONS

1. **ADD:** CSI 1.5C Substitution Form - to be used and included in all substitution request applications.
2. **ADD:** Section 08 9100 - Roof Screen Louver
3. **ADD:** Section 10 8213 - Roof Screens
4. **REVISE:** Section 10 5613 - Metal Storage Shelving, subsection 2.02 Four Post Shelving, A.2 - REVISE Shelf Capacity FROM 50 psf **TO 10 psf.**
5. **REVISE:** Section 10 5613 - Metal Storage Shelving: **REMOVE** Subsection 2.02 - C. Bracing: Formed Sheet Members and all sub-sub sections.

F. CHANGES TO DRAWINGS

1. None

G. PRIOR APPROVALS

1. **NOTE ON PRIOR APPROVALS:** Products from the following manufacturers have been reviewed as being equal to the specified items. The Contractor and supplier shall be responsible for fit, function, capacities and all other requirements in the contract documents for these products. Individual products must still meet the requirements in the plans and specifications and will be reviewed during the submittal process.
2. **ROOFING MEMBRANE:** Versico Roofing Systems, VersiFlex PVC, 60 mil.
3. **VARIOUS MECHANICAL:**
 1. Section 23 3113 - Metal Ducts: L&L Fabrication is an approved manufacturer
 2. Section 23 5534 - Gas-Fired Radiant Heaters: Roberts Gordon is an approved manufacturer.
 3. Section 23 7313 - Rooftop Units: JCI is an approved manufacturer
 4. Section 23 8231 - Electric Heaters: Indeeco is an approved manufacturer.
4. **LIGHTING:**
 1. Fixture types L1 & L3 - Prudential is an approved manufacturer.
 2. Fixture types U1 - QTran is an approved manufacturer.
 3. Fixture types B1 & B2 - DayBrite is an approved manufacturer.
 4. Fixture type D1, D2 & D2E - HE Williams is an approved manufacturer.
 5. Fixture type E2 - Stonco and Industrial Lighting are approved manufacturers
 6. Fixture type EL - Chloride is an approved manufacturer.
 7. Fixture type EM - Lightalarms is an approved manufacturer.
 8. Fixture type F1 - HE Williams is an approved manufacturer.
 9. Fixture type F1E - HE Williams is an approved manufacturer.
 10. Fixture type G1 - Sunpark is an approved manufacturer.
 11. Fixture type P1 - Gardco and KW Industries are an approved manufacturer
 12. Fixture type P3 - HE Williams is an approved manufacturer.
 13. Fixture type X1 - Lightalarms is an approved manufacturer



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14. **Fixture SD** - Philips Controls is an approved manufacturer

15. **Fixtures OS, PP, SOS, SOSD, & LCP** - Creston Lighting is an approved manufacturer.

H. ADDITIONAL REQUIREMENTS/ITEMS

1. **CIVIL** - attached are revised drawings, specifications and "Addendum 1 Civil Revisions" to be included as part of this addendum.

SECTION 00100

INVITATION TO BID

Separate sealed bids for construction of the **GREAT FALLS POLICE DEPARTMENT EVIDENCE ROOM EXPANSION** will be received by the City Clerk at the office of the City Clerk, Room 204, Civic Center, P.O. Box 5021, #2 Park Drive South, Great Falls, Montana 59403, until **3:00 p.m.** mountain standard time on ~~JANUARY 17, 2024~~ **JANUARY 23, 2024** and then publicly opened and read aloud thereafter in the **Rainbow** Conference Room at the Great Falls Civic Center.

The Project **GFPD EVIDENCE ROOM EXPANSION** comprises an addition to the South end of the existing Police Department building. The building will exist independent of the existing building but will have connections for access. The work comprises all trades and disciplines, including site/civil/limited utility work, including site lighting, concrete foundations, slabs, walks and curbs, asphalt paving and landscaping. The building is steel-framed construction with bar-joint upper floor framing with concrete slab, steel stairs and metal stud partitions. Exterior finishes are masonry and pre-finished metal panels over continuous insulation. Mechanical, electrical, plumbing and IT/security work is included. Finishes include limited areas of suspended acoustical panel ceilings/lighting with the remaining being painted exposed structure/systems.

Contract documents, consisting of a Project Manual and Drawings, may be examined or obtained at the Great Falls Builder's Exchange and other State and area plans exchanges. Contractors interested in bidding are required to obtain a copy of the Project manual from the City of Great Falls Finance Department, Suite 104, Civic Center, 2 Park Dr. Great Falls, MT. Required Deposit is **\$145.00** per set, which is not refundable.

