

SECTION 13125

ALUMINUM BLEACHER SYSTEM (NEW SCHOOLS/REPLACEMENT AT EXISTING SCHOOLS)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions, Division One and Division 3 Specification Sections, apply to this Section with special attention to the following:
 - 1. Shop Drawings, Product Data and Samples: Section 01340.
 - 2. Substitutions and Product Options: Section 01630.
 - 3. Cast in place concrete: Section 03300.

1.02 RELATED WORK

- A. Bleacher deck and seat replacement is covered in Section 13126.

1.03 REFERENCED STANDARDS

- A. Aluminum Association, Inc. standards referenced herein.
- B. The 2000 VUSBC (2000 IBC, Chapter 10, Section 1008.0).
- C. "Special Inspections: Implementation in Fairfax County" (2000 Edition), Department of Public Works and Environmental Services, Fairfax County, Virginia.
- D. ICC/ANSI A117.1-1998 (Accessible and Usable Buildings and Facilities).
- E. ADAAG: Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities, U.S. Architectural and Transportation Barriers Compliance Board.
- F. ASTM A36 – Specification for Structural Steel.
- G. ASTM A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, after fabrication.
- H. ASTM A307 – Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- I. AWS D1.1, Structural Welding Code – Steel.

J. AWS D1.3, Structural Welding Code – Sheet Steel.

1.04 DESCRIPTION OF WORK (*Edit based on project scope of work*)

- A. Design, fabrication and installation of elevated aluminum bleacher system(s) complete with concrete footings, steel substructure, decking, stairs, ramps and guard rails for “Home” and “Visitor” sides (as applicable).
- B. Pressbox: Coordinate interface of “Home” side bleachers with new pressbox (by others) or with existing pressbox, as applicable (See Drawings).
- C. Demolition (*Existing School Sites*): Remove existing bleacher system(s) completely, and dispose of legally off site. Comply with applicable requirements of Section 02070, Selective Demolition.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide a complete, integrated set of mutually dependent components and assemblies that form a bleacher system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure. Include primary and secondary framing, and accessories complying with requirements indicated.
- B. Structural Performance: Provide bleacher system(s) capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. A uniformly distributed live load of not less than 100 pounds per square foot of gross horizontal projection of the bleachers.
 - 2. Bleachers shall be designed to withstand, with or without live loads, the horizontal and uplift pressures due to the wind. Wind load: 80 miles per hour minimum wind speed.
 - 3. A horizontal swaying force applied to the seats, in a direction parallel to the length of the seats, of 24 pounds per foot.
 - 4. A horizontal swaying force applied to the seats, in a direction perpendicular to the length of the seats, of 10 pounds per foot.
 - 5. All seat and footboard members shall be designed for live loads of not less than 120 pounds per lineal foot.
 - 6. All seat and footboard members shall be designed for a minimum concentrated load of 400 lb applied at any point on surface.

7. Top Rail of Guardrail Systems: Capable of withstanding the following minimum loads applied as indicated.
 - a. Concentrated load of 200 lb applied at any point in any direction and non-concurrently with uniform load.
 - b. Uniform load of 100 lb per linear foot applied non-concurrently with concentrated load, acting vertically downward.
 - c. Uniform load of 50 lb per linear foot applied in any direction, acting non-concurrently with concentrated load.
- C. The bleacher system(s) shall be designed and assembled so that the maximum expansion, contraction, settlement or misalignment likely to occur will not cause stresses in excess of those permissible.

1.06 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01340 Shop Drawings, Product Data and Samples.
- B. Shop Drawings for bleacher system components (Include plans, elevations, sections, details, and attachments):
 1. Anchor Bolt Plans: Include location, diameter, and projection of anchor bolts required to attach bleacher to foundation.
 2. Structural Framing Drawings: Show complete fabrication of primary and secondary framing. Indicate welds and bolted connections, distinguishing between shop and field applications.
 3. Provide structural analysis data, including foundation design, signed and sealed by the registered professional engineer responsible for their preparation and licensed in the Commonwealth of Virginia.
- C. Include 4 additional copies of the bleacher shop drawing bearing signature and seal of the registered professional engineer for submission to the Fairfax County Critical Structures Section (FCCSS) of the Commercial Inspections Branch of the Division of Inspection Services, Department of Environmental Management (DPWES).
- D. Product Samples: Submit two 18-inch samples of each type of planking (seat foot, aisle, and riser), and two samples of end caps and support assemblies brackets, clips and fasteners).

- E. Product and Material Certificates: Signed by manufacturer of bleacher systems certifying that products and materials furnished comply with requirements of this Section.
- F. Letter of Design Certification: Signed and sealed by the registered professional engineer. Include the following:
 - 1. Name and location of Project.
 - 2. Order number.
 - 3. Name of manufacturer.
 - 4. Name of Contractor.
 - 5. Bleacher dimensions, including width, length, and height.
 - 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 - 7. Virginia Uniform Building Code (VUSBC) and year of edition.
 - 8. Design Loads: Include dead load, live load, deflection, wind loads/speeds, uplift loads and exposure.
 - 9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, in accordance with applicable code provisions.
- G. Welding Certificates: Copies of certificates for welding procedures and personnel.
- H. Erector Certificates: Signed by manufacturer certifying that erectors comply with requirements.
- I. Manufacturer Certificates: Signed by manufacturer certifying compliance with requirements. Include evidence of manufacturing experience.
- J. Qualification Data: For firms and persons specified in 1.07 "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- K. Warranties: Sample of manufacturer's warranty as specified in 1.09 of this Section.

