

Design Construction Standards

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PHILADELPHIA
PARKS & RECREATION

TABLE OF CONTENTS

Design and Construction Standards Introduction

Division 01 – General Requirements

- Division 01 Outline Specifications
- 015719 Environmental Controls

Division 03 - Concrete

- Division 03 Outline Specifications
- 033000 Cast-in-Place Concrete
- 033543 Polished Concrete Flooring

Division 04 - Masonry

- Division 04 Outline Specifications
- General Masonry Notes
- 040322 Brick Masonry Repointing
- 042000 Unit Masonry
- 042300 Glass Unit Masonry

Division 05 - Metals

- Division 05 Outline Specifications
- 051000 Structural Steel Framing
- 052000 Steel Joists and Girders
- 053000 Metal Decking
- 054000 Cold-Formed Metal Framing
- 055000 Metal Fabrications
- 055100 Metal Stairs

Division 06 - Wood

- Division 06 Outline Specifications
- 064020 Interior Architectural Millwork

Division 07 – Thermal and Moisture Protection

- Division 07 Outline Specifications
- 072100 Thermal Insulation
- 075216 SBS Modified Bituminous Membrane Roofing
- 076200 Sheet Metal Flashing and Trim
- 077200 Roof Accessories

Division 08 - Doors and Windows

Division 08 Outline Specifications

- 081416 Flush Wood Doors
- 083113 Access Doors and Frames
- 084113 Aluminum Framed Entrances and Storefronts
- 084500 Insulated Translucent Fiberglass Panel System
- 085113 Aluminum Windows
- 085210 Security Screens
- 087113 Automatic Door Operator
- 088000 Glazing
- 088300 Mirrors

Division 08 Full Specifications

- 081113 Hollow Metal Doors and Frames
- 081119 Stainless Steel Doors
- 087100 Door Hardware

Division 09 - Finishes

Division 09 Outline Specifications

- 090000 General Finishes Notes
- 093013 Gypsum Board
- 095113 Acoustical Panel Ceilings
- 096513 Resilient Base
- 096723 Resinous Flooring
- 099113 Exterior Painting
- 099123 Interior Painting

Division 09 Full Specifications

- 096516 Resilient Tile Flooring
- 096466 Athletic Wood Flooring
- 099113 Parks and Recreation Paint Colors

Division 10 - Specialties

Division 10 Outline Specifications

- 101110 Signage
- 102233 Operable Partitions

Division 10 Full Specifications

- 102113 Toilet Compartments
- 102800 Toilet Room Accessories

Division 11 - Equipment

Division 11 Outline Specifications

- 114000 Food Service Equipment
- 116623 Gymnasium Equipment
- 116800 Play Equipment and Structures
- 116833 Athletic Field Equipment
- 116866 Adult Fitness Equipment
- 116870 Pool Equipment

Division 12 - Furnishings

Division 12 Outline Specifications

- 129300 Site Furnishings

Division 21 Fire Suppression

Division 21 Outline Specifications

- 2113113 Wet-Pipe Sprinkler Fire Suppression System

Division 22 - Plumbing

Division 22 Outline Specifications

- 220000 General Plumbing Requirements
- 221316 Sanitary and Waste Piping
- 224213.13 Commercial Water Closets
- 224213.16 Commercial Urinals
- 224216.13 Commercial Lavatories
- 224713 Drinking Fountains

Division 23 – Mechanical

Division 23 Outline Specifications

- 230000 General Mechanical Systems Requirements
- 230593 Testing, Adjusting, Balancing for HVAC
- 230900 Control Systems Equipment

Division 26 – Electrical

Division 26 Outline Specifications

- 260100 Wiring Materials and Methods
- 260500 Basic Electrical Materials and Methods
- 260526 Grounding and Bonding
- 262713 Electrical Metering
- 265119 Interior LED Lighting
- 265219 Emergency and Exit Lighting
- 265668 Exterior Athletic Lighting

Division 26 Full Specification

- 265600 LED Exterior Lighting

Division 27 – Communications

Division 27 Outline Specifications

271500 Communication Cabling and Equipment

Division 28 – Electronic Safety and Security

Division 28 Full Specifications

282300 Video Surveillance and Mosquito Sonic Security Devices

283111 Digital and Addressable Fire Alarm System

Division 31 – Earthwork

Division 31 Outline Specifications

310000 General Earthwork Requirements

Division 32 - Exterior Improvements

Division 32 Outline Specifications

321216 Asphalt Paving

321313 Concrete Paving

321316 Decorative Concrete Paving

321813 Synthetic Grass Surfacing

321816 Playground Protective Surfacing

321823 Asphalt Athletic Court Color Coating

323113 Chain-link Fencing and Gates

323119 Decorative Metal Fences and Gates

319200 Turf Grass

329300 Landscape Planting

015639 Temporary Tree and Plant Protection

328400 Planting Irrigation

General – Playground Design

General – Aquatic Play Area / Sprayground / Splash Pad

General – Dog Park Design

General – Drainage and Stormwater Management Design

Details

Appendix

Appendix A Policy on Tree Preservation and Green Stormwater

Infrastructure Projects

Appendix B Project Inclusivity Checklist

Appendix C PPR Signage Standards Manual

Appendix D Policy to Address Tree Removal

Appendix E Waste and Recycling Infrastructure Specifications - available upon request

Design and Construction Standards Introduction

The following manual contains the design and construction standards and specifications for use on all City of Philadelphia parks, recreation centers, playgrounds, and/or athletic facilities. Any deviations from the guidelines or specifications contained in this manual must be approved in writing by City of Philadelphia Department of Parks and Recreation prior to design and/or construction.

All projects must obtain the appropriate and applicable local, state, or federal regulatory approvals such as:

- Philadelphia Water Department Stormwater, Erosion Control, Utility, Water, and Sanitary Sewer Approvals
- Philadelphia Department of Licenses & Inspections Zoning, Planning, and Building Approvals
- Philadelphia City Planning Commission
- Philadelphia City Zoning Board of Adjustment
- Philadelphia Art Commission
- Philadelphia Historical Commission
- Philadelphia Department of Streets
- Pennsylvania Department of Environmental Protection
- Pennsylvania Department of Transportation
- Army Corps of Engineers
- United States Department of Justice - American's with Disabilities Act Requirements

All projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require the minimal maintenance, and the maximum of durability for public use. Projects must also provide a safe and healthy environment that meets or exceeds code requirements and buildings must attain a high standard of energy efficiency through the life of the structure. Accordingly, the following construction materials and building components will not generally be approved for any projects:

- Gypsum Board
- Hollow Glass Unit Masonry
- Operable Partitions
- Wood Doors
- Plastic Laminate
- Acoustical Panel Ceiling Systems

Contained within the standards and specifications the follow are multiple items that shall be reviewed and approved by PPR, including but not limited to the following:

- Any work, materials, specifications, or designs that do not comply with this standard.
- Any proposed food service equipment must be submitted to PPR for review and approval.
- Proposed signage shall be submitted to PPR for review and approval and follow current PPR standards and graphics.
- On-site stormwater management systems and green infrastructure.
- Playground designs.
- Sprayground designs.
- Utility connections to existing on-site infrastructure.
- Unitized (pavers) pavements.
- Synthetic turf systems.
- Video, security and fire alarm systems.
- Landscape plantings.

Division 01

General Requirements

Division 01 Outline Specifications
015719 Environmental Controls

Division 1 Outline Specifications – General Requirements

SECTION 015719 – ENVIRONMENTAL CONTROLS

- 1.1 The project shall incorporate environmental controls during construction to protect the atmosphere, waterways, groundwater, plants, animal habitats, soils, utilities, etc., both on and off site.
- 1.2 Comply with the following Standards or Agencies:
 - A. Commonwealth of Pennsylvania Department of Environmental Protection (PADEP):
 1. Erosion and sediment pollution control program manual (latest edition)
 - B. City of Philadelphia:
 1. City Code
 2. Requirements by the Department of Licenses + Inspections
 - C. Philadelphia Water Department
 1. Philadelphia Stormwater Management Guidance Manual, Current Version
- 1.3 Establish and enforce ecological preservation measures which will avoid pollution of the atmosphere, waterways, groundwater, plants, soils, animal habitats, landfills, wetlands, the site, adjacent sites, roadways, etc. Prevent spilling of chemicals or waste. Provide emergency plans and methods for abatement of accidental spills of toxic substances.
- 1.4 Until permanent work establishes sediment control, provide temporary control, using vegetative cover with seeding, mulch, and binder within five (5) days after completion of grading of any given area. As a temporary measure, provide silt fences or compost filter socks, arranged along the toe of surface drainage ways and inlets, in such a manner that water will pass through the silt fences and filter the sediment. Replace silt fences or compost filter socks when they become clogged and ineffective. They shall be inspected as required by PWD/PADEP requirements.
- 1.5 During pipe laying work, prevent silt from entering the piping systems by use of hay bales, silt fence, temporary closures of pipe ends, or other means as best suited to the conditions.
- 1.6 Perform earth moving in phases to minimize the area and extent of exposed land. Control the rate of water runoff by diversion ditches, benches, berms, and other earth-formed shaping so that the rate of flow is retarded and silting shall be minimized. Reshape and restore conditions showing evidence of earth erosion.
- 1.7 Keep dust down at all times, including non-working days, weekends, and holidays. Wet down or treat disturbed soil with dust suppressers as required and approved. Do not leave areas of disturbed earth unworked for long periods of time. Provide temporary or permanent earth stabilization promptly. If required install perimeter fencing tarpaulins to control dust leaving the site. Use wet-cutting methods for cutting concrete, asphalt, and masonry. Do not shake out bags containing dust-causing substances.

- 1.8 Provide mufflers on internal combustion engine equipment. Maximum noise level shall be 90 dbA at 50 feet. Limit hours of operation of noisy construction to limits set by City ordinance.
- 1.9 Legally dispose of debris, chemicals, contaminated fill, and waste off the site. Collect and contain materials before disposal in orderly fashion and by means which prevent contamination of air, water and soil. Store chemicals in watertight containers. Do not burn materials on the site. Meet all local, state, or federal requirements.
- 1.10 Dump trucks shall be tarpaulin-covered so that spillage does not occur. Provide a gravel surfaced truck wheel washing area at entrances. Clean all truck wheels of mud, spoil, and debris before the trucks leave the site.
- 1.11 Maintain in working order environmental protection measures until they are no longer required. Terminate environmental control measures when there is no longer a threat of pollution. Remove temporary control measures. Complete or, if necessary, restore permanent construction that may have been delayed or damaged because of interference with environmental controls.

Division 3 Outline Specifications – Concrete

GENERAL CONCRETE

1.1 Concrete shall conform to the following standards where applicable by code:

A. American Concrete Institute (ACI):

1. ACI 117 – Specification for Tolerances for Concrete Construction and Materials
2. ACI 301 – Specification for Structural Concrete
3. ACI 318 – Building Code Requirements for Structural Concrete

B. Concrete Reinforcement Steel Institute (CRSI)

1. Manual of Standard Practice

SECTION 033000 – CAST-IN-PLACE CONCRETE

1.1 Cast-In-Place Concrete shall conform to the following minimum standards:

A. Concrete Minimum Strength: 4,000 psi at 28 days with a maximum slump of 4". Contractor is responsible for providing the mix design. Concrete Materials: Portland Cement: ASTM C 150, Type 1, Gray; and Normal-weight aggregates: ASTM C33, Coarse Aggregate, graded, from of single source. Foundations and Slab-on-grade floors. Comply with ACI 301, "Specification for Structural Concrete," Sections 1 through 5, and ACI 117, "Specifications for Tolerances for Concrete Construction and Materials.

B. Reinforcement:

1. Steel Reinforcement (epoxy-coated when required), Fabricate according to CRSI, "Manual of Standard Practice":
 - a. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
 - b. Plain-Steel Wire: ASTM A 82, galvanized.
 - c. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from galvanized steel wire into flat sheets.
2. Reinforcement Accessories:
 - a. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
 - b. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening

reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

- i. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
3. Vapor Retarder: Plastic Vapor Retarder: ASTM E1745, Class A or B, 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
4. Provide control joints at a spacing as required to prevent cracking.
5. Contractor is responsible for all concrete testing (strength, slump, and air content). An Inspection Agency must be present for all concrete deliveries and must get tickets for each truck.
6. Design of type and size of footing and foundation system will be based on soil bearing capacity as established by geotechnical test borings and geotechnical report foundation recommendations.

SECTION 033543 – POLISHED CONCRETE FLOORING

- 1.1 Polished Concrete Flooring shall conform to the following minimum standards: Specify highest level possible of stain resistant finish and damage resistant finish. Grind surface adequately to evenly expose aggregate.
- 1.2 Produce a minimum of three sets of full-scale field panels adjacent to the building, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work. The mock-ups are not to be part of the finished work and are to be removed from the construction site when directed by Architect.

Division 04

Masonry

Division 04 Outline Specifications

General Masonry Notes

040322 Brick Masonry Repointing

042000 Unit Masonry

042300 Glass Unit Masonry

Division 4 Outline Specifications – Masonry

GENERAL MASONRY

- 1.1 Philadelphia Parks and Recreation buildings and walls, both exterior and interior, should generally be built of unit masonry. If alternative materials are proposed for exterior and interior walls they shall be approved for use by PPR prior to design and/or construction.

SECTION 040322 – BRICK MASONRY REPOINTING

- 1.1 Brick Masonry Repointing shall conform to the following minimum standards: Brick masonry repointing where shown. Mortar ASTM C270. Do not base scope of work on unit prices.
- 1.2 For projects requiring Historical Commission review and approval, brick repointing mortar mix must be approved by Historical Commission – it must match the original in color, composition and detailing. Because the original bricks used to construct the facade are softer than contemporary bricks, a compatible mortar must be used to allow for the same rate of thermal expansion in the mortar and the bricks. A hard cement mortar may cause cracking and spalling and eventual deterioration of the brickwork. The composition of the mortar must not contain, under any circumstances, more than 20% portland cement. An acceptable ratio is between six-nine parts sand, to two parts lime to one part portland cement. As the color of the aggregate gives much of the characteristic of the mortar, match the new sand with the color and size of the old. Laboratory analysis of the existing mortar is required for submittal for review with the proposed new mortar mix. At areas indicated on elevations, remove deteriorated brick and replace with salvaged matching brick in good condition. Contractor must arrange site visit with representative of Historical Commission to approve field sample of replacement area of existing brick wall using matching salvaged bricks, mortar, and mortar joints. Field sample must be approved before work can begin.

SECTION 042000 – UNIT MASONRY

- 1.1 PPR Required Standard for Recreation Building Walls: Interior and Exterior - should generally be built of unit masonry. Concrete Unit Masonry shall conform to the following minimum standards:
 - A. ASTM C90, normal weight, Type I, concrete masonry units.
 - B. Mortar ASTM C270.
 - C. Grout ASTM C476, 2000 psi.
 - D. Reinforcing only galvanized, epoxy coated, or stainless steel (ASTM A615, Grade 60).
 - E. For finished exterior faces, smoother surfaces are better – If a glazed face is not in the budget, use ground-face block (C129: Grade N, Type 1). Avoid textures.
 - F. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed billet bars, galvanized finish. Do not specify coping stones.

SECTION 042300 – GLASS UNIT MASONRY

- 1.1 Glass Unit Masonry shall conform to the following minimum standards: Only specify **solid** glass masonry.
- 1.2 PPR will not approve use of hollow glass unit masonry because it is too difficult to replace broken hollow glass units; any proposed use of hollow glass unit masonry will be rejected.

Division 05

Metals

Division 05 Outline Specifications

051000 Structural Metal Framing

052000 Metal Joists

053000 Metal Decking

054000 Cold-Formed Metal Framing

055000 Metal Fabrications

055100 Metal Stairs

Division 5 Outline Specifications – Metals

SECTION 051000 STRUCTURAL METAL FRAMING

- 1.1 STRUCTURAL STEEL: The Design Consultant is responsible for complete coordination of statements in the specifications and the notes on drawings. Structural steel frame (beams and columns) and miscellaneous members to conform to ASTM A992, 50 ksi. Bolts to conform to either ASTM A307 or A325. Painting to consist of 1-coat of rust-inhibitive primer, min. 1.5 mil thick. Structural steel shall comply with the American Institute of Steel Construction (AISC), “Code of Standard Practice for Steel Buildings and Bridges.” Any architecturally exposed structural steel (AESS) must comply with AISC Code of Standard Practice, Reference Section 10: Architecturally Exposed Structural Steel. 2016 COSP (ANSI/AISC 303-16).
- 1.2 AFFIDAVIT FROM ERECTOR: The General Contractor shall be required to provide an affidavit, at the completion of the job, to the effect that the structural steel frame is plumb and level within the normal tolerances specified in the code.

SECTION 052000 METAL JOISTS

- 1.1 MANUFACTURER’S CERTIFICATE of compliance with Steel Joist Institute Specifications is required. Submit fabricator’s design calculations for any custom truss type bar joists. Submit fabricator’s mill certificate attesting that products meet or exceed SJI Specifications, Load Tables., and Weight Tables for Steel Joists and Steel Girders. Joists to be shop primed with a continuous dry paint film thickness of not less than 0.50 mil. Do not prime surfaces that will be field welded or field connected.
- 1.2 Fabrication to achieve end bearing of:
- A. 2 ½ inches on steel.
 - B. 4 inches on masonry.
- 1.3 PRIME COAT AND TOUCH-UP PAINTING, complying with SJI Specifications, will be considered adequate for joists, except where subjected to moisture or where exposed to view.

SECTION 053000 METAL DECKING

- 1.1 Steel Roof Deck: Fabricate panels conforming to SDI Publication No. 28 “Specifications and Commentary for Steel Roof Deck.” ASTM A 446, Grade A, G 60 zinc coated according to ASTM A 525; Profile Type WR, wide rib. Submittal of MANUFACTURER’S CERTIFICATE of compliance with Steel Deck Institute Specifications is required. Provide Shop Drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.
- A. For steel deck indicated to comply with certain design loading, General Contractor to submit structural analysis data sealed and signed by the Pennsylvania registered structural engineer responsible for its preparation.

- A. PRIME COAT AND TOUCH-UP PAINTING will be considered adequate for metal deck, except where subjected to moisture or where exposed to view. Where exposed to view – specify acoustic metal deck. Use galvanized metal deck for all roof applications.
- B. VENTED METAL DECKING - shall be used, when topped with insulating concrete roof decks.

SECTION 054000 COLD-FORMED METAL FRAMING

- 1.1 COLD-FORMED METAL STUD SYSTEM: “C” shaped load bearing steel studs (ASTM C 955) and furring strips shall be spaced 16 inches on center, maximum. Min Uncoated Steel Thickness: 0.0428 inch, Min Flange Width: 1 5/8”. Shop Drawings with Wind load calculations by a Pennsylvania registered structural engineer are required to be submitted for review and approval by the Architect/Engineer for exterior wall application. Wire tying of framing components is not permitted. Use qualified welders and comply with the American Welding Society (AWS).

SECTION 055000 METAL FABRICATIONS

- 1.1 Miscellaneous framing and supports for applications where framing and supports are not specified in other sections including but not limited to rough hardware, loose steel lintels, metal fabric enclosures, supports for building in architectural woodwork.
 - A. WELDER CERTIFICATION: The General Contractor is responsible for submitting for project record and retaining on construction site the welder certifications for any person performing on- site welded steel fabrication or erection. The certifications must be current and validated by welding logs or certification test(s) conducted with the last two (2) years.
 - B. GALVANIZING REQUIREMENTS: All exterior ferrous metals shall be hot-dip galvanized after fabrication.
 - C. MISCELLANEOUS METAL FRAMING FOR ELECTRICAL SUPPORT SYSTEMS: If electrical equipment is attached to support framing, the Electrical Contractor will provide and install that metal framing.
 - D. USE OF INK MARKING PENS ON SURFACES of any kind of materials is prohibited because such marks bleed through paint and other finishes.
 - E. LINTELS FOR PLUMBING, HVAC, AND ELECTRICAL INSTALLATIONS: The General Contractor shall furnish lintels for all openings through walls when openings are shown on the architectural or structural (General Contract) drawings. Note all such lintels and openings to require coordination of work and exact locations, by affected contractors. All such plumbing, HVAC, electrical, and sprinkler openings must be coordinated and shown on the General Contractor’s Systems’ Coordination Drawings which must be submitted for Architect/Engineer review and approval.

SECTION 055100 METAL STAIRS

- 1.1 STAIR TREADS FOR PUBLIC-ACCESS STAIRWAYS shall be concrete with cast metal nosings.
- A. STAIRS FOR DISABLED: Shall have railings on both sides and shall comply with the latest Accessibility Codes.
- B. HANDRAILS AND RAILINGS:
1. Must comply with ADA standards.
 2. Handrails and guardrails to be of stainless steel construction. Comply with ASCE "Specification for the Design of Cold-Formed Stainless Steel Structural Members." Bright, Directional Polish: Match AISI No. 4 finish.
- C. GRATINGS: Ferrous gratings shall be hot-dip galvanized. Galvanized hardware cloth shall be installed under all areaway gratings.
- D. STAIR TREADS AND NOSINGS: Steps shall conform to existing step formulas but shall not have risers that exceed seven (7) inches or treads that exceed eleven (11) inches. Nosings shall not extend past the face of the riser.

Division 06

Wood

Division 06 Outline Specifications

064020 Interior Architectural Millwork

Division 06 – Wood

Division 6 Outline Specifications – Wood

SECTION 064020 – INTERIOR ARCHITECTURAL MILLWORK

- 1.1 Interior architectural millwork shall conform to the following minimum standard:
- A. Architectural Woodwork Institute (AWI) custom grade. Conceal or countersink fasteners. Fasteners to be stainless steel.
 - B. Casework – Cabinet doors and drawer fronts and Cubbies to be fabricated of solid Hard Maple species, AWI grading rules, Custom Grade.
 - C. Other cabinet components to be hardwood plywood, Maple face species, HPVA grading rules, A-1 grade, rotary cut. Counters to be fabricated of Solid Polyester Resin (SPR) or Simulated Stone Surfaces (Quartz.).
 - D. Submit shop drawings for all Architectural Millwork and Solid Polyester Resin and/or Simulated Stone counters and worktops.
 - E. Plastic laminate will not be approved as an exposed finish material.

SECTION 061610 – WET CONDITIONS

Division 07

Thermal and Moisture Protection

Division 07 Outline Specifications

072100 Thermal Insulation

**075216 SBS Modified Bituminous
Membrane Roofing**

076200 Sheet Metal Flashing and Trim

077200 Roof Accessories

Division 7 Outline Specification – Thermal and Moisture Protection

SECTION 072100 – THERMAL INSULATION

- 1.1 Thermal Insulation shall conform to the following minimum standard: IECC 2015 (adopted by Philadelphia as of October 2018): R-7.5 extruded polystyrene board perimeter insulation at foundations. R-10 for unheated slabs. R-20 insulation for exterior walls. R-38 insulation in below sheathing/deck at roofs or R-30 insulation above roof deck. Provide air sealing.

SECTION 075216– STYRENE BUTADIENE STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

- 1.1 3 Ply Modified Bituminous Membrane Roofing System shall conform to the following minimum standards:
- A. Provide two (2) year installer warranty and twenty (20) year warranty for system including Cap Membrane, Roofing Membrane, Base Ply, Flashing Membrane and Roof Insulation with Prefabricated Control and Expansion Joint Flashing – 24-gauge stainless steel sheet by the listed Manufacturers:
 - 1. Johns Manville
 - 2. Firestone
 - 3. GAF
 - B. Manufacturer’s representative to provide field services – four (4) field visits – representative to attend commencement of installation of roofing materials and insulation materials, one progress visit, and inspect completed installation. Manufacturer’s representative to provide field reports for each visit.
 - C. General Contractor to provide Infrared survey of completed roof system confirming that there are no subsurface moisture conditions.

SECTION 076200 – SHEET METAL FLASHING AND TRIM

- 1.1 Sheet Metal Flashing and Trim shall conform to the following minimum standards:
- A. Submit for review and approval shop drawings indicating material profile and installation details of copings, fascia's, hanging gutters, downspouts, scuppers, panels, and siding.
 - B. No aluminum products will be accepted for miscellaneous metal fabrications at exterior of the building. Including copings, fascia's, hanging gutters, downspouts, scuppers, panels, and siding (All Exterior Metal).
 - C. Provide a 20-year extended warranty.
 - D. Two-piece Cap Flashing, Overflow Scupper Flashing, Through Wall and Window Flashing: Stainless Steel ASTM A167, Type 302, 26-gauge UNO.
 - E. Fascias, clips, and coping: Stainless steel; ASTM A167, Type 302, Shop formed, 0.0375-inch-thick

minimum (19 to 20 gauge); finish No. 2d (dull cold rolled mill finish).

- F. Turn masonry flashings up a minimum of 8 inches and bed into mortar joint of masonry. Lap end joints min. 6 inches and seal watertight.
- G. Exposed downspouts are to be avoided as they are prone to being damaged and vandalized.

SECTION 077200 – ROOF ACCESSORIES

1.1 Roof Accessories shall conform to the following minimum standards:

- A. Provide continuous metal gravity ridge and fascia ventilators.
- B. Roof Scuttles to be provided for roof access – Aluminum curb frame and lid with insulation, provide additional aluminum liner on outside face of curb installation.
- C. Equipment supports – 14 gauge galvanized steel, 3 ½ inches wide by height as needed.
- D. When dissimilar metals come into contact with each other, back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 30 mils.

Division 08

Doors and Windows

Division 08 Outline Specifications

081416 Flush Wood Doors
083113 Access Doors and Frames
084113 Aluminum Framed Entrances
and Storefronts
084500 Insulated Translucent
Fiberglass Panel System
085113 Aluminum Windows
085210 Security Screens
087113 Automatic Door Operator
088000 Glazing
088300 Mirrors

Division 08 Full Specifications

081113 Hollow Metal Doors
and Frames
081119 Stainless Steel Doors
087100 Door Hardware

Division 8 Outline Specifications – Doors and Windows

SECTION 81416 FLUSH WOOD DOORS

- 1.1 Wood doors are generally not used for Philadelphia Parks and Recreation (PPR) projects. Any proposed use of wood doors shall be approved by PPR prior to design, specification, and/or installation.

SECTION 083113 ACCESS DOORS AND FRAMES

- 1.1 Access doors and frames shall conform to the following minimum standards:
- A. Walls: Non-rated Panel and Frame Unit: Stainless steel frame, stainless steel panel, continuous off-set concealed hinge, key operated vandal-resistant lock.
 - B. Ceilings: Bonderized steel frame, bonderized steel panel, continuous hinge, key operated vandal resistant lock.
 - C. Architect to coordinate locations of Access Doors and Frames with mechanical, electrical, and plumbing items which require service access.

SECTION 084113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

- 1.1 Aluminum-framed entrances and storefronts shall conform to the following minimum standards:
- A. Basis of Design: Kawneer Trifab 451T Series Storefront Framing. Alternate manufacturers: YKK and Wausau.
 - 1. 2" x 4 ½" (Front Set) Framing Dimensions
 - 2. Thermal Break
 - 3. 1" Insulated Glazing Units (IGUs) meeting IECC 2015: U factor .75, SHGC .7 (clear)
 - 4. Locations:
 - a. Entrances
 - b. Single Story (up to 10'-0")
 - c. Small Punched Openings
 - a. Strip windows
 - 5. AA425 Doors to be incorporated into the entrance assemblies:

- a. Thermally broken with 4" vertical and top rails, with 10" Bottom Rail option.

SECTION 084500 INSULATED TRANSLUCENT FIBERGLASS PANEL SYSTEM

- 1.1 Insulated translucent fiberglass panel systems are better than glass windows in gymnasiums to avoid glare.

SECTION 085113 ALUMINUM WINDOWS

- 1.1 Aluminum curtain wall windows shall conform to the following minimum standards:
 - A. Basis of Design: Kawneer 1602 Series curtainwall; Alternate manufacturers: YKK and Wausau.
 - B. 2" x 5" Framing Dimensions
 - C. Thermal Break
 - D. 1" Insulated Glazing Units (IGUs) meeting IECC 2015: U factor .45, SHGC .4 (clear).
 - E. 1" Aluminum Insulated Panels (AIPs) where indicated in Drawings
 - F. Interior Aluminum Brake Metal Panels, set flush to interior face of curtainwall frame, with insulation as shown in drawings, located behind AIPs from finished floor level to bottom of first IGU framing.
 - G. Locations:
 - 1. Multi-Story
 - 2. Tall or Oversized Elevations
- 1.2 Aluminum punched opening and strip windows, fixed and operable, shall conform to the following minimum standards:
 - A. Basis of Design: Kawneer Trifab 451T Series Storefront Framing. Alternate manufacturers: YKK and Wausau.
 - B. 2" x 4 1/2" (Front Set) Framing Dimensions
 - C. Thermal Break
 - D. 1" Insulated Glazing Units (IGUs) meeting IECC 2015: U factor .45, SHGC .4 (clear) or 1/2" thick polycarbonate.
 - E. Thermal Break

- F. All operable aluminum window openings shall be in-swinging hoppers. Include heavy-duty security screens.

SECTION 085210 SECURITY SCREENS

- 1.1 Security screens shall conform to the following minimum standards:
 - A. Basis of Design: Kane Level 5 (heavy vandalism) steel narrowline, operable side-hinged (SNR50) with 16-gauge (63% open) perforated panel. Bonderized with thermoplastic, polyester powder-coat finish, AAMA 2603. Roto-lift emergency egress release. Keyed cam lock to match existing keying, include key number on shop drawing submittal.

SECTION 087113 AUTOMATIC DOOR OPERATORS

- 1.1 Only use automatic door operators at Older Adult Centers. Failure state must be easy to open. Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.
 - A. Shop Drawings: For automatic door operators. Include plans, elevations, sections, hardware mounting heights, and attachment details. Include diagrams for power, signal, and control wiring.
 - B. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
 - C. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within two (2) years from date of Substantial Completion.
 - D. General Contractor to provide services of a Certified Inspector to perform tests and inspection with the assistance of a factory-authorized service representative components, assemblies, and installations, including connections. Test and inspect each automatic door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards. Automatic door operators will be considered defective if they do not pass tests and inspections. Prepare test and inspection reports.
 - E. Approved manufacturers: Stanley, LCN, Assa Abloy Entrance Systems.

SECTION 088000 GLAZING

1.1 Glazing shall conform to the following minimum standards:

- A. Exterior glazing: 1" Insulated Glazing Units (IGUs) meeting IECC 2015: U factor .45, SHGC .4 (clear) or Clear ultraviolet stabilized Polycarbonate sheet with a mar scratch resistant coating; with a thickness of ½ inch thick, 2 year warranty:
 - 1. Approved products/manufacturers:
 - a. Tuffak CM-2 by AtoHass North America, Inc.
 - b. HYZOD AR by Sheffield Plastic, Inc.
 - c. LEXAN MR-5 by General Electric Company.
- B. Perforated Metal Screening for exterior polycarbonate glazing (alternate option to security screens):
 - 1. 1/8" thick stainless steel. Perforation pattern shall be 3/4" square holes, 1" straight row centers, with 57% open area.
 - 2. Adhesive for fastening perforated metal screening to polycarbonate glazing: Versilok HI 400 Series, Lord Industrial Adhesives.
- C. Interior Fire-rated Glazing: Firelite Plus, 5/16" thick laminated fire-rated and impact safety-rated glazing material. Manufacturer: Technical Glazing Products.
- D. Glazing Accessories: As recommended by manufacturer of plastic glazing sheet for wet or dry glazing installations.
 - 1. Setting Blocks: Neoprene or EPDM; 80 - 90 Shore A Durometer hardness.
 - 2. Spacer Shims: Neoprene; 50 - 60 Shore A durometer hardness.

SECTION 088300 MIRRORS

1.1 Mirrors shall conform to the following minimum standards:

- A. Polished stainless steel mirrors for bathrooms.

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior hollow-metal doors, frames, and borrowed light frames.
2. Exterior hollow-metal doors, frames, glazed openings, and insulated panels.

B. Related Requirements:

1. Section 042000 "Unit Masonry" for Mortar: Grout fill of metal frames.
2. Section 079200 "Joint Sealants" for Sealing of joints between masonry and frames. Sealing of glazing.
3. Section 081119 "Stainless-Steel Doors and Frames" for hollow-metal doors and frames manufactured from stainless steel.
4. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
5. Section 088000 "Glazing" for glazed openings, including fire-rated glass and plastic glazing.
6. Section 099113 "Exterior Painting" for finishes for exterior hollow-metal doors and frames.
7. Section 099123 "Interior Painting" for finishes for interior hollow-metal doors and frames.

1.3 PRODUCTS FURNISHED AND INSTALLED UNDER THIS SECTION *(Delete Products not applicable to project)*

- A. Hollow metal doors, swinging type, with fire rating as indicated on drawings.

- B. Doors shall include glass moldings and stops, louvers and other as shown in the schedule on the contract drawings and specified herein.
- C. Hollow metal frames with fire rating as indicated on drawings with anchors.
- D. Frames shall include glass moldings and stops, louvers and other as shown in the schedule on the contract drawings and specified herein.
- E. Hollow metal panels with fire rating as indicated on drawings similar in construction to doors.

1.4 REFERENCES

NOTE: The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. Contractor/Supplier/Installer should comply with the referenced standard. When a more recent standard may be considered, Contractor/Supplier/Installer shall request the Department of Public Property's approval.

A. Standards Agencies:

ANSI	American National Standards Institute, Inc., 1430 Broadway Avenue, New York, New York 10018.
ASTM	American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.
NAAMM	National Association of Architectural Metal Manufacturers, 600 South Federal Street, Chicago, Illinois 60605.
NFPA	National Fire Protection Association 1 Batterymarch Park P.O. Box 9101 Quincy, MA 02269
UL	Underwriters Laboratory, 333 Pfingsten Road, Northbrook, Illinois 60062.

B. STANDARDS:

1. ANSI A250.4-2011, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Hardware Reinforcings
2. ANSI A250.10-2011 Standard Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
3. ANSI/NAAMM HMMA 801-12, Glossary of Terms for Hollow Metal Doors and Frames

4. ANSI/NFPA 80 -2015, 16th Edition, Standard for Fire Doors and Fire Windows
5. ANSI/NFPA 252-2017, Standard Methods of Fire Tests of Door Assemblies
6. ANSI/UL 10B-2009, Fire Tests of Door Assemblies, 9th edition
7. ANSI/UL 10C-2016, Positive Pressure Fire Test of Door Assemblies, 1st Edition
8. ASTM A 653/A 653M-15, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
9. ASTM A 1008/A 1008M-16, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
10. ASTM A 1011/A 1011M-17a, Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength Low-Alloy with Improved Formability
11. ASTM B117-16 Method of Salt Spray (Fog) Testing.
12. ASTM C 143/C 143M-15a, Test Method for Slump of Hydraulic-Cement Concrete
13. ASTM D1735-14, Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
14. NAAMM HMMA 802-07, Manufacturing of Hollow Metal Doors and Frames
15. NAAMM HMMA 803-08, Steel Tables
16. NAAMM HMMA 810-08, Hollow Metal Doors
17. NAAMM HMMA 810 TN01-03, Defining Undercuts
18. NAAMM HMMA 820-87, Hollow Metal Frames
19. NAAMM HMMA 820 TN01-03, Grouting Hollow Metal Frames
20. NAAMM HMMA 820 TN02-03, Continuously Welded
21. NAAMM HMMA 830-02, Hardware Selection for Hollow Metal Doors and Frames
22. NAAMM HMMA 831-11, Recommended Hardware Locations for Hollow Metal Doors and Frames
23. ANSI/NAAMM HMMA 861-14 Commercial Hollow Metal Doors and Frames 3
24. NAAMM HMMA 840-16, Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames
25. NAAMM HMMA 850-14, Fire-Rated Hollow Metal Doors and Frames

1.5 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.6 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.
- C. Coordinate requirements for installation of glazing.