There will be a **Pre-Bid conference** in the **Rainbow** Room, Civic Center, #2 Park Dr. So., Great Falls, MT at **10:00 a.m on January 9, 2023**, followed by a site visit. Interested CONTRACTORS are encouraged to attend.

CONTRACTOR, and any of the CONTRACTOR'S subcontractors doing work on this project, will be required to obtain registration with the Montana Department of Labor and Industry (DLI). Forms for registration are available from the Department of Labor and Industry, P.O. Box 8011, 1805 Prospect, Helena, Montana 59604-8011. Information on registration can be obtained by calling 1-406-444-7734. CONTRACTOR is not required to have registered with the DLI prior to bidding on this project, but CONTRACTOR and subcontractors must have registered prior to execution of the Construction Agreement. All laborers and mechanics employed by the CONTRACTOR, or subcontractors in performance of the construction work, shall be paid wages at rates as may be required by the laws of the City of Great Falls and the State of Montana. The CONTRACTOR must ensure that employees, and applicants for employment, are not discriminated against because of their race, color, religion, sex or national origin.

Each bid, or proposal, must be accompanied by a Certified Check, Cashier's Check, or Bid Bond payable to City of Great Falls, in an amount not less than ten percent (10%) of the total amount of the bid. Successful BIDDERS, shall furnish an approved Performance Bond and Labor and Materials Payment Bond, each in the amount of one hundred percent (100%) of the contract

amount. Insurance, as required, shall be provided by the successful BIDDER(s) and a certificate(s) of that insurance shall be provided. Contractor, and all subcontractors, must be licensed to perform work in the City of Great Falls prior to contract award.

No bid may be withdrawn after the scheduled time for public opening of bids, which is **3:00 p.m.** Mountain Standard Time on ~~January 17, 2024~~ **JANUARY 23, 2024**.

The right is reserved to reject any or all proposals received, to waive informalities, to postpone the award of the contract for a period not to exceed sixty (60) days, and to accept the lowest responsive and responsible bid, which is in the best interest of the City.

The City of Great Falls is an Equal Opportunity Employer.

Published at Great Falls, Montana, this 17th day of December 2023.

Lisa Kunz, City Clerk
P.O. Box 5021
Great Falls, Montana 59403-5021

(1st Publication): **December 20, 2023**
(2nd Publication): **December 27, 2023**
(3rd Publication): **January 3, 2024**
(4th Publication): **January 10, 2024**

END OF SECTION 00100



SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: _____ Substitution Request Number: _____

From: _____

To: _____ Date: _____

A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

**SECTION 089100
ALUMINUM LOUVERS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aluminum louvers as shown on the Drawings and as specified herein, including but not necessarily limited to the following:
 - 1. Continuous blade type, architectural vision louvers.
 - 2. Concealed snap-in support clips and accessories.
 - 3. Factory-applied finish system to louver blades.
 - 4. Field measurements and verification of all openings and all conditions of the louver installations.

1.2 RELATED SECTIONS

1.3 REFERENCES

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. ASTM B 449 - Standard Specification for Chromates on Aluminum.
- E. ASTM D 1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
- F. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
- G. ASTM D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

1.4 COORDINATION

- A. Coordinate Work with other operations and installation of roofing materials to avoid damage to installed insulation and membrane materials.

1.5 ACTION SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00:
 - B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Load tables showing louver span capacities.
 - 3. Storage and handling requirements and recommendations.

4. Installation methods.

C. Shop Drawings:

1. Layout and erection drawings showing typical cross sections and dimensioned locations of all louver blades, trees, splices and corners. Include erection drawings, elevations, and details where applicable.

D. Selection Samples:

1. For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- B. Warranties: 3 signed copies of the following:
 1. Louver Units including paint finish.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing architectural louver systems.
- B. Provide aluminum louvers in strict accordance with state and local building codes and ordinances and conforming to applicable wind load factors relative to framing and anchorage.
- C. Provide factory-applied finish aluminum system in accordance with AAMA 2605 for Superior Performance Organic Coatings on Architectural Extrusions and Panels.

1.8 DELIVERY, HANDLING AND STORAGE

- A. Deliver louver components to the project site clearly marked for proper identification.
- B. Receive, handle and store materials in conformance with the manufacturers printed instructions.
- C. Store louver components in accordance with manufacturer's instructions, above ground, in dunnage and protected from weather, construction activities and other causes of damage or loss.
- D. Handling: Use a forklift or crane to move material. Do not lift the bundles by the metal bands.
 1. Fork Lift: Spread the forks as far as possible to balance the load. Drive slowly when moving long bundles over uneven surfaces to avoid tipping the load
 2. Crane: Position the canvas sling straps so that the space between the straps is at least 1/3 the length of the bundle. Use sling straps with looped ends running one end of the strap through the loop at the other end to cinch the bundle when lifted. When setting the load on the roof, put wood blocks under it to protect the roof and allow space to remove the sling straps.
 3. Roof Placement: Spread the bundles and crates out as much as possible to avoid overloading the roof structure. Place the material directly over major supports such as beams or trusses.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 WARRANTY