1.07 QUALITY ASSURANCE

- A. Codes and Standards: Design, fabrication, and installation shall be in accordance with applicable codes, regulations, and accessibility requirements.
- B. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Professional Engineer Qualifications: A registered professional engineer who is legally licensed to practice in the Commonwealth of Virginia and who is experienced in providing engineering services of the kind indicated and required by this Section. Engineering services are defined as those performed for installations of bleacher systems that are similar to those indicated for this Project in material, design, and extent.
- D. Manufacturer Qualifications: A firm with a minimum of five (5) years experience in manufacturing bleacher systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Source Limitations: Obtain bleacher system components through one source from a single manufacturer.
- F. Welding: Qualify procedures and personnel according to AWS requirements indicated in 3.03, "Referenced Standards".

1.08 FOUNDATIONS

- A. Design, provide and install concrete foundations to support bleacher system. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundations piers and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 "Concrete."

1.09 WARRANTY

- A. All materials and workmanship shall be guaranteed for a period of two (2) years.
 - 1. Repairs during the warranty period shall be initiated within twenty four (24) hours of notification by the Owner.
 - 2. One (1) month prior to the expiration of the warranty, Contractor shall visit the site with the Owner's Representative to determine if any deficiencies exist with the installation, or if any items previously reported by the Owner's Representative have not been corrected. Contractor shall correct such items, regardless of whether or not the duration of corrective work extends beyond the expiration date of the warranty.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Sturdisteel Company, P.O. Box 2655, Waco, Texas 76702-2655, 1 800-433-3116 (www.sturdisteel.com)
- B. Southern Bleacher Company, P.O. Box One, Graham, Texas 76450, 1 800-433-0912 (www.southernbleacher.com)
- C. Dant Clayton Corporation, 1500 Bernheim Lane, Louisville, Kentucky, 40201-7408, 1 800-626-2177 (www.dantclayton.com)
- D. E & D Specialty Stands, Inc., P.O. Box 770, 2081 Franklin Street, North Collins, NY 14111, 1 800-525-8515 (www.edstands.com)
- E. National Recreation Systems, Inc., 5120 Investment Drive, Fort Wayne, IN 46808, 1-888-568-9064 (www.bleachers.net)
- F. Other manufacturers, pre-bid approved in accordance with Section 01630, shall be acceptable.

2.02 MATERIALS

- A. All materials shall be new and free of scrapes, scratches and other blemishes or defects. Mill test certification shall be made available to the Owner upon request.
- B. Structural steel shall be A572-50, hot-dipped galvanized after fabrication to ASTM A-123 specifications. Material thickness and design of members shall be fully engineered for the full length and depth of the bleacher unit.
- C. Seatboards shall be extruded aluminum 6063-T6 alloy, clear anodized per AA-M10C22A31 class II (204 R1); minimum 1 3/4" x 9 5/8"; minimum wall thickness .075", channel configuration with a minimum of 4 vertical legs. Weight per foot: 1.861 pounds minimum.
- D. Footboards shall be extruded aluminum 6063-T6 alloy, mill finished; minimum 1 3/4" x 11-5/8"; minimum wall thickness .075" channel configuration with a minimum of 4 vertical legs. Weight per foot: 2.179 pounds minimum.
- E. Coved risers shall be extruded aluminum 6063-T6 alloy, mill finished, nominal 8" high with a 1" coved radius at the bottom of the boards to catch debris and aid in the cleaning process, wall thickness .080".

- F. Seat end caps shall be one piece, anodized aluminum channel design. Walkway and footboard end caps shall be one-piece mill finish channel design. All end caps shall be attached with rivets to the underside of the plank.
- G. Internal splice sleeves shall be provided at all perpendicular seams in load bearing deck members to maintain alignment of decking members during expansion/contraction. All seams shall occur at steel supports.
- H. Guard Rails: Provide and install at all sides of bleacher, stairs, ramps and landings.
 - 1. "2 Pipe Rail System": A top rail with fencing infill between rails.
 - 2. "3 Pipe Rail System": A top rail, intermediate rail and bottom rail with fencing infill between rails.
 - 3. The "2 Pipe Rail System" shall be used on the front and the "3 Pipe Rail System" shall be used on the sides and the back.
 - 4. The railings shall be 1 1/4" Schedule 40 anodized aluminum pipe (1-5/8" O.D.). The fencing shall be 2" x 9 Ga. Galvanized mesh, chain link fence.
 - 5. All rails shall be 42" in height (height of rail adjacent to seating shall be measured from the leading edge of the seat).
- I. Stairs shall have "3 Pipe Rail System" consisting of 1 1/4" schedule 40, anodized aluminum pipe, 1 5/8" O.D., with 2" x 9" gauge galvanized mesh chain link fencing. Top guardrail shall be 42" above the leading edge of the treads. A 34" high handrail shall be provided.
- J. All ordinary bolts shall be ASTM A-307 steel and all high strength bolts shall be ASTM A-325 steel; all bolts shall have a hot-dipped galvanized finish.
- K. Decking.
 - 1. The decking shall be fully closed with no openings between foot planks or risers.
- L. Stairs
 - 1. Shall conform to all above pertinent criteria consistent with the component design of the grandstand.
 - 2. Shall be self-supporting and shall not attach to or be suspended from any footboard of decking member.