1.7 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at the Project Site.

1.8 TESTING AND PERFORMANCE

- A. Performance Test for Steel Doors and Hardware Reinforcements (ANSI A151.1)
- B. The test specimen shall be a 3' - 0" x 7' - 0" nominal size 1¾" door.
- C. The specimen shall be tested in accordance with the ANSI A151.1 procedure for the Level "A" doors (1,000,000 cycles).
 - 1. The specimen shall be tested in accordance with the ANSI AI 51.1 procedure for twist test which requires a maximum pressure of 300 lbs. pressure.
- D. All test reports shall include a description of the test specimen, procedures used in testing, and indicate compliance with the acceptance criteria of the test.
- E. Labeled Fire-Rated Doors and Frame Product.
 - 1. Doors, frames, transom frames and sidelight assemblies provided for openings requiring fire, temperature rise, shall be listed and/or classified and bear the label of a testing agency having a factory inspection service. The product shall be tested in accordance with ANSI/NFPA 252 or ANSI/UL-10B, ANSI, UL-10C and constructed as listed or classified for labeling. Fire, temperature rise and/or smoke and draft control ratings shall be determined and scheduled by the Architect.
 - 2. If any door or frame product specified by the Architect to be fire-rated cannot qualify for labeling because of design, hardware or any other reason, the Architect shall be so advised in the submittal documents. If hardware, glazing, or other options affect the fire-rating and are unknown at the time of submittal document preparation, the architect shall be advised.

1.9 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall provide evidence of having personnel and plant equipment capable of fabricating hollow metal door and frame assemblies of the type specified herein.

B. Installer Qualifications:

1. Installer, trained by the primary product manufacturer, with a minimum of five (5) years documented experience installing hollow metal doors and frame assemblies similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Quality Criteria:

1. All door and frame assemblies shall meet the requirements of Paragraph 1.8 of these specifications.
2. Fire labeled doors and frames shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect and as required by the applicable Building Code. Such doors and frames shall be constructed as tested in accordance with ASTM E152 (UL-10B) and approved by Underwriters Laboratories or other recognized testing agencies having a factory inspection service.
3. If any door or frame specified by the Architect to be fire-rated cannot qualify for appropriate labeling because of its design, hardware or any other reason, the Architect shall be so advised before fabricating work on that item is started.
4. Fabrication methods and product quality shall meet the standards set by the Hollow Metal Manufacturers Association, HMMA, a Division of the National Association of Architectural Manufacturers, NAAMM, as set forth in these specifications.

1.10 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

- B. *Sustainable Design Submittals: Rebuild Projects with over 10,000 square feet of renovation or new construction shall meet at a minimum the LEED™ Silver rating (See The Philadelphia Code, Section 17-111). Refer to Specification Sections 013329 Sustainable Design Reporting and 018113 Sustainable Design Requirements. For projects required to be certified at a minimum LEED Silver rating level, submit:*

1. *Product Declarations confirming recycled content of the metal used to fabricate the hollow metal doors and frames. Include product data, certification letter, and costs for materials with recycled content.*
2. *All other environmental product declarations required to meet the sustainable design and construction goals pertaining to these products including but not limited to regional materials.*

- C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

D. Samples for Initial Selection: For hollow-metal doors and frames.

1. Samples for Verification (No work to be fabricated until samples are approved):
2. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).
3. Fabrication: Prepare Samples approximately 8 by 10 inches (203 by 254 mm) corner section to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge including welding joint of head to jamb, top, and bottom construction; core construction; and hinge, hinge mortise and other applied hardware reinforcement. Include separate section showing glazing if applicable with glazing stop applied to both head and jamb section to show corner joint.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing with stops if applicable.

E. Product Schedule: For hollow-metal doors and frames, show each door and opening, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule – Show hardware group on schedule. Provide one schedule for the entire project – coordinate schedule for doors and openings of materials specified in other sections.

1.11 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

Retain "Oversize Construction Certification" Paragraph below for oversized fire-rated assemblies.

- B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.
- C. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- D. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- E. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld International, LLC.
 - 2. Ceco Door; ASSA ABLOY.
 - 3. Curries Company; ASSA ABLOY.
 - 4. Greensteel Industries, Ltd.
 - 5. North American Door Corp.
 - 6. Pioneer Industries.
 - 7. Republic Doors and Frames.
 - 8. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

(Delete Assemblies not applicable to project)

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide assemblies with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction

requirements for tested and labeled fire-rated door assemblies except for size.

- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than **0.70 deg Btu/F x h x sq. ft.** *<Insert lower U-factor if required for LEED Silver Certification for projects > 10,000 SF or if Philadelphia adopts more recent IECC standard than IECC 2009>* when tested according to ASTM C 518.

2.3 INTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Hollow-Metal Doors (Extra Heavy-Duty, SDI A250.8, Level 3) and Frames (Maximum Heavy-Duty, SDI A250.8, Level 4): NAAMM-HMMA 861; SDI A250.4, Physical Performance Level A. At locations indicated in the Door and Frame Schedule.

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches. Doors shall be neat in appearance and free from warping or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of the metal used.
- c. Face: Face sheets shall be 0.053 in. (1.3 mm) minimum thickness and shall be manufactured from cold-rolled steel conforming to ASTM A 1008/A 1008M, or hot-rolled, pickled and oiled (HRPO) steel conforming to ASTM A 1011/A 1011M CS Type B. Steel shall be free of scale, pitting, coil breaks or surface blemishes, buckles, waves or other defects. For interior areas subject to corrosive conditions provide zinc coated face sheets as specified below in 2.4 A.1.c.
- d. Edge Construction: Door face sheets shall be joined at their vertical edges by a continuous weld extending the full height of the door with no visible seams on their faces or vertical edges per HMMA-801-83. Joint shall be set toward the center of the vertical edge of the door. A joint at the corner of the door face and the vertical edge is not accepted. The top and bottom edges shall be closed with a continuous channel, also not less than 0.053" thickness, spot welded to both sheets.
- e. Edge Profiles: Edge profiles shall be provided on both vertical edges of single acting doors as follows: beveled 1/8" in 1 3/4" profile. All hardware for single acting doors shall be designed for beveled edges as specified.
- f. Core: The door shall be stiffened by continuous vertically formed steel sections which, upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.030" minimum thickness, spaced so that the vertical interior webs shall be no more than 6" apart and securely fastened to both face sheets by spot welds spaced a maximum of 5" o.c. vertically. Spaces between stiffeners shall be filled with fiberglass, batt-type material.
- g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.

2. Frames:

- a. Materials: cold rolled steel conforming to ASTM A1008/A1008M CS Type B, or hot-rolled, pickled and oiled (HRPO) steel conforming to ASTM A 1011/A1011M CS Type B.

Minimum thickness: In openings 4' - 0" or less, steel shall be 0.053" (1.3 mm) minimum thickness. In openings greater than 4' - 0", steel shall be 0.067" (1.7 mm) minimum thickness. For interior areas subject to corrosive conditions provide metallic coated as specified below in 2.4 A.2.a.

- b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Full profile welded.
 - 1) All frames shall have integral stops and be welded units of the sizes and types shown in the contract drawings.
 - 2) Corner joints shall have all contact edges closed tight with miter faces, and either butted or miter stops. Faces and soffits shall be continuously welded and the faces finished smooth. The use of gussets or splice plates as a substitute for welding shall not be acceptable.
 - 3) All other face joints shall be continuously welded and smoothly finished.
 - 4) Minimum depth of stops shall be $\frac{5}{8}$ ". Cut-off stops, where shown, shall be capped at heights as shown in the contract drawings, and jamb joints below cut-off stops shall be welded, filled and ground smooth so that there are no visible seams
 - 5) When shipping limitations so dictate, frames for large openings shall be fabricated in sections designated for assembly in the field by others. Alignment plates or angles shall be installed at each joint. Such components shall be the same thickness as the frame. Field joints shall be made in accordance with approved submittal drawings and shall be field welded.
- 3. Exposed Finish: Prime. After fabrication, all tool marks and surface blemishes shall be filled and sanded as required to make all exposed faces and vertical edges, and welded joints, smooth and free from irregularities. Metallic Coated surfaces shall be treated to insure maximum paint adhesion. After appropriate preparation, all exposed and accessible surfaces shall receive a rust inhibiting primer which meets or exceeds ASTM B117 salt spray for 150 hours and ASTM D1 735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.
 - a. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - b. Construction: Full profile welded.
 - 1) All frames shall have integral stops and be welded units of the sizes and types shown in the contract drawings.
 - 2) Corner joints shall have all contact edges closed tight with miter faces, and either butted or miter stops. Faces and soffits shall be continuously welded and the faces finished smooth. The use of gussets or splice plates as a substitute for welding shall not be acceptable.
 - 3) All other face joints shall be continuously welded and smoothly finished.
 - 4) Minimum depth of stops shall be $\frac{5}{8}$ ". Cut-off stops, where shown, shall be capped at heights as shown in the contract drawings, and jamb joints below cut-off stops shall be welded, filled and ground smooth so that there are no visible seams
 - 5) When shipping limitations so dictate, frames for large openings shall be fabricated in sections designated for assembly in the field by others. Alignment plates or angles shall be installed at each joint. Such components shall be the same thickness as the

frame. Field joints shall be made in accordance with approved submittal drawings and shall be field welded.

4. Exposed Finish: Prime. After fabrication, all tool marks and surface blemishes shall be filled and sanded as required to make all exposed faces and vertical edges, and welded joints, smooth and free from irregularities. Metallic Coated surfaces shall be treated to insure maximum paint adhesion. After appropriate preparation, all exposed and accessible surfaces shall receive a rust inhibiting primer which meets or exceeds ASTM B117 salt spray for 150 hours and ASTM D1 735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES (Exterior Hollow Metal Doors and Frames are always to be fabricated of Stainless Steel unless specially approved by PPR to follow the below specifications for existing or retrofit conditions. See related Specification Section 081119 Stainless Steel Doors and Frames.)

A. Maximum Duty Doors and Frames: NAAMM-HMMA 861; SDI A250.8, Level 4; SDI A250.4, Physical Performance Level A. At locations indicated in the Door and Frame Schedule

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches. Doors shall be neat in appearance and free from warping or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of the metal used.
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.70 mm), with minimum G60 or A60 (ZF180) with a coating weight of not less than 0.60 ounces per square foot (0.30 ounces per square foot per side).
- d. Edge Construction: Continuously welded with no visible seam. Door face sheets shall be joined at their vertical edges by a continuous weld extending the full height of the door with no visible seams on their faces or vertical edges per HMMA-801-83. Joint shall be set toward the center of the vertical edge of the door. A joint at the corner of the door face and the vertical edge is not accepted.
- e. Edge Profiles: Edge profiles shall be provided on both vertical edges of single acting doors as follows: beveled 1/8" in 1 3/4" profile. All hardware for single acting doors shall be designed for beveled edges as specified.
- f. Top Edge Closures: Close top edges of doors with flush continuous channel closures of same material as face sheets, spot welded to both sheets. Fit Exterior Doors with an additional flush closing channel at the top edge. Seal joints against water penetration.
- g. Bottom Edges: Close bottom edges of doors with flush continuous channel closures of same material as face sheets, spot welded to both sheets. Where required for attachment of weather stripping an additional flush closing channel with end closures of same material as face sheets shall be provided. Provide weep-hole openings in bottoms closure channels of exterior doors to permit moisture to escape.
- h. Core: Steel stiffened. The door shall be stiffened by continuous vertically formed steel sections which, upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.030" minimum thickness, spaced so that the vertical interior webs shall be no more than 6" apart and securely fastened to both face sheets by spot

welds spaced a maximum of 5" o.c. vertically. Spaces between stiffeners shall be filled with fiberglass, batt-type material.

2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.09 inch (2.3 mm), except 0.12 inch (3 mm) for openings exceeding 4 feet (1219 mm) wide; with minimum G60 or A60 (ZF180) coating.
 - b. Construction: Full profile welded.
 - 1) All frames shall have integral stops and be welded units of the sizes and types shown in the contract drawings.
 - 2) Corner joints shall have all contact edges closed tight with miter faces, and either butted or miter stops. Faces and soffits shall be continuously welded and the faces finished smooth. The use of gussets or splice plates as a substitute for welding shall not be acceptable.
 - 3) All other face joints shall be continuously welded and smoothly finished.
 - 4) Minimum depth of stops shall be $\frac{5}{8}$ ". Cut-off stops, where shown, shall be capped at heights as shown in the contract drawings, and jamb joints below cut-off stops shall be welded, filled and ground smooth so that there are no visible seams
 - 5) When shipping limitations so dictate, frames for large openings shall be fabricated in sections designated for assembly in the field by others. Alignment plates or angles shall be installed at each joint. Such components shall be the same thickness as the frame. Field joints shall be made in accordance with approved submittal drawings and shall be field welded.
3. Exposed Finish: Primed. After fabrication, all tool marks and surface blemishes shall be filled and sanded as required to make all exposed faces and vertical edges, and welded joints, smooth and free from irregularities. Metallic Coated surfaces shall be treated to insure maximum paint adhesion. After appropriate preparation, all exposed and accessible surfaces shall receive a rust inhibiting primer which meets or exceeds ASTM B117 salt spray for 150 hours and ASTM D1 735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.

2.5 BORROWED LITES

- A. Fabricate frames and removable glazing channel stops from same thickness material as interior door frames as specified in Section 2.3 A.2.a. above. Stops to be butted at corner joints and secured to the frame using stainless steel #6 countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Borrowed lites in fire rated wall enclosures shall be prepared for listed glazing as required in accordance with the hollow metal assembly manufacturer's fire rating procedure.

2.6 HOLLOW-METAL INFILL PANELS

- A. Provide hollow-metal infill panels of same materials, construction, and finish as adjacent hollow metal door assemblies.

2.7 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type:

- a. Frames for installation in new masonry walls shall be provided with adjustable jamb anchors of the same material as the frame. Acceptable jamb anchors shall be TEE-strap or strap and stirrup type no less than 0.075" thickness, or wire type no less than 0.185" in diameter. Straps shall be no less than 2" x 10" in size, corrugated and/or perforated. All frames in new masonry shall be filled with grout. The number of anchors provided on each jamb shall be as follows:
 - 1) Frames up to 60" ..., 2 anchors.
 - 2) Frames greater than 60" up to 90" ..., 3 anchors.
 - 3) Frames greater than 90" up to 96" ..., 4 anchors
 - 4) Frames greater than 96", 4 anchors plus 1 for each 24" or fraction thereof over 96" spaced at 24" maximum between anchors (U.L. fire ratings may require additional anchors. Verify building and local code requirements, the most stringent will apply).
- b. Frames for installation in existing masonry or concrete walls shall be prepared for stainless steel expansion bolt type anchors. The preparation shall consist of a countersunk hole for a 3/8" diameter bolt and a spacer from the unexposed surface of the frame to the wall. The spacer shall be welded to the frame and spaced a maximum of 6" from the top and bottom, with intermediate spacing at a maximum of 26" o.c. Fasteners for such anchors shall be stainless steel provided by Installer. All frames installed in exterior openings shall be filled with grout.

2. Dry Wall Type:

- a. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, no less than 0.048" thickness, securely welded inside each jamb. The number of anchors provided on each jamb shall be as follows:
 - 1) Frames up to 60" ..., 3 anchors.
 - 2) Frames greater than 60" up to 90" ..., 4 anchors.
 - 3) Frames greater than 90" up to 96" ..., 5 anchors.
 - 4) Frames greater than 96", 5 anchors plus 1 for each 24" or fraction thereof over 96" spaced at 24" maximum between anchors (U.L. fire ratings may require additional anchors. Verify building and local code requirements, the most stringent will apply).

3. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 4. Post-installed Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
1. Floor anchors with two holes for fasteners shall be fastened inside jambs with at least four (4) spot welded per anchor.
 2. Where so scheduled for finish floor underlayment thickness, adjustable floor anchors, providing no less than 2" height adjustment, shall be fastened in place with at least four (4) spot welds per anchor.
 3. Floor anchors shall be of the same material as the frame, with a minimum of 0.075" thickness.
- C. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.8 MATERIALS

Retain "Recycled Content of Steel Products" Paragraph below to specify recycled content if applying for LEED Credit MR 4. USGBC allows a default value of 25 percent to be used for steel, without documentation; higher percentages can be claimed if they are supported by appropriate documentation. The Steel Recycling Institute indicates that steel sheet typically has 23 percent postconsumer recycled content and 1.5 percent preconsumer recycled content..

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B. with minimum G60 or A60 (ZF180) with a coating weight of not less than 0.60 ounces per square foot (0.30 ounces per square foot per side).
- E. Inserts, Bolts, and Fasteners: Stainless Steel where noted, otherwise, Hot-dip galvanized according to ASTM A 153/A 153M.

- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 088000 "Glazing."

2.9 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding
 - 2. Provide stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 - 4. Terminated Stops: Terminate stops [6 inches (152 mm)] <Insert dimension> above finish floor with a [45] [90]-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
 - 5. Frames for installation in masonry wall openings more than 4' - 0" in width shall have an angle or channel stiffener made from the same material as the frame that shall be factory welded into the head when the head is to be grouted. Such stiffener shall not be used as lintel or load bearing member, shall not be longer than the opening width but not shorter than 1" and they shall not be less than 0.105" in thickness.
 - 6. Plaster guards shall be provided and welded in place at all hardware mortises on frames to be set in masonry or concrete openings. They shall be made from the same material as the frame with not less than 0.019" thickness.

7. Where specified or scheduled, Hollow Metal Infill Panels will be secured flush to the outside of exterior frames or flush to the secure side of interior frames. The Infill Panels will be anchored to the frame sections with loose stops and moldings on inside or non-secure side of hollow-metal frames. Provide stops for installation with stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
 2. Where nontemplated, mortised, and surface-mounted door hardware is to be applied, reinforce doors and frames, with all drilling and tapping done in the field, to receive:
 - a. Minimum thickness for hardware reinforcements in doors as follows:
 - 1) Full mortise hinges and pivots, 0.180".
 - 2) Reinforcements for lock fronts, concealed holders, or surface mounted closer, 0.105".
 - 3) Internal reinforcements for all other surface applied hardware 0.075".
 - b. Minimum thickness for hardware reinforcements in frames as follows:
 - 1) Hinge and pivot reinforcements ..., 0.195" x 1¼" >10" in length.
 - 2) Strike reinforcements ..., 0.105"
 - 3) Closer reinforcements ..., 0.105"
 - 4) Flush bolt reinforcements ..., 0.105"
 - 5) Reinforcements for surface applied hardware ..., 0.105"
 - 6) Reinforcements for hold open arms ..., 0.105"
 - 7) Reinforcements for surface panic devices ..., 0.105"
 3. In cases where electrically operated hardware is required, and indicated on architectural door schedule, conduit, hardware enclosures and/or junction boxes within the door shall be provided. Access plates where required shall be the same thickness as the door and fastened with a minimum of (4) #8-32 machine screws or #6 metal screws, not to exceed 12" o.c.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated, made of the same material and material thickness as the door or frame. Form corners of stops and moldings with butted hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated, to secure glazing coordinated in accordance with the glass sizes and thicknesses specified.
 2. Multiple Glazed Lites: Provide welded, fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame stops and moldings on outside of exterior and on secure side of interior doors and frames. Fixed glass stops and molding shall be welded to the secure side. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
6. At Exterior doors, metallic-coated surfaces beneath the glazing stops and the inside of the glazing stop shall be treated for maximum paint adhesion and painted with a rust inhibiting primer prior to installation in the frame.
7. At Interior doors, the metal surfaces to which glazing stops are secured and the inside of the glazing stops shall be chemically treated for the maximum paint adhesion and painted with a rust inhibiting primer prior to installation in the door.
8. Fire rated doors shall be prepared for listed glazing as required in accordance with the door manufacturer's fire rating procedure.

2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.
 1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.11 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.0480-inch- (1.2-mm-) thick, cold-rolled steel sheet set into 0.053-inch- (1.3-mm-) thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with welded inverted-V or inverted-Y blades.
 2. Lightproof Louver: Stationary louvers constructed with welded baffles to prevent light from passing from one side to the other.
 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of

- door assembly. Maximum louver size: 24" x 24" per leaf. Louvers are permitted in the lower portion of door only.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

2.12 CLEARANCES AND TOLERANCES

- A. Edge clearances for swinging doors shall not exceed the following
1. Between doors and frames, at head and jambs ..., $\frac{3}{16}$ ".
 2. Between edges of pairs of doors ..., $\frac{1}{16}$ "
 3. At door sills where a threshold is used ..., $\frac{3}{8}$ ". Measured from bottom of door to top of threshold.
 4. At door sills where no threshold is used ..., $\frac{3}{4}$ ".
 5. Between door bottom and nominal surface of floor coverings at fire rated openings as provided in NFPA 80-990, Paragraph 2.5.5.
- B. Manufacturing tolerance shall be maintained within the following limits:
1. Frames for single door or pair of doors:
 - a. Thickness of sheet metal ..., +0.015"; —0.007".
 - b. Width, measured between rabbets at the head. Nominal opening width ..., + $\frac{1}{16}$ "; — $\frac{1}{32}$ ".
 - c. Height (total length of jamb rabbet). Nominal opening height ..., + $\frac{3}{64}$ ".
 - d. Cross sectional profile dimensions.
 - 1) Face ..., + $\frac{1}{32}$ ".
 - 2) Stop ..., $\pm \frac{1}{32}$ ".
 - 3) Rabbet ..., + $\frac{1}{32}$ ".
 - 4) Depth ..., + $\frac{1}{32}$ ".
 - 5) Throat ..., $\pm \frac{1}{16}$ ". Frames overlapping walls to have throat dimension $\frac{1}{8}$ " greater than dimensioned wall thickness to accommodate irregularities in wall construction.
 2. Doors:
 - a. Thickness of sheet metal ... +0.015"; —0.007".
 - b. Width ..., + $\frac{3}{64}$ "
 - c. Height ..., + $\frac{3}{64}$ "
 - d. Thickness ..., + $\frac{1}{16}$ "
 - e. Hardware cutout dimensions. Template dimensions ..., +0.015"; —0"
 - f. Hardware location ..., + $\frac{1}{32}$ "

2.13 HARDWARE LOCATIONS

1. The location of hardware on doors and frames shall be coordinated with the locations indicated in Specification Section 087100 Door Hardware.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove wraps or covers from doors and frames upon delivery at the building site. Record any damage or error in the hollow metal delivered to the job site, and notify the manufacturer/supplier on writing to maintain warranty and/or fire label
- B. Promptly clean and touch up any scratches or disfigurement caused in shipping or handling with a rust inhibiting primer
- C. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed. Check doors and frames for correct size, swing =, fire rating and opening number.
- D. Store hollow metal door and frame materials in a dry location on planks at least 4" off ground or 2" off floor slab. Doors shall be stored in a vertical position and spaced at least $\frac{3}{8}$ " by wood strip or blocking. Materials shall be covered to protect them from damage but in such a manner as to permit air circulation. Place no more than 5 doors or welded frames in a group. In the case of multi-opening frames, no more than three units should be stored in a group, to avoid serious racking or other damage to the bottom of the frame
- E. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. The installer shall perform the following:
 - 1. Prior to installation, the area of floor on which the frame product is to be installed, and within the path of the door swing, shall be checked for flatness.
 - 2. Prior to installation, all interior surfaces of perimeter frame product sections to be installed in masonry or concrete walls shall be isolated and protected from grout and antifreeze agents.
- C. Doors and frame product shall be checked for correct size, swing, fire rating and opening number. Permissible installation tolerances shall not exceed the following:
 - 1. Squareness, $\pm 1/16$ " measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - 2. Squareness, $\pm 1/16$ " measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - 3. Twist, $\pm 1/16$ " measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.

4. Plumbness, $\pm 1/16$ " measured on the jamb at the floor.

D. Hollow-Metal Frames: Comply with NAAMM-HMMA 840.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.
5. Plaster guards and junction boxes are intended to protect hardware mortises and tapped mounting holes from masonry grout of 4" maximum slump consistency which is hand troweled in place. If a light consistency grout (greater than 5" slump when tested in accordance with ASTM C 143/C 143M) is to be used, special precautions must be taken in the field by the installation contractor to protect the aforementioned.
6. Frame products are not intended or designed to act as forms for grout or concrete. Grouting of hollow metal sections shall be done in "lifts" or precautions shall be otherwise taken by the contractor to ensure that frames are not deformed or damaged by the hydraulic forces that occur during this process.
7. Any grout or other bonding material shall be promptly cleaned off of frames or doors following installation. Hollow metal surfaces shall be kept free of grout, tar, or other bonding material or sealer.
8. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
9. Exposed hollow metal surfaces which have been scratched or otherwise marred during installation, cleaning, and/or field welding, shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with a rust inhibitive primer comparable to and compatible with the shop applied primer and finish paint specified in Section 099000.

E. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.
- F. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 081119 – STAINLESS STEEL DOORS AND FRAMES

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

Note:

*Stainless steel doors and frames should be specified for **all** exterior doors. At interior locations, Stainless steel doors and frames should **only** be specified in locations with highly corrosion potential.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Stainless-steel doors, frames, glazed openings, borrowed light frames, and insulated panels.
- B. Related Requirements:
 - 1. Section 042000 "Unit Masonry" for Mortar: Grout fill of metal frames.
 - 2. Section 079200 "Joint Sealants" for Sealing of joints between masonry and frames. Sealing of glazing.
 - 3. Section 081113 "Hollow Metal Doors and Frames" for hollow-metal doors and frames manufactured from steel.
 - 4. Section 087100 "Door Hardware" for door hardware for stainless steel doors.
 - 5. Section 088000 "Glazing" for glazed openings, including fire-rated glass and plastic glazing.

1.3 PRODUCTS FURNISHED AND INSTALLED UNDER THIS SECTION *(Delete Products not applicable to project)*

- A. Stainless steel metal doors, swinging type, with fire rating as indicated on drawings.

- B. Doors shall include glass moldings and stops, louvers and other as shown in the schedule on the contract drawings and specified herein.
- C. Stainless steel frames with fire rating as indicated on drawings with anchors.
- D. Frames shall include glass moldings and stops, louvers and other as shown in the schedule on the contract drawings and specified herein.
- E. Stainless steel panels with fire rating as indicated on drawings similar in construction to doors.

1.4 REFERENCES

NOTE: The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. Contractor/Supplier/Installer should comply with the referenced standard. When a more recent standard may be considered, Contractor/Supplier/Installer shall request the Philadelphia Parks and Recreation Department's approval.

A. Standards Agencies:

ANSI	American National Standards Institute, Inc., 1430 Broadway Avenue, New York, New York 10018.
ASTM	American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.
NAAMM	National Association of Architectural Metal Manufacturers, 600 South Federal Street, Chicago, Illinois 60605.
NFPA	National Fire Protection Association 1 Batterymarch Park P.O. Box 9101 Quincy, MA 02269
UL	Underwriters Laboratory, 333 Pfingsten Road, Northbrook, Illinois 60062.

B. Standards:

1. ANSI A250.4-2011, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Hardware Reinforcings
2. ANSI/NAAMM HMMA 801-12, Glossary of Terms for Hollow Metal Doors and Frames
3. ANSI/NFPA 80 -2015, 16th Edition, Standard for Fire Doors and Fire Windows
4. ANSI/NFPA 252-2017, Standard Methods of Fire Tests of Door Assemblies

5. ANSI/UL 10B-2009, Fire Tests of Door Assemblies, 9th edition
6. ANSI/UL 10C-2016, Positive Pressure Fire Test of Door Assemblies, 1st Edition
7. ASTM B117-16 Method of Salt Spray (Fog) Testing.
8. ASTM C 143/C 143M-15a, Test Method for Slump of Hydraulic-Cement Concrete
9. ASTM D1735-14, Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
10. NAAMM HMMA 802-07, Manufacturing of Hollow Metal Doors and Frames
11. NAAMM HMMA 803-08, Steel Tables
12. NAAMM HMMA 810-08, Hollow Metal Doors
13. NAAMM HMMA 810 TN01-03, Defining Undercuts
14. NAAMM HMMA 820-87, Hollow Metal Frames
15. NAAMM HMMA 820 TN01-03, Grouting Hollow Metal Frames
16. NAAMM HMMA 820 TN02-03, Continuously Welded
17. NAAMM HMMA 830-02, Hardware Selection for Hollow Metal Doors and Frames
18. NAAMM HMMA 831-11, Recommended Hardware Locations for Hollow Metal Doors and Frames
19. ANSI/NAAMM HMMA 866 Commercial Stainless Steel Doors and Frames
20. NAAMM HMMA 840-16, Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames
21. NAAMM HMMA 850-14, Fire-Rated Hollow Metal Doors and Frames

1.5 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.6 COORDINATION

- A. Coordinate anchorage installation for stainless steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

- C. Coordinate requirements for installation of glazing.

1.7 PREINSTALLATION MEETINGS

- A. Preinstallation Conference combined with Hollow Metal Doors and Frames Preinstallation Conference: Conduct conference at the Project Site.

1.8 TESTING AND PERFORMANCE

- A. Performance Test for Steel Doors and Hardware Reinforcements (ANSI A151.1)
- B. The test specimen shall be a 3' - 0" x 7' - 0" nominal size 1¾" door.
- C. The specimen shall be tested in accordance with the ANSI A151.1 procedure for the Level "A" doors (1,000,000 cycles).
 - 1. The specimen shall be tested in accordance with the ANSI AI 51.1 procedure for twist test which requires a maximum pressure of 300 lbs. pressure.
- D. All test reports shall include a description of the test specimen, procedures used in testing, and indicate compliance with the acceptance criteria of the test.
- E. Labeled Fire-Rated Doors and Frame Product.
 - 1. Doors, frames, transom frames and sidelight assemblies provided for openings requiring fire, temperature rise, shall be listed and/or classified and bear the label of a testing agency having a factory inspection service. The product shall be tested in accordance with ANSI/NFPA 252 or ANSI/UL-10B, ANSI, UL-10C and constructed as listed or classified for labeling. Fire, temperature rise and/or smoke and draft control ratings shall be determined and scheduled by the Architect.
 - 2. If any door or frame product specified by the Architect to be fire-rated cannot qualify for labeling because of design, hardware or any other reason, the Architect shall be so advised in the submittal documents. If hardware, glazing, or other options affect the fire-rating and are unknown at the time of submittal document preparation, the architect shall be advised.

1.9 QUALITY ASSURANCE

- A. Manufacturer's Qualifications.
 - 1. Manufacturer shall provide evidence of having personnel and plant equipment capable of fabricating stainless steel door and frame assemblies of the type specified herein.
- B. Installer Qualifications
 - 1. Installer, trained by the primary product manufacturer, with a minimum of five (5) years documented experience installing stainless steel doors and frame assemblies similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Quality Criteria.

1. All door and frame assemblies shall meet the requirements of Paragraph 1.8 of these specifications.
2. Fire labeled doors and frames shall be provided for those openings requiring fire protection ratings as determined and scheduled by the Architect and as required by the applicable Building Code. Such doors and frames shall be constructed as tested in accordance with ASTM E152 (UL-I0B) and approved by Underwriters Laboratories or other recognized testing agencies having a factory inspection service.
3. If any door or frame specified by the Architect to be fire-rated cannot qualify for appropriate labeling because of its design, hardware or any other reason, the Architect shall be so advised before fabricating work on that item is started.
4. Fabrication methods and product quality shall meet the standards set by the Hollow Metal Manufacturers Association, HMMA, a Division of the National Association of Architectural Manufacturers, NAAMM, as set forth in these specifications.

1.10 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Sustainable Design Submittals:

Rebuild Projects with over 10,000 square feet of renovation or new construction shall meet at a minimum the LEED™ Silver rating (See The Philadelphia Code, Section 17-111). Refer to Specification Sections 013329 Sustainable Design Reporting and 018113 Sustainable Design Requirements. For projects required to be certified at a minimum LEED Silver rating level, submit:

1. Product Declarations confirming recycled content of the metal used to fabricate the hollow metal doors and frames. Include product data, certification letter, and costs for materials with recycled content.
2. All other environmental product declarations required to meet the sustainable design and construction goals pertaining to these products including but not limited to regional materials.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.

7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

D. Samples for Initial Selection: For stainless steel doors and frames.

1. Samples for Verification (No work to be fabricated until samples are approved):
2. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).
3. Fabrication: Prepare Samples approximately 8 by 10 inches (203 by 254 mm) corner section to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge including welding joint of head to jamb, top, and bottom construction; core construction; and hinge, hinge mortise and other applied hardware reinforcement. Include separate section showing glazing if applicable with glazing stop applied to both head and jamb section to show corner joint.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing with stops if applicable.

E. Product Schedule: For stainless steel doors and frames, show each door and opening, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule – Show hardware group on schedule. Provide one schedule for the entire project – coordinate schedule for doors and openings of materials specified in other sections.

1.11 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated stainless steel door and frame assembly, for tests performed by a qualified testing agency.

Retain "Oversize Construction Certification" Paragraph below for oversized fire-rated assemblies.

- B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver stainless steel doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to finished surface of stainless steel units.

- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

- C. Store stainless steel doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:.
1. Ceco Door; ASSA ABLOY.
 2. Curries Company; ASSA ABLOY.
 3. Greensteel Industries, Ltd.
 4. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

(Delete Assemblies not applicable to project)

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Smoke- and Draft-Control Assemblies: Provide assemblies with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.
- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than **0.70 deg Btu/F x h x sq. ft.** *<Insert lower U-factor if required for LEED Silver Certification for projects > 10,000 SF or if Philadelphia adopts more recent IECC standard than IECC 2009>* when tested according to ASTM C 518.

2.3 STAINLESS STEEL DOORS AND FRAMES

- A. Stainless Steel Doors (Extra Heavy-Duty, SDI A250.8, Level 3) and Frames (Maximum Heavy-Duty, SDI A250.8, Level 4): NAAMM-HMMA 866; SDI A250.4, Physical Performance Level A. At locations indicated in the Door and Frame Schedule.
1. Doors for Highly Corrosive Environments:
 - a. Type: As indicated in the Door and Frame Schedule.