- A. Louvers:
 - 1. Provide written warranty, stating that the louvers, exclusive of paint finish, will be free of faults and defects for a period of twenty (20) years.
 - 2. Provide warranty signed by the louver manufacturer and installing contractor.
- B. Paint Finish:
 - 1. Provide written warranty stating that the paint finish applied on all louver components will retain its film integrity, color and chalk as defined by AAMA 2605 for a period of twenty (20) years.
 - 2. Provide warranty signed by the louver manufacturer and paint finish applicator (if separate from manufacturer).
- C. The above warranties are in addition to, and not a limitation of, other rights the Owner may under the Contract Documents.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design Loads: Comply with Building Code for site location and building height.
 - 1. Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures, using the latest published ASCE version.
 - 2. Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.
- B. Thermal Movement: Normal thermal movement is defined as that resulting from a 120 degrees F maximum change (range) in ambient temperature. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night time sky heat loss.
- C. Anchors and Connections:
 - 1. Anchors, connections and assemblies connecting the louvers and associated fabrications to the supporting construction are shown on the Drawings as suggested locations for the louver manufacturer/installer's information. The louver manufacturer/installer is responsible for the structural design and placement of the connections and anchors, including all connecting hardware, accessories and reinforcing necessary for fabrication, and installation of the louvers and associated fabrications.

2. The louver manufacturer is to notify the Architect in writing prior to the submittal of shop drawings of any changes in the proposed locations of connections and anchors.
3. The Architect's review of shop drawings is not to be construed as removing responsibility from the louver manufacturer/installer for structural failures related to design, fabrication, installation, and fabrication services.

2.2 MANUFACTURERS

- A. Acceptable Manufacturer: RoofScreen Mfg., which is located at: 347 Coral St. ; Santa Cruz, CA 95060; Toll Free Tel: 866-766-3727; Tel: 831-421-9230; Fax: 866-253-0738; Email: request info (info@roofscreen.com); Web: www.roofscreen.com.
- B. Substitutions: Or approved equal.
- C. Requests for substitutions will be considered in accordance with provisions of Section 012500, Substitutions Procedures

2.3 PRODUCTS

- A. Basis-of-Design Manufacturer and Louver: RoofScreen Mfg.
 1. VisionGuard L20 Slatted Louver.

2.4 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, 6063-T6 alloy and temper.
- B. Fasteners:
 1. Provide exposed fasteners of stainless steel or carbon steel with factory applied protective coating, with finish color coating to match the finish on aluminum.
 2. Provide fasteners not exposed to view of stainless steel or carbon steel with factory applied protective coating.

2.5 FABRICATION

- A. Fabricate louvers with close-fitting, field-made splice joints in blades designed to permit expansion and contraction without deforming blades or framework and with supporting members and hardware concealed from front edges of blades so blades have continuous appearance.
- B. General:
 1. Fabricate all units to produce uniform sight lines and to be level, plumb and in same plane as adjacent panels.
 2. Accurately fabricate all joints for proper fit.
 3. Protect exposed surfaces against damage from scratches and discoloration.
- C. Louvers:
 1. Fabricate continuous blade louvers from minimum 0.1 inch thick extruded aluminum to shapes and configurations shown on the Drawings.
 2. Provide support clips from minimum 0.125 inch thick extruded aluminum to comply with specified performance criteria and manufacturer's fabrication procedures and standards.

3. Provide vertical supports (“trees”) from minimum 3 inch by 3 inch by 0.188 inch thick extruded aluminum angles to comply with specified performance criteria and manufacturer's fabrication procedures and standards, at spacings not further apart than recommended by manufacturer.
 4. Corners:
 - a. Provide inside and outside corners fabricated from 6 inch by 6 inch by 0.100 inch thick aluminum trim, painted to match louver blades, to be fastened with exposed fasteners.
- D. Provide all accessories and materials for fabrication, assembly and installation required to provide a complete and warranted louver installation.

2.6 FINISH OF ALUMINUM

- A. Provide all louver members and accessories free of scratches and serious blemishes affecting the finish system.
- B. Fluoropolymer Paint Finish: Factory finish all louver members, trims and mitered corners with thermoset fluoropolymer paint system in accordance with the manufacturer's printed requirements and performance specifications and the AAMA specification Ref. AAMA 2605 for Superior Performance Organic Coatings on Aluminum Extrusions and Panels.
- C. Color selection will be made by the Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine all surfaces to receive parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Installation of louvers constitutes acceptance of the existing conditions.