3. Stair risers shall be fully closed.
- M. Aisles:
1. Aisles shall be designed so that all vertical and horizontal areas within the bay of the aisles area shall be fully closed.
 2. Aisles shall be provided with handrails in accordance with the VUSBC.
 3. Aisle stairs shall have contrasting nosings with black powder coat finish or other means to distinguish the leading edge of each step.
- N. Ramps and Ramp Platforms:
1. Treads shall be 6063-T6 extruded aluminum with a fluted surface and a minimum wall thickness of .078". Minimum vertical height of treads shall be 1.75" actual. Treads shall be mill finish.
- O. Accessible Viewing Positions (See Drawings for layout and location)
1. Accessible viewing area inset into the front rows of seating shall comply with the most stringent requirements of the VUSBC or the ADA Accessibility Guidelines. Handicapped seating shall be enclosed as indicated on the Drawings with no open vertical risers allowed.
 2. The ramp shall have a "3 Pipe Rail System" consisting of 1 1/4" Schedule 40, anodized aluminum pipe (1 5/8" O.D.) with 2" x 9 Ga. Galvanized mesh, chain link fencing. Top guardrail shall be 42" above the ramp surface.
 3. A handrail 34" above the ramp surface shall be provided.
- P. Other System Features and Components: (See Drawings for number of rows and aisles; stair, ramp and seating configuration; seating capacity, and configuration of accessible viewing areas)
1. Riser per row shall be 8 in.
 2. Depth per row shall be 24 in.
 3. Height of seats above respective footboards shall be 18".
 4. Walkway width shall be 60 in. minimum.
 5. Footboard decking system shall be fully closed.

6. Aisles to have intermediate aisle rails.
7. Front to back bracing shall be structural angle, bolted at ends and centers. Rod bracing shall be used for side-to-side bracing.
8. On columns requiring 2 or more sets of "X" bracing, the connecting strut shall run continuously for the entire length of the unit.
9. Seat numbers:
 - a. Decals with black lettering on aluminum field.
 - b. Rows: Alphabetical letters.
 - c. Seat Numbers: Numerals.

PART 3 - EXECUTION

3.01 SITE INSPECTION AND PROTECTION (*Existing School Sites*)

- A. Prior to beginning work, inspect the work area in the presence of the Owner's Representative to review work conditions, site constraints and limitations for use of the site by Contractor's personnel.
- B. The Contractor shall maintain the project site in a clean, safe, and orderly condition.
- C. All existing site features (such as paving, grassed areas, lights, fencing, etc.) not designated to be removed, altered or relocated shall be protected during the course of the work. Repair, replace or restore any site features damaged as the result of this work at no cost to the Owner.
- D. No vehicular traffic, foot traffic, or storage of materials shall be allowed on the stadium running track. No construction activity shall be allowed to cross the track.
- E. Any existing fencing otherwise designated to remain, but which may require temporary removal for access to project area, shall be restored at completion of the work.

3.02 DEMOLITION (*Existing School Sites*)

- A. The Contractor shall completely remove and legally dispose of all existing planking, bleacher structure including foundations, and other related materials.

No demolished materials shall be allowed to remain on site for more than 48 hours.

- B. The Owner shall have right of first refusal on any salvageable materials. Any materials designated by the Owner's Representative for salvage shall be stored on site in an approved location.

3.03 INSTALLATION

- A. All work shall be installed in accordance with the manufacturer's written installation instructions and the approved submittal.
- B. All fasteners shall be torqued to the manufacturer's specifications using a torque wrench or other approved means.
- C. All welding shall be performed in accordance with AWI Standards.
- D. Immediately after installation, inspect all parts for proper alignment and fastening.

3.04 CLEAN UP

- A. Remove all excess materials, packaging and other debris associated with the work of this Section from the work area and dispose of legally.
- B. Restore all areas of site disturbed by the work of this Section.

3.05 CLOSE OUT

- A. Instruct Owner's personnel in the proper maintenance of bleacher seats, foot and riser planking, railings and associated components.

END OF SECTION

SECTION 13126

BLEACHER DECK AND SEATING REPLACEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions and Division 1 through Division Two Specification Sections, apply to the work of this Section.

1.02 RELATED WORK

- A. Complete, outdoor aluminum bleacher systems are covered under Section 13125.

1.03 REFERENCED STANDARDS

- A. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- B. Aluminum Association, Inc. standards referenced herein.
- C. The Virginia USBC (IBC, Chapter 10, Section 1008, as applicable).

1.04 DESCRIPTION OF WORK *(Edit based on site survey and required scope of work)*

- A. Provide all labor, supervision, material, and equipment for the work as follows:
 - 1. Removal of all existing foot planks.
 - 2. Removal of all existing seat planks.
 - 3. Removal of all aisle, stair and walkway planking.
 - 4. Installation of new aluminum planking (replacement in kind, except as noted).
 - 5. Installation of new aluminum risers to fully enclose vertical gaps between foot planks at seating areas and at aisles, stairs and walkways.
 - 6. Installation of new aisle handrails.
 - 7. Installation of new chain link mesh infill at existing guardrails, *or* complete replacement of existing guardrails.

1.05 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Minimum five (5) years experience in the design and manufacture of aluminum bleacher planking and accessories.
- B. Installer Qualifications: Contractor shall utilize personnel trained and experienced in the installation of aluminum bleacher planking.
- C. Aluminum planking and associated components shall all be products of one manufacturer.

1.06 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01340.
- B. Shop drawing submittal shall include the following:
 - 1. Manufacturer's descriptive data and details for all materials.
 - 2. Details showing placement and attachment to existing bleacher substructure.
 - 3. Product samples: Submit two (2) 18" samples of each type of planking (seat, foot and riser boards), two (2) samples of end caps and support assemblies (including brackets, hold down clips, and nuts and bolts).

1.07 WARRANTY

- A. Contractor shall warrant the workmanship and materials for a period of two (2) years.
 - 1. Repairs during the warranty period shall be initiated within twenty four (24) hours of notification by the Owner.
 - 2. One (1) month prior to the expiration of the warranty, Contractor shall visit the site with the Owners Representative to determine if any deficiencies exist with the installation, or if any items previously reported by the Owner's Representative have not been corrected. Contractor shall correct such items, regardless of whether or not the duration of corrective work extends beyond the expiration date of the warranty.