- b. Thickness: 1-3/4 inches. Doors shall be neat in appearance and free from warping or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of the metal used.
 - c. Face: Face sheets shall be 0.050 in. (1.27 mm) minimum thickness and shall be manufactured from Type 316 stainless steel sheet. Steel shall be free of scale, pitting, coil breaks or surface blemishes, buckles, waves or other defects.
 - d. Edge Construction: Door face sheets shall be joined at their vertical edges by a continuous weld extending the full height of the door with no visible seams on their faces or vertical edges per HMMA-801-83. Joint shall be set toward the center of the vertical edge of the door. A joint at the corner of the door face and the vertical edge is not accepted. The top and bottom edges shall be closed with a continuous channel, also not less than 0.062" (1.59 mm) thickness, welded to both sheets.
 - e. Edge Profiles: Edge profiles shall be provided on both vertical edges of single acting doors as follows: beveled 1/8" in 1 3/4" profile. All hardware for single acting doors shall be designed for beveled edges as specified.
 - f. Core: The door shall be stiffened by continuous vertically formed steel sections which, upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.030" minimum thickness, spaced so that the vertical interior webs shall be no more than 6" apart and securely fastened to both face sheets by spot welds spaced a maximum of 5" o.c. vertically. Spaces between stiffeners shall be filled with fiberglass, batt-type material.
 - g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
 - h. Exposed Finish: No. 6, Dull Satin
2. Frames for Highly Corrosive Environments:
- a. Materials: Type 316 stainless steel sheet. Minimum thickness: In openings 4' - 0" or less, steel shall be 0.062" (1.59 mm) minimum thickness. In openings greater than 4' - 0", steel shall be 0.078" (1.98 mm) minimum thickness.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
 - 1) All frames shall have integral stops and be welded units of the sizes and types shown in the contract drawings.
 - 2) Corner joints shall have all contact edges closed tight with miter faces, and either butted or miter stops. Faces and soffits shall be continuously welded and the faces finished smooth. The use of gussets or splice plates as a substitute for welding shall not be acceptable.
 - 3) All other face joints shall be continuously welded and smoothly finished.
 - 4) Minimum depth of stops shall be 5/8". Cut-off stops, where shown, shall be capped at heights as shown in the contract drawings, and jamb joints below cut-off stops shall be welded, filled and ground smooth so that there are no visible seams
 - 5) When shipping limitations so dictate, frames for large openings shall be fabricated in sections designated for assembly in the field by others. Alignment plates or angles shall be installed at each joint. Such components shall be the same thickness as the frame. Field joints shall be made in accordance with approved submittal drawings and shall be field welded.
3. Exposed Finish: No. 6, Dull Satin.

2.4 BORROWED LITES

- A. Fabricate frames and removable glazing channel stops from same thickness material as door frames as specified in Section 2.3 A.2.a. above. Stops to be butted at corner joints and secured to the frame using stainless steel #6 countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of stainless steel of same or greater thickness as stainless steel frames.
- D. Borrowed lites in fire rated wall enclosures shall be prepared for listed glazing as required in accordance with the stainless steel assembly manufacturer's fire rating procedure.

2.5 STAINLESS STEEL INFILL PANELS

- A. Provide stainless steel infill panels of same materials, construction, and finish as adjacent stainless steel door assemblies.

2.6 FRAME ANCHORS

- A. Jamb Anchors:

1. Masonry Type:

- a. Frames for installation in new masonry walls shall be provided with adjustable jamb anchors of the same material as the frame. Acceptable jamb anchors shall be TEE-strap or strap and stirrup type no less than 0.075" thickness, or wire type no less than 0.185" in diameter. Straps shall be no less than 2" x 10" in size, corrugated and/or perforated. All frames in new masonry shall be filled with grout. The number of anchors provided on each jamb shall be as follows:
 - 1) Frames up to 60" ..., 2 anchors.
 - 2) Frames greater than 60" up to 90" ..., 3 anchors.
 - 3) Frames greater than 90" up to 96" ..., 4 anchors
 - 4) Frames greater than 96", 4 anchors plus 1 for each 24" or fraction thereof over 96" spaced at 24" maximum between anchors (U.L. fire ratings may require additional anchors. Verify building and local code requirements, the most stringent will apply).
- b. Frames for installation in existing masonry or concrete walls shall be prepared for stainless steel expansion bolt type anchors. The preparation shall consist of a countersunk hole for a $\frac{3}{8}$ " diameter bolt and a spacer from the unexposed surface of the frame to the wall. The spacer shall be welded to the frame and spaced a maximum of 6" from the top and bottom, with intermediate spacing at a maximum of 26" o.c. Fasteners for such anchors shall be stainless steel provided by Installer. All frames installed in exterior openings shall be filled with grout.

2. Dry Wall Type:

- a. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, no less than 0.048" thickness, securely welded inside each jamb. The number of anchors provided on each jamb shall be as follows:
 - 1) Frames up to 60" ..., 3 anchors.
 - 2) Frames greater than 60" up to 90" ..., 4 anchors.
 - 3) Frames greater than 90" up to 96" ..., 5 anchors.
 - 4) Frames greater than 96", 5 anchors plus 1 for each 24" or fraction thereof over 96" spaced at 24" maximum between anchors (U.L. fire ratings may require additional anchors. Verify building and local code requirements, the most stringent will apply).
 3. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 4. Post-installed Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
1. Floor anchors with two holes for fasteners shall be fastened inside jambs with at least four (4) spot welded per anchor.
 2. Where so scheduled for finish floor underlayment thickness, adjustable floor anchors, providing no less than 2" height adjustment, shall be fastened in place with at least four (4) spot welds per anchor. Terminate bottom of frames at top of underlayment.
 3. Floor anchors shall be of the same material as the frame, with a minimum of 0.078" thickness.
- C. Material: stainless steel sheet – same type as door face.

2.7 MATERIALS

Retain "Recycled Content of Steel Products" Paragraph below to specify recycled content if applying for LEED Credit MR 4. USGBC allows a default value of 25 percent to be used for steel, without documentation; higher percentages can be claimed if they are supported by appropriate documentation. The Steel Recycling Institute indicates that steel sheet typically has 23 percent postconsumer recycled content and 1.5 percent preconsumer recycled content..

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent
- B. Stainless Steel Sheet: ASTM A 240/A 240M, austenitic stainless-steel, Type 316.
- C. Steel Sheet: ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, commercial steel, Type B.
- D. Metallic-Coated Steel Sheet: ASTM A653/A 653M, commercial steel, with minimum G60 (Z180) or A60 (ZF180) metallic coating.

- E. Foam-Plastic Insulation: Manufacturer's standard polystyrene board insulation with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM 84. Enclose insulation completely within door.
- F. Mineral-Fiber Insulation: Insulation made of rock-wool fibers, slag-wool fibers, or glass fibers.
- G. Inserts, Bolts, and Fasteners: Stainless Steel where noted, otherwise, Hot-dip galvanized according to ASTM A 153/A 153M.
- H. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- J. Glazing: Comply with requirements in Section 088000 "Glazing."
- K. Grout: Comply with ASTM C 476, with a slump of not more than 4 inches (102) as measured according to ASTM C 143/C 143M.

2.8 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Stainless Steel Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding
 - 2. Provide stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 - 4. Terminated Stops: Terminate stops [6 inches (152 mm)] <Insert dimension> above finish floor with a [45] [90]-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
 - 5. Frames for installation in masonry wall openings more than 4' - 0" in width shall have an angle or channel stiffener made from the same material as the frame that shall be factory welded into the

head when the head is to be grouted. Such stiffener shall not be used as lintel or load bearing member, shall not be longer than the opening width but not shorter than 1" and they shall not be less than 0.105" in thickness.

6. Plaster guards shall be provided and welded in place at all hardware mortises on frames to be set in masonry or concrete openings. They shall be made from the same material as the frame with not less than 0.019" thickness.
 7. Where specified or scheduled, Stainless Steel Infill Panels will be secured flush to the outside of exterior frames or flush to the secure side of interior frames. The Infill Panels will be anchored to the frame sections with loose stops and moldings on inside or non-secure side of Stainless Steel frames. Provide stops for installation with stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Comply with BHMA A156.115 for preparing stainless steel doors and frames for hardware.
 2. Where nontemplated, mortised, and surface-mounted door hardware is to be applied, reinforce doors and frames, with all drilling and tapping done in the field, to receive:
 - a. Minimum thickness for hardware reinforcements in doors as follows:
 - 1) Full mortise hinges and pivots, 0.180".
 - 2) Reinforcements for lock fronts, concealed holders, or surface mounted closer, 0.105".
 - 3) Internal reinforcements for all other surface applied hardware 0.075".
 - b. Minimum thickness for hardware reinforcements in frames as follows:
 - 1) Hinge and pivot reinforcements ..., 0.195" x 1¼" >10" in length.
 - 2) Strike reinforcements ..., 0.105"
 - 3) Closer reinforcements ..., 0.105"
 - 4) Flush bolt reinforcements ..., 0.105"
 - 5) Reinforcements for surface applied hardware ..., 0.105"
 - 6) Reinforcements for hold open arms ..., 0.105"
 - 7) Reinforcements for surface panic devices ..., 0.105"
 3. In cases where electrically operated hardware is required, and indicated on architectural door schedule, conduit, hardware enclosures and/or junction boxes within the door shall be provided. Access plates where required shall be the same thickness as the door and fastened with a minimum of (4) #8-32 Stainless Steel machine screws or #6 Stainless Steel metal screws, not to exceed 12" o.c.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated, made of the same material and material thickness as the door or frame. Form corners of stops and moldings with butted hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated, to secure glazing coordinated in accordance with the glass sizes and thicknesses specified.
2. Multiple Glazed Lites: Provide welded, fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame stops and moldings on outside of exterior and on secure side of interior doors and frames. Fixed glass stops and molding shall be welded to the secure side. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
5. Provide stops for installation with stainless steel countersunk sheet metal screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.
6. Fire rated doors shall be prepared for listed glazing as required in accordance with the door manufacturer's fire rating procedure.

2.9 STAINLESS STEEL FINISHES

- A. Stainless Steel Finishes: Remove tool and die marks and stretch lines, or blend into finish. Grind and polish surfaces to produce uniform finish, free of cross scratches. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- B. Finish: No. 6, Dull Satin.
- C. Grain Direction: For finishes exhibiting grain, run grain vertically on door faces and frame jambs.

2.10 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.0480-inch- (1.2-mm-) thick, cold-rolled steel sheet set into 0.053-inch- (1.3-mm-) thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with welded inverted-V or inverted-Y blades.
 2. Lightproof Louver: Stationary louvers constructed with welded baffles to prevent light from passing from one side to the other.
 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly. Maximum louver size: 24" x 24" per leaf. Louvers are permitted in the lower portion of door only.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

2.11 CLEARANCES AND TOLERANCES

- A. Edge clearances for swinging doors shall not exceed the following
1. Between doors and frames, at head and jambs ..., $\frac{3}{16}$ ".
 2. Between edges of pairs of doors ..., $\frac{1}{16}$ "
 3. At door sills where a threshold is used ..., $\frac{3}{8}$ ". Measured from bottom of door to top of threshold.
 4. At door sills where no threshold is used ..., $\frac{3}{4}$ ".
 5. Between door bottom and nominal surface of floor coverings at fire rated openings as provided in NFPA 80-990, Paragraph 2.5.5.
- B. Manufacturing tolerances: Fabricate frames to tolerances indicated in NAAMM-HMMA 866; tolerances shall be maintained within the following limits:
1. Frames for single door or pair of doors:
 - a. Thickness of sheet metal ..., +0.015"; —0.007".
 - b. Width, measured between rabbets at the head. Nominal opening width ..., + $\frac{1}{16}$ "; — $\frac{1}{32}$ ".
 - c. Height (total length of jamb rabbet). Nominal opening height ..., + $\frac{3}{64}$ ".
 - d. Cross sectional profile dimensions.
 - 1) Face ..., + $\frac{1}{32}$ ".
 - 2) Stop ..., $\pm \frac{1}{32}$ ".
 - 3) Rabbet ..., + $\frac{1}{32}$ ".
 - 4) Depth ..., + $\frac{1}{32}$ ".
 - 5) Throat ..., $\pm \frac{1}{16}$ ". Frames overlapping walls to have throat dimension $\frac{1}{8}$ " greater than dimensioned wall thickness to accommodate irregularities in wall construction.
 2. Doors:
 - a. Thickness of sheet metal ... +0.015"; —0.007".
 - b. Width ..., + $\frac{3}{64}$ "
 - c. Height ..., + $\frac{3}{64}$ "
 - d. Thickness ..., + $\frac{1}{16}$ "
 - e. Hardware cutout dimensions. Template dimensions ..., +0.015"; —0"
 - f. Hardware location ..., + $\frac{1}{32}$ "

2.12 HARDWARE LOCATIONS

1. The location of hardware on doors and frames shall be coordinated with the locations indicated in Specification Section 087100 Door Hardware.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove wraps or covers from doors and frames upon delivery at the building site. Record any damage or error in the stainless steel doors and frames delivered to the job site, and notify the manufacturer/supplier on writing to maintain warranty and/or fire label
- B. Promptly clean and touch up any scratches or disfigurement caused in shipping or handling.
- C. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Check doors and frames for correct size, swing, fire rating and opening number.
- D. Store door and frame materials in a dry location on planks at least 4" off ground or 2" off floor slab. Doors shall be stored in a vertical position and spaced at least $\frac{3}{8}$ " by wood strip or blocking. Materials shall be covered to protect them from damage but in such a manner as to permit air circulation. Place no more than 5 doors or welded frames in a group. In the case of multi-opening frames, no more than three units should be stored in a group, to avoid serious racking or other damage to the bottom of the frame
- E. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. General: Install stainless steel doors and frames plumb, rigid, properly aligned, and braced securely until permanent anchors are set. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. The installer shall perform the following:
 - 1. Prior to installation, the area of floor on which the frame product is to be installed, and within the path of the door swing, shall be checked for flatness.
 - 2. Prior to installation, all interior surfaces of perimeter frame product sections to be installed in masonry or concrete walls shall be isolated and protected from grout and antifreeze agents.
- C. Doors and frame product shall be checked for correct size, swing, fire rating and opening number. Permissible installation tolerances shall not exceed the following:
 - 1. Squareness, $\pm 1/16$ " measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - 2. Squareness, $\pm 1/16$ " measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 - 3. Twist, $\pm 1/16$ " measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
 - 4. Plumbness, $\pm 1/16$ " measured on the jamb at the floor.
- D. Stainless Steel Frames: Comply with NAAMM-HMMA 840.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 2. Fire-Rated Openings: Install frames according to NFPA 80.
 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 4. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.
 5. Plaster guards and junction boxes are intended to protect hardware mortises and tapped mounting holes from masonry grout of 4" maximum slump consistency which is hand troweled in place. If a light consistency grout (greater than 5" slump when tested in accordance with ASTM C 143/C 143M) is to be used, special precautions must be taken in the field by the installation contractor to protect the aforementioned.
 6. Frame products are not intended or designed to act as forms for grout or concrete. Grouting of hollow metal sections shall be done in "lifts" or precautions shall be otherwise taken by the contractor to ensure that frames are not deformed or damaged by the hydraulic forces that occur during this process.
 7. Any grout or other bonding material shall be promptly cleaned off of frames or doors following installation. Hollow metal surfaces shall be kept free of grout, tar, or other bonding material or sealer.
 8. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 9. Exposed hollow metal surfaces which have been scratched or otherwise marred during installation, cleaning, and/or field welding, shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with a rust inhibitive primer comparable to and compatible with the shop applied primer and finish paint specified in Section 099000.
- E. stainless steel Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors according to NFPA 105.

- F. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with stainless steel manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. Clean grout and other bonding material off stainless steel doors and frames immediately after installation.
- B. Stainless Steel Touchup: Immediately after erection, smooth any scratched or damaged areas of stainless steel; polish to match undamaged finish.

END OF SECTION

SECTION 087111 - DOOR HARDWARE

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - b. Other doors to the extent indicated.
- 2. Cylinders for door hardware specified in other Sections.
- 3. Electrified door hardware.

- B. Related Requirements:

- 1. Section 081113 "Hollow Metal Doors and Frames".
- 2. Section 081119 "Stainless-Steel Doors and Frames".
- 3. Section 084113 "Aluminum-Framed Entrances and Storefronts" for entrance door hardware, except cylinders.
- 4. Section 087113 "Automatic Door Operators" for low-energy power operators and low-energy power-assist operators.

- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

- 1. Permanent cylinders cores and keys to be furnished and installed by *Philadelphia Parks and Recreation Department*.

1.3 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings

of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.
- D. Provide removal schedule of the lock cylinders and cores. Coordinate delivery of the salvaged items with the project coordinator. All items not delivered shall be replaced with new.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 PRE-SUBMITTAL CONFERENCE:

- A. Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, arrange for manufacturers' representatives to hold a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for all doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware

Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- D. System Operational Descriptions: Complete system operational narratives for the access controlled openings defining the *Philadelphia Parks and Recreation Department's* prescribed requirements for the opening functionality. Narratives include, but are not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions, and interfaces with other building control systems.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.
- G. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing *Philadelphia Parks and Recreation Department's* final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.
 - 1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final **[door hardware]** **[and]** **[keying]** schedule.

1.8 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum [5] years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum [3] years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum [5] years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and the *Philadelphia Parks and Recreation Department* concerning both standard and electromechanical door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware schedules.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Division 1 - Closeout Procedures.
- B. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.10 QUALIFICATIONS

- A. Manufacturers: Companies specializing in the manufacture of products specified in this Section with minimum five years experience.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with minimum five years experience.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.12 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive PPR of other rights PPR may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the *Philadelphia Parks and Recreation Department*. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods (Door Hardware):
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Ten years for manual door closers.

1.13 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for *Philadelphia Parks and Recreation Department* 's continued adjustment, maintenance, and removal and replacement of door hardware.

1.14 SEQUENCING AND SCHEDULING

- A. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.
- B. Furnish hardware templates to frame and door manufacturers for installation of hardware.
- C. Provide removal's schedule of the lock's cylinder and cores. Coordinate delivery of the salvaged items with the department's Architect/Engineer. All items not delivered shall be replaced with new.

SPECIAL NOTE: All removal of the existing lock's cylinder and cores must be carefully done and set aside for the Department's disposition.

- D. Package lock's cylinder and cores individually label and identify package with door opening code to match Hardware Schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

	Item	Manufacturer	Comments
A.	Hinges	Markar & Stanley	
B.	Locksets, Cylinders and Cores	Best	
C.	Pull/Pull Plates	Rockwood	
D.	Kick Plates	Rockwood	
E.	Armor Plates	Rockwood	
F.	Closers	LCN	
G.	Thresholds	Reese & Pemko	
H.	Door Stops/Wall Bumpers	IVES & Rockwood	
I.	Exit Devices	Monarch	
J.	Weatherstripping	Reese & Pemko	
K.	Keying Control System	Best	
L.	Remote Annunciator Panel	Detex	
M.	Magnetic Switch	GRI	
N.	Security Astragal, "TEE" Type	Markar	
O.	Surface Bolts	IVES	

P.	Padlocks	Best of Wilsom Bohannon
Q.	Overhead Holder	LCN
R.	Lock Guards	Markar
S.	Removable Mullion (interior only)	Monarch
T.	Substitutions under the provisions of Section 012513.	

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
 - 1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
 - 3. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Thresholds: Not more than 1/2 inch high.
 - 4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
 - a. Test Pressure: Positive pressure labeling.

Retain "Smoke- and Draft-Control Door Assemblies" Paragraph below if required. The International Building Code requires fire door assemblies to comply with smoke- and draft-control requirements in corridors, smoke barriers, and smoke partitions.

- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

2.3 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and the Door Hardware Sets at the end of Part 3.

1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
- a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements.
 - b. The following is a list of the Basis of Design Manufacturers:

<u>Item</u>	<u>Manufacturer</u>	<u>Comments</u>
Hinges	Markar & Stanley	
Locksets, Cylinders and Cores	Best	
Pull/Pull Plates	Rockwood	
Kick Plates	Rockwood	
Armor Plates	Rockwood	
Closers	LCN	
Thresholds	Reese & Pemko	
Door Stops/Wall Bumpers	IVES & Rockwood	
Exit Devices	Monarch	
Weatherstripping	Reese & Pemko	
Keying Control System	Best	
Remote Annunciator Panel	Detex	
Magnetic Switch	GRI	
Security Astragal, "TEE" Type	Markar	
Surface Bolts	IVES	

Padlocks	Best of Wilsom Bohannon
Overhead Holder	LCN
Lock Guards	Markar
Removable Mullion (interior only)	Monarch
Substitutions	

2. Substitutions to the Basis of Design list of Manufacturers:

- a. Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, the *Philadelphia Parks and Recreation Department*, and their designated consultants.

2.4 HINGES

A. Manufacturers: Basis of Design provide products by Markar & Stanley

1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Butt Hinges:
 - 1) Bommer Industries.
 - 2) Hager Companies.
 - 3) McKinney Products.
 - b. Continuous Barrel Hinges:
 - 1) Bommer Industries.
 - 2) McKinney Products.
 - 3) Pemko Manufacturing.

B. Standards: Certified products complying with the following:

1. Butts and Hinges: ANSI/BHMA A156.1.
2. Continuous Barrel Hinges: ANSI/BHMA A156.26.
3. Template Hinge Dimensions: ANSI/BHMA A156.7.

C. Quantity: Provide the following hinge quantity, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches.
2. Three Hinges: For doors with heights 61 to 90 inches.
3. Four Hinges: For doors with heights 91 to 120 inches.
4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

D. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

Maximum Door Size (inches)	Hinge Height (inches)	Metal Thickness (inches)	
		Standard Weight	Heavy Weight
Up to 48-in by 120-in by 1-3/4	4-1/2	0.134	0.180
48-in by up to 120-in by 1-3/4	5	n/a	0.190

E. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

1. Exterior Doors: Heavy weight, stainless steel barrel type hinge
2. Interior Doors: Standard weight, steel, ball bearing hinges unless Hardware Sets indicate heavy weight.

F. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
 - a. Out-swinging access controlled doors.

G. At Aluminum Entrances and Storefronts: Continuous-Geared Hinges: Minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves with a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Provide concealed flush mount (with or without inset), full surface, and half surface, in standard and heavy duty models, as specified in the door hardware sets. Concealed continuous hinges to be U.L. listed for use on up to and including 90 minute rated door installations. Factory cut hinges for door size and provide with removable service power transfer panel where indicated at electrified openings.

2.5 DOOR OPERATING TRIM

A. Manufacturers: Basis of Design provide products by Best

1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Surface Bolts and Flushbolts:
 - 1) Door Controls International.
 - 2) McKinney Products.
 - 3) Rockwood Manufacturing.
2. Standards: Comply with the following:
 - a. Surface Bolts: BHMA A156.16.
 - b. Automatic and Self-Latching Flush Bolts: BHMA A156.3.
 - c. Manual Flush Bolts: BHMA A156.16.
3. Surface Bolts and Flush Bolts: BHMA Certified Grade 1.
4. Provide manual flush bolts with top rod of sufficient length to allow bolt location approximately six feet from the floor. Furnish dust proof strikes for bottom bolts. Surface bolts to be 8" in length and U.L. listed for labeled fire doors.

5. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
 - a. Mortise Flush Bolts: Minimum 3/4-inch throw.

2.6 LOCKS AND LATCHES

- A. Manufacturers: Basis of Design provide products by Monarch
 1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Mechanical Mortise Locks and Latches:
 - 1) Corbin Russwin Hardware - ML2000 Series.
 - 2) Sargent Manufacturing - 8200 Series.
 - 3) Schlage - L9000 Series
- B. Standards: Comply with the following:
 1. Mortise Locks and Latches: BHMA A156.13, Certified Grade 1, Series 1000.
- C. Lock Trim: Match the following design style:
 1. Levers:
 - a. Monarch Falcon – SUTRO design.
- D. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:
 1. Mortise Locks: BHMA A156.13.
- E. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
 1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
- F. Backset: 2-3/4 inches unless otherwise indicated.

2.7 CYLINDERS AND KEYING

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide products by Best.
- B. Standards: Comply with the following:
 1. Cylinders: BHMA A156.5 Certified Grade 1.
- C. Cylinders: Cylinders complying with the following:
 1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
- D. Construction Master keying: Furnish construction master keyed cylinders or temporary keyed construction cores where specified.
 1. General Contractor to provide permanent cores to Philadelphia Parks & Recreation.
- E. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- F. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
- G. Key Control System: Provide lockable cabinet for key control and storage as indicated in Hardware Sets.
- H. All door locks shall be master keyed to the PPR's master keying system incorporating completely removable and interchangeable cylinder cores. The interchangeable cores shall be removable by a special control key.
- I. Furnish construction cores during the period of construction using only construction keys. Upon date established by the Architect or Engineer, void construction core system and install specified keying system.
- J. All lock shall be grand master keyed and master keyed to the specifications of the *Philadelphia Parks and Recreation Department*. All permanent cores, shall be installed seven (7) days before the final inspection. All their keys, shall be shipped directly from the manufacturer to the *Philadelphia Parks and Recreation Department* only. All locks shall be supplied to the contractor with temporary construction cores for use by the contractor during the construction period.
- K. All mortise lock-sets shall be of heavy duty series and shall meet ANSI A156 Series 1000, Grade 1 operational and Grade 1 security.
- L. Locks must be supplied with cores and keys to match existing system.
- M. The master key system where required shall be a factory registered system to insure the propriety of the codes and avoid duplication or cross-keying.
- N. Provide ten extra keyed interchangeable cores for each master keyed group.
- O. Lock-sets and latch-sets shall be heavy duty mortise type with hinged, antifriction, $\frac{3}{4}$ inch throw latch-bolt with antifriction piece made of self lubricating stainless steel. The lock body cover will have five screw fasteners. Functions and design as indicated in the hardware groups. Functions shall be one inch projection with two hardened steel roll pins and concealed mounting.
- P. Permanent keys and cores will be stamped with the applicable key mark for identification. Mark the side of every core with the key mark.
- Q. Lock-sets and cores to be of the same manufacturer to maintain complete lock-set warranty.
- R. Deadbolts shall have no exposed mounting screws. Screws shall be covered by the trim plate that shall be detachable only after the core is removed.

- S. All cores shall be high security type, Best® #5C7DD. They shall be removable from all lock-sets by Special Control Key. Also, the removable core must be instantly interchangeable without modification for use in any lock throughout this system.
- T. Furnish two individual keys for each lock.
- U. Furnish keys (for each building) in the following quantities:
 - 1. 6 master keys.
 - 2. 2 control keys.
 - 3. 2 construction keys.
 - 4. 2 Individual keys for each.
 - 5. 2 Grandmaster keys.

2.8 STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Dustproof Strikes: BHMA A156.16.

2.9 EXIT DEVICES

- A. Manufacturers: Basis of Design provide products by Monarch
 - 1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Corbin Russwin Hardware - ED4000/ED5000 Series.
 - b. Sargent Manufacturing - 80 Series.
 - c. Von Duprin - 35A/98 Series.
- B. Standard: BHMA A156.3, Certified Grade 1.
- C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- D. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- E. Outside Trim: Match design for locksets and latchsets, unless otherwise indicated.

- F. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

2.10 ACCESSORIES FOR PAIRS OF DOORS

- A. Manufacturers: Basis of Design provide products by Monarch
 - 1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - 2. Keyed Removable Mullions:
 - a. Corbin Russwin Hardware.
 - b. Sargent Manufacturing.
 - c. Von Duprin.
- B. Standards: Comply with the following:
 - 1. Coordinators: BHMA A156.3.
 - 2. Removable Mullions: BHMA A156.3.
- C. Fire-Exit Removable Mullions: Provide keyed removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

2.11 CLOSERS

- A. Manufacturers: Basis of Design provide products by LCN
 - 1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - 2. Surface-Mounted Closers (Heavy Duty):
 - a. Corbin Russwin Hardware - DC8000 Series with heavy duty arms.
 - b. Norton Door Controls - 7500 Series with heavy duty arms.
 - c. Sargent Manufacturing - 351 Series with heavy duty arms.
- B. Standards: Comply with the following:
 - 1. Surface Closers: BHMA A156.4, Certified Grade 1.
- C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide non-handed, factory-sized closers adjustable to meet field conditions and requirements for opening force.
- D. Closer Options: As indicated in hardware sets, provide door closer options including: delayed action, hold open arms, extra duty parallel arms, positive stop/hold open arms, compression stop/hold open arms, special mounting brackets, spacers and drop plates. Through bolt type mounting is required as indicated in the door hardware sets.

2.12 OPERATING AND PROTECTIVE TRIM UNITS

A. Manufacturers: Basis of Design provide products by Rockwood

1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Metal and Plastic Protective Trim Units:
 - 1) McKinney Products.
 - 2) Trimco Manufacturing TR).
 - b. Door Pulls:
 - 1) McKinney Products.
 - 2) Trimco Manufacturing.
2. Standard: BHMA Certified A156.6.
3. Materials: Fabricate protection plates from the following:
 - a. Stainless Steel: .050 inches thick, beveled four sides (B4E) with countersunk screw holes.
 - b. Furnish protection plates sized two inches less than door width (LDW) on push side and by height specified in door hardware sets.
4. Push/Pull Plates: .050 inch thick, 4 inches wide by 16 inches high with square corners and beveled edges, secured with exposed screws.
 - a. Straight Pull Design: 1-inch round diameter with 10-inch centers and 1 1/2-inch clearance from face of door.
 - b. Offset Pull Design: 1-inch round diameter pull, with 10-inch centers and clearance of 1-1/2 inches from face of door with offset of 45 degrees.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in door hardware sets.

2.13 STOPS AND HOLDERS

A. Manufacturers: Basis of Design provide products by IVES or Rockwood

1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - a. Stops and Holders:
 - 1) McKinney Products.
 - 2) Trimco Manufacturing.
 - b. Combination Overhead Stops and Holders:
 - 1) Glynn-Johnson - 100 Concealed and 90 Surface Series
 - 2) Sargent Hardware - 600 Concealed and 500 Surface Series.
2. Standards: Comply with the following:
 - a. Stops and Bumpers: BHMA A156.16, Certified Grade 1.

- b. Combination Overhead Holders and Stops: BHMA A156.8, Certified Grade 1.
- 3. Stops and Bumpers: Provide wall stops for all doors unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead stops and/or holders. Whenever possible, use wall bumpers or dome type door stops. Where it is impractical to use wall stops or bumper, furnish floor type door stops. Wall bumpers suitable to typical substrate - 402.5 or 403.5 by Ives; 403 or 405 by Rockwood.
- 4. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch fabricated for drilled-in application to frame. Provide (3) per single door and (2) per paired door frame if applied gasketing is not specified in Hardware Sets.

2.14 DRIP CAP

- A. Drip cap to be 16 ga. Stainless Steel 1.5" by 1.5" by full width of door opening. Installed on frame above door opening in full bed of sealant, with fasteners at 3" O.C.

2.15 RAIN DRIP

- A. Manufacturers: Basis of Design provide products by Reese.
- B. Drip cap to be aluminum 1.5" by 9/16" by full width of door opening. Installed on frame above door opening in full bed of sealant, with fasteners at 3" O.C.

2.16 DOOR THRESHOLDS, WEATHERSTRIPPING AND GASKETING

- A. Manufacturers: Basis of Design provide products by Reese & Pemko
 - 1. Subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
 - 2. Door Thresholds, Weatherstripping and Gasket Seals:
 - a. McKinney Weatherstripping Products.
 - b. Zero.
- B. Standard: Comply with BHMA A156.22.
- C. General: Provide continuous weatherstrip seal on exterior doors and smoke, light, or sound gasketing on interior doors where specified. Provide non-corrosive fasteners for exterior applications.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Install header seal before mounting door closer arms.
 - 2. Meeting Stile Astragals: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Sweep: Apply to bottom of door, forming seal with threshold when door is closed.
- D. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- E. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
1. Intumescent Seals and Gasketing: Provide concealed, Category A type gasketing systems on assemblies where an intumescent seal is required to meet IBC and UL-10C positive pressure labeling.
- F. Thresholds
1. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 2. Compressing-Top Thresholds: Metal member with compressible vinyl seal on top of threshold that seals against bottom of door; and base metal of aluminum.
 3. Saddle Thresholds:
 - a. Type: Fluted top, barrier free.
 - b. Base Metal: Aluminum.
 4. Half-Saddle Thresholds: Fluted-top metal member; and base metal of aluminum.
 5. Provide a pre-drilled (countersunk) aluminum floor plate threshold as scheduled. Thresholds shall be an assembled unit comprised of two supports and a floor plate and one or two pair of mitered returns (when wider than the wall's width). All components shall anchored to substrate with ¼" Hollow Set Drop-In anchors, and laid in a full bed of high strength cement grout. Thresholds shall satisfy the following conditions for sizing and installation according to substrate, finish floor, interior/exterior grades, frame opening and masonry opening:
 6. Thresholds shall cover all interior and exterior slab joints, extending at least 1" beyond them.
 7. Thresholds shall cover a ½" minimum of the edge of the finish floor.
 8. The threshold's length shall be equal to the width of the masonry opening where it is scheduled to be installed, and shall be cut neatly to fit around jambs. Also, it shall be as wide as the width of the wall that contains the masonry opening (two plates may be required), and no more than ¼" larger on each side.
 9. Threshold shall be installed o.c. of masonry opening.
 10. When a difference on grades between the interior and the exterior edges of the threshold occurs, provide supports of dissimilar heights to correct the differential on grades.
 11. When thresholds' width extend beyond the width's requirements stated in condition 03 above, to satisfy conditions 01 and 02 also above, they shall have a miter returns on both ends. Miter return's corners shall have a miter joint continuously welded and ground smooth. All miter returns shall abut against the walls.
 12. Tolerance for all joints and seams of the assembled components shall be lesser 1/32".

2.17 MAGNETIC STEEL DOOR SWITCH

- A. Recessed Steel Door Switch Set shall be provided and ready to be connected (available wire leads in conduit inside the frame) to a Remote Indicating Panel (RIP), where available or for future application. These switches are designed primarily to serve as: Sensing devise to detect the opening of a door, assuring that a protected door is securely under surveillance; trigger for the wall mounted Exit Alarm, which will signal that a door has been inadvertently left open; and direct switch to set off many kinds of audio and/or visual alarms. Provide model 8080-T magnetic steel door switch set, by GRI Telemark Corp., GRI Plaza, Kimball, Nebraska 69145. Color to be selected by the Architect or Engineer.
- B. Overhead mounted is required. The switch contacts are housed in the door frame separate from the magnet which is recessed into the key side of the door @ 3" o.c. from the top side of the door. Provide factory punched holes on frames and doors. When field drilling might be needed, door and frame must

be templated, in order to achieve the proper alignment of the pair of contacts. Mortar box must be installed in all frames where switch contacts are to be inserted.

2.18 JUNCTION BOX - MORTAR SHIELD FOR DOOR SWITCH

- A. Provide one junction box/mortar shield per each door leaf at each exterior frame. Fast junction box/mortar shield to the frame with SS countersunk TORX pinhead screws. Paint with bituminous paint the surface of the junction box/mortar shield that will be in contact with the frame.
 - 1. JB-2 Junction Box & Mortar Shield by Stanley.
- B. Connect a ½" flexible metal conduit to side outlet of the junction box/mortar shield with a 90° connector for flexible metal conduit. Connect the other end of the conduit to the punched hole on the indoor face of the frame with a straight connector for flexible conduit. This will allow at any time the wiring of the switch into the building. See detailed drawing.