3.2 INSTALLATION

- A. Set all items in their correct locations as shown on the final reviewed shop drawings, level, square, plumb and at proper elevations and in alignment with other work.
- B. Assemble and anchor the various components to allow for expansion and contraction, maintaining a watertight installation.

3.3 CLEANING & PROTECTION

- A. After erection, protect exposed portions of the louvers from damage.
- B. Just prior to final acceptance, remove protective coverings and clean surfaces with plain water or if required, with a solution as recommended by manufacturer of finish coating system.
- C. Touch up finish coat system of all imperfections as recommended by manufacturer of finish coating system.

- D. Remove and replace any component that cannot be successfully repaired at no additional cost to the Owner.

END OF SECTION

**SECTION 10 8213
ROOF SCREENS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Stand-alone roof equipment screens and supporting steel framework. Screens shall be designed to attach to the roof structure and not the equipment being screened.
- B. Roof screen accessories.

1.2 REFERENCES

- A. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- B. ASTM A 513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
- C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM A 787 - Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing
- F. ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- G. ASTM A 1057 - Standard Specification for Steel, Structural Tubing, Cold Formed, Welded, Carbon, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- H. ASTM B 749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
- I. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing.
- J. ASTM D 6878 - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing.
- K. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- L. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- M. AWS D1.1 - Structural Welding Code - Steel.
- N. AWS D1.6 - Structural Welding Code - Stainless Steel.

1.3 COORDINATION

- A. Coordinate Work with other operations and installation of roofing materials to avoid damage to installed insulation and membrane materials.

1.4 ACTION SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Layout and erection drawings showing typical cross sections and dimensioned locations of all frames and base supports. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing pre-manufactured metal-framed equipment screens.
- B. Design Qualifications: Provide structural design calculations stamped by a professional engineer licensed in the state in which this project is located.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site clearly marked for proper identification.
- B. Receive, handle and store materials in conformance with the manufacturers printed instructions.
- C. Store products under cover, in manufacturer's unopened packaging until ready for installation.
- D. Protect materials from exposure to moisture.
- E. Store materials in a dry, warm, ventilated weathertight location.
- F. Protect metal fabrications from damage by exposure to weather.
- G. Handling: Use a forklift or crane to move material. Do not lift the bundles by the metal bands.
 - 1. Fork Lift: Spread the forks as far as possible to balance the load. Drive slowly when moving long bundles over uneven surfaces to avoid tipping the load
 - 2. Crane: Position the canvas sling straps so that the space between the straps is at least 1/3 the length of the bundle. Use sling straps with looped ends running one end of the strap through the loop at the other end to cinch the bundle when lifted. When setting the load on the roof, put wood blocks under it to protect the roof and allow space to remove the sling straps.
 - 3. Roof Placement: Spread the bundles and crates out as much as possible to avoid overloading the roof structure. Place the material directly over major supports such

as beams or trusses.

4. Position bundles of tubing parallel to the slope of the roof and block prior to opening to prevent the tubing from rolling down the roof slope when unbundled.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Verify roof screen dimensions and conditions of the installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating equipment enclosure without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Framing System: Provide manufacturer's standard written limited warranty stating that the complete framing system shall be warranted against structural failure due to cracking, buckling, bending, tearing or corrosion arising under normal use and environmental conditions for the coverage period applicable.
 1. Products installed on projects located 2 miles or greater from salt or brackish bodies of water shall be warranted for twenty (20) years
 2. Products installed on projects located greater than 1 mile but less than 2 miles from salt or brackish bodies of water will be warranted for five (5) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years.
 3. Products installed on projects located 1 mile or less from salt or brackish bodies of water will be warranted for three (3) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years
- B. Panel Finish:
 1. Provide written warranty stating that the paint finish applied on all equipment enclosure panels will be warranted against chipping, peeling, cracking, fading, or blistering for the coverage period of twenty (20) years.
 2. Provide warranty signed by the panel manufacturer and paint finish applicator (if separate from manufacturer).
- C. Louvers: Refer to Section 089100, Louvers
- D. The above warranties are in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design Loads: Comply with Building Code for site location and building height.
 - 1. Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures, using the latest published ASCE version.
 - 2. Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.
- B. Structural Design: Prepare structural design calculations for screen framing and attachment to structure including reactions at base supports for verification of roof structure by Architect.

2.2 MANUFACTURERS

- A. Acceptable Manufacturer: RoofScreen Mfg., which is located at: 347 Coral St.; Santa Cruz, CA 95060; Toll Free Tel: 866-766-3727; Tel: 831-421-9230; Fax: 866-253-0738; Email: request info (info@roofscreen.com); Web: www.roofscreen.com.
- B. Substitutions: Or approved equal.
- C. Requests for substitutions will be considered in accordance with provisions of Section 012500, Substitutions Procedures.