PART 2 - PRODUCTS**2.01 APPROVED MANUFACTURERS**

- A. Sturdisteel Company, P.O. Box 2655, Waco, Texas 76702-2655,
1 800-433-3116 (www.sturdisteel.com)

- B. Southern Bleacher Company, P.O. Box One, Graham, Texas 76450, 1 800-433-0912 (www.southernbleacher.com)
- C. Dant Clayton Corporation, 1500 Bernheim Lane, Louisville, Kentucky, 40201-7408, 1 800-626-2177 (www.dantclayton.com)
- D. E & D Specialty Stands, Inc., P.O. Box 770, 2081 Franklin Street, North Collins, New York, 1 800-525-8515 (www.edstands.com)
- E. National Recreation Systems, Inc., 5120 Investment Drive, Fort Wayne, IN 46808, 1-888-568-9064 (www.bleachers.net) .
- F. Other manufacturers pre-bid approved in accordance with Section 01630 shall be acceptable.

2.02 MATERIALS (*Edit based on scope of work*)

- A. General: All materials shall be new and free of scrapes, scratches and other blemishes or defects.
- B. Seat Planks: Extruded Aluminum, 6063-T6 alloy, clear anodized per AA-M10C22A31, Class II, 204R1, minimum 1 ¾" deep channel configuration with a minimum wall thickness of 0.75". Boards shall have a minimum of 4 vertical legs.
- C. Foot Planks Walkways and Aisle Stairs: Extruded aluminum, 6063-T6 alloy, mill finished, minimum 1 ¾" deep channel configuration with a minimum wall thickness of 0.75". Boards shall have a minimum of 4 vertical legs.
- D. Riser Planks: Extruded aluminum, 6063-T6 alloy, mill finished, with minimum wall thickness of 0.80".
- E. Guard Rail Mesh: 2" x 9 gauge galvanized chain link.
- F. Guard Rails:
 - 1. Provide and install at all sides of bleacher, stairs, ramps and landings.
 - a. "2 Pipe Rail System": A top rail with fencing infill between rails.
 - b. "3 Pipe Rail System": A top rail, intermediate rail and bottom rail with fencing infill between rails.
 - c. The "2 Pipe Rail System" shall be used on the front and the "3 Pipe Rail System" shall be used on the sides and the back.

- d. The railings shall be 1 1/4" Schedule 40 anodized aluminum pipe (1-5/8" O.D.). The fencing shall be galvanized mesh per 202.E above.
 - e. All rails shall be 42" in height (height of rail adjacent to seating shall be measured from the leading edge of the seat).
2. Stairs shall have a "3 Pipe Rail System" consisting of 1 1/4" schedule 40, anodized aluminum pipe (1 5/8" O.D.), with 2" x 9 gauge galvanized mesh chain link fencing. Top guardrail shall be 42" above the leading edge of the treads. A 34" high handrail shall be provided.
- G. Accessories:
1. Channel end caps: Extruded aluminum, 6063-T6, clear anodized per AA-M10622A31, Class II, 204R1, for seat planks; mill finish for foot planks. Provide at end rows of foot and seat planks.
 2. Joint sleeves: Extruded aluminum, 6061-T6 inserted in planks to maintain alignment when joining two planks together.
 3. Brackets: Extruded aluminum, 6061-T6; for attaching seat planks to bleacher structure.
 4. Hold down clip assembly: Extruded aluminum, 6061-T6, with coated tamper resistant nuts and bolts.
 5. Aisle stair nosing: Provide contrasting nosing with black powder coat finish or other means to distinguish the leading edge of each step.

PART 3 - EXECUTION

3.01 SITE INSPECTION AND PROTECTION

- A. Prior to beginning work, inspect the work area in the presence of the Owner's Representative and Architect to review existing conditions, site constraints and limitations for use of the site by Contractor's personnel.
- B. The Contractor shall maintain the project site in a clean, safe, and orderly condition.
- C. All existing site features (such as paving, grassed areas, lights, fencing, etc. not designated to be removed, altered or relocated shall be protected during the course of the work. Repair, restore or replace any site features damaged as the result of the work of this Section at no cost to the Owner.

- D. No vehicular or foot traffic shall be allowed on or across the stadium running track. No materials shall be stored on the track.
- E. Any existing fencing otherwise designated to remain, but which may require temporary removal for access to project area, shall be restored at completion of the work.

3.02 DEMOLITION

- A. The Contractor shall remove and legally dispose of all existing planking and related materials. No demolished materials shall be allowed to remain on site for more than 48 hours.
- B. The Owner shall have right of first refusal on any salvageable materials. Any materials designated by the Owner's Representative for salvage shall be stored on site in an approved location.

3.03 INSTALLATION

- A. All work shall be installed in accordance with the manufacturer's written installation instructions and the approved submittal.
- B. All fasteners shall be torqued to the manufacturer's specifications using a torque wrench or other approved means.
- C. Immediately after installation, inspect all parts for proper alignment and fastening.

3.04 CLEAN UP

- A. Remove all excess materials, packaging and other debris associated with the work of this Section from the work area and dispose of legally.
- B. Restore all areas of site disturbed by the work of this Section.

3.05 CLOSE OUT

- A. Instruct Owner's personnel in the proper maintenance of bleacher seats, foot and riser planking, and associated components.