2.19 KEYS HOUSING BOX

- A. Provide at each facility one key cabinet, master keyed to building system. Cabinet shall be made of sheet metal with a baked enamel finish, colored as selected by the Architect or Engineer; it shall have the capacity to handle this Project plus 25 percent expansion. Cabinet to include Best 1EJ74 cabinet lock with interchangeable core.
- B. Regent model #RWC 25S by Tel-Kee.

2.20 FASTENERS

- A. Furnish necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life and hard use. Use one way or Torx pin-head screws on all hardware.
- B. Where necessary, furnish fasteners with toggle bolts, expansion shields, sex bolts, and other anchors approved by the Architect or Engineer, according to the material to which the hardware is to be applied and according to the recommendations of the hardware manufacturer.
- C. Setting of fasteners shall not be done into or by-mean-of "adjusta-screws". Manufacturers' recommended fasteners will be driven into the pre-tapped holes for fully templates mortised hardware, following an approved hardware schedule and templates.
- D. Provide fasteners which harmonize with the hardware as to finish and materials.

2.21 SHOP CUTS

- A. Any cutting must be done in the manufacturer shop. No field cutting will be accepted. This applies, but not limited to armor, push, pull and kick plates; also, frames and doors.
- B. Indicate on shop drawings submission the location of shop cuts, punches and perforations. This applies, but not limited to armor, push, pull and kick plates; also, frames and doors.

2.22 WELDING

- A. All welding shall be of continuous type. Provide filler wire similar to the material being welded. All welding shall be ground smooth to blend with the surrounding finish.

2.23 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Finish hardware, except as otherwise noted, to be of stainless steel with US32D finish. Where items are not manufactured in stainless steel, dull chrome US26D shall be furnished.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Notify architect of any discrepancies or conflicts between door schedule, door types, drawings and scheduled hardware. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Contractors' installers are to be trained and certified by a door hardware manufacturer representative on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated in attachment for Hardware Mounting Heights. or required to comply with governing regulations:
1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
- C. Boxed Power Supplies: Verify locations with Architect.
1. Configuration: Provide the least number of power supplies required to adequately serve doors with access control equipment.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- G. Lock Cylinders: Install construction cores to secure building and areas during construction period.
1. Replace construction cores with permanent cores as directed by PPR.
- H. Key Control System:
1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.
 3. Key Control System Software: Set up multiple-index system based on final keying schedule.
- I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
1. Do not notch perimeter gasketing to install other surface-applied hardware.
- K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

- L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
2. Consult with and instruct *Philadelphia Parks and Recreation Department's* personnel on recommended maintenance procedures.
3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish, provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of *Philadelphia Parks and Recreation Department* occupancy.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for PPR's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include nine months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.8 DEMONSTRATION

- A. Engage a factory-authorized representative to train *Philadelphia Parks and Recreation Department's* maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware

3.9 DOOR HARDWARE SETS

- A. The hardware sets listed below represent the design intent and direction of the *Philadelphia Parks and Recreation Department* and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.
 - 1. Hardware mounting locations specific for each hardware set are shown on the door diagram drawing immediately following the associated hardware set description below.

HARDWARE SET No. 1***EXIT Exterior Pair of Doors with a Removable Mullion.¹***

(2)	Continuous Hinges	HG-305 (SS) NRP	Markar
(2)	Closer	4211H-CUSH (ST3011 size 4)	LCN
(1)	High Security Cylinder	1E7K4-32-S2 (Active leaf)	Best
(2)	Extended Cylinder	1E72 (provide with Exit Devices CD function)	Best
(1)	Exit Device	CD-18-M-816L-3 <SUTRO level ² >	Monarch
(1)	Exit Device	CD-18-M-EO-3	Monarch
(2)	Security Astragal	EG-T-308 (continuous)	Markar
(1)	Assembly Set Threshold ³	234A to 280A ⁴ +(2)S247A+261A	Reese
(2)	Kick Plates	J102 x US16(0.0625") x 12" x 1½" < Dr.W	Rockwood
(2)	Armor Plates (SS)	J101 x US16(0.0625") x 36" x 1½" < Dr.W	Rockwood
(2)	Set Weatherstrip	353A & 807A	Reese
(1)	Set Magnetic Switch ⁵	8080T (Recess type) or 250-36 (Surface type)	GRI
(2)	Mortar Boxes ⁶	JB-2 Junction Box	Stanley
(1)	Drip Cap ⁷	R199A	Reese

¹ Removable mullion to be fabricated by door frame manufacturer with the same profile and material of the door frame.

² Rim locks with pull-handle on the 6 o'clock position. The handle unlatching action is enabled by key from outside.

³ Cut thresholds to fit around the mullion. Thresholds will be set in a full bed of grout.

⁴ Absolute width may vary per each door as defined in item 2.10 of this Section. Also, a combination of two sizes may be required.

⁵ Install on new frames switch magnetic sensor 8080T set in a STANLEY junction box/mortar shield. Install 250-36 on existing frames only.

⁶ Apply bituminous paint to the mortar box's surface that will be in contact with the frame.

⁷ Continuous on frame head, completely across masonry opening. Do not install on doors under a canopy or an overhang.

DRIP CAP
& WEATHER STRIP

REMOVEABLE
MULLION &
SECURITY
ASTRAGAL (EXT.)

CLOSER

CYLINDERS HIGH
SECURITY AND
EXTENDED

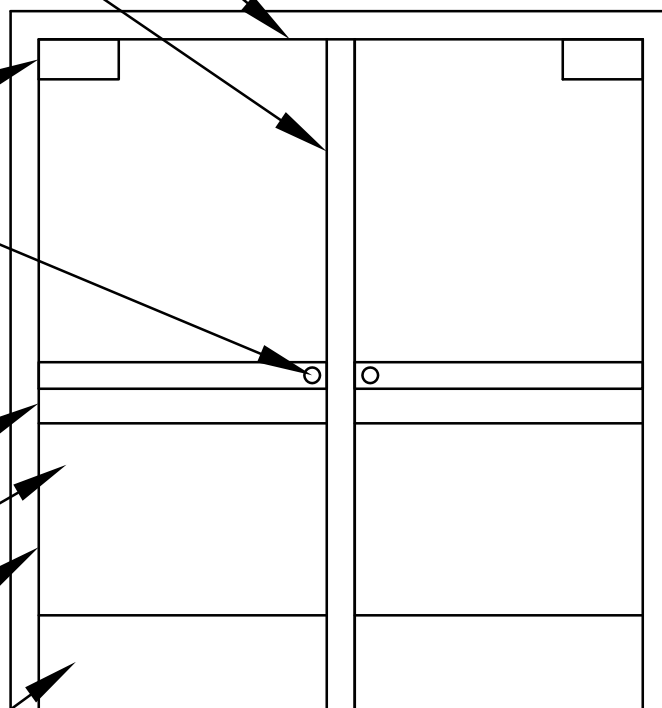
EXIT DEVICE

ARMOR PLATE

CONT. HINGE
BOTH LEAFS

KICK PLATE

THRESHOLD



SET INCLUDES:
-MAGNETIC SWITCH
AND MORTAR BOX



HARDWARE SET No. 2***EXIT Exterior Single Door***

(1) Continuous Hinge	HG-305 (SS) NRP	Markar
(1) Closer	4211H-CUSH (ST3011 size 4)	LCN
(1) High Security Cylinder	1E7K4-32-S2	Best
(1) Extended Cylinder	1E72 (provide with Exit Devices CD function)	Best
(1) Exit Device	CD-25-M-511L-3 <SUTRO level ⁸ >	Falcon
(1) Kick Plate	J102 x US16(0.0625") x 12" x 1½" < Dr.W	Rockwood
(1) Armor Plate	J101 x US16(0.0625") x 36" x 1½" < Dr.W	Rockwood
(1) Security Astragal	EG-T-308 (continuous)	Markar
(1) Threshold	234A to 280A ⁹ +(2)S247A+261A	Reese
(1) Set Weatherstrip	353A & 807A	Reese
(1) Set Magnetic Switch ¹⁰	8080T (Recess type) or 250-36 (Surface type)	GRI
(1) Mortar Box ¹¹	JB-2 Junction Box	Stanley
(1) Drip Cap ¹²	R199A	Reese

⁸ Rim locks with pull-handle on the 6 o'clock position. The handle unlatching action is enabled by key from outside.

⁹ Absolute width may vary per each door as defined in item 2.10 of this Section. Also, a combination of two sizes may be required.

¹⁰ Install on new frames switch's magnetic sensor 8080T set in a STANLEY junction box/mortar shield. Install 250-36 on existing frames.

¹¹ Apply bituminous paint on mortar box's surface that will be in contact with the frame.

¹² Continuous on frame head, completely across masonry opening. Do not provide under or overhang canopy

DRIP CAP
& WEATHER STRIP

SECURITY
ASTRAGAL (EXT.)

CLOSER

CYLINDERS HIGH
SECURITY AND
EXTENDED

EXIT DEVICE

ARMOR PLATE

CONT. HINGE
BOTH LEAFS

KICK PLATE

THRESHOLD

SET INCLUDES:
-MAGNETIC SWITCH
AND MORTAR BOX



HARDWARE SET No. 3***Exterior Single Door***

(1) Continuous Hinge	HG-305 (SS) NRP	Markar
(1) Closer	4211H-CUSH (ST3011 size 4)	LCN
(1) Deadbolt	48H-7-K-1E7K4-32-S2 or 48H-7-R-1E7K4-32-S2 ¹³	Best
(2) Pull Plate ¹⁴	93	Rockwood
(1) Kick Plate	J102 x US16(0.0625") x 12" x 1½" < Dr.W	Rockwood
(1) Armor Plate	J101 x US16(0.0625") x 36" x 1½" < Dr.W	Rockwood
(1) Security Astragal	EG-T-308 (continuous)	Markar
(1) Threshold	234 A to 280A ¹⁵ +(2)S247A+261A	Reese
(1) Set Weatherstrip	353A & 807A	Reese
(1) Set Magnetic Switch ¹⁶	8080T (Recess type) or 250-36 (Surface type)	GRI
(1) Mortar Box ¹⁷	JB-2 Junction Box	Stanley
(1) Drip Cap ¹⁸	R199A	Reese

¹³ Install locks with "R" function on exterior doors at any room with an exterior door as the only exit.

¹⁴ Install under the upper half portion of the pull plate a 14 gauge SS filler plate with flushed edges.

¹⁵ Absolute width may vary per each door as defined in item 2.10 of this Section. Also, a combination of two sizes may be required.

¹⁶ Install on new frames switch's magnetic sensor 8080T set in a STANLEY junction box/mortar shield. Install 250-36 on existing frames.

¹⁷ Apply bituminous paint on mortar box's surface that will be in contact with the frame.

¹⁸ Continuous on frame head, completely across masonry opening.

DRIP CAP
& WEATHER STRIP

CLOSER

DEADBOLT

PULL PLATE
(INT & EXT)

EXIT DEVICE

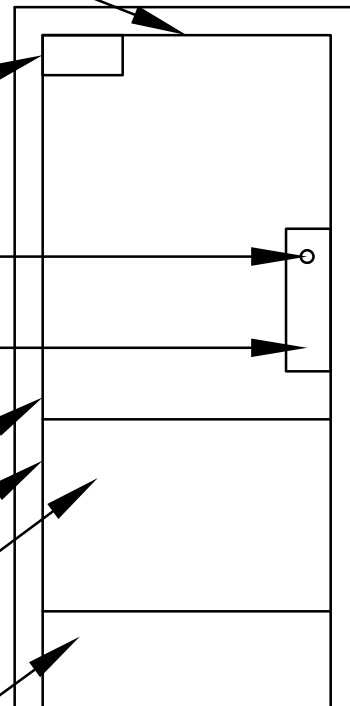
CONT. HINGE

ARMOR PLATE

KICK PLATE

THRESHOLD

SECURITY
ASTRAGAL
(EXT.)



SET INCLUDES:
-MAGNETIC SWITCH
AND MORTAR BOX



HARDWARE SET No. 4***(Existing) EXIT Exterior Double Doors with Removable Mullion.***

(2)	Continuous Hinges	HG-305 (SS) NRP	Markar
(2)	Closer ¹⁹	4211H-CUSH (ST3011 size 4)	LCN
(1)	High Security Cylinder	1E7K4-32-S2 (Active leaf)	Best
(2)	Extended Cylinder	1E72 (provide with Exit Devices CD function)	Best
(1)	Exit Device	CD-18-R-816L-3 <SUTRO level ²⁰ >	Monarch
(1)	Exit Device	CD-18-R-EO-3	Monarch
(2)	Pull Plate	93	Rockwood
(1)	Security Astragal	EG-T-308 (continuous on active leaf)	Markar
(1)	Assembly Set Threshold ²¹	234A to 280A ²² +(2)S247A+261A	Reese
(2)	Kick Plates	J102 x US16(0.0625") x 12" x 1½" < Dr.W	Rockwood
(2)	Armor Plates (SS)	J101 x US16(0.0625") x 36" x 1½" < Dr.W	Rockwood
(2)	Set Weatherstrip	353A & 807A	Reese
(1)	Set Magnetic Switch ²³	8080T (Recess type) or 250-36 (Surface type)	GRI
(2)	Mortar Boxes ²⁴	JB-2 Junction Box	Stanley
(1)	Drip Cap ²⁵	R199A	Reese

¹⁹ Set a longer delay for closer on active leaf than the inactive leaf to allow latch/strike time coordination for engagement.

²⁰ Rim locks with pull-handle on the 6 o'clock position. The handle unlatching action is enabled by key from outside.

²¹ Cut thresholds to fit around the mullion. Thresholds will be set in a full bed of grout.

²² Absolute width may vary per each door as defined in item 2.10 of this Section. Also, a combination of two sizes may be required.

²³ Install on new frames switch magnetic sensor 8080T set in a STANLEY junction box/mortar shield. Install 250-36 on existing frames only.

²⁴ Apply bituminous paint to the mortar box's surface that will be in contact with the frame.

²⁵ Continuous on frame head, completely across masonry opening. Do not install on doors under a canopy or an overhang.

DRIP CAP
& WEATHER STRIP

CLOSER

PULL PLATE (EXT)

CYLINDERS HIGH
SECURITY AND
EXTENDED

EXIT DEVICE

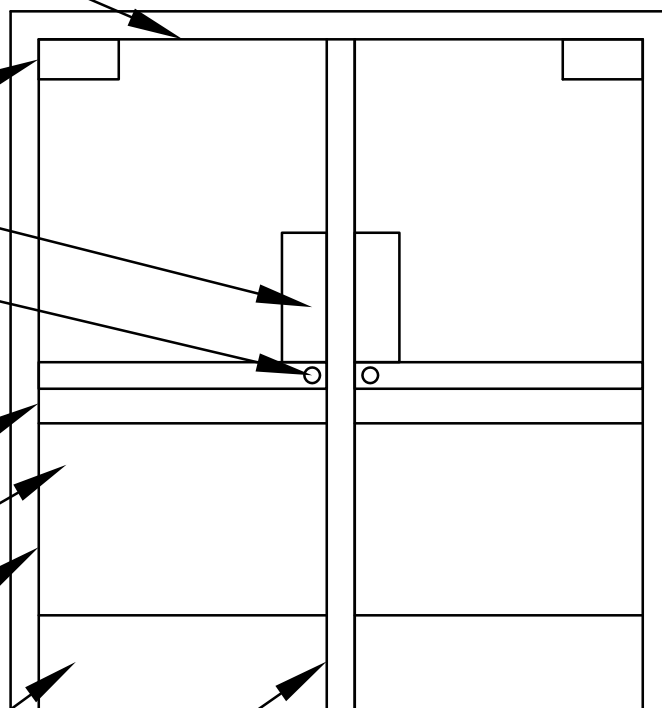
ARMOR PLATE

CONT. HINGE
BOTH LEAFS

KICK PLATE

THRESHOLD

SECURITY
ASTRAGAL
(ACTIVE LEAF)
AND REMOVABLE
MULLION



SET INCLUDES:
-MAGNETIC SWITCH
AND MORTAR BOX



HARDWARE SET No. 5**Exterior Double Doors (at Field Maintenance Door)**

(2)	Continuous Hinges	HG-305 (SS) NRP	Markar
(2)	Overhead Holders	3310	ABH
(1)	Deadbolt	39H-7-K-1E7K4-32-S2	Best
(2)	Pull Plate ²⁶	93	Rockwood
(1)	Security Astragal	EG-T-308 (continuous)	Markar
(1)	Threshold	224A to 280A ²⁷ +(2)S247A+261A	Reese
(2)	Surface Bolts ²⁸	360 (8" size)	Ives
(2)	Kick Plates	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(2)	Armor Plates (Stainless Steel)	J101 x US16(0.0625")x 48" x 1½" < Dr.W	Rockwood
(1)	Set Magnetic Switch ²⁹	8080T (Recess type) or 250-36 (Surface type)	GRI
(2)	Mortar Boxes ³⁰	JB-2 Junction Box	Stanley
(1)	Set Weatherstrip	353A & 807A	Reese
(1)	Drip Cap ³¹	R199A	Reese

²⁶Install under the upper half portion of the pull plate a 14 gauge SS filler plate with flushed edges. Install pulls on the active leaf only.

²⁷Absolute width may vary per each door as defined in item 2.10 of this Section. Also, a combination of two sizes may be required.

²⁸The bottom surface bolt must engage into the mullion only, not into the floor.

²⁹Install on new frames switch's magnetic sensor 8080T set in a STANLEY junction box/mortar shield. Install 250-36 on existing frames.

³⁰Apply bituminous paint to the mortar box's surface that will be in contact with the frame.

³¹Continuous on frame head, completely across masonry opening.

SURFACE BOLT ON INTERIOR FACE

DRIP CAP
& WEATHER STRIP

SECURITY
ASTRAGAL (EXT.)

CLOSER

PULL PLATE

DEAD BOLT

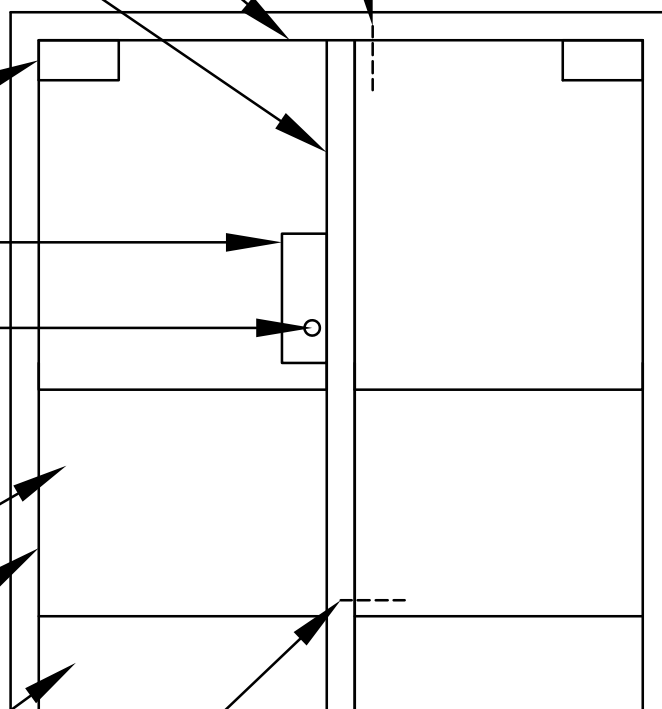
ARMOR PLATE

CONT. HINGE
BOTH LEAFS

KICK PLATE

THRESHOLD

SURFACE BOLT
ON INTERIOR
FACE



SET INCLUDES:
-MAGNETIC SWITCH
AND MORTAR BOX
-OVERHEAD
HOLDERS
-SURFACE BOLTS
ON INTERIOR FACE
OF INACTIVE LEAF



PHILADELPHIA
PARKS & RECREATION

HARDWARE DETAIL SET 5

HARDWARE SET No. 6***Fire Rated Interior Pair of Doors with a Removable Mullion³² at Corridors or Vestibules.***

(3)	Pr. Hinges	IHTCB1961R-4½" (Butt) NRP	Stanley
(1)	Exit Device	F-18-M-816L-3 <SUTRO level ³³ >	Monarch
(1)	Exit Device	F-18-M-EO-3	Monarch
(1)	Extended Cylinder	1E72 (provide with Exit Device active leaf)	Best
(2)	Closer	4211H (ST3011 size 4)	LCN
(2)	Kickplate	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(2)	Kickplate	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(2)	Wall bumper ³⁴	402½ or 403½	Ives
(2)	Set Silencers	No. 20	Ives

³² Removable mullion to be fabricated by door frame manufacturer with the same profile and material of the door frame.

³³ Rim locks with pull-handle on the 6 o'clock position. The handle unlatching action is enabled by key from outside.

³⁴ When doors swinging up to 135° only. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.

REMOVABLE
MULLION

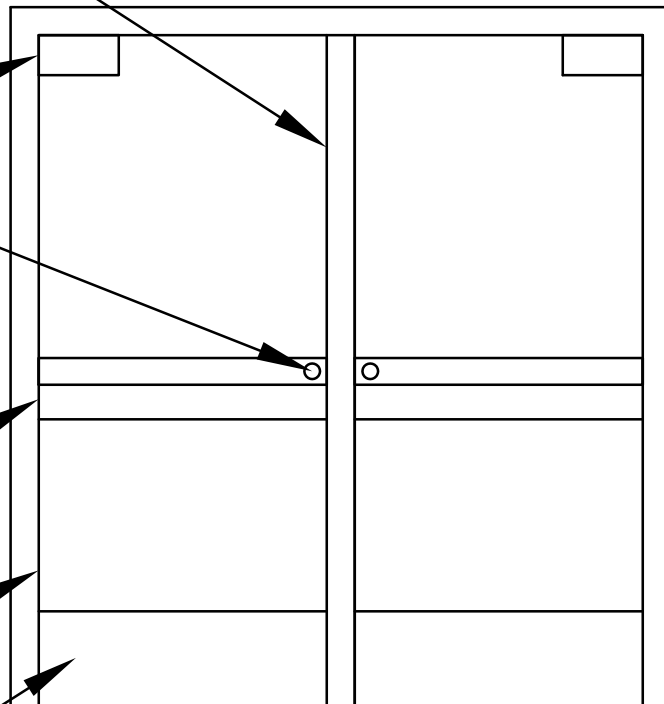
CLOSER

CYLINDERS
EXTENDED

EXIT DEVICE

PR. HINGES

KICK PLATE



SET INCLUDES:
-WALL BUMPER
-SILENCER

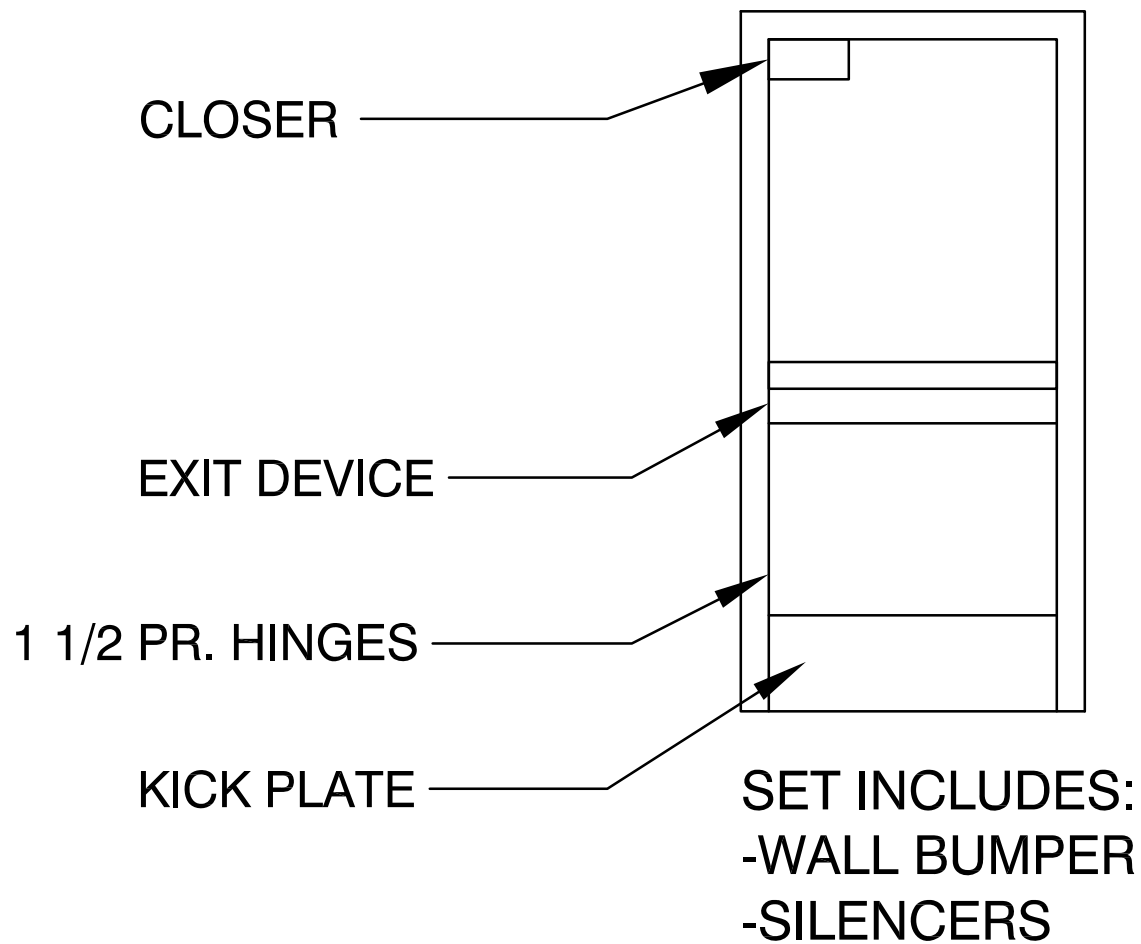


HARDWARE SET No. 7***Fire Rated Interior Single Door for Corridors or Vestibules.***

(1½)	Pair Hinges	IHTCBI961R-4½" (Butt) NRP	Stanley
(1)	Exit Device	F-18-R-816L-3 <SUTRO level ³⁵ >	Monarch
(1)	Closer	4211H (ST3011 size 4)	LCN
(1)	Kickplate	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(1)	Kickplate	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(1)	Wall Bumper ³⁶	402½ or 403½	Ives
(1)	Set Silencers	No. 20	Ives

³⁵ Rim locks with pull-handle on the 6 o'clock position. The handle unlatching action is enabled by key from outside.

³⁶ Only when doors swinging up to 135°. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.

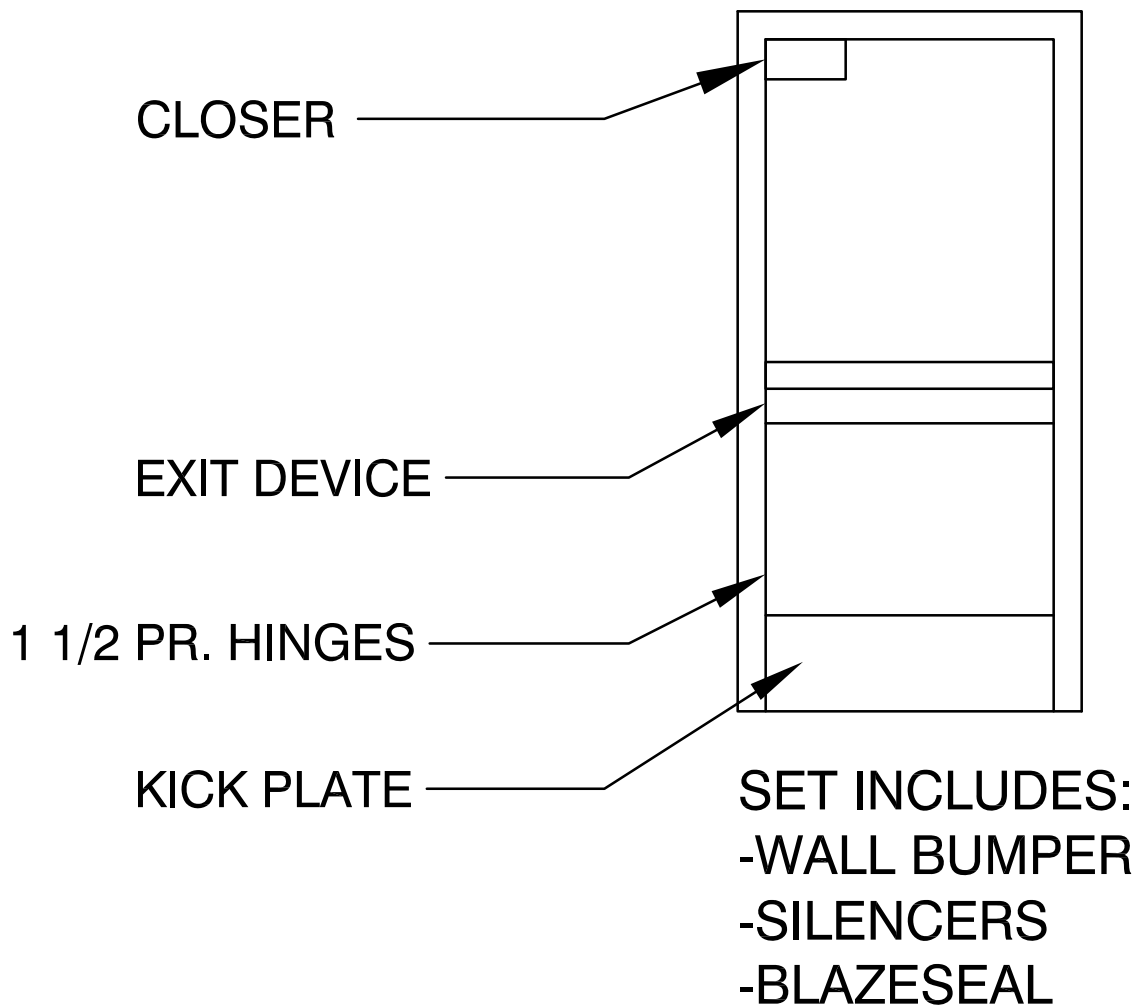


HARDWARE SET No. 8***Fire Rated Interior Single Door for Egress Stairs.***

(1½)	Pair Hinges	IHTCBI961R-4½" (Butt) NRP	Stanley
(1)	Exit Device	F-18-R-816L-3 <SUTRO level ³⁷ >	Monarch
(1)	Closer	4211H (ST3011 size 4)	LCN
(1)	Kickplate	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(1)	Kickplate	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(1)	Wall Bumper ³⁸	402½ or 403½	Ives
(1)	Set Silencers	No. 20	Ives
(1)	Set Edge Sealing Gasket	BlazeSeal (painted with frame)	Reese

³⁷ Rim locks with pull-handle on the 6 o'clock position.

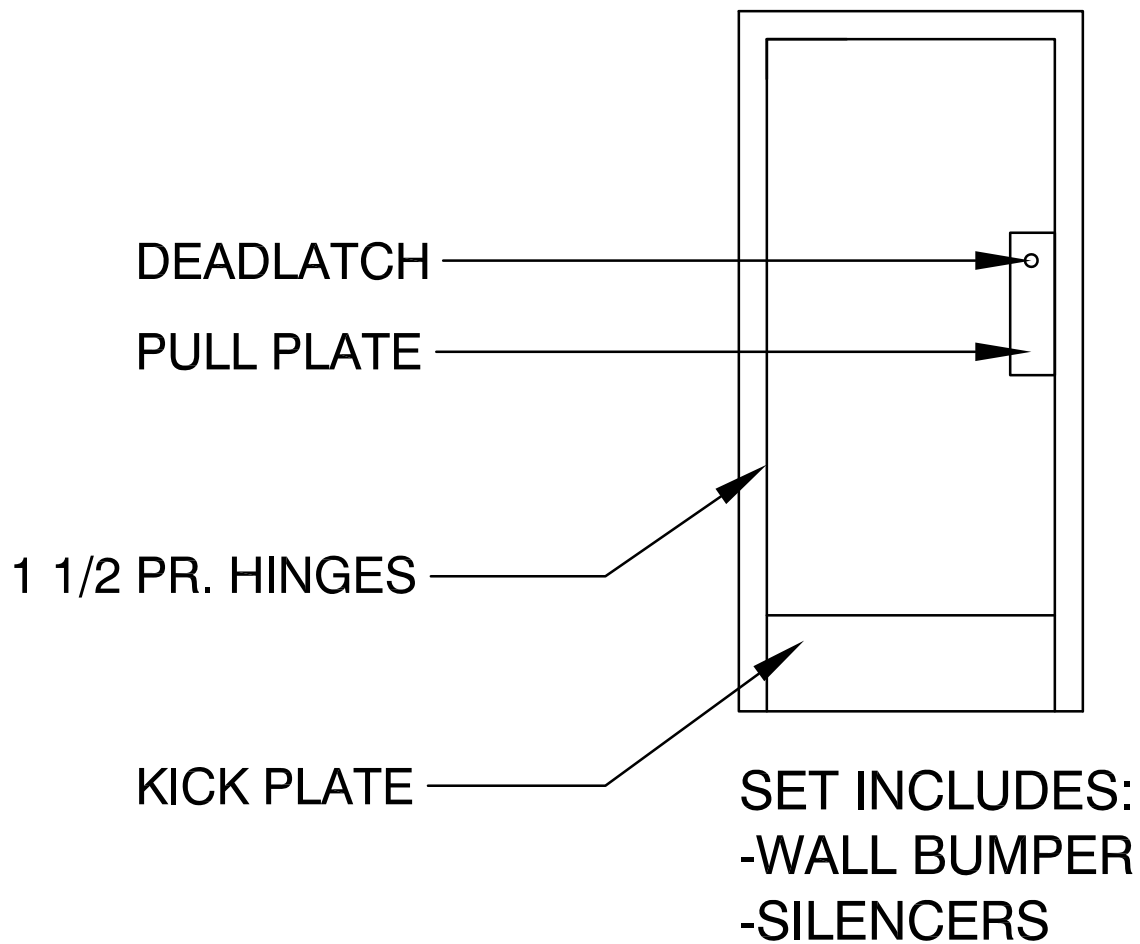
³⁸ Only when doors swinging up to 135°. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.



HARDWARE SET No. 9**Interior Single Door (Closet, and Janitor's Closet)**

(1½)	Pair Hinges	IHTCBI961-4½" (Butt) NRP	Stanley
(1)	Deadlatch	83T-7(5C7DD)-S-S5	Best
(1)	Pull Plate	93	Rockwood
(1)	Kickplate @ room or corridor side only	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(1)	Set Silencers	No. 20	Ives
(1)	Wall Bumper ³⁹	402½ or 403½	Ives

³⁹Doors swinging up to 135° only. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.