2.3 MATERIALS

- A. Square Base Supports: Weldments fabricated from cold rolled steel conforming to ASTM A 1008, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil baked on powder coat primer.
 - 1. Height 12 inches (305 mm).
- B. Square Base Support Extensions: Fabricated from same material and finish as base supports.
 - 1. Height 8 inches (203 mm).
- C. Square Base Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish, and fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm). Provide moment resisting adjustable connection to attach framing to base cap.
- D. Round Post Supports: 12 inch (305 mm) tall weldments fabricated from galvanized steel tube conforming to ASTM A 500 and cold rolled steel plate conforming to ASTM A36, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil shop primer to base plate and weld. Provide height adjustment with galvanized tube sleeve conforming to ASTM A 500, sized to telescope over outside of round post tube and fastened at desired height with self-drilling, self-tapping screws.
- E. Round Post Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish fabricated to slip over 2-1/2" sleeve tube allowing adjustable height when used with Round Post Support.
- F. Square PVC Roof Flashing: Fabricated from 60 mil, white, single ply PVC sheet conforming to ASTM D 4434. Provide with base flange that extends a minimum of 5 inches (127 mm) onto the roof surface on all four sides. Riser shall be tapered to allow easy fit over Square Base Supports with minimal gap at top of flashing. Hot weld all seams for water tightness.
- G. Roof Flashing: Refer to Division 07 section that specifies the roof membrane.

- H. Base Cap Gasket: EPDM with self-adhesive closed cell foam.
- I. Framing: Carbon or galvanized steel structural tubing in manufacturer's standard sizes, conforming to ASTM A 500 and/or ASTM A787 with manufacturer's standard galvanized coating conforming to ASTM A 1057. Provide with wall thickness as determined by structural calculations.
- J. Connector Fittings: Fabricated from AISI Type 304 stainless steel with mill finish.
- K. Steel Girts: Steel tube conforming to ASTM A 500 and/or A 787, with a G90 hot-dip galvanized coating.
- L. Steel Hat Channel: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating per ASTM A 1057.
- M. Hardware: Bolts, nuts and washers: 18-8 stainless steel.
- N. Self-Drilling Screws: Carbon steel with factory applied protective coating conforming to ASTM B 117 salt spray testing.
- O. Welding Materials: AWS D1.1; type required for materials being welded.
- P. Louvers: Refer to Section 089100, Louvers.

2.4 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Fabricate system components so that portions of screen can be dismantled for repairs to equipment being screened and for future roof replacement.
- F. Trim and Closures: Fabricated from 24 gauge metal and finished with the manufacturer's standard coating system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine area where work will be installed to verify the installation can be performed in accordance with the Drawings and structural calculation requirements without interference from other equipment or trades.
- B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- C. Do not begin installation until conditions have been properly prepared.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.
- D. Anchor fabrications to structure as indicated.
- E. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape to eliminate possibility of corrosive or electrolytic action between metals.
- F. Exercise care when installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes.
- G. Install flashing boots at base supports as required to provide a watertight connection. Install as recommended by the roof membrane manufacturer.
- H. Remove all protective masking from material immediately after installation.

3.4 CLEANING AND PROTECTION

- A. Remove all protective masking from framing and trim material immediately after installation. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. Maintain in a clean condition during construction.
- B. Protect installed products until completion of project.
 - 1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
 - 2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.
- C. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.
- D. Replace metal wall panels and framing members that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Addendum 1 Civil Revisions:

Plans

SHEET C1.0

- Added General Note: 22. COORDINATE FENCE ACCESS SYSTEM (KEYPAD/ CARD READER/ RADIO) WITH OTHER FACILITY SECURITY ACCESS FEATURES. SEE ITC PLANS AND SPECIFICATIONS.

SHEET C3.0

- Revised curb layout within the fence for consistent stall spacing per City Review Comments.
- Revised leaders on multiple callouts to point to feature.
- Added Infiltration/Detention Swale Detail 5/C6.1 callout per City Review Comments.
- Added callout for fence to terminate at canopy wall.
- Revised gate note at entrance canopy to clarify a standard 4' man gate.

SHEET C4.0

- Revised grading for revised curb layout within the fence for consistent stall spacing per City Review Comments.

SHEET C5.0

- Added to Note 1: COORDINATE ACCESS SYSTEM (KEYPAD/ CARD READER/ RADIO) WITH OTHER FACILITY SECURITY FEATURES. SEE ITC PLAN AND SPECIFICATIONS.