END OF SECTION

INSTRUCTIONS FOR EDITING AND COORDINATION

SECTION 13129

PREFABRICATED PRESSBOX

1. Paragraph 1.03C - Revise pressbox description and requirement per scope of work.

SECTION 13129
PREFABRICATED PRESSBOX

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 AND Division 3 Specification Sections, apply to the Work of this Section with special attention to the following:
 - 1. Shop Drawings, Product Data and Samples: Section 01340.
 - 2. Substitutions and Product Options: Section 01630.
 - 3. Cast in place concrete: Section 03300.
 - 4. Structural Steel: Section 05120.

1.02 RELATED WORK

- A. Section 13125: Aluminum Bleacher System.
- B. Section 13126: Bleacher Deck and Seating Replacement

1.03 DESCRIPTION OF WORK

- A. Furnish and install pressbox, access stairs and support structure as described in these specifications.
- B. Reinforce, retro-fit and adjust existing bleacher structure to accept pressbox access stair landings if pressbox is to be incorporated into an existing bleacher structure. Quantities, types and locations of projection screens are indicated on the Drawings.
- C. Locations for press box are as follows:
 - 1. Football Field with proper ship ladder to the observatory roof with slanted face and side windows on both sides
 - 2. Baseball field with no slanted face and no access to roof and no side windows
 - 3. Softball field with no slanted face and no access to roof and no side windows

- D. Fabricate and install press box as indicated on the drawings.

1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance Characteristics: Engineer, fabricate, and install press box capable of withstanding the effects of gravity loads and the following loads and tresses within limits and under conditions indicated:
 - 1. Wind Loads: Determine loads based on the following minimum design wind pressures:
 - a. Uniform pressure as required by local authorities having jurisdiction.
 - 2. Snow Loads: **As required by local authorities having jurisdiction and designed for Fairfax County.**
 - 3. Live Loads: 100psf gross horizontal area.
 - 4. Perpendicular Sway Load: 10lbs/lin ft of seat plank.
 - 5. Lateral Sway Load: 24lbs/lin ft of seat plank.
 - 6. Live Load for Seat and Tread Planks: 120lbs/lin. ft to footboards.
 - 7. Top Rails of Guardrails:
 - a. Uniform load of 50lbf/ ft. applied in any direction.
 - b. Concentrated load of 200lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 8. Infill of Guardrails:
 - a. Concentrated load of 50lbf applied horizontally on an area of 1 sq ft.
 - b. Infill load and other loads need not be assumed to actconcurrently.
- B. Thermal Movements: Provide pressbox and support that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gains and nighttime-sky heat loss.

- 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Detailing, fabrication, and installation of Press Box and all attachments shall be in accordance with AISC Specifications for Aluminum Structures.
- D. Shop Connections: Welded and capable of carrying stress put upon them.
- E. Welding: Comply with AWS Standards.

1.05 SUBMITTALS

- A. The following items must be presented for evaluation.
 - 1. Manufacturer's Product Data: Submit manufacturer's descriptive product literature indicating the specified product.
 - 2. Product Data: Submit manufacturer's product specifications for press box and accessory indicated or required.
 - 3. Proof of site visit and familiarity with existing site conditions if project involves incorporating pressbox into existing bleacher structure.
- B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of grandstands, bleachers, and press box, as well as procedures and diagrams. Submit shop drawings indicating layout of grandstand and bleacher seating systems coordinated with field measurements and including seat heights, row spacing and rise, aisle widths and locations, overall dimensions, connections and relationship to adjoining work, accessories, types of materials and finishes.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Statement of compliance: On cover sheet of submittal drawings, the following statement shall be executed and dated by the authorized agent of the contractor responsible for such work – “This is to certify that all specification requirements have been met and all dimensions, conditions and quantities are verified as shown and / or corrected on these submittal drawings”.
- C. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.
- D. Qualification Data: For Installer.
- E. Field Quality-Control Report: Indicate compliance of installed press box and components with requirements.

- F. Maintenance Data: For each product to include in maintenance manuals.
- G. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing pressboxes and support structures similar to those indicated for this Project and that have a minimum 10 years of experience and a record of successful-in-service performance.
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing press box and support structure to comply with performance requirements.
 - 2. **AISC Certification:** All Structural steel for the pressbox and support structure is to be fabricated in an AISC certified plant. Only manufacturers listed on the AISC website as being certified meet these criteria. Proper certification and inspections are required under Chapter 17 of the IBC Code. Criteria is set forth requiring AISC Certification to confirm to the owners, architect, engineer and building official that the steel manufacturing facility has the fabricating personnel, organization, experience, procedures, knowledge, equipment and the commitment to produce steel of the quality required for the building industry.
 - 3. Press Box manufacturer must be registered with the Commonwealth of Virginia Department of Housing and Urban Development as an authorized supplier of Industrialized Buildings. Authorization must be based on construction methods as described in this section.
- B. Local Representation: Manufacture shall have local representation in the Commonwealth of Virginia. Representative will have the sole authority to provide information and answers at all meetings, attend construction meetings, respond to architect / owner's requests and concerns, coordinate and schedule with other contractors and sub-contractors. Representative will meet with owner for minimum of four (4) scheduled meetings and be required to provide up-dated weekly status reports to the owner throughout the duration of the project. **Contractor shall submit a schedule to the Owner within ten days of award of contract.**
- C. Installer Qualifications: Engage an experienced Installer to perform the work of this Section who has specialized in installing types of Press Boxes similar to those required for this Project and who is acceptable to, or certified by, manufacturer of pressbox.
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the Commonwealth of Virginia and who is experienced in providing engineering services of the kind indicated. Engineering services are

defined as those performed for installations of press boxes that are similar to that indicated for this Project in material, design, and extent.