HARDWARE SET No. 10**Toilet Rooms Doors**

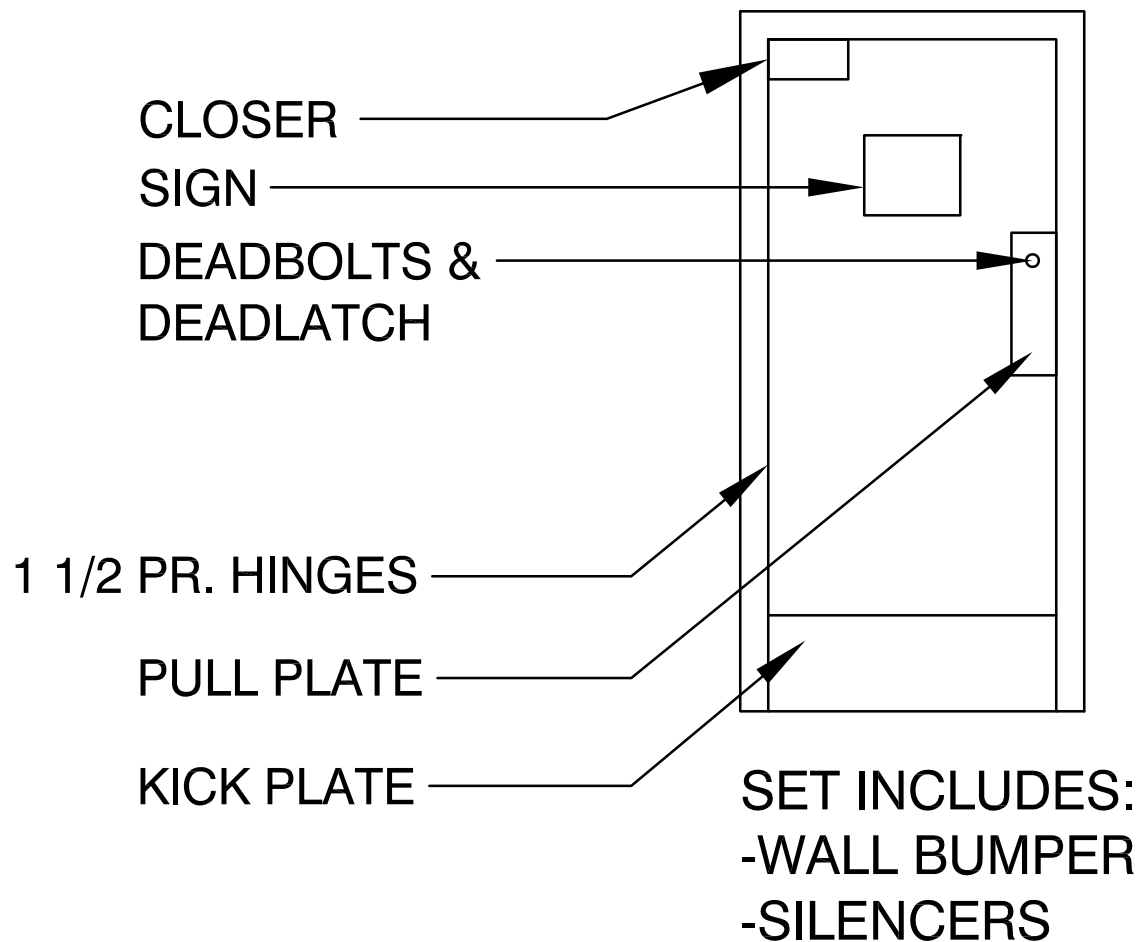
(1½)	Pr. Hinges	IHTCB1961-4 ½" (Butt) NRP	Stanley	
(1)	Deadbolt	83T-7(5C7DD)-S-S1	Best,	OR
(1)	Deadlatch	93K-7(5C7DD)-T-15D-S3 ⁴⁰	Best,	OR
(1)	Deadbolt	83T-7(5C7DD)-L-S5-CS ⁴¹	Best	
(1)	Closer	4211H-CUSH (ST3011 size 4)	LCN	
(2)	Pull	93	Rockwood	
(1)	Kick Plates	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood	
(1)	Kick Plates	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood	
(1)	Wall bumper ⁴²	402½ or 403½	Ives	
(1)	Set Silencers	No. 20	Ives	
(1)	Sign ⁴³ - Men Restroom	BF684-US26D	Rockwood,	OR
(1)	Sign ⁵¹ - Men ADA Restroom	BF687-US26D	Rockwood,	OR
(1)	Sign ⁵¹ - Women Restroom	BF685-US26D	Rockwood,	OR
(1)	Sign ⁵¹ - Women ADA Restroom	BF688-US26D	Rockwood,	OR
(1)	Sign ⁵¹ - Unisex Restroom	BF686-US26D	Rockwood,	OR
(1)	Sign ⁵¹ - Unisex ADA Restroom	BF689-US26D	Rockwood	

⁴⁰Required for emergency access **at single compartment handicap toilet room only**, in lieu of 83T-7-S-S1 type.

⁴¹Required only when a bathroom has an interior and an exterior doors. This deadbolt must be installed on the interior door.

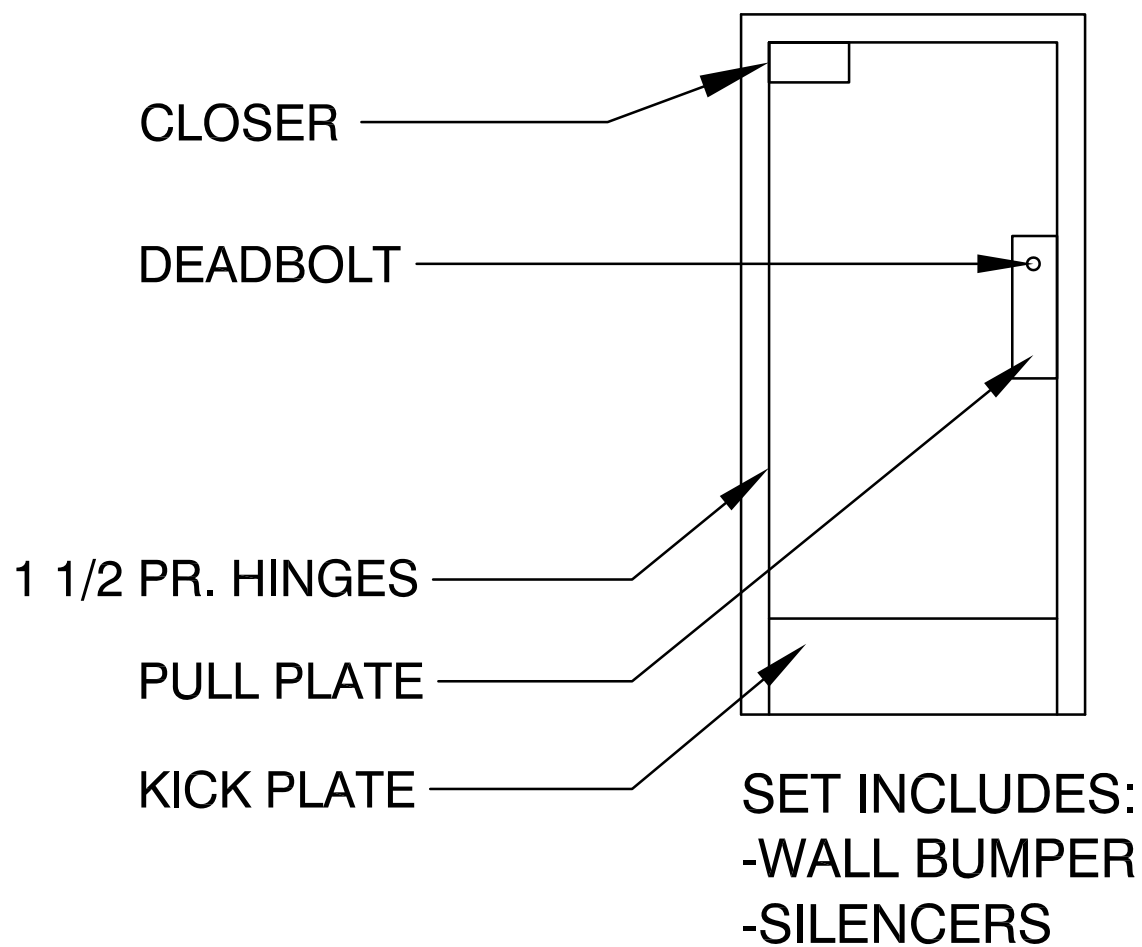
⁴²Doors swinging up to 135° only. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.

⁴³Install a suitable sign from those listed here on the door per schedule.



HARDWARE SET No. 11**Interior Single Door (Office, Classroom)**

(1 ½)	Pairs Hinges	IHTCB1961-4 ½" (Butt) NRP	Stanley
(1)	Deadbolt	83T-7(5C7DD)-S-S5-32	Best
(2)	Pull Plate	93	Rockwood
(1)	Closer	4211H-CUSH (ST3011 size 4)	LCN
(1)	Kickplate	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(1)	Kickplate	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(1)	Wall Bumper	402½ or 403½	Ives
(1)	Set Silencers	No. 20	Ives



HARDWARE SET No. 12	Interior Dutch Door	
(2) Pairs Hinges	IHTCB 1961-4½" (Butt) NRP	Stanley
(1) Deadbolt (upper half)	83T-7(5C7DD)-S-S5-32	Best
(1) Mortised Latchbolt (lower half)	35H-7(5C7DD)-EW-3-H-32-WT-S2	Best
(1) Pair Dutch Door Bolts	No. 54	IVES
(1) Pair of Pulls (only outside)	½ size No. 92	Rockwood
(1) Kickplate	J102 x US16(0.0625") x 12" x 1"<Dr.W	Rockwood
(1) Kckplate	J102 x US16(0.0625") x 12" x ¼"<Dr.W	Rockwood
(1) Door Holder (upper half)	No. 495	IVES
(1) Door Stop (lower half)	No. 403½	IVES
(1) Set Silencers	No. 20	IVES

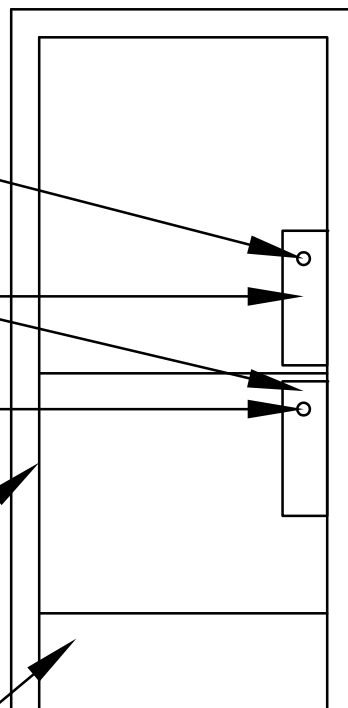
DEADBOLT

PULL PLATE

MORTISED
LATCHBOLT

PR. HINGES

KICK PLATE



SET INCLUDES:

-DOOR HOLDER (UPPER
HALF)

-DOOR STOP (LOWER HALF)

-SILENCERS

-PAIR DUTCH DOOR BOLTS



PHILADELPHIA
PARKS & RECREATION

HARDWARE DETAIL SET 12

111

SCALE: 1/2" = 1'-0"

DATE: NOV. 2019

HARDWARE SET No. 13***Interior Pair of Doors with a Removable Mullion⁴⁴.***

(3)	Pr. Hinges	IHTCB1961R-4½" (Butt) NRP	Stanley
(1)	Deadbolt	83T-7(5C7DD)-S-S5-32>	Ives
(2)	Surface Bolt	360 (8" size) (bottom bolt engages mullion only, not floor)	Ives
(2)	Closer	4211H-CUSH (ST3011 size 4)	LCN
(2)	Push	73F	Rockwood
(2)	Pull	93	Rockwood
(2)	Kickplate	J102 x US16(0.0625") x 12" x ¼" < Dr.W	Rockwood
(2)	Kickplate	J102 x US16(0.0625") x 12" x 1" < Dr.W	Rockwood
(2)	Wall bumper ⁴⁵	402½ or 403½	Ives
(2)	Set Silencers	No. 20	Ives

3.9 HARDWARE MOUNTING HEIGHTS

- A. Hardware Mounting Heights to be as indicated on Construction Drawings.

END OF SECTION 087111 after the following page: Hardware Detail Set 13.

⁴⁴ Removable mullion to be fabricated by door frame manufacturer with the same profile and material of the door frame.

⁴⁵ When doors swinging up to 135° only. Use 402½ on GWB and hollow CMU, and 403½ on solid masonry.

SURFACE BOLT

REMOVABLE
MULLION

CLOSER

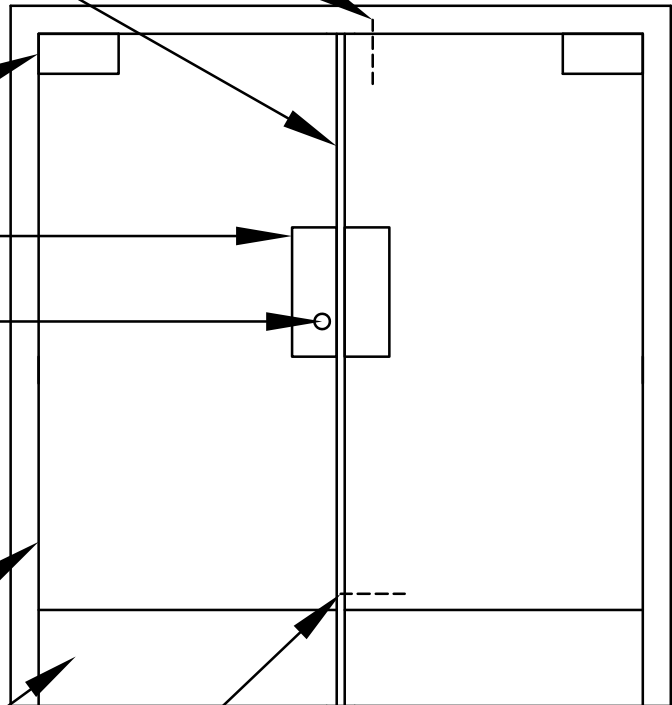
PULL PLATE

DEAD BOLT

3 PAIR HINGES
FOR TWO LEAFS

KICK PLATE

SURFACE BOLT



SET INCLUDES:
-WALL BUMPERS
-SILENCERS
-SURFACE BOLTS
ON INACTIVE LEAF
-PUSH PLATES



PHILADELPHIA
PARKS & RECREATION

HARDWARE DETAIL SET 13

113

SCALE: 1/2" = 1'-0"

DATE: JAN. 2020

Division 09

Finishes

Division 09 Outline Specifications

090000 General Finishes Notes
093013 Gypsum Board
095113 Acoustical Panel Ceilings
096513 Resilient Base
096723 Resinous Flooring
099113 Exterior Painting
099113 Parks and Recreation Paint Colors
099123 Interior Painting

Division 09 Full Specifications

096516 Resilient Tile Flooring
096466 Athletic Wood Flooring
099113 Parks and Recreation Paint Colors

Division 9 Outline Specification – Finishes

SECTION 090000 – GENERAL NOTES

- 1.1 In lieu of gypsum wallboard, use Magnesium Oxide boards at framed ceilings and walls in wet conditions, including bathrooms.

SECTION 093013 – GYPSUM BOARD

- 1.2 Avoid specification of Gypsum board partitions. Interior walls should be constructed of unit masonry, not gypsum board. Any proposed use of gypsum board for ceilings must be reviewed and approved by PPR. Only high-impact GWB or 5/8" gypsum board backed with 1/2" plywood will be considered.

SECTION 095113 ACOUSTICAL PANEL CEILINGS

- 1.1 Acoustical Panel Ceilings are generally not used for Philadelphia Parks and Recreation projects and use will not be allowed for ReBuild projects.

SECTION 096466 ATHLETIC WOOD FLOORING

- 1.1 See attached full specification for Athletic Wood Flooring.

SECTION 096516 RESILIENT TILE FLOORING

- 1.1 See attached full specification for Resilient Tile Flooring. Do not Use Sheet Flooring.

SECTION 096513 RESILIENT BASE

- 1.1 See attached full specification for Resilient Tile Flooring. Do not Use Sheet Flooring.

SECTION 096723 RESINOUS FLOORING

- 1.1 Resinous Flooring shall conform to the following minimum standards:

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base. Non-slip for wet locations.
- B. Color and Pattern: As selected by Architect from manufacturer's full range.
- C. Overall System Thickness : ¼ inch.
- D. Reinforcing Membrane: Flexible resin formulation that is recommended by resinous flooring manufacturer.
- E. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

SECTION 099113 EXTERIOR PAINTING

- 1.1 General Note - All Exterior exposed ferrous metal surfaces to be painted except for stainless steel items and unless noted otherwise. Anodized aluminum surfaces are not to be painted; and galvalume roofing materials are to be supplied with manufacturer's finishes and are not to be painted. Follow the attached Philadelphia Parks and Rec Paint Color Guide. Use Sherwin-William anti-graffiti coating and Low VOC paints.
- 1.2 Direct to Metal paint systems in the same number of coats by Sherwin Williams or Benjamin Moore can be used in lieu of the Tnemec products specified below. Exterior Painting for applications not covered by the Paint Color Guide shall conform to the following minimum standards:
 - A. Ferrous Metal – Unprimed:
 - 1. Surface Preparation: SSPC-SP6/NACE 3 Commercial Blast Cleaning with a minimum angular anchor profile of 1.5 mils. 2. One coat of primer; Tnemec 90-97 @ 2.5 - 3.5 mil dry thickness.
 - 2. Intermediate coat; Tnemec N69 H.B. Epoxoline II @ 4.0-6.0 mil dry thickness. Slightly tinted to another shade than the final finish coat.
 - 3. Polyurethane finish coat; Tnemec 1095 @ 2.0 - 3.0 mil dry thickness.
 - 4. Optional Fluoropolymer finish coat; Tnemec Series 1071 @ 2.0-3.0 mil dry thickness
 - B. Ferrous Metal - Shop Primed:
 - 1. Surface Preparation: SSPC-SP1 Solvent Cleaning: remove all visible oil, grease, soil, drawing and cutting compounds and other soluble contaminants from surfaces with solvents or commercial cleaners using various methods of cleaning such as wiping, dipping, steam cleaning or vapor degreasing. Surface must be clean, dry, sound, and free of debris prior to application.
 - 2. Intermediate coat; Tnemec N69 H.B. Epoxoline II @ 4.0-6.0 mil dry thickness. Slightly tinted to another shade than the final finish coat. Outline Specifications Division 9 - Finishes January 2020
 - 3. Polyurethane finish coat; Tnemec 1095 @ 2.0 - 3.0 mil dry thickness.
 - 4. Optional Fluoropolymer finish coat; Tnemec Series 1071 @ 2.0-3.0 mil dry thickness

C. Ferrous Metal – Galvanized:

1. Surface Preparation: Visible deposits of oil, grease, or other contaminants shall be removed as required by SSPC-SP1. Sweep (Abrasive) Blasting per SSPC-SP16 to achieve a uniform anchor profile (1.0 to 2.0 mils). Galvanized surfaces must be clean, dry, and contaminant free prior to application of coatings.
2. Prime coat; Tnemec Series N69 @ 4.0-6.0 mil dry thickness. Slightly tinted to another shade than the final finish coat.
3. Second finish coat; Tnemec 1095 @ 2.0 - 3.0 mil dry thickness..

D. Non-Ferrous Metal - Unprimed (aluminum or copper):

1. One coat: Vinyl acid wash; #760 line or Galva-Prep Phosphoric acid wash.
2. One coat: DTM Acrylic primer; #073-189.
3. Two coats: Alkyd gloss; #074. Slightly tinted to another shade than the final finish coat.
4. One coat: GCP 1000. Color selected by the Architect.

E. Concrete Masonry Units:

1. One coat of Moorcraft Supercraft Latex Block Filler #285.
2. Two coats of Moorcraft Superspec Low Lustre Latex Paint #185

SECTION 099123 INTERIOR PAINTING

1.1 Interior Painting shall be Low or no VOC. Follow the attached Philadelphia Parks and Rec Paint Color Guide. Interior Painting shall conform to the following minimum standards:

A. Wood – Painted:

1. One coat: Alkyd primer; #037-172.
2. Two coats: Alkyd gloss enamel; #074.

B. Ferrous Metal – Unprimed:

1. Three Coats: Direct to Metal, M24 @ 2.0 mil dry thickness

C. Ferrous Metal – Shop Primed:

1. First finish coat; Direct to Metal, M24 @ 2.0 mil dry thickness.
2. Second finish coat; Direct to Metal, M24 @ 2.0 mil dry thickness.

D. Ferrous Metal – Galvanized:

1. One primer coat; M15@ 2.0 mil dry thickness.
2. Two finish coats; Direct to Metal, M29 @ 2.0 mil dry thickness.

E. Non-Ferrous Metal - Unprimed (galvanized, aluminum, copper):

1. One coat: Vinyl acid wash; #760 line or Galva-Prep Phosphoric acid wash.
2. One coat: DTM Acrylic Primer, #073-189.
3. Two coats: Alkyd gloss enamel; #074.

F. Concrete Masonry Units:

1. One coat of Moorcraft Supercraft Latex Block Filler #285.

2. Two coats of Moorcraft Superspec Low Lustre Latex Paint #185.

G. Gypsum Board – Impact -Resistant

1. One coat of latex enamel underbody; #345.
2. Two coats: Latex semi-gloss finish; #310.

H. Gypsum Board – Moisture-Resistant

1. One Coat epoxy primer.
2. Two coats epoxy finish.

SECTION 096466 - WOOD ATHLETIC FLOORING

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes wood athletic flooring.
 - 1. Vapor retarder on substrate surface.
 - 2. Plywood subflooring on cushion pads.
 - 3. Hardwood flooring, nailed.
 - 4. Reinstallation of existing metal Vented Cove Base.
 - 5. Surface sanding and finish coating.
- B. Related Requirements:
 - 1. Division 3 – Cementitious Self-Levelling Floor Underlayment.
 - 2. Division 11 – Gymnasium Equipment: Volleyball floor sleeve system.
 - 3. Division 26 – Wiring Devices - Electrical Fixtures – Electronic Scoreboard and Control Connection.

1.3 REFERENCES

- A. American Plywood Association.
- B. Maple Flooring Manufacturers Association (MFMA):
- C. DIN testing conducted by Otto-Graf-Institute, Stuttgart, Germany.

1.4 COORDINATION

- A. Coordinate layout and installation of slab depressions to accommodate layout and height of wood athletic flooring assembly.

- B. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wood athletic flooring.

- B. Sustainable Design Submittals:

- 1. < insert sustainable design text for certified wood.>
 - 2. < insert sustainable design text for adhesives.>
 - 3. < sustainable design text for composite wood.>
 - 4. < insert sustainable design text for low-emitting floor finish system.>

- C. Shop Drawings: For each type of floor assembly, include the following:

- 1. Plans, sections, and attachment details.
 - 2. Details of concrete-slab depressions.
 - 3. Expansion provisions and trim details.
 - 4. Layout, colors, widths, and dimensions of game lines and markers.
 - 5. Locations of floor inserts for athletic equipment installed through flooring assembly.

- D. Samples: For each exposed product and for each color and texture specified, approximately 12 inches long in size.

- 1. Include Sample sets showing the full range of normal color and texture variations expected in wood flooring.
 - 2. Include Sample sets showing finishes and game-line and marker paints applied to wood flooring.

- E. Samples for Initial Selection: For each type of wood athletic flooring and accessory in each type of exposed color and finish.

- 1. Include manufacturer's color charts showing colors and glosses available for the following:
 - a. Floor finishes.
 - b. Game-line and marker paints.

- F. Samples for Verification: For each type of wood athletic flooring and accessory required; approximately 12 inches long and of same thickness and material indicated for the Work.

- 1. Include Sample sets showing the full range of normal color and texture variations expected in wood flooring.

2. Include Sample sets showing finishes and game-line and marker paints applied to wood flooring.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each wood athletic flooring system, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wood athletic flooring and finish systems to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. < insert sustainable design text for manufacturer qualifications.>
- B. < insert sustainable design text for vendor qualifications.>
- C. Installer Qualifications: A firm or individual that has been approved by MFMA as an accredited Installer according to the MFMA Accreditation Program.
 1. Installer responsibilities include installation and field finishing of wood athletic flooring components and accessories, and application of game lines and markers.

1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum five years experience. Comply with all applicable grading and installation guidelines including those of the Maple Flooring Manufacturers' Association (M.F.M.A.), The Northern Oak Flooring Manufacturers' Association (N.O.F.M.A.), The Canadian Lumberman's Association (C.L.A.) and the Southern Pine Inspection Bureau (S.P.I.B.)
- B. Installer: Company specializing in performing the Work of this Section with minimum five years experience.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver floor assembly materials in unopened cartons or bundles.
- B. Protect wood from exposure to moisture. Do not deliver wood components until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.
- C. Store wood components in a dry, warm, well-ventilated, weathertight location and in a horizontal position.

1.11 FIELD CONDITIONS

- A. Conditioning period begins not less than seven days before wood athletic flooring installation, is continuous through installation, and continues not less than seven days after installation.
 1. Environmental Conditioning: Maintain ambient temperature between 65 and 75 deg F and relative humidity planned for building occupants, but not less than 35 percent or more than 50 percent, in spaces to receive wood athletic flooring during the conditioning period.

2. Wood Conditioning: Move wood components into spaces where they will be installed, no later than beginning of the conditioning period.
 - a. Do not install wood athletic flooring until wood components adjust to relative humidity of, and are at same temperature as, spaces where they are to be installed.
 - b. Open sealed packages to allow wood components to acclimatize immediately on moving wood components into spaces in which they will be installed.
- B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- C. Install wood athletic flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Resilient Wood Gymnasium Flooring System: Robbins, Inc. - 4777 Eastern Avenue, Cincinnati, Ohio.
- B. Floor Finish Coating System: Hillyard Chemical Company - 302 North Fourth Street, Saint Joseph, Missouri.
- C. Substitutions: Under provisions of Section 01630.

2.2 SYSTEM DESCRIPTION

- A. Design System: Bio Cushion Classic
- B. System Type: Floating.
- C. Overall System Height: As indicated on Drawings.

2.3 PERFORMANCE REQUIREMENTS

- A. < insert sustainable design text for certified wood.>
- B. < insert sustainable design text for composite wood products.>

2.4 FLOORING MATERIALS

- A. Maple Flooring: Comply with MFMA grading rules for species, grade, and cut.
 1. Certification: Provide flooring that carries MFMA mark on each bundle or piece.
- B. Random-Length Strip Flooring: Northern hard maple (*Acer saccharum*), kiln dried, random length, tongue and groove, and end matched.
 1. Grade: MFMA-RL Second and Better.

2. Thickness: 25/32 inch.
3. Face Width: 2-1/4 inches.

2.5 SUBFLOOR MATERIALS

- A. Plywood Underlayment: two layers APA rated, C-D plugged, exterior glue, tongue and groove, 15/32 inch thick.
- B. Resilient Pads: With air voids for resiliency and installed at manufacturer's standard spacing for product designation indicated above.
 1. Type: Bio Pad.
 2. Material: EPDM.
 3. Thickness: 7/16 inch.

2.6 FINISHES

- A. Floor-Finish System: System of compatible components recommended in writing by flooring manufacturer, and MFMA approved.
 1. Floor-Sealer Formulation: Pliable, penetrating type. MFMA Group 1, Sealers.
 2. Finish-Coat Formulation: Formulated for gloss finish indicated and multicoat application.
 - a. Type: MFMA Group 5, Water-Based Finishes.
 3. Game-Line and Marker Paint: Industrial enamel compatible with finish coats and recommended in writing by manufacturers of finish coats, and paint for this use.
 4. <insert sustainable design text for floor treatment products.>

2.7 ACCESSORIES

- A. Vapor Retarder: ASTM D 4397, polyethylene sheet not less than 6 mils thick.
- B. Resilient Wall Base: Molded, vented, rubber or vinyl cove base; 4 by 3 by 48 inches; with premolded outside corners.
 1. Color: Black.
- C. Thresholds: <Insert requirements.>
- D. Fasteners: Type and size recommended by manufacturer, but not less than those recommended by MFMA for application indicated.
- E. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood athletic flooring manufacturer.

F. Adhesives: Manufacturer's standard for application indicated.

1. < insert sustainable design text for VOC content of adhesive.>
2. < insert sustainable design text for adhesives.>

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Concrete Slabs: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

If products are installed on other substrates, including existing concrete, insert additional examination requirements and revise "Preparation" Article. Edit the above section to address conditions for athletic wood floor replacement in an existing building if applicable. Also supplement the preparation and installation requirements below for site-specific athletic wood floor replacement requirements in an existing building.

3.2 PREPARATION

- A. Concrete Slabs:
 1. Grind high spots and fill low spots on concrete substrates to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.
 2. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- B. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Comply with wood athletic flooring manufacturer's written instructions, but not less than written recommendations of MFMA applicable to flooring type indicated.
- B. Pattern: Lay flooring parallel with long dimension of space to be floored unless otherwise indicated.
- C. Expansion Spaces: Provide as indicated, but not less than that required by manufacturer's written instructions and MFMA's written recommendations at walls and other obstructions, and at interruptions and terminations of flooring.
 - 1. Cover expansion spaces with base molding, trim, and saddles, as indicated on Drawings.
- D. Vapor Retarder: Cover entire slab area beneath wood flooring. Install with joints lapped a minimum of 6 inches and sealed.
- E. Underlayment: Install perpendicular to direction of flooring, staggering end joints in adjacent rows.
- F. Strip Flooring: Mechanically fasten perpendicular to supports.
- G. Installation Tolerances: 1/8 inch in 10 feet of variance from level.

3.4 SANDING AND FINISHING

- A. Allow installed flooring to acclimate to ambient conditions before sanding.
- B. Follow applicable recommendations in MFMA's "Industry Recommendations for Sanding, Sealing, Court Lining, Finishing, and Resurfacing of Maple Gym Floors."
- C. Machine sand with coarse, medium, and fine grades of sandpaper to achieve a level, smooth, uniform surface without ridges or cups. Remove sanding dust by tack or vacuum.
- D. Finish: Apply seal and finish coats of finish system according to finish manufacturer's written instructions. Provide no fewer than four coats total and no fewer than two finish coats.
 - 1. Water-Based Finishes: Use finishing methods recommended by finish manufacturer to reduce grain raise and sidebonding effect.
 - 2. Game-Line and Marker Paint: Apply game-line and marker paint between final seal coat and first finish coat according to paint manufacturer's written instructions.
 - a. Mask flooring at game lines and markers, and apply paint to produce lines and markers with sharp edges.
 - b. Where game lines cross, break minor game line at intersection; do not overlap lines.
 - c. Apply game lines and markers in widths and colors according to requirements indicated on Drawings.
 - d. Apply finish coats after game-line and marker paint is fully cured.

3.5 PROTECTION

- A. Protect wood athletic flooring during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion.
 - 1. Do not cover flooring after finishing until finish reaches full cure and not before seven days after applying last finish coat.
 - 2. Do not move heavy and sharp objects directly over flooring. Protect fully cured floor finishes and surfaces with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

SECTION 096519 - RESILIENT TILE FLOORING

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient floor tile.
 - 2. Wall base.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. <insert sustainable design text for adhesives.>
 - 2. <insert sustainable design text for sealants.>
 - 3. <insert sustainable design text for flooring.>
- C. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- D. Samples: Full-size units of each color, texture, and pattern of floor tile required.
- E. Samples for Initial Selection: For each type of floor tile indicated.

- F. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- G. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

1.10 WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited Warranty Period: 5 years

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less

2.2 RESILIENT FLOOR TILE MATERIALS

- A. Manufacturers: Basis of Design provide products by Armstrong Flooring, Inc.
 - 1. Other manufactures subject to compliance with requirements, products by one of the following manufacturers may be submitted under the provisions of Division 01, Substitution Procedures.
- B. Basis of Design: Specify through-body VCT, minimum 1/8" thickness.
- C. Colors and Patterns: Avoid white, off-white, and light field tile colors. Avoid monolithic colors, be mindful of colors and patterns that can easily be scuffed and look dirty.

2.3 WALL BASE MATERIALS

- A. For top set wall base: Provide 1/8 in. thick, 6 in. high Armstrong Flooring Color-Integrated Wall Base with a matte finish, conforming to ASTM F 1861, Type TP - Rubber, Thermoplastic, Group 1 - Solid, Style B – Cove.
- B. Colors and Patterns: to be selected from manufacturer's color options.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
 - 1. < insert sustainable design text for flooring adhesive.>
 - 2. < insert sustainable design text for adhesives.>
- C. Provide transition/reducing strips tapered to meet abutting materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer and the Manufacturer's Representative present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 1. Lay tiles in pattern indicated on drawings.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - 4. Apply 3 to 5 coats of high-quality commercial floor polish, such as Armstrong Flooring S-480 Commercial Floor Polish. If the floor has already been stripped (due to construction traffic), the application of a stain resistant sealer (such as Armstrong Flooring S-495 Commercial Floor Sealer) prior to the application of polish, is recommended in areas that will be exposed to heavy traffic and/or staining agents.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.
- E. Manufacturer's Field Representation to include providing cleaning and maintenance training and demonstration to Philadelphia Parks and Recreation Department's staff. Manufacturer's Representative to confirm in writing that the installation meets manufacturer's installation and cleaning recommendations at completion

END OF SECTION

Paint Color Guide

Paint Type/Company Paint Name Number Finish Used on Technique

PARK GREEN (same as CCD Streetscape and Parkway Green)

Sign Paints	PPG Corafon	Dark Green	ADS5238020	20% Gloss	Parkway signs	Spray & Bake
	Matthews	Depth of Green	MP12435	Satin	CCD Transit Portal Poles	Sprayed-on enamel similar to automotive finish
	Matthews	Cityscape Green	R84020			Industrial enamel?
Industrial Enamel Paint / Acrylic Trim Enamel	MAB & Sherwin-Williams	Seashore - Ebony Green	24-660 or MAB 660		Bollards, bike racks, etc.	More durable than Matthews - used where people & objects will come into contact with painted surface and/or where you have a need to repaint
	<i>Competitor:</i> Axo Nobel		colormap			
Powder Coating	Dupont	Allestra Powder Coating	see RAL code below		benches, other street furnishings made in a factory	apply dry, electrically charge it to get it to stick, and then bake
	Spraylat		see RAL code below		" "	" "
* RAL Code	RAL*	Fur Green	6009	< Darren & Seth think this is a better match		
	RAL*	Black Green	6012	< David Kanthor @ CCD gave this number, chosen by Joel Katz		

*RAL = International paint numbers - used for powder coating. More info available from Tiger Drylac (www.tiger-coatings.us)

Paint Type/Company Paint Name Number Finish Used on Technique

PARK BROWN

Sign Paints	PPG Corafon	Clydesdale Brown	ADS4343020	20% Gloss	Water Works signs	Spray & Bake
	Matthews	Urban Sign will provide (5/3)			Boxers' Trail signs	Sprayed-on enamel similar to automotive finish
* RAL Code	RAL*	Oxide Red	3009	<<< Need to confirm with samples		
	RAL*	Nut Brown	8011 or 8012	<<< Need to confirm with samples		

*RAL = International paint numbers - used for powder coating. More info available from Tiger Drylac (www.tiger-coatings.us)

Division 10

Specialties

Division 10 Outline Specifications

101110 Signage

102233 Operable Partitions

Division 10 Full Specifications

102113 Toilet Compartments

102800 Toilet Room Accessories

Division 10 Outline Specifications – Specialties

SECTION 101110 SIGNAGE

- 1.1 Follow current Philadelphia Parks and Recreation (PPR) Signage Standards for signage requirements, graphics, and standards. All signage shall be submitted to PPR for review and approval.
- 1.2 Signage colors are Sherwin Williams colors; 6510 Loyal Blue (Dark Blue), 9149 Inky Blue (Light Blue) and Egyptian Earth 70yr19/557 (Orange).