SHEET C6.0

- Added note to Detail 6/C6.0: 1. IF EXISTING PAVEMENT AND/OR BASE COURSE THICKNESS IN CITY RIGHT-OF-WAY UTILITY TRENCH AREAS IS GREATER THAN THAT SHOWN, MATCH EXISTING CONDITIONS THICKNESSES.

SHEET C6.1

- Added Infiltration/Detention Swale Detail 5/C6.1 per City Review Comments.
- Added to list of approved fence models/manufacturers in Note 1 of Detail 6/C6.1: WIREWORKS PLUS BY AMERISTAR FENCE PRODUCTS.
- Added to list of approved gate models/manufacturers in Note 1 of Detail 7/C6.1: TRANSPORT TRAVERSE MAJESTIC BY AMERISTAR FENCE PRODUCTS.

Specifications

SECTION 02820

- Added "WireWorks Plus by Ameristar Fence Products" to the list of approved fence products/manufacturers.
- Added "TransPort Traverse Majestic by Ameristar Fence Products" to the list of approved cantilever slide gate products/manufacturers.
- Revised gate operator from hydraulic operation to electric chain driven operation and added "Model HDSL24UL as manufactured by Lift Master, or approved equal" for operator product.
- Removed requirement that grounding wire connectors be exothermic welded type.

CONSTRUCTION SPECIFICATIONS

DIVISION 2 - SITE WORK SECTION 02820 ORNAMENTAL FENCES AND GATES

PART 1: GENERAL

1.1 DESCRIPTION

- A. This section covers the construction of ornamental fence and gates in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Construction Drawings.

1.2 SUBMITTALS

- A. Submittal procedures, format, and typically required documentation shall be in accordance with the General Conditions and Specification Section 01300 Submittals.
- B. Product Data: Material descriptions, dimension of individual components and profiles, and finishes for the following:
 - 1. Fence, gate posts, brackets, rails and fittings.
 - 2. Gates and hardware.
 - 3. Gate operators, including operating instructions.
 - 4. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
 - 5. Operation and Maintenance Manual
- C. Shop Drawings:
 - 1. Show locations of fence, each gate, posts, rails, and details of gate swing direction, or other operation, hardware, and accessories.
 - 2. Indicate materials, dimensions, sizes, weights, and finishes of components.
 - 3. Include plans, elevations, sections, gate swing direction and other required installation and operational clearances, and details of post anchorage, attachment and bracing.
 - 4. Installation recommendations and instructions by manufacturer describing all details for a typical fence and gates.
 - 5. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
 - 6. Wiring Diagrams: Power and control wiring, communication features, and access control features. Differentiate between factory-installed and field-installed wiring and between components provided by fence manufacturer and those provided by sections.

1.3 RELATED WORK

- A. Division 26 – Electrical. For electrical service and connections for motor operators, controls, limit switches, other powered devices and for system disconnect switches.

1.4 REFERENCES

ASTM STANDARDS: American Society for Testing and Materials

ASTM A500	Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round Shapes.
ASTM A787	Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing
ASTM A853	Standard Specification for Steel Wire, Carbon, for General Use
ASTM D2794	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact). D3359 - 17 Standard Test Methods for Measuring Adhesion by Tape.
ASTM F900	Standard Specification for industrial and commercial swing gates.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installations of fences and gates similar in material, design, and extent to those indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Fences and Gates: Obtain each color, grade, finish, type, and variety of components for fences and gates from one source with resources to provide fences and gates of consistent quality in appearance and physical properties.
- C. Electrical Components, Devices, and Accessories: Listed and labelled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. UL Standard: Provide gate operators that comply with UL 325.
- E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.