- E. Source Limitations: Obtain press box and support structure through one source from a single manufacturer.
- F. Product Options: Drawings indicate size, profiles, and dimensional requirements of Press Boxes and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- G. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."
- H. Regulatory Requirements: In addition to local and state governing regulations, comply with applicable provisions in 2015 "International Building Code."
- I. Accessibility Requirements: In addition to local and state governing regulations, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act Architectural Guidelines (ADA), Accessibility Guidelines (ADAAG)."
- J. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- K. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.
- L. Pre-installation Conference: Conduct a **pre-construction conference** at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of Press Box that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including, but not limited to, excessive deflection.
 - 2. Failure of system to meet performance requirements.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

- B. Warranty Period: Five (5) year from date of Substantial Completion including travel expenses, material, and equipment.
- C. Warranty Period for Metal Finishes: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Southern Bleacher Company (Basis of Design) – as represented by Grandstand Design Enterprises, Inc. 800-422-1922 www.southernbleacher.com
 - 2. Dant Clayton Corporation, Louisville, Kentucky, 800-626-2177 www.dantclayton.com
 - 3. Outdoor Aluminum, Inc. Geneva, Alabama. 800.225.4249 www.outdooraluminum.com
 - 4. Pre-bid approved manufactures in accordance with Section 0163 and this Section shall be acceptable
- B. **Submission of bid is indication that ALL parts / products of the specification will be provided.**

2.02 PRESSBOX SUPPORT STRUCTURE AND LANDINGS

- A. Materials:
 - 1. Steel: ASTM A 36.
 - 2. Aluminum: Extruded alloy 6063-T6.
 - 3. Foundation Concrete: Minimum compressive strength of 3000psi at 28 days.
 - 4. Accessories:
 - a. Steel Connections: ASTM A 307, galvanized.
 - b. Aluminum Components: ASTM A 307, cadmium plated.
 - c. Hold-Down Clip Assembly and End Caps: Aluminum Alloy 6063T6.
- B. Steel Members:

1. Columns: Spaced at 18 feet o.c. longitudinal.
 2. Cross Braces: Steel angles.
- C. Guardrail System: Provide guardrails at all sides of pressbox landings and rooftop filming platform
1. Material: Anodized aluminum pipe, with end plugs at ends of straight runs and elbows at corners. Secure to angle rail risers with galvanized fasteners.
 2. Top Railing: 48 inches above walkways, entrances, and filming platform.
 3. Chain Link Infill on Side and Back: 9 gage galvanized fabric fastened in place with galvanized fittings and aluminum ties.
- D. Aluminum Footboards: Size per component requirements, non-slip aluminum planks made of 6063-T6 aluminum alloys with minimum wall thickness of 0.094 inches. Footboards shall be secured to their steel supports by means of extruded aluminum clips and 5/16-inch-diameter bolts. All splices shall occur at steel supports. Splices in other locations will not be permitted.
1. Deck System: Interlocking Deck
 - a. The tread system shall be comprised of aluminum extrusions which interlock together lengthwise. The interlocking mechanism will minimize deflection and not separate due to loads being applied to individual planks.
 - b. The system shall cause the deck planks to react together at all treads and walkways to live load and form the appearance of a single tread system. By design, this system forms a solid, overlapping tread and riser installation.
 - c. The nose extrusion shall allow for a 1" extruded aluminum contrasting nose piece to be flush mounted on the leading edge and shall capture the vertical riser plank in an extruded pocket. The heel extrusion shall have a .70" vertical lip at the rear of the plank to allow for placement of vertical riser plank and inhibit fluids from escaping at the rear of the tread.
 - d. These extrusions shall be such that the attachment of the seat brackets, step brackets, mid-aisle rails and all other components is accomplished without deck penetrations. No through bolting or drilling of the aluminum tread / riser system shall be permitted.
- E. Aluminum Risers: Aluminum planks made of 6063-T6 aluminum alloys with minimum wall thickness of 0.094 inches. Provide continuous aluminum riser

closures between all footboards. Through bolting or drilling of the riser board is unacceptable.

- F. Stairs: 2-by-12-inch aluminum treads with maximum 7-inch rise.
- G. Hardware: All connections for foot boards, guardrails, and guardrail pipe shall be tamperproof and galvanized. Footboard connections shall be made with galvanized fasteners.
- H. Concrete Footings: Foundations shall extend not less than 40" under sub-grade. Pressbox manufacturer shall design concrete foundations in accordance with soil compaction as verified on site by engineering firm. Owner shall approve footing design prior to installation. Provide 3000psi compressive strength concrete.
- I. Support Structure: Manufacturer's standard hot-dipped galvanized steel. Aluminum is unacceptable. Painted steel is unacceptable.
- J. Finishes:
 - 1. Steel: Hot-dipped galvanized after fabrication in accordance with ASTM A 123.
 - 2. Aluminum:
 - a. Aluminum Footboards: Mill finish.
 - b. Riser Boards: Anodized finish.

2.03 PRESS BOXES

- A. Product Description: Type II Construction
 - 1. Press Box Support Structure: Press box will be set on galvanized steel support structure. Press box will be anchored with structural mechanism to support all engineered loads as determined by bleacher manufacture's engineer.
 - 2. Press Box Dimensions: As shown on drawings
 - 3. Press Box to be constructed in accordance with approved drawings.
- B. Materials/Finishes
 - 1. Press Box Support Structure:
 - a. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.