SECTION 102113 PLASTIC TOILET COMPARTMENTS

- 1.1 See attached full specification for Toilet Compartments. Design of bathrooms and toilet rooms should accommodate gender neutral bathroom requirements.

SECTION 102233 OPERABLE PARTITIONS

- 1.1 Avoid use of Operable Partitions – they break too easily. Operable Partitions are generally not used for Philadelphia Parks and Recreation projects and use will not be allowed without review and approval by PPR.

SECTION 102800 TOILET ROOM ACCESSORIES

- 1.1 See attached full specification for Toilet Room Accessories. Warm Air Dryers are required; paper towel dispensers will not be approved. Specify effective, no-maintenance Warm Air Dryers. Installation of wall surface-mounted warm air dryers must be durable and meet ADA requirements.

SECTION 104313 AED MACHINES, CABINETS, AND SIGNS

- 1.1 Defibrillator: Stryker Product # 99512-001711. LIFEPAK CR2 Cellular Defibrillator, Semi-Automatic, English-Spanish, carrying case, 8 year warranty. Includes 1 PR QUIK-STEP electrodes and 1 battery (4 years each LIFEPAK CR2 Data Plan 8yr, USB cable, Operating Instructions.
- 1.2 Cabinet: Stryker product # 11996-000445, AED Wall Cabinet, Rotaid Solid Plus, with Alarm, White.
- 1.3 Emergency response kit: Stryker Product # 11998-000334
- 1.4 Location Sign: Stryker Product # 11998-000331, AED Wall Sign Traditional w/logo, T-mount, 8x10.

SECTION 102113 - PLASTIC TOILET COMPARTMENTS

Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for Rebuild projects: All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use. Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments and post-to-ceiling screens to overhead structural system.
 - 2. Section 102800 "Toilet Room Accessories" for toilet tissue dispensers, grab bars, and similar accessories mounted on toilet compartments.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

- B. Sustainable Design Submittals:

- 1. <insert sustainable design text for recycled content if applicable to this project.>

- C. Shop Drawings: For toilet compartments.

- 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of cutouts for compartment-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.
 - 5. Show ceiling-mounted items, and overhead support or bracing locations.

- D. Samples for Initial Selection: For each type of toilet compartment material indicated.
 - 1. Include Samples of hardware and accessories involving material and color selection.
- E. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
 - 1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.
- F. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
 - 1. Door Hinges: two (2) hinges with associated fasteners.
 - 2. Latch and Keeper: Ten (10) latches and keepers with associated fasteners.
 - 3. Door Bumper: Ten (10) bumpers with associated fasteners.
 - 4. Door Pull: Four (4) door pulls with associated fasteners.
 - 5. Fasteners: Twenty (20) fasteners of each size and type.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Santana Products Co.
- B. Bobrick Washroom Equipment, Inc.
- C. Bradley Corporation

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: **75** or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Insert sustainable design text for recycled content if applicable to this project.>
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.3 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Toilet-Enclosure Style: Floor and ceiling anchored.
- B. Entrance-Screen Style: Floor and ceiling anchored.
- C. Urinal-Screen Style: Post to ceiling.
- D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
 - 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 - 2. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 - 3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range
- E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.
- F. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters; with shoe and sleeve (cap) matching that on the pilaster.
- G. Brackets (Fittings):
 - 1. Stirrup Type: Ear or U-brackets, stainless steel
 - 2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.4 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless-steel continuous, cam type that swings to a partially open position, allowing emergency access by lifting door. Mount with through-bolts.
 2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
 3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
 4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
 5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless-Steel Castings: ASTM A 743/A 743M.
- G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.6 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.
- E. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- F. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.
- G. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
 - 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
 - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.

- b. Align brackets at pilasters with brackets at walls.
- 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Floor-and-Ceiling-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 102800 – TOILET ROOM ACCESSORIES

*Note to design professional preparing Rebuild project-specific specifications: this italicized note sets forth the overall standard for specifying materials and systems for ReBuild projects: **All Rebuild projects must meet the Philadelphia Parks and Recreation (PPR) project standard to be designed and constructed to require minimal maintenance, and the maximum of durability for public use. Products and systems specified should be selected to sustain intense public use.** Please delete this italicized paragraph and other italicized instructions in the body of the specification prior to issuing the specification for bidding the project.*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Public-use washroom accessories.
2. Staff bathroom accessories.
3. Warm-air dryers.
4. Childcare accessories.
5. Underlavatory guards.
6. Custodial accessories.

- B. Related Requirements:

1. Section 088300 "Mirrors" for frameless mirrors.
2. Section 102113 Plastic Toilet Compartments for mounting surfaces for accessories.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Coordinate the work of this Section with the placement of internal wall reinforcement to receive inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated. Retain subparagraph below if product designations are indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects. Not all manufacturers offer a special mirror warranty. Verify available warranties and warranty periods.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - **PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Waste Receptacle (WR):
 - 1. Bradley
 - 2. Mounting: Open top, Semirecessed
 - 3. Minimum Capacity: 4 Gallon (15 Liter)
 - 4. Material and Finish: Stainless steel, No. 4 finish (satin)] 18 guage.
 - 5. Liner: Reusable vinyl liner.
 - 6. Lockset: Tumbler type for waste receptacle.
- C. Liquid-Soap Dispenser:
 - 1. Scott Essential High Capacity Manual Skin Care Dispenser, 1 L, Black
- D. Grab Bar (GB):
 - 1. Bradley models 8122-00142 and 8122-00136
 - 2. Mounting: Flanges with concealed fasteners.
 - 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
 - 4. Outside Diameter: 1-1/2 inches.
 - 5. Configuration and Length: As indicated on Drawings, Straight, 36 inches long and Straight 48 inches long.
- E. Towel Pin (TP):
 - 1. Bobrick Model No. B-677
 - 2. Description: Projecting minimum of 3 3/8 inches from mounting surface. 2x2 inch flange.
 - 3. Material and Finish: Stainless steel, No. 4 finish (satin) One per Restroom and one per Toilet Compartment.
- F. Mirror Unit (MU):
 - 1. Bradley 7481
 - 2. Framed Stainless Steel security mirror: fabricated of 20 gauge type 430 stainless steel, bright annealed. Stretcher leveled for uniform finish. Reflective surface is bright and smooth with a mirror

- like finish after being polished to a #8 architectural finish. One unit for each standard lavatory except Staff Toilet Room.
3. Frame: Stainless-steel channel.
 - a. Corners: Welded and ground smooth.
 4. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
 5. Size: 24x36 inches.

2.3 STAFF BATHROOM ACCESSORIES

- A. Source Limitations: Obtain private-use bathroom accessories from single source from single manufacturer.
- B. Toilet Tissue Dispenser (TD):
 1. Bradley
 2. Description: Single-roll dispenser with hood.
 3. Mounting: Surface mounted.
 4. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).
- C. Medicine Cabinet (MC):
 1. Bradley
 2. Mounting: Recessed, for nominal 4-inch wall depth.
 3. Size: 18 by 30 inches.
 4. Door: Framed mirror door concealing storage cabinet equipped with continuous hinge and spring-buffered, rod-type stop and magnetic door catch.
 5. Shelves: Three, adjustable
 6. Material and Finish:
 - a. Cabinet: Stainless steel, No. 4 finish (satin) 20 gauge, type 430 stainless steel.
 - b. Mirror and Frame: Polished Stainless steel.
 - c. Hinge: stainless steel.
 - d. Shelves: Stainless steel, No. 4 finish (satin) 20 gauge.

D. Towel Pin (TP):

1. Bobrick Model No. B-677
2. Description: Projecting minimum of 3 3/8 inches from mounting surface. 2x2 inch flange.
3. Material and Finish: Stainless steel, No. 4 finish (satin) One per Staff Single User Bathroom.

2.4 WARM-AIR DRYERS

A. Source Limitations: Obtain warm-air dryers from single source from single manufacturer. One per two lavatories in Public Use Washrooms and one per Single User Bathroom including Staff Bathrooms.

B. Multiple Airflow Warm-Air Dryer (HD):

1. Dyson Hand Dryers: HU-02
2. Description: Multiple airflow warm-air hand dryer, using two or more airstreams for rapid hand drying.
3. Mounting: Surface mounted, with low-profile design.
4. Operation: Electronic-sensor activated with operation time of 10 seconds.
5. Cover Material and Finish: Stainless steel, No. 4 finish (satin).
6. Electrical Requirements: 115 V, 15 A, 1725 W.

2.5 CHILDCARE ACCESSORIES

A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.

B. Diaper-Changing Station (DCS):

1. KoalaKare. Model KB200-05SS
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support minimum of 250-lb static load when opened.
3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: [Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
6. Liner Dispenser: Built in.

2.6 UNDERLAVATORY GUARDS

A. Underlavatory Guard (PG):

1. TruBro
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.7 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Utility Shelf (US):

1. Bobrick
2. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.
3. Size: 16 inches long by 6 inches deep
4. Material and Finish: Not less than nominal 0.05-inch-thick stainless steel, No. 4 finish (satin).

C. Mop and Broom Holder (MH):

1. Bobrick
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Hooks: Four (4).
5. Mop/Broom Holders: Three (3), spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - a. Shelf: Not less than nominal 0.05-inch-thick stainless steel.
 - b. Rod: Approximately 1/4-inch-diameter stainless steel.

2.8 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.9 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of 6 keys to Owner's representative.

PART 3 - **EXECUTION**

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

Division 11

Equipment

Division 11 Outline Specifications

114000 Food Service Equipment
116623 Gymnasium Equipment
116800 Play Equipment and Structures
116833 Athletic Field Equipment
116866 Adult Fitness Equipment
116870 Pool Equipment

Division 11 Outline Specification – Equipment

SECTION 114000 FOOD SERVICE EQUIPMENT

1.1 Staff use Kitchen:

- A. Refrigerator – Residential style.
- B. Microwave – Countertop unit only.
- C. Sink – Residential style.
- D. Countertops – Stainless Steel only.
- E. Cabinets – Stainless Steel only.

1.2 Program Use Kitchen:

- A. Refrigerator – Residential style, no ice machine.
- B. Microwave – Countertop unit only.
- C. Sink – residential style.
- D. Countertops – Stainless Steel only.
- E. Cabinets – Stainless Steel only.
- F. Range/Oven – Residential style, slide in unit, electric only.
- G. Ventilation – Residential style range hood, direct exhaust preferred.

1.3 General Notes:

- A. Deviations from the kitchen elements for each type as listed above must be reviewed and approved by PPR
- B. Existing facilities undergoing renovation may have existing functional equipment that may be reused and reinstalled. Design team to work with PM and site staff to evaluate condition of existing equipment and determine potential for reuse.
- C. Coordinate with PM and Site staff to determine if commercial refrigerator should also be included in either a Staff Kitchen or a Program Use kitchen, or if the commercial refrigerator will be located in another space. Refer to [Commercial Refrigerator memo](#).
- D. Most PPR facilities will not accommodate a commercial cooking kitchen. If requested, this will require discussion and formal approval by PPR. Please note that this is triggered by intent to sell food, not the style of equipment.

SECTION 116623 GYMNASIUM EQUIPMENT

- 1.1 Gymnasium Equipment shall conform to the following minimum standards:
- A. *Basketball Backstops and Accessories*: Porter Forward Fold Backstop (Motorized Retractable) 90917000. Clear rectangular glass backboard Model B-205A. Pro-Strut Movable Rim Goal Model No. 240180 Torq-Flex Goal.
 - B. *Volleyball and Badminton Standards*: Porter Athletic model #1981001 Powr line VB Competition Plus Package, 3 ½" OD. Package includes Powr Line Standard, Official Upright Protective Pad), Competition Net, Powr-Select Net Antennas.
 - C. *Gym Divider Curtains*: All Count Covers: 13-ounce mesh top and 22-ounce vinyl bottom, full height to bottom of trusses.
 - D. *Gym Floor Cover System and Storage Racks*: All Court Covers: 32 oz polyester fabric PVC coated on both sides.
 - E. *Athletic Wall Pads*: 7' min. high athletic pads as required for safe play. Check heights and look up standards for safety. Consider functionality of the room if intended to serve multiple sports.
 - F. *Athletic Safety Net*: On deck Sports Hockey Clear Safety Netting 20' x 100' (1 ¾") with sewn border and grommets on bottom edge.
 - G. *Score Board*: PPR cannot procure and maintain indoor or outdoor scoreboards.

SECTION 116800 – PLAY EQUIPMENT AND STRUCTURES

- 1.1 Play equipment and structures shall conform to the following minimum standards:
- A. Approved Manufacturers:
 - 1. Landscape Structures Inc., 601 7th Street, Delano, MN 55328, Phone: 763-972-5200
 - 2. Little Tikes, 878 E. Highway 60, Monett, MO 65708, Phone: 800-325-8828
 - 3. BCI Burke Company, P.O. Box 549, 727 Northwest Way, Fond du Lac, WI 54937, Phone: 800-266-1250
 - 4. Kompan, 821 Grand Avenue Parkway, Pflugerville, TN 78660, Phone: 800-426-9788
 - 5. Playcore and Gametime, 544 Chestnut Street, Chattanooga, TN 37402, Phone: 877-762-7563
 - B. Selected play and recreational equipment shall be reviewed and approved by PPR prior to final design, purchase, and installation.
 - C. Refer to Division 32 – Playground General Notes for more information.
 - D. Swing frames and swings must not utilize proprietary components for ease of replacement.

SECTION 116833 – ATHLETIC FIELD AND SPORTS EQUIPMENT

1.1 Athletic field and sports equipment shall conform to the following minimum standards:

A. Athletic field and sports equipment include:

1. Basketball goals, hoops, nets, backboards, and accessories.
2. Baseball/softball backstops, bases, outfield fences, foul poles, and accessories.
3. Soccer goals.
4. Football goals.
5. Combination football/soccer goals.
6. Lacrosse goals.
7. Tennis nets and accessories.
8. Pickleball nets and accessories.
9. Ping Pong Tables.

B. Approved Manufacturers:

1. PW Athletic, (George Ely Associates) P.O. Box 396, Carlisle, PA 17013, 800-262-8448
2. JayPro Sports, LLC., 976 Hartford Turnpike, Waterford, CT 06385, 800-243-0533
3. GameTime (MRC, P.O. Box 106, Spring Lake, NJ 07762, 800-922-0070)
4. TrueBounce Inc. 56 Conduit Street, New Bedford, MA 02745, 866-873-3715 www.truebounce.com.
 - a. TrueBounce XL7042 Perforated Polycarbonate Backboard, or approved equal. Install per manufacturer's specifications.
 - b. TrueBounce RB240 Park & Rec Front Mount Super Goal, or approved equal. Install per manufacturer's specifications.
5. Bison Inc. 603 L Street, Lincoln Nebraska 68508, 402-474-3353 www.bisoninc.com

C. For baseball and soccer equipment selected shall be for the age-appropriate use group and field size being proposed. Care should be taken in the design of fields to allow for multiple age groups or sport divisions from youth sports to adult sports.

D. Designer shall be responsible for design of appropriate footing or anchorage system for selected athletic equipment accounting for on-site conditions as well as manufacturer's recommendations.

E. Fencing for athletic fields and sports courts shall be powder coated steel posts and hardware with black vinyl coated fabric. Fence fabric mesh size shall be no greater than 2-inch. Fence fabric shall be placed facing the field or court so that fence posts are not exposed to players, except at corners, openings, and gates.

F. Basketball:

1. Basketball Goals, Hoops and Backboards:

- a. Poles shall be 6 inch by 6 inches square steel and embedded into a concrete footing. Poles and frame shall be powder coated black in color. If designer/contractor wishes to use a different color for the post they shall obtain approval from Philadelphia Parks and Recreation.
- b. Footings shall be per manufacturer's minimum recommendations for size. Concrete strength shall be a minimum of 3,500psi at 28 days. Designer/contractor shall evaluate on-site in-situ soil conditions to determine if footing size needs to be increased.
- c. Backboards shall be clear acrylic or polycarbonate type backboard with powder coated steel frame with color to match pole. Backboard shall be 42 inches by 72 inches.
- d. Basketball rims shall be heavy-duty flex goals with nylon nets. Rim to be orange in color. Break-away rims are not permitted except for polycarbonate backboards.
- e. Basketball poles and backboard can be either single or double mounted per manufacturer's recommendations.
- f. Adjustable basketball hoop systems are not permitted.
- g. Approved manufacturers and models:
 - 1) Bison Inc.
 - i. Single Backboard: Ultimate Polycarbonate Playground Basketball System – Model Number BA873U-BK\

2. Basketball Court Markings:

- A. Line striping shall be shall be one consistence color throughout the court such as white or yellow.
- B. Court center circles and free throw lanes at either end can be coated or painted with solid color(s).
- C. Cushioned court surfaces are not permitted.

G. Baseball/Softball:

- 1. Baseball/softball backstops and fencing shall be designed, selected, and placed for the appropriate age group or playing division be proposed for the field. Care should be taken in the design of fields to allow for multiple age groups or sport divisions from youth sports to adult sports.
- 2. Baseball/softball backstops shall be angular type with overhang sections for foul ball protection. Color for fencing shall be black with steel posts and vinyl coated fabric. Arch or round type backstops are not permitted. Vertical fabric of mesh should be 1" or 1 1/4" GGA mesh.

3. 8-Foot high fencing shall overlap with the end of the backstop fence, leaving a protected pass through for players entering the field, and extend at a minimum past the players bench and any spectator seating area(s) on the side of the field to protect these areas from foul balls. Protective netting of the sides of the field is not preferred and shall be approved by PPR.
4. Outfield fences if provided and under 8 feet in height shall include a 4-inch diameter corrugated HDPE/plastic yellow fence top protector. Fence top protector shall be secured to fence top with manufacturer's recommended fasteners every 2 feet.
5. Baseball/softball infield mix soil for base runs, batting area, skinned area, and/or pitchers' mound shall be a manufactured clay soil product specifically for baseball/softball use. Manufacturer's include:
 - a. Diamond-Tex, Gap, PA, Web: <http://www.diamondtex.com/>
 - b. DuraEdge Products, Inc., Grove City, PA., Web: <https://duraedge.com/>
 - b. Beam Clay/Partac Peat Corporation, Great Meadows, NJ, Web: <http://www.beamclay.com/>

H. Tennis:

1. Individual or groups of tennis courts shall have their perimeters fenced with 8-foot high chain link fencing meeting PPR standard listed in this section or Division 32. Provide a minimum of 2 gates for access.
2. Tennis court nets and posts shall be placed in steel sleeves set in concrete footings so that nets and posts can be removed. Concrete foot shall be sized appropriately to handle the tension of the net cable and not deflect the posts or the net.
3. Entire tennis courts surface shall be coated or painted and line striped with required sport lines for the sport. Areas of play shall be a single color and differentiate from out of bounds or foul areas. Line striping shall contrast with selected court colors, ideally white. Cushioned tennis court surfaces are not permitted.

I. Ping Pong:

1. Ping Pong table must be approved by PPR and appropriate for outdoor usage. Approved designs include:
 - a. Doty & Sons Concrete Products, Inc., Sycamore IL., Web: <https://outdoorconcretegames.com/product/b-y-o-ping-pong-table-tennis/>

J. Boxing Rings:

1. If space and ceiling height allows, provide 20' x 20' Drop and Lock Boxing Ring with all accessories.
 - a. Basis of Design Manufacturer: TITLE Boxing. Web: <https://www.titleboxing.com/products/title-boxing-dual-level-drop-n-lock-competition-ring>
 - b. Other acceptable manufacturers: Ringside.
 - 1) Provide tongue and groove platform plywood.
2. For boxing gyms that cannot accommodate an elevated, full-size ring, consult with PPR to confirm appropriate size and ring type."

SECTION 116866 – ADULT FITNESS EQUIPMENT

1.1 Adult fitness equipment shall conform to the following minimum standards:

A. Approved Manufacturers:

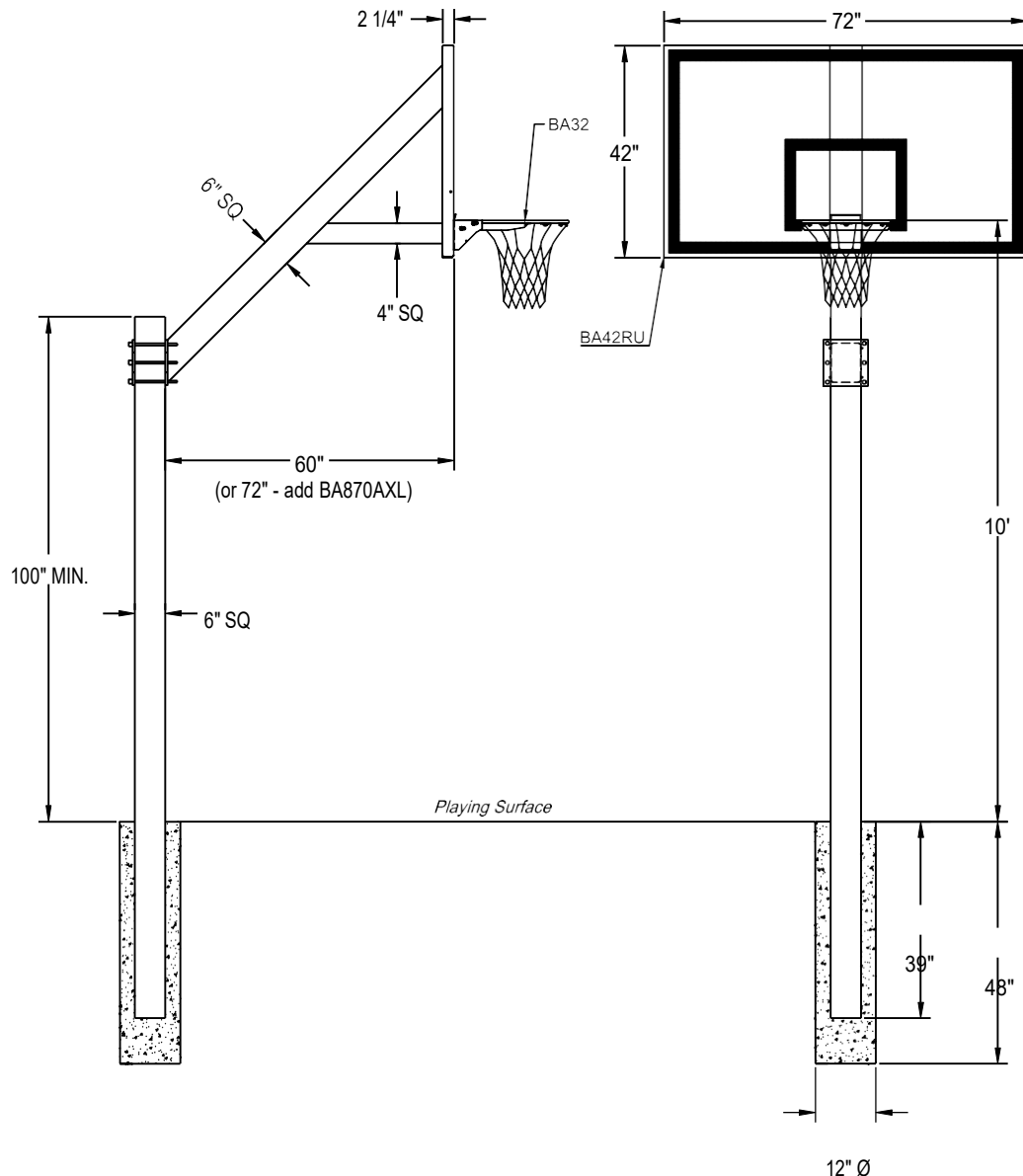
1. Little Tikes, 878 East Highway 60, Monett, MO 65708, 800-325-8828
2. Landscape Structures Inc., 601 7th Street, Delano, MN 55328, 763-972-5200
3. Kompan, 821 Grand Avenue Parkway, Pflugerville, TN 78660, 800-426-9788
4. GameTime (MRC, P.O. Box 106, Spring Lake, NJ 07762, 800-922-0070)

SECTION 116870 – POOL EQUIPMENT

1.1 Pool Handicap Lift Specs:

- A. Spectrum Aquatics Motion Trek BP 350 with in-ground anchor to deck.





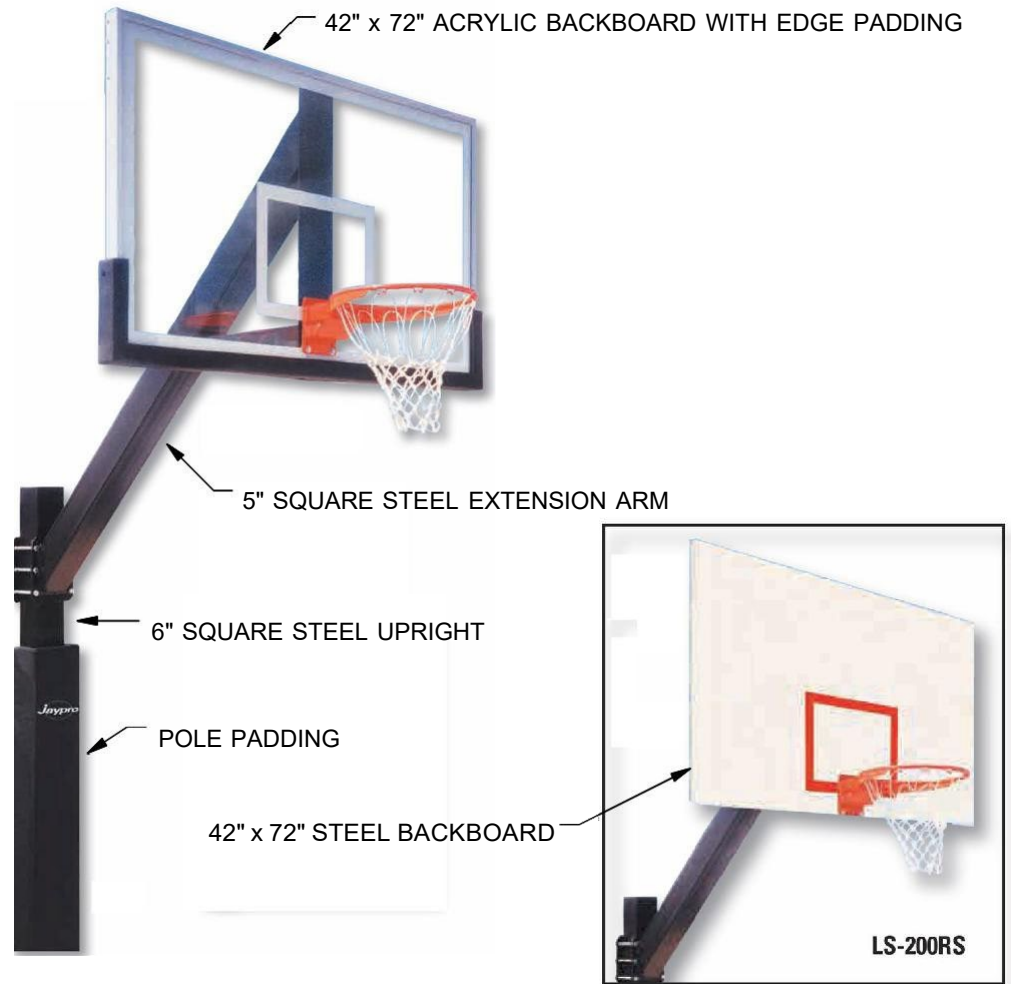
Pole shall be constructed of 6" square, 3/16" wall structural steel tube suitable for a 39" in-ground installation. 45° extension arm shall be 6" square, 3/16" wall structural tube with a 4" square, 1/8" wall steel tube horizontal support and 1/4" thick steel backboard support plate. Pole shall be designed so that rim mounts directly to pole to minimize stress on the backboard. Extension arm shall be mounted by means of 6 each 5/8" grade 8 bolts. Pole system shall provide a minimum setback from the front of pole to front of backboard of 60". System can be ordered with an optional 72" setback (BA870AXL) if desired. Entire pole system shall have a textured black polyester powder coated finish and carry an unconditional lifetime functional warranty. Vertical pole shall be capped to keep out rain. Backboard shall be 42" x 72" official-sized 1/2" clear unbreakable polycarbonate with a limited lifetime warranty. Polycarbonate shall be framed with aluminum extensions and have a white border and shooter's square. Rim shall be the flexible type with official 5/8" diameter ring and one-piece net attachment. Rim shall have a 1-year limited warranty and an orange powder coated finish. Installation to be completed in accordance to manufacturer's instructions. Do not scale drawings. Entire system weight shall be 480#.



PRODUCT SPECIFICATION

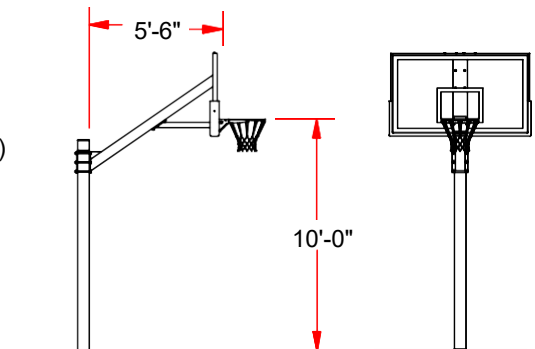
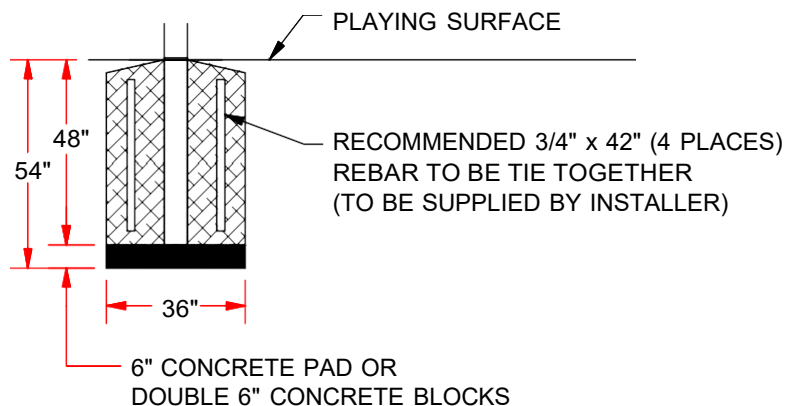
BA873U-BK ULTIMATE™ POLYCARBONATE PLAYGROUND BASKETBALL SYSTEM

LS-200 / LS-200RS



FEATURES:

- * 66" PLAY SAFE AREA
- * UPRIGHT & EXTENSION ARM ARE CONSTRUCTED OUT OF HEAVY GAUGE STEEL.
- * FIXED HEIGHT OF 10' HIGH RIM, HEIGHT CAN BE ADJUSTED AFTER COURT RESURFACING.
- * OFFICIAL SIZE BACKBOARD 42" x 72" ACRYLIC OR STEEL BOARD.
- * LS-200 COMES WITH ACRYLIC BACKBOARD WITH EDGE PADDING.
- * LS-200RS COMES WITH STEEL BACKBOARD.



REV.	DESCRIPTION	DATE	BY
-	INITIAL	1/12	Moune T.

LS-200 / LS-200RS

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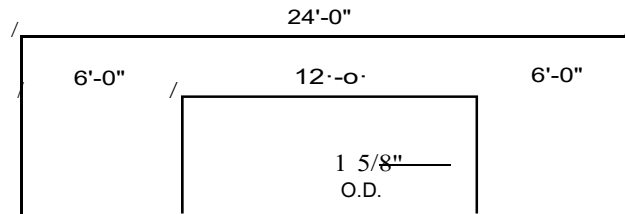


FAX:
860.444.1779 (SALES)
860.440.0628 (ENG.)

PHONE:
800.243.0533 (TOLL FREE)
860.447.3001 (LOCAL)

JAYPRO SPORTS, LLC, 976 HARTFORD TURNPIKE, WATERFORD, CT 06385 USA

DRAWING NAME / PART NUMBER: LS-200 / LS-200RS	
DRAWN BY: Moune T.	ISSUE DATE: 1/18/2012
CHK'D BY: WVB	CHK DATE: 1/18/2012
SHEET: 1 OF 1	REV. -



FRONT AND REAR TENSION
 5/8" BARS WITH TENSION BAR
 BANDS @ 1'-2" O/C (MAX.)
 O.D.

3/8" DIA. TRUSS RODS
 WITH TIGHTENERS

7 PERIMETER POSTS

0°
 I

0°
 io

GA., 2" MESH CHAIN LINK
 ABRIC WITH KNUCKLED ENDS
 FOR OVERHEAD ONLY
 FOUL BALL EXTENSION

PLAN VIEW

TIE WIRES @
 1'-2" O/C FOR
 ALL VERTICAL

WITH

T TOP

AIL BAND WITH
 OFFSET CUP (TYP.)

S;S-;

111
 3" O.D.--
 b

O.D. I
 1 S;S-;

2 1/F----
 O.D.

1 S;S-;

O.D. I

TENSION BAR BANDS
 TENSION BARS WITH
 @ 1'-2" O/C

--TIE WIRES @ 2'-0"
 O/C FOR ALL HORIZONTAL
 RAILS

FINISH GRADE

18" DIA. CONCRETE
 FOOTING, SLOPE TOP
 TO DRAIN, 1/4" PER
 FOOT (MIN.)

-#6 GA., 1" OR 1-1/4"
 MESH CHAIN LINK
 FABRIC WITH KNUCKLED ENDS
 FOR ALL VERTICAL LOCATIONS

NQIE.

STUABBGLREADAEND NON-YIELDING

SECTION LEVATION

1. 1_5R ilA ,tS tCtN R F li[c1NgN fu E
 AREAS", SHEET L-6 FOR SPECIFIC REPAIRS
 TO THE EXISTING BACKSTOP. CONTRACTOR
 IS RESPONSIBLE FOR ONLY THOSE
 REPAIRS STATED ON THE PLAN.
2. CONTRACTOR IS RESPONSIBLE FOR RE-
 ATTACHING OR REPLACING EXISTING
 COMPONENTS REMOVED OR DAMAGED
 BY THE BACKSTOP RENOVATIONS.

TYPICAL BASEBALL BACKSTOP DETAIL

SCALE: NTS

DATE: 1/12/23

Division 12

Furnishings

Division 12 Outline Specifications

129300 Site Furnishings

Division 12 Details

129300 Site Furnishings

Division 12 Outline Specifications– Furnishings

Section 129300 – Site Furnishings

Site furnishings shall conform to the following minimum standards:

A. Approved Site Furnishing Manufacturers:

1. Dumor, Inc. – P.O. Box 142, Mifflintown, PA 17059, Phone: (800) 598-4018, Web: www.dumor.com.
Local Representative: General Recreation, P.O. Box 440, Newtown Square, PA 19073, Phone: (800) 726-4793, Web: www.generalrecreationinc.com
2. Concrete Classics – P.O. box 382, Middlebury, CT, 06762, Phone: (203) 560-9097, Web: www.concrete-classics.com
3. Displays2go – 81 Commerce Drive, Fall River, MA 02720, Phone: 1(877) 671-8061, Fax: 1(401) 247-0392, Email: info@displays2go.com, Web: www.displays2go.com
4. Equal approved by Philadelphia Parks and Recreation.