PART 2: PRODUCTS

2.1 MATERIALS

- A. General: Fence shall be model “Omega Architectural” manufactured by Omega II Fence Systems, “WireWorks Plus” manufactured by Ameristar Fence Products, or approved equal. Gate shall be model “Omega Architectural” manufactured by Omega II Fence Systems, “Transport Traverse Majestic” by Ameristar Fence Products, or approved equal.
- B. Mesh Fencing and Accessories:
1. 6-foot-high nominal panels.
 2. 6-gauge pre-galvanized steel wire, welded rectangular in shape and approximately 2”x6” in size.
 3. Cold rolled annealed wire made of AISI Grade 1018 steel with tensile strength of at least 70 000 psi (515 Mpa) in accordance with ASTM A853.
 4. Panels shall have 3 folds.
- C. Posts and Accessories.
1. Omega Architectural - 3-inch x 3-inch, 11-gauge
 2. WireWorks Plus
 - a. Line Posts - 2-inch x 2-inch 16-gauge
 - b. Gate Posts – 2.5-inch x 2.5-inch 12-gauge
 3. Cold rolled 1008 grade steel to meet ASTM A500 and ASTM A787 & hot dipped galvanized
 4. Provide manufacturer recommended accessories.
 5. Provide post caps.
- D. Swing Gates.
1. Frames: Two (2) 1-1/2 in x 1-1/2 in (38.1 mm x 38.1 mm) horizontal tubes and two (2) 2 in x 2 in (50.8 x 50.8 mm) vertical tubes, all 16-gauge (1.6 mm) tubes, welded at intersections to create a rigid frame, in accordance with ASTM F900.
 2. Standard Hardware: Hot-dip galvanized steel in conformity with ASTM F900, sized to assure proper gate operation. Non-moving parts shall be powder coated.
 3. Hinge: Structurally designed to support all gates without deformation during opening and closing.
 4. Latch: Clamp-on gravity system that is self latching. Includes the following:
 - a. Self-locking Device: With padlock eyes as an integral part of latch.
 5. Other Hardware:
 - a. Spring Hinge: For self-closing gate mechanism.
- E. Cantilever Sliding Gates.
1. Cantilever gates shall be fabricated in accordance with ASTM F1184 Class 2 and F2200.
 2. Frame:
 - a. Aluminum extrusions 6061-T6 following ASTM B221.
 - b. Double track with vertical uprights and diagonal braces. Components shall be welded together forming a rigid one-piece frame integrating the top and bottom track.

- c. Layout as recommended by manufacturer for opening width called for below.
 - 3. Opening:
 - a. 24-foot opening.
 - b. Overall length equal to 1.5x its single opening (opening and overhang).
 - 4. Gate Posts: Gate posts shall be 4 in (101.6 mm) steel square sections or as otherwise manufacturer recommended. The steel shall meet requirements of ASTM A500, Grade B with a minimum yield strength of 40 000 psi (276 MPa).
 - 5. Truck Assembly: Swivel type, zinc plated body with four (4) sealed and lubricated ball bearings.
 - 6. Gate Operator:
 - a. General: Provide factory-assembled automatic gate operation system designed for gate size, type, weight, and site environment.
 - i. Heavy Duty
 - ii. Electric Chain Driven Operation
 - iii. Motor horsepower as recommended by operator manufacturer.
 - iv. UL approval.
 - v. Provide unit designed and wired for both right-hand/left-hand opening, permitting universal installation.
 - vi. Comply with NFPA 70.
 - vii. Operator shall be Model HDSL24UL as manufactured by Lift Master, or approved equal.
 - b. Control Equipment: Comply with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70, Class 2 control circuit, maximum 24-V AC or DC.
 - c. Access options:
 - i. See ITC Plans and Specifications for access control system (keypad/ card reader/ radio module). Ensure access control system is compatible with other access control procedures in effect or as proposed.
 - d. Vehicle Loop Detector System. System including automatic closing timer with adjustable time delay before closing and electronic loop detector. Provide an electronic detector with adjustable detection patterns, adjustable sensitivity and frequency settings, and panel indicator light designed to detect presence or transit of a vehicle over an embedded loop of wire and to emit a signal activating the gate operator. Provide layout, size, and number of loops as shown on the Construction Drawings or as recommended by detection system manufacturer
 - e. Obstruction Detection Devices. Provide internal or edge automatic safety sensors on each motorized gate.
 - f. Accessories
 - i. Battery Back-up System
 - ii. Fire Box
 - iii. Fire Siren Sensor
- F. Coatings.
 - 1. Wire and Post Coating:
 - a. Omega II - Polyester powder coating.

- i. Minimum 4 mils applied by an electrostatic process. Coating shall cover all surfaces of the wire, and post sections, including accessories. Coating shall be capable of withstanding the following tests:
 - a) Mechanical adhesion test as per ASTM D3359 - Method B.
 - b) Shock resistance tests as per ASTM D2794.
 - c) Salt spray testing with a minimum of 1 000 hours without red rust appearance, as per ASTM B117.
 - d) Humidity resistance in a weather meter chamber as per ASTM D2247.
 - e) Exposure to ultraviolet light with exposure of 1 000 hours using apparatus Type E and 63°C as per ASTM D1499.
 - ii. Color: Black
 - b. Ameristar - PermaCoat®
 - i. Thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm).
 - ii. Color: Black
- 2. Gate Coating:
 - a. Frame:
 - i. Paint primer:
 - a) Epoxy-vinyl paint primer.
 - ii. Paint coat:
 - a) Acrylic surface coating. Standard black color.
 - iii. Wire panel coated with polyester powder coating specified for fence mesh.