- b. Shop connections are seal welds.
 - c. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.
2. Press Box: All materials shall be new and shall comply with ASTM specifications.
- a. Floor
 - 1. Main support to be a galvanized steel floor frame sized to support structure and metal belly pan for support of insulation.
 - 2. Floor to be INTERLOCK Aluminum Decking System, extruded aluminum alloy 6063-T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports. (Tongue & Groove or Standard extrusion is not acceptable.)
 - 3. Insulation: Kraft faced fiberglass building insulation R-11, 3 1/2 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal.
 - b. Wall Structure
 - 1. 4-inch x 4-inch x 11-gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4-inch x 2 1/2-inch x 14-gauge steel "cees" with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design.
 - 2. Insulation: Kraft faced fiberglass building insulation R-11, 3 1/2 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglass Corp., or equal.
 - 3. Interior Finish
 - a. 1/2-inch vinyl coated gypsum panels, Gold Bond vinyl-surfaced Durasan- Harvest Cotton.
 - b. Cove Base: Vinyl 4 inches' x .080 equal to PRO CB-35 Nubian.
 - 4. Exterior Finish
 - a. 26-gauge pre-finished R-Panel paneling as manufactured by MBCI, Signature 200 color series, or equal.

- b. Wall panels are attached with #12 TEK screws - 6" O.C. at the top and bottom of the panels.
 - c. Lap screws are placed at each end of the panels, at the intermediate supports, and at the midpoint between supports (TEK #14).
 - d. All fasteners to be painted same color as exterior paneling.
 - e. **All keys to be keyed to FCPS MASTER KEY**
- c. Roof Structure
- 1. 4-inch x 4-inch x 11-gauge square tubing with maximum spacing of 6 feet on center and 4 inches' x 2 1/2 inches' x 14-gauge steel "cees" with maximum spacing of 2 feet on center.
 - 2. Roof: 1/8 inch four-way steel plate roof, continuous welded seams coated with acrylic metal primer as manufactured by Coronado and 36 mils of acrylic roof coating as manufactured by Isothermal Protective Coatings, or equal. Plate is welded on both sides of rafters with 1-1/2-inch-long 1/8-inch fillet welds on 12-inch o.c.
 - 3. Insulation: Kraft faced fiberglass building insulation, R-19 (minimum) 6 inches thick. Batt or roll as manufactured by Owens-Corning Fiberglas Corp., or equal.
 - 4. Cornice: 26-gauge steel pre-finished to match metal siding.
 - 5. Ceiling: 24-inch x 24-inch x 5/8-inch acoustical ceiling tile (model #- USG Fissured 560) with USG grid main tee (model # DXL24), cross tee (model # DXL 216), wall angle (model # M7), wind clips and other components as manufactured by USG, or equal.
 - 6. If additional bracing is needed to meet snow loads for Fairfax County manufacturer is required to meet those standards.
- d. Exterior Doors
- 1. Full flush steel construction with honeycomb core. 18-gauge skin sheets. Dimensions: 3 feet 0 inches' x 6 feet 8 inches. Color: White or as selected by the Architect

2. Steel doorframe (16 gauge) complete with ½- inch threshold and weather-stripping.
 3. Exterior Hardware: Yale 546F Exterior Trim, or equal. Handles shall be lever- type that allows operation without tight grasping or twisting of the wrist. Keyed alike locks.
 4. Interior Hardware: Yale 2100 Exit Device, or equal. Handle shall be panic bar that allows for opening without any grasping, twisting or turning.
- e. Interior Doors
1. Interior Birch Unit. Dimensions: 3 feet 0 inches' x 6 feet 8 inches.
 2. Hardware: Handles shall be lever type that allows operation without tight grasping or twisting of the wrist.
- f. Interior Walls
1. Framing to be steel galvanized studs (25 ga.) 1 1/4-inch x 3 5/8 inch at maximum 2 feet on center.
 2. Finishes to be consistent with all other interior finishes.
 3. Fixed glass windows (2'0" by 4'8") shall be located at front of interior walls above counter to allow for better viewing.
- g. Exterior Windows
1. Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
 2. Sash: Tilt toward inside for easy cleaning.
 3. Glazing: Clear tempered panes.
 4. Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
 5. Finish: Electro-statically applied acrylic enamel.
 6. Windows shall be slanted inward at the bottom to eliminate glare.
- h. Countertop

1. 18" wide countertop constructed of 4"x 2 1/2" x 14-gauge steel, and anodized aluminum plank with aluminum finished edge. Countertop heights shall be constructed to allow wheelchair usage at all locations.
 2. Counter shall be installed on front wall of all rooms under windows in pressbox.
- i. Painting: Materials equal to. Coronado, or equal.
1. Surfaces: Exterior Doors, Door Frames
 - a) Primer: Applied by Door Manufacturer.
 - b) Finish: 2 coats acrylic latex semi-gloss enamel applied by press box manufacturer.
 2. Surfaces: Interior Doors
 - a) Primer: Jones Blair Interior Exterior Oil Primer, or equal.
 - b) Finish: 2 coats acrylic latex semi-gloss enamel.
 3. Surfaces: Exterior Siding
 - a) Primer: Applied by Siding Manufacturer.
 - b) Finish: Applied by Siding Manufacturer. Color selected by owner.
 - c) Touchup: If applicable
- j. Surfaces: Wall and Roof Structure
1. Primer: Coronado DTM Industrial 180-11 acrylic metal primer applied after welding, or equal.
- k. Caulking: Sonneborn NP1 – Polyurethane sealant, all temperature, UV resistant, or equal. Silicone products are not acceptable.
- l. Electrical
1. Submittal drawing shall indicate devices and circuitry.
 2. Fixtures: 2-lamp, 40-watt T-8 fluorescent, white strip with electronic ballast design as manufactured by Lithonia

Lighting, or equal. Fixtures shall be located above countertops and be maximized to full length of compartment space.