B. Benches:

1. Park Betting Benches: Dumor Bench 165-60I (6' Cast Bench, Ipe Seat)
 - i. Approved Alternate: Dumor Bench 166-60I (6' Backless Cast Bench, Ipe Seat)
 - b. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette, but color selection shall be approved by PPR
 - c. Bench to be surface mounted (S-2) to concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors.
2. Urban Setting Benches: Dumor Bench 160-60 (6' Cast Bench Steel Seat) with Dumor Center Armrest or custom "Fairmount Park Panel" center armrest.
 - i. Approved Alternate: Dumor Bench 164-60 6' (Cast Bench, Steel Seat) with Dumor Center Armrest or custom "Fairmount Park Panel" center armrest.
 - b. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette, but color selection shall be approved by PPR
 - c. Bench to be surface mounted (S-2) to concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors.
3. Athletic Field/Courts: Dumor 105 S-1 (Embedment) or Approved equal.
 - a. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette, but color selection shall be approved by PPR.
 - b. Bench to be embedded (S-1) in concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors or post anchored in a concrete footing cast below grade.

C. Table and Chairs:

1. Dumor Series 76-32PL (2 seat-ADA Compliant), 76-33PL (3 seat-ADA Compliant) or 76-34PL (4 seat).
 - a. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette, but color selection shall be approved by PPR.
 - b. Table and chairs to be embedded (S-1) in concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors or post anchored in a concrete footing cast below grade.
 - c. Designer shall provide 2 or 3 seat tables to accommodate persons in wheelchairs per the ADA.
2. Dumor Series 78 (game tables)
 - a. Seat options:
 - i. 78-32PL S-1 (2 seat)
 - ii. 78-33ADAPL S-1 (3 seat-ADA Compliant)
 - iii. 78-34PL S-1 (4 seat)
 - b. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette; but color selection shall be approved by PPR.
 - c. Table and chairs to be embedded (S-1) in a concrete footing cast below grade.
 - d. Designer shall provide 2 or 3 seat tables to accommodate persons in wheelchairs per the ADA.
3. Dumor Series 72 PL (picnic table)
 - a. Seat options:
 - i. 72-68-1PL (ADA Compliant)
 - ii. 72-80PL
 - b. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette; but color selection shall be approved by PPR.
 - c. Table to be surface mounted (S-2) to concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors or post anchored (S-1) in a concrete footing cast below grade.
4. Concrete Classics Precast Concrete Fixed Chess Table and Precast Concrete Fixed Seats
 - a. Table: CC215 precast concrete table 32 inches square with single 6 inch diameter center concrete post/leg, total height table top to bottom of leg is 53 inches. Post leg has precast hole at bottom for contractor provided 24 inch long by No. 6 rebar for anchorage into cast-in-place concrete footing

below grade.

- b. Seat(s): CC250 precast concrete round stool with embedment footing, 18 inches in diameter by 24 inches tall total. Seats can be set on 2, 3, or 4 sides of the above noted table. Bottom of stool embedment has precast hole at bottom for contractor provided 26 inch long by No. 6 rebar for anchorage into cast-in-place concrete footing below grade.
- c. Designer shall provide 2 or 3 seat tables to accommodate persons in wheelchairs per the ADA.

D. Trash Receptacles:

- 1. Dumor Series 157-32FTO, 157-32SH or 157-32-25BT.
 - a. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette; but color selection shall be approved by PPR.
 - b. Standard top opening:
 - i. FTO
 - c. 32 Gallon interior plastic liner, black in color.
 - d. Side liner access with operable latch.
 - e. Trash receptacle to be surface mounted (S-2) to concrete paving or pad or PPR approved rigid paving with manufacturer's recommended anchors or post anchored (S-1) in a concrete footing cast below grade.

E. Bike Racks:

- 1. Dumor Series 83-00 or 290-00 (Powder-Coated Finish), or approved equal.
 - a. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette; but color selection shall be approved by PPR.
 - b. Bike rack to be embedded in concrete (S-1).

F. Bollards:

- 1. Dumor Series 400 or approved equal
- 2. Removable: Bollards 400-42/S-1SL
- 3. Fixed :400-42
- 4. Chain: ½" Grade 304, Stainless Steel
- 5. Color to be selected by designer. Standard Philadelphia Parks and Recreation color is black.
- 6. Bollard to be embedded in concrete.

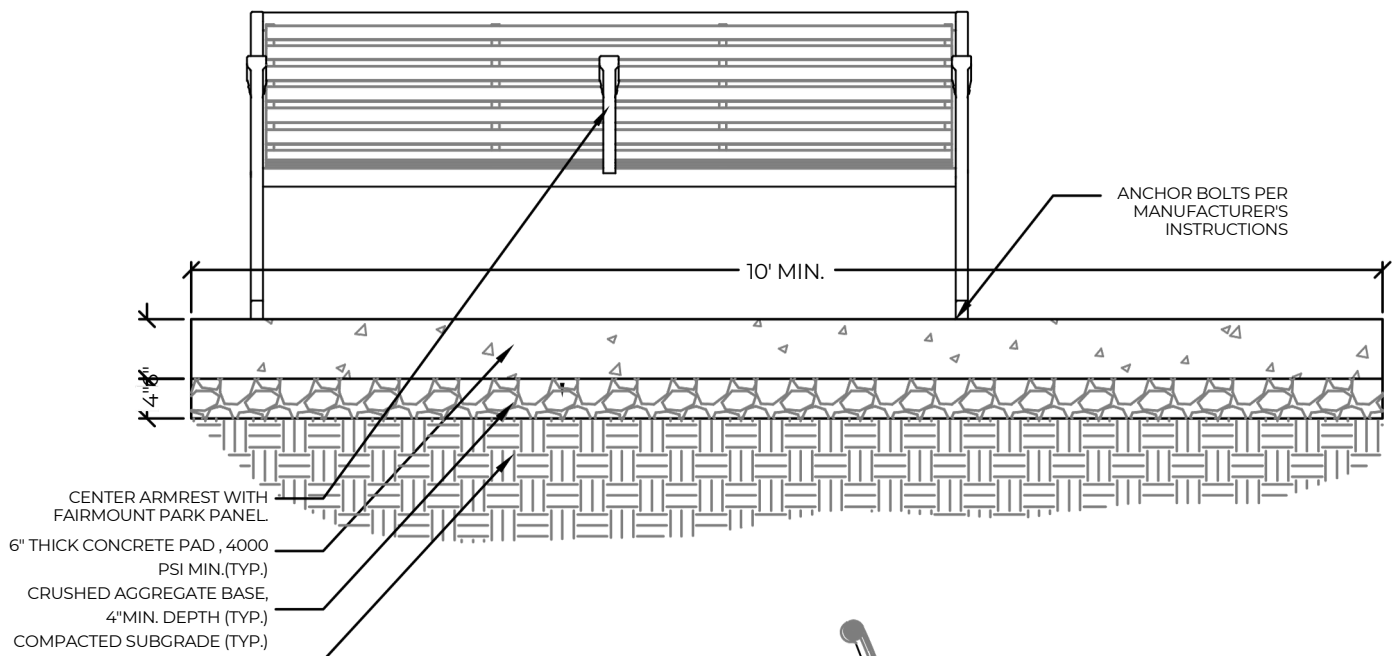
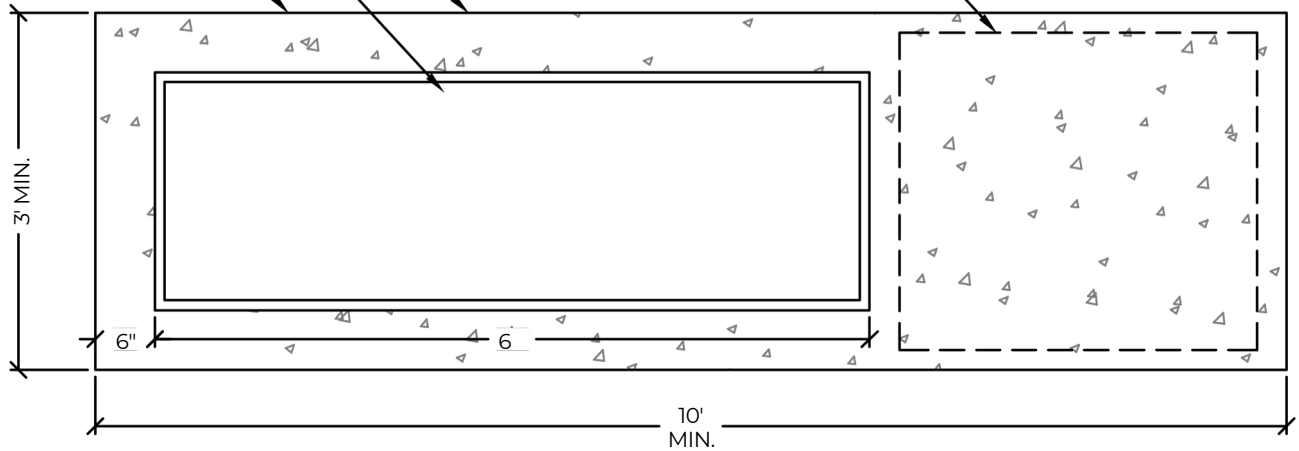
G. Bulletin Boards:

1. Display2go 24.5 x 18.5-Inch Enclosed Bulletin Board for Outdoor Use, with Locking Door
2. SKU: ODNBCB1319, or approved equal.
3. Frame: Aluminum, weather resistant.
4. Mounting: Surface-mounted or embedded in concrete, as per project requirements.
5. Locking Mechanism: Secure, tamper-resistant locking door.
6. Standard Philadelphia Parks and Recreation color is black. Designer may select another color from manufacturer's standard color palette; but color selection shall be approved by PPR.

THIS SPACE COULD BE SHARED
WITH ADJACENT BENCH, IF
DESIRED

NEW BENCH (TYP.) BENCH TO
BE MOUNTED TO CONCRETE
PAD AS PER MANUFACTURER'S
INSTRUCTIONS
6" THICK CONCRETE PAD, 4000
PSI MIN.(TYP.)

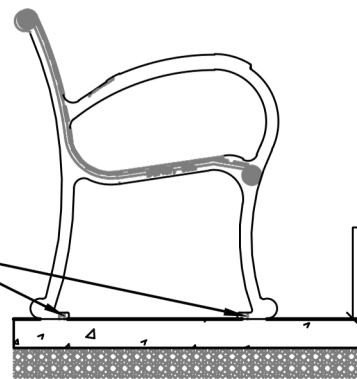
ADA SPACE FOR WHEELCHAIR. AREA MUST
MEET MOST CURRENT ADA STANDARDS
(<2% SLOPE IN ANY DIRECTION)



NOTES:

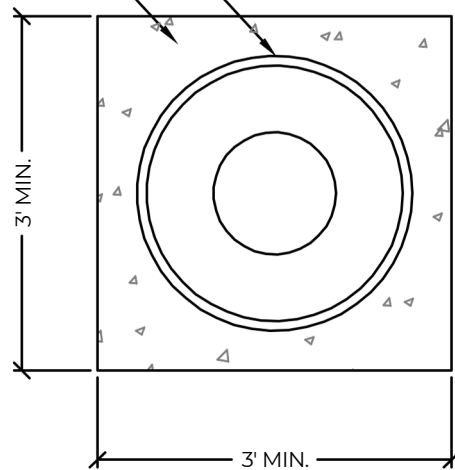
1. ALL DIMENSIONS ARE THE RECOMMENDED MINIMUMS.
2. ALL SITE FURNISHINGS ARE TO BE MOUNTED TO CONCRETE PADS AS INSTRUCTED BY MANUFACTURER.
3. ANY AND ALL AREAS DESIGNATED FOR WHEEL CHAIR AND OR ACCESSIBLE USES MUST COMPLY WITH CURRENT AMERICAN WITH DISABILITIES ACT REGULATIONS (ADA).

ANCHOR BOLTS PER
MANUFACTURER'S
INSTRUCTIONS

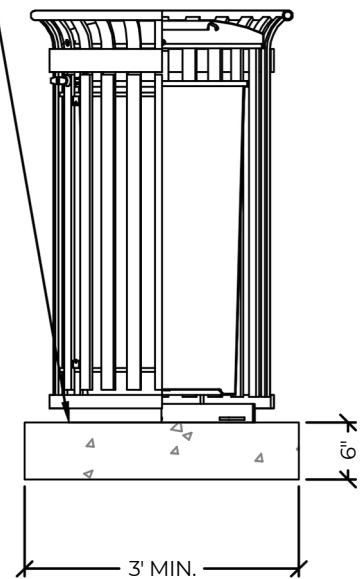


6" THK.
CONCRETE
SLAB
(3,600 PSI MIN.)

NEW TRASH RECEPTACLE (TYP.) TO BE
MOUNTED AND ANCHORED TO
CONCRETE PAD AS PER
MANUFACTURER'S INSTRUCTIONS
6" THICK CONCRETE PAD, 4000
PSI MIN.(TYP.)



NEW TRASH RECEPTACLE (TYP.) TO BE
MOUNTED AND ANCHORED TO
CONCRETE PAD AS PER
MANUFACTURER'S INSTRUCTIONS



NOTES:

1. ALL DIMENSIONS ARE THE RECOMMENDED MINIMUMS.
2. ALL SITE FURNISHINGS ARE TO BE MOUNTED TO CONCRETE PADS AS INSTRUCTED BY MANUFACTURER.



PHILADELPHIA
PARKS & RECREATION

TYPICAL TRASH RECEPTICAL ON CONCRETE PAD DETAIL

167

SCALE: NTS

DATE: JANUARY

Division 21

Fire Suppression

Division 21 Full Specifications

211313 Wet-Pipe Sprinkler Fire
Suppression System

SECTION 211313 – WET-PIPE SPRINKLER FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Cover system for sprinkler piping.
3. Specialty valves.
4. Sprinklers.
5. Alarm devices.
6. Manual control stations.
7. Control panels.
8. Pressure gages.

B. Related Requirements:

1. Section 211119 "Fire Department Connections" for exposed-, flush-, and yard-type fire department connections.
2. Section 230523 "General-Duty Valves for Water-Based Fire-Suppression Piping" for ball, butterfly, check, gate, post-indicator, and trim and drain valves.

1.3 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig (1200-kPa) maximum.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties

and accessories.

- C. Shop Drawings: For wet-pipe sprinkler systems:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include diagrams for power, signal, and control wiring.
- D. Delegated-Design Submittal: For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Domestic water piping.
 - 2. Storm Drainage piping.
 - 3. Natural Gas piping.
 - 4. Items penetrating finished ceiling include the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - 5. HVAC Ductwork and Equipment.
- B. Qualification Data: For qualified Installer and professional engineer.
- C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Welding certificates.
- E. Fire-hydrant flow test report.
- F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
- G. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
- B. Welding Qualifications: Qualify procedures and operators according to 2010 ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13.
- B. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.
- C. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design wet-pipe sprinkler systems.
 - 1. Available fire-hydrant flow test records are indicated on Drawing FPO.O. the following conditions:
 - 2. Sprinkler system design shall be approved by authorities having jurisdiction.
 - a. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - b. Sprinkler Occupancy Hazard Classifications:
 - 1) Building Service Areas: Ordinary Hazard, Group 1.
 - 2) Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - 3) General Storage Areas: Ordinary Hazard, Group 1.

- 4) Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - 5) Office and Public Areas: Light Hazard.
 - 6) Kitchen Areas: Ordinary Hazard, Group 1.
3. Minimum Density for Automatic-Sprinkler Piping Design:
- a. Refer to Schedule on Drawing FPO.).
4. Maximum Protection Area per Sprinkler: According to UL listing.
5. Maximum Protection Area per Sprinkler:
- a. Office Spaces: 225 sq. ft. (20.9 sq. m).
 - b. Storage Areas: 130 sq. ft. (12.1 sq. m).
 - c. Mechanical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - d. Electrical Equipment Rooms: 130 sq. ft. (12.1 sq. m).
 - e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
- D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

2.2 STEEL PIPE AND FITTINGS

- A. Standard-Weight, Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
- C. Uncoated-Steel Couplings: ASTM A 865/A 865M, threaded.
- D. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- E. Malleable- or Ductile-Iron Unions: UL 860.
- F. Cast-Iron Flanges: ASME 16.1, Class 125.
- G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
- H. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
 - 1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- I. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Anvil International.
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
- 2. Pressure Rating: 175-psig (1200-kPa) minimum.
 - 3. Painted Uncoated Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable- iron casting or ASTM A 536, ductile-iron casting, with dimensions matching steel pipe.
 - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) and ASTM B 88, Type M (ASTM B 88M, Type C) water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18 pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22 pressure fittings.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general- duty brazing unless otherwise indicated.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- G. Grooved-Joint, Copper-Tube Appurtenances:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Anvil International.
 - b. Shurjoint Piping Products.
 - c. Victaulic Company.
 - 2. Grooved-End Copper Fittings: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
 - 3. Grooved-End-Tube Couplings: To fit copper-tube dimensions, with design similar to AWWA C606. Include ferrous housing sections, EPDM-rubber gasket suitable for hot and cold water, and bolts and nuts.
- H. Copper-Tube, Extruded-Tee Connections:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. T-DRILL Industries Inc.
- 2. Description: Tee formed in copper tube according to ASTM F 2104.

2.4 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 - 1. Standard-Pressure Piping Specialty Valves: 175-psig (1200-kPa) minimum.
- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Alarm Valves:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Globe Fire Sprinkler Corporation.
 - b. Reliable Automatic Sprinkler Co., Inc. (The).
 - c. Tyco Fire & Building Products LP.
 - d. Victaulic Company.
 - e. Viking Corporation.
 - 2. Standard: UL 193.
 - 3. Design: For horizontal or vertical installation.
 - 4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer.
 - 5. Drip Cup Assembly: Pipe drain with check valve to main drain piping.
 - 6. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
- G. Automatic (Ball Drip) Drain Valves:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire & Building Products LP.
 - 2. Standard: UL 1726.
 - 3. Pressure Rating: 175-psig (1200-kPa) minimum.
 - 4. Type: Automatic draining, ball check.
 - 5. Size: NPS 3/4 (DN 20).

6. End Connections: Threaded.

2.5 SPRINKLER PIPING SPECIALTIES

A. Branch Outlet Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Anvil International.
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
2. Standard: UL 213.
3. Pressure Rating: 175-psig (1200-kPa) minimum.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-tee and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig (1200-kPa) minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded or grooved.

C. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Tyco Fire & Building Products LP.
 - b. Victaulic Company.
 - c. Viking Corporation.
2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig (1200-kPa) minimum.
4. Body Material: Cast- or ductile-iron housing with sight glass.

5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

D. Adjustable Drop Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Aegis Technologies, Inc.
 - b. CECA, LLC.
 - c. Corcoran Piping System Co.
 - d. Merit Manufacturing.
2. Standard: UL 1474.
3. Pressure Rating: 250-psig (1725-kPa) minimum.
4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
5. Size: Same as connected piping.
6. Length: Adjustable.
7. Inlet and Outlet: Threaded.

E. Flexible Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Fivalco Inc.
 - b. FlexHead Industries, Inc.
 - c. Gateway Tubing, Inc.
 - d. Victaulic Company.
2. Standard: UL 1474.
3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175-psig (1200-kPa) minimum.
5. Size: Same as connected piping, for sprinkler.

2.6 SPRINKLERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Globe Fire Sprinkler Corporation.
 2. Reliable Automatic Sprinkler Co., Inc. (The).
 3. Tyco Fire & Building Products LP.
 4. Victaulic Company.
 5. Viking Corporation.
- B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

- C. Pressure Rating for Automatic Sprinklers: 175-psig (1200-kPa) minimum.
- D. Automatic Sprinklers with Heat-Responsive Element:
 - 1. Early-Suppression, Fast-Response Applications: UL 1767.
 - 2. Nonresidential Applications: UL 199.
 - 3. Characteristics: Nominal 1/2-inch (12.7-mm) orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- E. Sprinkler Finishes: bronze.
- F. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Plastic, white finish, one piece, flat.
 - 2. Sidewall Mounting: Plastic, white finish, one piece, flat.
- G. Sprinkler Guards:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
 - d. Viking Corporation.
 - 2. Standard: UL 199.
 - 3. Type: Wire cage with fastening device for attaching to sprinkler.

2.7 ALARM DEVICES

- A. Alarm-device types shall match piping and equipment connections.
- B. Water-Flow Indicators:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. McDonnell & Miller.
 - b. Potter Electric Signal Company, LLC.
 - c. Viking Corporation.
 - d. Watts; a Watts Water Technologies company.
 - 2. Standard: UL 346.
 - 3. Water-Flow Detector: Electrically supervised.

4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
5. Type: Paddle operated.
6. Pressure Rating: 250 psig (1725 kPa).
7. Design Installation: Horizontal or vertical.

C. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Kennedy Valve Company; a division of McWane, Inc.
 - b. Potter Electric Signal Company, LLC.
 - c. System Sensor.
2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.
6. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application

2.8 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. AMETEK, Inc.
 2. Ashcroft Inc.
 3. WIKA Instrument Corporation.
- B. Standard: UL 393.
- C. Dial Size: 3-1/2- to 4-1/2-inch (90- to 115-mm) diameter.
- D. Pressure Gage Range: 0- to 250-psig (0- to 1725-kPa) minimum.
- E. Label: Include "WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping in Section 211100 "Facility Fire-Suppression Water-Service Piping" for exterior piping.
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Section 211100 "Facility Fire-Suppression Water-Service Piping."
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.3 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
 - 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Install seismic restraints on piping. Comply with NFPA 13 requirements for seismic-restraint device materials and installation.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill to outside building.
- J. Install alarm devices in piping systems.
- K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.

- L. Install pressure gages on riser and at each sprinkler test connection. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft-metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they are not subject to freezing.
- M. Fill sprinkler system piping with water.
- N. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
- O. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire- Suppression Piping."
- P. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- K. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- L. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- M. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2144. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- N. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

3.6 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.
- B. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.
6. Verify that equipment hose threads are same as local fire department equipment.

B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.9 CLEANING

A. Clean dirt and debris from sprinklers.

B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.10 PIPING SCHEDULE

A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends, cast-iron threaded fittings, and threaded joints.

B. Copper-tube, extruded-tee connections may be used for tee branches in copper tubing instead of specified copper fittings. Branch-connection joints must be brazed.

1. Standard-pressure, wet-pipe sprinkler system, NPS 2 (DN 50) and smaller, shall be one of the following:
2. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
3. Standard-weight, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.
5. Type L (Type B) or Type M (Type C), hard copper tube with plain ends; cast- or wrought-copper, solder-joint fittings; and brazed joints.
6. NPS 2 (DN 50), Type L (Type B) or Type M (Type C), hard copper tube with roll- grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

C. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 and larger, shall be one of the following:

1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
3. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.

3.11 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Pendent, recessed, flush, and concealed sprinklers as indicated.
3. Wall Mounting: Sidewall sprinklers.

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
4. Provide upright sprinklers with Guards in Mechanical and Storage Rooms
5. Upright, Pendent and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces.

Division 22

Plumbing

Division 22 Outline Specifications

221316 Sanitary and Waste Piping
224213.13 Commercial Water Closets
224213.16 Commercial Urinals
224216.13 Commercial Lavatories
224713 Drinking Fountains

Division 22 Outline Specifications – Plumbing

SECTION 221316 – SANITARY AND WASTE PIPING

1.1 PIPING MATERIALS:

A. Provide piping materials per the pipe schedule table below:

PIPING SYSTEM	LOCATION	REQUIREMENT
Storm Piping	Interior (above ground)	Service Weight Cast Iron No-Hub with mechanical stainless-steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" dia. and smaller
	Interior (underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (yard drainage)	1. Service Weight Cast Iron bell and spigot with lead & oakum joints. 2. Ductile Iron Class 51 for all sizes with push-on joints. 3. Precast Reinforced Concrete Pipe with rubber gasket watertight joint.
	Exterior (house drain & house sewer)	Service Weight Cast Iron bell and spigot with lead & oakum joints, Ductile Iron Class 51 for all sizes with push-on joints.
Sanitary Piping (waste/vent)	Interior (above ground & house drain)	Service Weight Cast Iron No-Hub with mechanical stainless-steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" diameter and smaller
	Interior (pump discharge)	Galvanized steel pipe schedule 40, with threaded drainage fittings, Victaulic fitting in conjunction with groove pipe, 2" and larger is permitted.
	Interior (underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (house sewer/underground)	Ductile iron Pipe Class 56 with push-on joint

B. Deviations from the above table shall be approved by Philadelphia Parks and Recreation (PPR), Department of Licenses + Inspections (L+I), and Philadelphia Water Department.

SECTION 224213.13 – COMMERCIAL WATER CLOSETS

1.1 WATER CLOSET GENERAL DESIGN OUTLINE

A. Standard Water Closet Design Criteria: Unless otherwise directed by the owner, water closets for Standard Compliance shall adhere to the design criteria listed below. Coordinate the color, finishes, and manufacturer options with Owner.

1. Mounting Type: Floor Mounted
2. Outlet Orientation: Bottom
3. Spud: Top
4. Type: Flushometer Valve
5. Style: Siphon
6. Water Consumption: 1.6 gallons per flush
7. Min. Flow Rate: 25 gallons per minute
8. Material: Vitreous China
9. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN;

- B. ADA Compliant Water Closet Design Criteria: Accessible toilets shall comply with ADA (Americans with Disabilities Act) Unless otherwise directed by the owner, water closets for Accessible Compliance shall adhere to the design criteria listed below. Coordinate the color, finishes, and manufacturer options with Owner.

1. Mounting Type: Floor Mounted
2. Outlet Orientation: Bottom
3. Spud: Top
4. Type: Flushometer Valve
5. Style: Siphon
6. Water Consumption: 1.6 gallons per flush
7. Min. Flow Rate: 25 gallons per minute
8. Material: Vitreous China
9. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN

- C. Toilet Seat Design Criteria (Standard and ADA):

1. Type: Commercial
2. Material: Solid Polypropylene Plastic
3. Shape: Open Front; Elongated
4. Hinge: Check; Self-Sustaining
5. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN

- D. Flushometers Design Criteria (Standard and ADA): All flushometers shall be mechanically operated. Electric, battery-operated, solenoid-actuated shall not be specified without approval from the owner. Specify flushometers based on the design criteria listed below:

1. Type: Lever-Handle; Diaphragm
2. Style: Exposed
3. Water Consumption: 1.6 gallons per flush
4. Material: Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve in compliance with ASSE 1037, ANSI/ASME 113.19.6
5. Manufacturers: SLOAN; ZURN; AMERICAN STANDARD

SECTION 224213.16 – COMMERCIAL URINALS

1.1 URINAL OUTLINE

- A. Standard and Accessible Urinal Design Criteria: Unless otherwise directed by the owner, urinals shall adhere to the design criteria listed below. Accessible urinals shall comply with ADA regulations. Coordinate the color, finishes, and manufacturer options with Owner.
1. Mounting Type: Wall-Hung
 2. Outlet Orientation: Bottom
 3. Flush Action: Washout
 4. Type: Flushometer Valve
 5. Style: Siphon
 6. Water Consumption: 1.0 gallons per flush
 7. Min. Flow Rate: 25 gallons per minute
 8. Material: Vitreous China
 9. Manufacturers: AMERICAN STANDARD; KOHLER; ZURN; SLOAN;
- B. Flushometers Design Criteria (Standard and ADA): All flushometers shall be mechanically operated. Electric, battery-operated, solenoid-actuated shall not be specified without approval from the owner. Specify flushometers based on the design criteria listed below:
1. Type: Lever-Handle; Diaphragm
 2. Style: Exposed
 3. Water Consumption: 1.0 gallons per flush
 4. Material: Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve in compliance with ASSE 1037, ANSI/ASME 113.19.6
 5. Manufacturers: SLOAN; ZURN; AMERICAN STANDARD

SECTION 224216.13 – COMMERCIAL LAVATORIES

- 1.1 GENERAL DESIGN OUTLINE: Unless otherwise directed by the owner, sinks, lavatories, faucets shall adhere to the design criteria listed below. Faucets shall either be manual, or of the self-closing type. They shall not be automatic.
- 1.2 DESIGN OUTLINE BY ROOM TYPE:
- A. Kitchen Sink:
1. Mounting Type: Drop In
 2. Dimensions: 25"x22"
 3. Type: Self-Rimming, Single Compartment
 4. Sink Material: Cast Iron
 5. Sink Finish Type: Gloss
 6. Number of Faucet Holes: 3
 7. Faucet Type: Three-Hole Widespread kitchen faucet

8. Handles: 2 - Lever Handles (wristblade)
9. Faucet Material – Brass w/ brass valve bodies
10. Min. Flow Rate: 1.5 gallons per minute
11. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;

B. Arts/Craft's Sink:

1. Mounting Type: Top Mount
2. Dimensions: Approx. 24"x21"
3. Type: Utility
4. Sink Material: Cast Iron
5. Sink Finish Type: Enamel
6. Number of Faucet Holes: 3
7. Faucet Type: Three-Hole Widespread kitchen faucet
8. Handles: 2 - Lever Handles (wristblade)
9. Faucet Material – Brass w/ brass valve bodies
10. Min. Flow Rate: 1.5 gallons per minute
11. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;

C. Lavatories:

1. Mounting Type: Wall-Hung
2. Dimensions: Approx. 24"x21"
3. Type: D-Shaped; Front Overflow
4. Sink Material: Vitreous China
5. Color: White
6. Faucet Holes: 4" centers for wall hanger or concealed arms support
7. Faucet Type: 2-Handle, Centerset
8. Faucet Material – Brass w/ brass valve bodies
9. Min. Flow Rate: 0.35 gallons per minute
10. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;

SECTION 224713–DRINKING FOUNTAINS

1.1 GENERAL DESIGN OUTLINE BY TYPE

A. Building Drinking Fountain:

1. Type: Self-Contained, Electric refrigerated. Unit shall have ADA clearances. Unit shall be certified to NSF/ANSI 61 & 372, and meet all federal, state, and city low-lead requirements.
2. Mounting: Floor mounted. Non-pressurized water tank shall be located after bubbler valve so that tank is subjected to line-pressure only when valve button is pressed.
3. Capacity: 50 °F and approx. 8GPH
4. Material: Stainless Steel
5. Manufactured by ELKAY or PPR approved equal

B. Building Drinking Fountain (Suggested Alternative that meets ADA):

1. Wall-mounted drinking fountain with bottle filling station may be specified.
2. Fountain shall be ADA compliant and GreenSpec listed
3. Lower units shall have push bar activation. Bottle filling units shall include electronic sensors for touchless activation.
4. Bottle filling station shall deliver 8 GPH of 50 °F drinking water.
5. Unit shall be stainless steel construction with integral drain.

C. Exterior Drinking Fountain:

1. Type: Self-contained pedestal type non-filtered, non-refrigerated drinking fountain with freeze resistant valve assembly. Unit shall be ADA and ICC 117.1 compliant. Unit shall be certified NSF/ANSI 61 & 372 (lead free), and meet all federal, state, and local code requirements.
2. Mounting: Floor mounted to concrete slab or paving using manufacturers approved vandal resistant anchors.
3. Bubbler style: Vandal resistant.
4. Materials:
 - a. Bowl/Bubbler: 316 Stainless steel.
 - b. Exterior Housing/Pedestal: Powder coated steel. Color to be selected from manufacturer's standard color palette.
5. Manufacturer: Elkay or PPR approved equal.
 - a. Bowl/Bubbler: 316 Stainless steel.
 - b. Exterior Housing/Pedestal: Powder coated steel. Color to be selected from manufacturer's standard color palette.
6. Model: Elkay 4400 Series or PPR approved equal pedestal mounted, non-filtered, and freeze resistant. Approved options:
 - a. Single (1) Bowl Pedestal: LK4400FRK or PPR approved equal.
 - b. Double (2) Bowl/Bi-Level Pedestal: LK4420FRK or PPR approved equal.
 - c. Double (2) Bowl/Bi-Level Pedestal with Pet Station: LK4420DBFRK or PPR approved equal.
 - d. Single (1) Bowl Pedestal with Pet Station: LK4400DBFRK or PPR approved equal.
 - e. Triple (3) Bowl Pedestal: LK4430FRK or PPR approved equal.
 - f. Bottle Filling Station Pedestal: LK4400BFFRK or PPR approved equal.
 - g. Bottle Filling Station and Single (1) Bowl/Bi-Level Pedestal: LK4420BF1UFRK or PPR approved equal.
 - g. Bottle Filling Station and Double (2) Bowl/Tri-Level Pedestal: LK4430BF1UFRK or PPR approved equal.
 - g. Bottle Filling Station and Single (1) Bowl/Bi-Level Pedestal with Pet Station: LK4420BF1UDBFRK or PPR approved equal.
7. Units shall have integral drain connection within pedestal with drainage to code compliant discharge point.

Division 22

Plumbing

Division 22 Outline Specifications

220000 General Notes
221316 Sanitary and Waste Piping
224213.13 Commercial Water Closets
224213.16 Commercial Urinals
224216.13 Commercial Lavatories
224713 Drinking Fountains

Division 22 Outline Specifications – Plumbing

SECTION 220000 – GENERAL NOTES

1.1 Backflow Preventer:

- A. Use the Watts brand when choosing a backflow preventer.

SECTION 221316 – SANITARY AND WASTE PIPING

1.2 PIPING MATERIALS:

- A. Provide piping materials per the pipe schedule table below:

PIPING SYSTEM	LOCATION	REQUIREMENT
Storm Piping	Interior (above ground)	Service Weight Cast Iron No-Hub with mechanical stainless-steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" dia. and smaller
	Interior (underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (yard drainage)	1. Service Weight Cast Iron bell and spigot with lead & oakum joints. 2. Ductile Iron Class 51 for all sizes with push-on joints. 3. Precast Reinforced Concrete Pipe with rubber gasket watertight joint.
	Exterior (house drain & house sewer)	Service Weight Cast Iron bell and spigot with lead & oakum joints, Ductile Iron Class 51 for all sizes with push-on joints.
Sanitary Piping (waste/vent)	Interior (above ground & house drain)	Service Weight Cast Iron No-Hub with mechanical stainless-steel couplings. Galvanized steel pipe schedule 40, with threaded drainage fittings allowed for 3" diameter and smaller
	Interior (pump discharge)	Galvanized steel pipe schedule 40, with threaded drainage fittings, Victaulic fitting in conjunction with groove pipe, 2" and larger is permitted.
	Interior (underground)	Service Weight Cast Iron bell and spigot with lead and oakum joints.
	Exterior (house sewer/underground)	Ductile iron Pipe Class 56 with push-on joint

- B. Deviations from the above table shall be approved by Philadelphia Parks and Recreation (PPR), Department of Licenses + Inspections (L+I), and Philadelphia Water Department.