PART 3: EXECUTION

- A. Examination
 - 1. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
 - 2. Do not begin installation before final grading is completed, unless otherwise permitted.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

- B. Preparation
1. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 ft (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
- C. Installation
1. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated on the Construction Drawings.
 2. Post Setting: Set posts in concrete footing having a minimum depth of 36-inches. Protect portion of posts above ground from concrete splatter. Place concrete around posts and consolidate. Using mechanical devices to set posts is not permitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.
 - a. Space line posts uniformly according to manufacturer recommendations.
 - b. Extend concrete 2 in (50.8 mm) above grade. Smooth and shape to shed water.
- D. Fence Installation
1. Install fencing to lines and grades shown on the Construction Drawings.
 2. The fence panel shall be installed to maintain a clear minimum distance of 1-1/4 in (31.8 mm) and a maximum distance of 2 in (50.8 mm) from the ground surface.
 3. Mesh fence sections are fastened to the posts with the manufacturer recommended fasteners and brackets. Install fasteners and brackets in accordance with manufacturer installation instructions.
 4. For the fence to follow slopes, it is required to step the fence sections. The Universal bracket on square posts can be slid along the post at the desired height and should always be install flush with horizontal wire (no gap). When faced with a steep slope, it will be necessary to order longer posts and panels cut in half as to keep the gap under the panel to a minimum.
 5. Upon cutting or trimming a post or a wire mesh section, apply a zinc rich primer to the exposed ends and finish with the matching touch-up paint supplied by the manufacturer.
- E. Gate Installation
1. Install gate posts in accordance with manufacturer's instructions.
 2. Concrete Set Gate Posts: Drill holes in firm, undisturbed or compacted soil. Holes shall have a diameter 4 times greater than outside dimension of post, and depths approximately 6 in (150 mm) deeper than frost level or as indicated on the Construction Drawings. Set post bottom 36 in (914 mm) below surface or as indicated on the Construction Drawings.
 3. Place concrete around posts in a continuous pour, tamp for consolidation. Trowel finish around post and slope to direct water away from posts. Check each post for vertical and top alignment and maintain in position during placement and finishing operations. Install gates perfectly horizontal and levelled (at junction), plumb, and secure for full opening without interference.
 4. Attach hardware so to have the nuts inside the property thus making the assembly tamper-proof which will prevent unauthorized removal.

5. Adjust hardware for smooth operation and lubricate where necessary to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

F. Gate Operator Installation

1. General: Install gate operators according to manufacturer's recommendations, aligned and true to fence line and grade.
2. Excavation for Pedestals: Hand-excavate holes for bases/pads, in firm, undisturbed or compacted soil to dimensions and depths and at locations as required by gate operator component manufacturer's recommendations.
3. Concrete Bases/Pads: 4000 PSI cast-in-place concrete; dimensioned and reinforced according to gate operator component manufacturer's recommendations.
4. Vehicle Loop Detector System: Bury and seal wire loop according to manufacturer's recommendations. Connect to equipment operated by detector. Comply with NFPA 70 and manufacturer's written instructions for grounding of electric-powered motors, controls, and other devices.

G. Grounding and Bonding

1. Fence Grounding: Install at maximum intervals of 1,500 ft except as follows:
 - a. Fences within 100 ft (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 ft
 - b. Gates and Other Fence Openings: Ground fence on each side of opening.
 - i. Bond metal gates to gate posts.
 - ii. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 in (460 mm) below finished grade.
 - c. Conductors: Bare, solid copper wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
 - d. Connectors and Ground Rods: Listed in UL 467.
 - i. Connectors for Below-Grade Use
 - ii. Ground Rods: Copper-clad steel. Size: 5/8 in by 96 in (16 mm by 2 400 mm).
2. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 ft (45 m) on each side of crossing.
3. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2, unless otherwise indicated.
4. Grounding Method: At each grounding location, drive a ground rod vertically until the top is 6 in (150 mm) below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.
5. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
6. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware,

conductors, and connection methods so metals in direct contact will be galvanically compatible.

- a. Use electroplated or hot-tin-coated materials to ensure high conductivity to make contact points closer in order of galvanic series.
 - b. Make connections with clean, bare metal at points of contact.
 - c. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
7. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.
 8. Perform field quality assurance test to ensure grounding is adequate.
- H. Adjusting (For gate operator only)
1. Gate: Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
 2. Automatic Gate Operator: Energize circuits to electrical equipment and devices. Adjust operators, controls, safety devices, alarms, and limit switches.
 3. Lubricate hardware, gate operator, and other moving parts.
- I. Demonstration
1. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates.
 - a. Test and adjust operators, controls, alarms, safety devices, hardware, and other operable components. Replace damaged or malfunctioning operable components.
 - b. Train Owner's personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 - c. Review operation and maintenance manuals.

END OF SECTION