3. Wiring to be in non-metallic conduit, or equal. N.E.C. breaker box to be 100- amp surface mounted on wall with 2-inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected. (Service line to Press Box is responsibility of Owner).
4. Electrical outlets installed per NEC shall be standard duty. All outlets shall be surface mounted on wall.
5. Sound, Telephone, Clock, Field Communication: Empty double outlet boxes per N.E.C. with 3/4-inch conduit stubbed out bottom of Press Box for use of Owner. Outlet boxes to be flush mounted into wall. Any wiring completed on-site will be responsibility of such contractor for inspections. Quantity. Two will be provided. Owner shall indicate additional boxes needed.
6. Filming Gallery: Weather-tight outlet box for cameras. Quantity: Three. Owner shall indicate additional outlets needed.
7. Provide baseboard heaters in all rooms.

2.04 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.05 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

- C. Extruded aluminum alloy, 6063-T6 Clear anodized 204R1, AA-M10C22A31, Class II finish

2.06 GALVANIZED STEEL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for, installation tolerances, and other conditions affecting performance of work.
- B. Verify with Owner's testing company that foundation bearing conditions are in accordance with assumptions made in design calculations and Shop Drawings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ERECTION

- A. Install pre-engineered press box and stairs in accordance with manufacturer's instructions and final Shop Drawings. Provide accessories indicated or required and anchors, inserts and other items required for installation of units and attachment of adjoining construction.
- B. Set press box plumb and aligned. Level base plates true to plane. Any cranes or rigging required shall be the contractor's responsibility.

3.03 FIELD QUALITY CONTROL

- A. Arrange for press box manufacturer's technical personnel to inspect press box and components during installation and at final completion and to certify compliance with requirements.

3.04 ADJUSTING AND CLEANING

- A. Adjust doors, operable windows, and hardware to operate smoothly, easily, properly, and without binding. Confirm that locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.
- C. Clean installed aluminum on exposed and semi-exposed surfaces. Touch-up shop applied finishes and restore damaged or soiled areas.

3.05 CLEANING

- A. After completion of the installation, remove all trash, debris, tools and other materials related to the Work of this Section and dispose of legally.

END OF SECTION

SECTION 13500

PLANETARIUM RENOVATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General Conditions and Division 1 Specifications, apply to the work of this section.

1.02 RELATED WORK

- A. Shop Drawings: Section 01340
- B. Operating and Maintenance Data: Section 01730
- C. Structural steel: Section 05120
- D. Wiring Installation Requirement: Section 16620

1.03 DESCRIPTION OF WORK

- A. Renovate the planetarium projection system to a digital fish-eye projection system complete with hardware and software for higher resolution projection.

1.04 SUBMITTALS

- A. Complete shop drawings shall be provided prior to work commencing indicating construction and installation details. Shop drawings shall be submitted in accordance with Section 01340. Field verify existing conditions prior to shop drawing preparations.
- B. Submit the following:
 - 1. Manufacturer's written technical information.
 - 2. Shop drawings showing installation details, dimensions, support connections and interface with adjoining work
 - 3. Manufacturer's written recommended installation instructions, which shall become the basis for accepting or rejecting the installation of the work.
 - 4. Manufacturer's written instructions for proper operation and maintenance.

1.05 WARRANTIES

- A. System shall be covered by the manufacturer's written warranty for a minimum of two (2) years.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store equipment in Manufacturer's original packaging with all identifying labels intact.
- B. Store in a secure, well-ventilated area, protected from damage by other trades and exposure to temperature and humidity extremes.

PART 2 - PRODUCTS**2.01 APPROVED SYSTEMS**

- A. ePlanetarium's "Full Dome Spherical Projection System", design standard.
- B. Other acceptable manufacturer's approved subject to compliance with the requirements of this section:
 - 1. Spitz
 - 2. Pre-bid approved manufacturer per Section 01630

2.02 EQUIPMENT

- A. Projector: OmniFocus 30240 with F804K7 upgrade
 - 1. 2400 Fulldome (3840 x 2400)
 - 2. 7,000 Lumens
 - 3. Laser Light Engine
 - 4. Mounting Stand
- B. Computer: PC laptop computer
 - 1. Windows 10; 16GB RAM, 2.8GHz Intel Core 2, NVIDIA GeForce video card with 4GB VRam, 256 solid-state hard drive, three-year warranty.
- C. Software: All software and content to be loaded on system computer prior to installation and configured for fulldome projection.
 - 1. WorldViewer
 - 2. OpenSpace
 - 3. WorldWide Telescope

4. Stellarium
 5. NASA JPL's Eyes Platforms
- D. Fulldome Shows (10):
1. Seeing
 2. Sun Our Living Star
 3. From Earth to the Universe
 4. The Dark Matter Mystery
 5. Losing the Dark
 6. Saturn Ring World
 7. Two Small Pieces of Glass
 8. IBEX-Search for the Edge of the Solar System
 9. From Earth to the Universe
 10. The Incredible Sun.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine conditions under which operable partitions shall be installed. Notify Architect and Owner's Representative of any adverse conditions that would affect proper performance of the work. Do not begin operations until such conditions have been corrected.
- B. Schedule work to minimize conflicts with work of other trades.

3.02 INSTALLATION

- A. Complete installation shall be by an authorized, factory-trained installer and shall include all work shown and described on drawings specified herein and in accordance with approved, final shop drawings and manufacturer's written installation instructions. Protect installation from damage by work of other trades until substantial completion and Owner acceptance.

3.03 CLEANING

- A. Remove all trash, excess materials, tools, and other debris from the project area and legally dispose of off site.

3.04 DEMONSTRATION

- A. Demonstrate proper operation and maintenance procedures to Owner's Representative and school staff. Include one (1) day on-site installation and training with 15 hours of remote video conferencing support post installation.

END OF SECTION