SECTION 224213.13 – COMMERCIAL WATER CLOSETS

1.1 WATER CLOSET GENERAL DESIGN OUTLINE

- A. Standard Water Closet Design Criteria: Unless otherwise directed by the owner, water closets for Standard Compliance shall adhere to the design criteria listed below. Coordinate the color, finishes, and manufacturer options with Owner.
1. Mounting Type: Floor Mounted
 2. Outlet Orientation: Bottom
 3. Spud: Top
 4. Type: Flushometer Valve
 5. Style: Siphon
 6. Water Consumption: 1.6 gallons per flush
 7. Min. Flow Rate: 25 gallons per minute
 8. Material: Vitreous China
 9. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN;
- B. ADA Compliant Water Closet Design Criteria: Accessible toilets shall comply with ADA (Americans with Disabilities Act) Unless otherwise directed by the owner, water closets for Accessible Compliance shall adhere to the design criteria listed below. Coordinate the color, finishes, and manufacturer options with Owner.
1. Mounting Type: Floor Mounted
 2. Outlet Orientation: Bottom
 3. Spud: Top
 4. Type: Flushometer Valve
 5. Style: Siphon
 6. Water Consumption: 1.6 gallons per flush
 7. Min. Flow Rate: 25 gallons per minute
 8. Material: Vitreous China
 9. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN
- C. Toilet Seat Design Criteria (Standard and ADA):
1. Type: Commercial
 2. Material: Solid Polypropylene Plastic
 3. Shape: Open Front; Elongated
 4. Hinge: Check; Self-Sustaining
 5. Manufacturers: KOHLER; ZURN; AMERICAN STANDARD; SLOAN
- D. Flushometers Design Criteria (Standard and ADA): All flushometers shall be mechanically operated. Electric, battery-operated, solenoid-actuated shall not be specified without approval from the owner. Specify flushometers based on the design criteria listed below:
1. Type: Lever-Handle; Diaphragm
 2. Style: Exposed
 3. Water Consumption: 1.6 gallons per flush
 4. Material: Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve in compliance with ASSE 1037, ANSI/ASME 113.19.6
 5. Manufacturers: SLOAN; ZURN; AMERICAN STANDARD

SECTION 224213.16 – COMMERCIAL URINALS

1.1 URINAL OUTLINE

- A. Standard and Accessible Urinal Design Criteria: Unless otherwise directed by the owner, urinals shall adhere to the design criteria listed below. Accessible urinals shall comply with ADA regulations. Coordinate the color, finishes, and manufacturer options with Owner.
1. Mounting Type: Wall-Hung
 2. Outlet Orientation: Bottom
 3. Flush Action: Washout
 4. Type: Flushometer Valve
 5. Style: Siphon
 6. Water Consumption: 1.0 gallons per flush
 7. Min. Flow Rate: 25 gallons per minute
 8. Material: Vitreous China
 9. Manufacturers: AMERICAN STANDARD; KOHLER; ZURN; SLOAN;
- B. Flushometers Design Criteria (Standard and ADA): All flushometers shall be mechanically operated. Electric, battery-operated, solenoid-actuated shall not be specified without approval from the owner. Specify flushometers based on the design criteria listed below:
1. Type: Lever-Handle; Diaphragm
 2. Style: Exposed
 3. Water Consumption: 1.0 gallons per flush
 4. Material: Valve Body, Cover, Tailpiece and Control Stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve in compliance with ASSE 1037, ANSI/ASME 113.19.6
 5. Manufacturers: SLOAN; ZURN; AMERICAN STANDARD

SECTION 224216.13 – COMMERCIAL LAVATORIES

- 1.1 GENERAL DESIGN OUTLINE: Unless otherwise directed by the owner, sinks, lavatories, faucets shall adhere to the design criteria listed below. Faucets shall either be manual, or of the self-closing type. They shall not be automatic.
- 1.2 DESIGN OUTLINE BY ROOM TYPE:
- A. Kitchen Sink:
1. Mounting Type: Drop In
 2. Dimensions: 25"x22"
 3. Type: Self-Rimming, Single Compartment
 4. Sink Material: Cast Iron
 5. Sink Finish Type: Gloss
 6. Number of Faucet Holes: 3
 7. Faucet Type: Three-Hole Widespread kitchen faucet

8. Handles: 2 - Lever Handles (wristblade)
9. Faucet Material – Brass w/ brass valve bodies
10. Min. Flow Rate: 1.5 gallons per minute
11. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;

B. Arts/Craft's Sink:

1. Mounting Type: Top Mount
2. Dimensions: Approx. 24"x21"
3. Type: Utility
4. Sink Material: Cast Iron
5. Sink Finish Type: Enamel
6. Number of Faucet Holes: 3
7. Faucet Type: Three-Hole Widespread kitchen faucet
8. Handles: 2 - Lever Handles (wristblade)
9. Faucet Material – Brass w/ brass valve bodies
10. Min. Flow Rate: 1.5 gallons per minute
11. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;

C. Lavatories:

1. Mounting Type: Wall-Hung
2. Dimensions: Approx. 24"x21"
3. Type: D-Shaped; Front Overflow
4. Sink Material: Vitreous China
5. Color: White
6. Faucet Holes: 4" centers for wall hanger or concealed arms support
7. Faucet Type: 2-Handle, Centerset
8. Faucet Material – Brass w/ brass valve bodies
9. Min. Flow Rate: 0.35 gallons per minute
10. Manufacturers: KOHLER; AMERICAN STANDARD; SLOAN;
11. Toggle Bolts: (Flange, springclip, drill type, etc.) for sink connection

SECTION 224713– DRINKING FOUNTAINS

1.1 GENERAL DESIGN OUTLINE BY TYPE

A. Building Drinking Fountain:

1. Type: Self-Contained, Electric refrigerated. Unit shall have ADA clearances. Unit shall be certified to NSF/ANSI 61 & 372, and meet all federal, state, and city low-lead requirements.
2. Mounting: Floor mounted. Non-pressurized water tank shall be located after bubbler valve so that tank is subjected to line-pressure only when valve button is pressed.
3. Capacity: 50 °F and approx. 8GPH
4. Material: Stainless Steel
5. Manufactured by ELKAY or PPR approved equal

B. Building Drinking Fountain (Suggested Alternative that meets ADA):

1. Wall-mounted drinking fountain with bottle filling station may be specified.
2. Fountain shall be ADA compliant and GreenSpec listed
3. Lower units shall have push bar activation. Bottle filling units shall include electronic sensors for touchless activation.
4. Bottle filling station shall deliver 8 GPH of 50 °F drinking water.
5. Unit shall be stainless steel construction with integral drain.

C. Exterior Drinking Fountain:

1. Exterior drinking fountains are standard with or without a bottle filling station.
2. Type: Self-contained pedestal type non-filtered, non-refrigerated drinking fountain with freeze resistant valve assembly. Unit shall be ADA and ICC 117.1 compliant. Unit shall be certified NSF/ANSI 61 & 372 (lead free), and meet all federal, state, and local code requirements.
3. Mounting: Floor mounted to concrete slab or paving using manufacturers approved vandal resistant anchors.
4. Bubbler style: Vandal resistant.
5. Materials:
 - a. Bowl/Bubbler: 316 Stainless steel.
 - b. Exterior Housing/Pedestal: Powder coated steel. Color to be selected from manufacturer's standard color palette.
6. Manufacturer: Elkay or PPR approved equal.
 - a. Bowl/Bubbler: 316 Stainless steel.
 - b. Exterior Housing/Pedestal: Powder coated steel. Color to be selected from manufacturer's standard color palette.
7. Model: Elkay 4400 Series or PPR approved equal pedestal mounted, non-filtered, and freeze resistant. Approved options:
 - a. Single (1) Bowl Pedestal: LK4400FRK or PPR approved equal.
 - b. Double (2) Bowl/Bi-Level Pedestal: LK4420FRK or PPR approved equal.
 - c. Double (2) Bowl/Bi-Level Pedestal with Pet Station: LK4420DBFRK or PPR approved equal.
 - d. Single (1) Bowl Pedestal with Pet Station: LK4400DBFRK or PPR approved equal.
 - e. Triple (3) Bowl Pedestal: LK4430FRK or PPR approved equal.
 - f. Bottle Filling Station Pedestal: LK4400BFFRK or PPR approved equal.
 - g. Bottle Filling Station and Single (1) Bowl/Bi-Level Pedestal: LK4420BF1UFRK or PPR approved equal.
 - g. Bottle Filling Station and Double (2) Bowl/Tri-Level Pedestal: LK4430BF1UFRK or PPR approved equal.
 - g. Bottle Filling Station and Single (1) Bowl/Bi-Level Pedestal with Pet Station: LK4420BF1UDBFRK or PPR approved equal.
8. Units shall have integral drain connection within pedestal with drainage to code compliant discharge point.

Division 23 Outline Specifications – Mechanical

SECTION 230000 – GENERAL MECHANICAL SYSTEM REQUIREMENTS

1.0 INSIDE AMBIENT DESIGN PARAMETERS & LOAD CALCULATIONS:

- A. Indoor ambient temperatures shall be maintained at 68°F for heating and 72°F for cooling. HVAC systems (cooling and heating) shall be sized to maintain this indoor room temperature. Heating and Cooling loads shall be calculated and adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system.

1.1 HVAC SYSTEMS AND EQUIPMENT SELECTION PROCEDURES:

- A. All newly constructed spaces shall be heated, cooled and ventilated. All existing spaces that are upgraded shall be provided with heating, cooling and ventilation unless otherwise specified by the scope of work.
- B. Natural Gas: All equipment (boilers, RTU's Heat-Pumps, etc.) for facilities with existing natural gas service shall operate on natural gas only.
- C. Heating:
 - 1. The existing building steam and/or hot water heating systems and associated radiators/convectors shall continue to serve without modification unless an upgrade to these systems is included as part of the scope of work.
 - 2. If heating upgrades are included, the heating systems shall be upgraded to hot water systems. All new buildings shall use only hot water heating systems. This includes hot water boilers, and associated radiators/convectors.
 - 3. Boilers:
 - a. Hot Water or Steam Boilers being replaced shall continue to serve hot water or steam, unless an upgrade is included as part of the scope of work. If upgrades are included, all boilers shall serve hot-water.
 - b. All new boilers shall be condensing boilers. If condensing boilers are not feasible, the Architect/Engineer of Record must demonstrate the reasoning to the owner and obtain the owner's approval;
 - c. All boiler plants shall have a reserve capacity with an N+1 redundancy.
 - d. No modular boilers shall be installed in any of the facilities.
 - e. All new boilers shall be gas-fired. If there is no existing gas service to the facility, plan with the owner and utility company for new gas service. If providing new gas service is not part of the upgrades, then all new boilers shall be dual-fuel with the capacity of future upgrade to gas.
 - f. All new boilers shall be provided with an integral combustion air control system; a diagnostic control panel with a full text display indicating the operating conditions of the boiler; and a lead/lag control panel.

D. Cooling & Ventilation:

1. All new and upgraded spaces shall be air-conditioned unless otherwise specified in the scope of work. Equipment shall be sized based on cooling loads. Cooling loads shall include the sensible loads and the latent dehumidification loads. Ventilation calculations shall be calculated in accordance with parameters defined in UCC and ASHRAE Standards.
2. Unless not feasible, new and upgraded spaces shall be air-conditioned, heated and ventilated by Rooftop Units (RTUs) with Direct Expansion (DX). RTU's shall utilize Variable Refrigerant Flow (VRF) and provide a method of tempering the ventilation air to meet indoor temperature and ventilation requirements. All RTU's shall be entirely enclosed (sides and top) by a chain-link fence or similar vandal-proof enclosures.
3. Small single-zone spaces, or spaces in which RTUs installations are not feasible shall be equipped with split-unit systems. The outdoor condensing unit(s) shall have a full vandal-proof enclosure, and preferably be mounted on the roof.
4. For indoor units, no condensate pumps shall be used for any units. All condensate must be drained through gravity.

1.2 APPROVED MANUFACTURERS:

- A. The "Approved Manufacturers" for all HVAC and Mechanical equipment are listed below. An "Approved Equal" maybe selected with the approval of the OR. If the equipment is not listed below, the equipment selected must be approved by the EOR

B. Boilers:

1. Weil-McLain
2. Smith Mills
3. Cleaver Brooks
4. Burnham

C. RTU/VRF Systems:

1. Carrier Corporation
2. Trane
3. Johnson Controls (YORK)

D. Split A/C Units:

1. Daikin
2. Mitsubishi
3. American Cool Air

E. Convectors (Steam or Hot Water):

1. Slant/Fin Corp

2. Modine Mfg. Co.
3. Sterling Heating Equipment
4. Dunham-Bush
5. Vulcan Radiator Corp

F. Pumps:

1. Grundfos Pumps Corporation Smith Mills
2. PACO Pumps
3. Bell & Gossett
4. Taco, Inc.
5. MEPCO
6. Armstrong Pumps Inc.

G. Exhaust Fans:

1. Loren Cook Co.
2. Greenheck Corp.

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 GENERAL OUTLINE

A. Testing & Balancing Agency TAB:

1. The air distribution and hydronic systems shall be tested and balanced by an independent agency, licensed, bonded, and certified to perform such work in the city of Philadelphia.
2. The TAB Contractor shall be currently licensed and certified by Associated Air Balancing Council (AABC), or National Environmental Balancing Bureau (NEBB), or Testing, Adjusting and Balancing Bureau (TABB);
3. The work of the Testing & Balancing (TAB) Contractor shall be specified in the Construction Documents by the Design Professional.
4. The TAB Contractor shall be selected by the OWNER. Under no circumstances shall the TAB contractor be a sub-contractor to the General or Mechanical Contractor.

B. Design Consultant Specifications:

1. Specify that all air-distribution systems shall be tested and balanced. The air -flows shall be specified to be set within 5% of the design requirements.
2. Specify all necessary dampers, controls, and shaves required to meet the balance conditions.
3. Specify that all hydronic systems shall be tested and balanced.

4. Specify mechanical system noise levels that are to be compatible with the intended function within the building spaces.
 5. Specify that final to be conducted after all systems are operational and have been accepted.
 6. Specify that all systems start-up, testing, balancing, final operations, maintenance & training manuals, shall be completed on or before substantial completion.
 7. Specify that all systems start-up, testing, balancing, final operations, maintenance & training manuals shall be completed as a requirement of substantial completion.
- C. TAB Submittal Requirements:
1. TAB contractor shall provide verification that systems operate at 50% and 100% of the design capacity.
 2. TAB report shall include copies of equipment cut-sheets, including major equipment, diffusers, dampers, pump and fan curves, etc.
 3. TAB report for air-balancing shall include drawing plan indicating and identifying diffuser/grille locations.

SECTION 230900 – CONTROL SYSTEMS EQUIPMENT

1.1 GENERAL OUTLINE

- A. HVAC systems shall be zoned to differentiate between north, south, east, and west exposures, and internal areas.
- B. Zones shall have independent controls and shall include outside air and zone temperature reset, scheduling, air-side economize, and scheduling.
- C. Air-Handlers serving Gymnasium must configured for 100% economizing and Demand Control Ventilation. Economizing and DCV is preferred in all other room-types.
- D. Every facility shall have a main building controller to control newly installed HVAC equipment. All zones and rooms thermostats shall be integrated with this main building controller. Main building controller shall have the ability to override all associated zone or room controls.
- E. New main building controllers installed in every facility shall be integrated and networked to fully communicate with the “Central Controller located in the Philadelphia Parks & Recreation’s Energy Office”.
- F. Specify installation of sufficient instruments, so that energy efficiency can be trend monitored from main building controllers and at the Central Controller in the “Energy Office”.

Division 26

Electrical

Division 26 Outline Specifications

260000 General Electrical Systems

260500 Basic Electrical Materials and
Methods

260526 Grounding

262713 Electrical Metering

265119 Interior Lighting

265219 Emergency and Exit Lighting

265668 Exterior Athletic Lighting

Division 26 Full Specification

265600 LED Exterior Lighting

Division 26 Outline Specifications – Electrical

SECTION 260100 – WIRING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 260000 - General Electrical Requirements

1.2 GENERAL REQUIREMENTS

- A. All materials and equipment furnished by this Contractor shall be new, the best in grade and quality, and manufactured in the United States of America with standards and ratings as specified herein. No substitution or deviation from the materials and equipment specified herein will be allowed except by written permission from the Engineer.
- B. All materials and equipment shall be of the latest type and design and, where applicable, shall bear the label, stamp or seal of UL, NFPA, IEEE, NEMA, ASME, ASTM, ASA and other industry regulatory groups.
- C. All items of the same kind shall be of the same make throughout the work.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Manufacturer: Triangle, General Cable, General Electric, Anaconda or Phelps Dodge.
 - 1. Standards: NEC Article No. 310.
 - 2. Conductor: Copper, solid for No. 8 and smaller, stranded for No. 6 or larger.
 - 3. Insulation: 600 volts; THWN/THHN for general use, THHN or TFN for lighting fixture use
 - 4. Minimum size: No. 14 for control wiring, No. 12 for all other unless otherwise noted.
 - 5. Other Types: As indicated or required.

2.2 RACEWAYS

- A. Rigid Conduit: Conform to the following:
 - 1. Manufacturer: Triangle, Spang, Youngstown, or Jones & Laughlin.
 - 2. Standards: NEC Article No. 346; UL.
 - 3. Material: Steel, heavy wall, hot dip galvanized inside and outside.
 - 4. Joints: Standard pipe thread: furnished with coupling; shipped with thread protector through 2" size.
 - 5. Minimum Size: 3/4".
- B. Intermediate Metal Conduit (IMC): Conform to the following:
 - 1. Manufacturer: Triangle, Spang, Youngstown.
 - 2. Standards: NEC Article No. 345; UL.

3. Material: Steel only, intermediate wall thickness, hot dipped galvanized.
4. Joints: Standard pipe thread, furnish with coupling, shipped with thread protector through 2" size.
5. Minimum Size: 3/4".

C. Electrical Metallic Tubing (EMT): Conform to the following:

1. Manufacturer: Triangle, Spang, Youngstown, Kaiser or Jones & Laughlin.
2. Standards: NEC Article No. 348; UL 797.
3. Material: Contractor's option: Steel, thin wall, electro-galvanized or aluminum, thin wall.
4. Minimum Size: 3/4".

D. Flexible Conduit: Conform to the following:

1. Manufacturer: Triangle, Spang, Youngstown or Jones & Laughlin.
2. Standards: NEC Article No. 350; UL1.
3. Material: Steel, hot dip galvanized.
4. Minimum Size: 1/2", and 3/8" where permitted by NEC.

E. Polyvinyl/Chloride Raceways (PVC)

1. Manufacturer: Johns-Manville, Can-Tex, Quazite.
2. Standards: NEC Article 347; UL 651
3. Material: Heavy wall, Schedule 40 made of virgin polyvinyl chloride or material re-ground from the manufacturer's own products.
4. Fittings: Virgin PVC, Schedule 40
5. Joints: Solvent welded; watertight and pressure tight to 25 PSI.
6. Adapters: PVC to metallic conduit adapters designed for the purpose.
7. Minimum Size: 2" Diameter.

2.3 CAST CONDUIT FITTINGS

A. Manufacturer: Crouse-Hinds, Appleton, Pyle-National or Killark.

1. Standards: NEC Article No. 370.
2. Description: Cast body with gasketed screw cover and threaded hubs.
3. Material: Cast ferrous alloy, corrosion resistant finish for steel conduit: zinc alloy and similar soft metal castings not acceptable; Copper-free aluminum casting for aluminum conduit; formed PVC for plastic conduit.

2.4 CONDUIT CONNECTORS

A. Manufacturer: T & B, Appleton or OZ.

1. Standards: NEC Article No. 370.
2. Metal Conduit Materials: Cast malleable iron and pressed steel; rain tight and concrete tight; threaded for rigid steel conduit, intermediate metal conduit, and compression type or indentor type for EMT; corrosion resistant finish.
3. Not acceptable: Setscrew connectors and tamp-on types; zinc alloy and similar soft metal pressure castings.
4. Connectors for EMT Conduit 3" and larger shall be set screw or uncouple type.

2.5 EXPANSION FITTINGS

A. Manufacturer: Crouse-Hinds, Appleton or OZ.

1. Manufacturer's Designation: XJ and XJSA.
2. Material and Finish: Same as rigid conduit.
3. Description: Cast slip-joint fitting for conduit, with flexible bonding conductor for continuity of ground through metallic conduit.

2.6 SLEEVES

A. Material: Schedule 40 galvanized steel pipe.

1. Application: Floors, through exterior masonry walls, through roof, and underground.

B. Material: 18 gauge galvanized sheet metal.

1. Application: Areas not requiring schedule 40 pipe.

2.7 WIREWAYS

A. Manufacturer: Square-duct, Keystone or Hoffman.

1. Standards: NEC Article No. 362.
2. Material: Steel, baked enamel finish, with hinged cover; conduit knock- outs.
3. Size: Minimum 4" square; other sized as noted on drawings.
4. Accessories: Hinged connectors: elbows; fittings for changes in direction; cut-off fittings; hangers; closing plates; cabinet adapters; wire retainers; other modifications and accessories as required for project.

2.8 OUTLET BOXES

A. Manufacturer: Steel City, Race and Appleton.

1. Standards: NEC Article No. 370.
2. Material: Pressed steel, zinc coated.
3. Minimum size: 4" square or octagon; gangable 2" x 3" where used with cable; depth as required for project.
4. Extension rings: To suit various conditions.
5. Hardware: Grounding screw and cable wiring connectors as required by wiring method.
6. Other Types: As required by job conditions.

2.9 PULL AND JUNCTION BOXES - INTERIOR

A. Manufacturer: Hoffman, Keystone or Burns.

1. Standards: NEC Article No. 370; ASTM A-386.
2. Material: Galvanized steel, code gauge.
3. Cover: Same material as box, screw on type, maximum size 300 square inches in one piece.

2.10 PULL AND JUNCTION FOR UNDERGROUND WORK

A. Manufacturer: Quazite or equal

1. Standards: N.E.C.; UL; ASTM D-635
2. Material: Composolite non-concrete type enclosure; Reinforced Plastic Mortar designed and tested to temperatures of -50 degrees F.
3. Color: Grey for paved areas; Green for grassy areas.
4. Loading: "Light vehicular traffic" (5000# load over any 10" x 10" area).
5. Assembly: Cover, box and extension with solid base; cover shall be interchangeable with other manufacturers.
6. Fasteners: Pent-head, recessed type.
7. Hubs: Suitable for solvent welding of PVC raceways to box.

2.11 CONVENIENCE RECEPTACLES - INTERIOR

A. Manufacturer: P & S No. 26342, Arrow Hart, or Leviton

1. Standards: NEC Article 410L, and NEMA.
2. Type: Duplex, 2 pole, 3 wire, with U slot ground.
3. Construction: Heavy duty, totally enclosed back, specification grade.
4. Contacts: 20 amp., phosphor bronze, double wiping.
5. Wiring terminal type: Side or back
6. Body: Brown phenolic composition.
7. Plates: .035" Type No. 302 (18-8) stainless steel with satin finish. (Tamperproof hardware)

2.12 CONVENIENCE RECEPTACLES - EXTERIOR

A. Manufacturer: P & S, Arrow Hart, or Leviton

1. Standards: NEC Article 410L, and NEMA
2. Type: Duplex, 2 pole, 3 wire, with U-slot ground; Ground fault circuit interrupting protection.
3. Construction: Heavy duty, totally enclosed back, specification grade.
4. Contacts: 20 amp, phosphor bronze, double wiping.
5. Wiring terminal type: Side.
6. Body: Brown phenolic composition.
7. Cover plate: Gasketed, cast metal with cap over each receptacle opening; Caps permanently attached to cover plate by short length of bead chain or spring hinged flap. (Tamperproof hardware).

2.13 LOCAL SWITCHES - INTERIOR

A. Manufacturer: P & S No. 26021, 26023, 26024, Arrow Hart, or Leviton.

1. Standards: NEC Article No. 380; NEMA.
2. Construction: Specification grade, 20A at 120/277 V., 2 HP at 240 V., 1 HP at 120 V.
3. Type: Flush, quiet, AC, totally enclosed brush tumbler, rocker type handle single pole, 3-way and 4-way as noted on drawings.
4. Modifications: Pilot light, key operation, interchangeable type as indicated.
5. Wiring Type: Side or back; Accept #10 wire, if required.
6. Body: Unit, brown phenolic composition.
7. Plates: .035" Type No. 302 (18-8) stainless steel with satin finish. (Tamperproof hardware)

2.14 SMALL WIRE CONNECTORS

A. Manufacturer: 3-M, T & B or Ideal.

1. Standards: NEC Article No. 110.
2. Application: Conductors No. 10 and smaller, solid and stranded, copper conductors.
3. Description: Twist-on solderless pressure connector, spiral metal spring in metal cup or crimped metal sleeve, plastic insulating cap with long flared skirt to cover un-insulated portion of conductor.

2.15 LARGER COPPER CONDUCTOR CONNECTORS

A. Manufacturer: T & B Series 54,000, Burndy or OZ.

1. Standards: NEC Article No. 110.
2. Application: Copper conductors No. 8 and larger, solid and stranded, wire and bus.
3. Material: Copper alloy, tin plated aluminum alloy, or other approved material.
4. Wire Connector: Long barrel compression type attached with hydraulic die.
5. Bus Connector: Compression type with multiple bolts, tin plated flat washer.
6. Applied insulation: Vinyl tape over insulating filler, heat shrinkable sleeves, or pre-molded plastic enclosure to fit each specific combination of connector and conductors.

2.16 FIRE RESISTANT SEALANT

A. Manufacturer: CTC PR:855

1. Standards: UL Classified; ASTM E119-73; ASTM E-8475.
2. Description: Silicone foam to prevent spread of fire and products of combustion through fire-rated, fire-resistant, and fire-stopped barriers by sealing interstitial spaces of penetrations.
3. Characteristics: Expand 2 to 3 times liquid volume; non-toxic and non-allergenic before and after cure; cure time 24 hours; flame spread number 20; fuel contributed factor 20; optical smoke density factor 235.

2.17 GROUNDING MATERIALS

A. Manufacturer: Chance, Hubbard, Steel City, Burndy, OZ, T & B, Cadweld or Blackburn.

1. Standards: NEC Article No. 250.
2. Materials: Non-ferrous copper and its alloys; aluminum not acceptable.
3. Grounding Conductors: Code gauge stranded copper wire, bare and with green insulation.
4. Ground bus, field installed: Copper minimum size 1/4" x 2".
5. Ground clamps and connectors: Multiple bolt type. Clamps for pipe, lugs for flat surfaces, saddle clamp or compression type for wire.
6. Conduit ground bushings: Galvanized malleable iron with screw pressure connector; insulated throat where required.

2.18 SPLICES AND TAPS

A. All splicing shall be done in outlet, panel and junction boxes, and not in conduits or equipment cabinets. Splices or taps in conductors shall be made with connectors and wrapped with rubber tape of a type and thickness equivalent to the original insulation and then covered with friction tape. When connecting stranded cables together, each strand shall be carefully cleaned before soldering or connecting. All taps and splices in branch circuit wiring shall be made with pressure type connectors.

- B. Underground splices shall be avoided. Where necessary, use material and methods approved for submersed conditions.

2.19 PHOTOCONTROLS

- A. Photocontrols for lighting shall provide a single-pole contact closure at a decreasing illumination level of one foot-candle. The contact shall open at an increasing illumination level adjustable between one and three foot-candles. On and off delays of a least 15 seconds shall prevent spurious operation due to transient lighting phenomena. The photocontrol shall be locking type with hermetically sealed element, and shall be rated a 1.8 KVA at 240 volts AC. The control shall be supplied complete with all-weather locking type receptacle with color-coded leads, and integral two-inch slipfitter, if required.
- B. Regarding mounting a surveillance camera & surveillance recording equipment on top of a pole → The equipment should be mounted on a pole, with an above ground length greater than 10-ft above the ground level, or above the 10-ft above an adjacent elevated platform.

2.20 CONTACTORS AND REMOTE CONTROL SWITCHES

- A. Contactors as manufactured by ASCO (ASCO 920 and 917), Square-D Company or ITE – Siemens, and Remote Control Switches shall be enclosed type: (NEMA 1 Enclosure), mechanically held with 120 or 240 volt coils, encapsulated. Number and rating of poles shall be as shown. Contacts shall be silver alloy, double break. Auxiliary relay shall be provided for 2-wire control, where indicated. No other manufacturers of contactors than those listed herein shall be accepted. Temperature Controlled Enclosure - Model = Mier BW-1248ACHT Nema.
- B. Control switches for contactors and remote control switches shall be two position (ON-OFF), momentary or maintained contact, Push button type, with pilot light, as required, specification grade, rated 20 amperes, 250 volts. Each switch or group of switches shall be provided with a laminated plastic nameplate indicating the sport and/or field controlled (See Identification, Nameplates and Tags).

2.21 TIME SWITCHES

- A. Time switches shall be multi-pole or single pole, designed for operation on alternating current, rating as indicated on the drawings. Switches shall be equipped with astronomic 24-hour, 7-day dial, necessary tripping and omitting devices. Time switches shall provide reserve power for 16 hours operation. Unit shall be contained in NEMA-1 enclosure. Temperature Controlled Enclosure - Model = Mier BW-1248ACHT Nema.

2.22 HARDWARE

- A. All exposed fasteners shall be stainless steel, vandal proof type requiring special tools. Provide the number of special tools as required by the Department, upon completion of the project.

2.23 LOCKS AND KEYS

- A. All locks for lighting and power panels, and all other electrical systems of locked apparatus shall have keys which are compatible with the existing system. The Department shall be consulted prior to ordering locks for equipment.

2.24 IDENTIFICATION, NAMEPLATES AND TAGS

- A. Provide for each safety switch, panelboard and similar items of equipment, a laminated plastic nameplate

of molded phenolic compound to indicate the device and equipment served. Characters shall be white, not less than 1/4 inch high.

- B. Provide approved tags for all feeders, at both ends, and at intermediate junction and pull boxes. Tag shall indicate feeder designation or equipment served, and state phase and voltage of feeder.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The equipment and materials shall be installed in accordance with the recommendations of the respective manufacturers.
- B. If more than one trade is involved in the project, this Contractor shall cooperate and coordinate his work with the other trades. The locations of pipes, ducts, conduits, panelboards, lighting outlets, air outlets, motor controls and other equipment must be coordinated in order to avoid any interferences or placing services at the wrong locations. Exact locations of outlets, conduits and other materials and equipment must be coordinated with and approved by the Department .
- C. The work shall be performed in an approved first class, workmanlike manner, and shall conform to the best practices of the trade, and to all requirements of the National Electrical Code.
- D. The Electrical Contractor shall at all times protect and preserve all materials, equipment, fixtures and conduits from corrosion, dirt, paint, building materials, acid, tools, overload, freezing, theft and vandalism. This Contractor shall repair or replace all equipment and materials which are lost or damaged as the result of inadequate protection. Open ends of conduit and equipment shall be capped or plugged during the construction schedule and remain capped or plugged until wiring is ready to be installed.
- E. All materials and equipment shall be properly isolated against the transmission of vibration or noise to any part of the building.
- F. Where work is designated to be directed or performed by the General Contractor, and no General Contractor is involved in the project, the Electrical Contractor shall employ the proper trades to accomplish the work.

3.2 WIRING METHODS

- A. Rigid steel conduit shall be used for all exposed exterior raceways. Rigid steel conduit shall also be used for raceways in or below slabs on grade, for underground raceways in locations regularly subject to vehicular traffic, and where shown. Exposed exterior raceways shall be installed only when specifically indicated on the plans or when specifically directed by the Department . Normally, exterior raceways shall be installed underground.
- B. Intermediate metallic conduit shall be used for raceways in solid masonry walls and partitions, and for exposed interior raceways in locations where raceways may be subject to abuse or injury.
- C. Electrical Metallic Tubing (EMT) may be used for all exposed interior branch circuit wiring in locations not subject to abuse or injury and for concealed wiring where conditions of heat or mechanical abuse preclude the use of PVC raceways.
- D. Rigid steel conduit installed underground shall be provided with a 3-inch concrete envelope. Spacers shall be provided at the bottom of the trench at intervals not exceeding 4 feet, to assure that the envelope completely surrounds the conduit.

- E. Rigid PVC conduit shall be used for all underground raceways in areas not regularly subject to vehicular traffic, for raceways in concrete walls, floors and ceilings, and for raceways to be run through cinder fill. Provide a separate, code-sized ground wire in each PVC conduit.
- F. In underground raceways, rigid PVC conduit shall be snaked slightly to provide for soft spots in the trench.
- G. All underground raceways shall be installed at least 30 inches below finished grade. In each trench containing underground raceways, provide a plastic warning tape, equal to Thomas & Betts, one foot below grade.
- H. All underground raceways shall be laid staggered so that no joints are horizontally opposite one another. Where conduits enter hand-holes and/or manholes, they shall be provided with suitable bushings of the same size. The Electrical Contractor shall be responsible for checking grades and installing conduits with suitable drainage to manholes. Where conduits enter buildings, rigid galvanized conduit shall be used.
- I. Exposed raceways shall be installed parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings.
- J. All changes in direction of one-inch conduits and larger shall be made with standard elbows or cast metal fittings. Field-made bends and offsets in 3/4-inch conduit shall be made with an approved hickey or conduit-bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided. Care shall be taken to prevent the lodgment of plaster, dirt or trash in raceways, boxes, fittings and equipment during the course of construction. Clogged raceways shall be entirely freed of obstruction or shall be replaced.
- K. Conduits or pipes embedded in concrete slabs shall be spaced not closer than three diameters on centers and they shall be so placed as to avoid changing the locations of the reinforcement.
- L. Except when plans of conduits and pipes are approved by the Engineer, embedded conduits, other than those merely passing through, shall be not larger in outside diameter than one-third the thickness of the slab, wall or beam in which they are embedded.
- M. Raceways shall be securely supported and fastened in place at intervals of not more than 10 feet with pipe straps, wall brackets, hangers or ceiling trapeze. Fastenings shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded threaded studs or studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine or wood screws. Threaded C-clamps shall not be used. Raceways or pipe straps shall not be welded to steel structure. Wooden plugs shall not be used.
- N. No. 12 conductors and 3/4 in. raceways shall be the minimum used for power and lighting and No. 14 conductors and 3/4 in. raceways for control and signal systems. No conduit smaller than 3/4 in. shall be used.
- O. Raceways shall be exposed in unfinished rooms unless otherwise indicated on drawings. Exposed conduit shall follow building lines.
- P. Flexible metallic tubing shall be employed only where building construction does not allow use of rigid conduit, and in 18-inch lengths, for connection to lighting fixtures and to motors and other vibrating equipment.
- Q. Running threads shall not be permitted and approved threaded couplings shall be used on full weight conduit. Conduit bends shall be the long radius type without kinks, flattening or crushing. Each end of

any conduit terminating in a pressed steel box of any kind shall be provided with an approved insulating type bushing.

- R. Conduit ends shall be square cut and reamed. Concealed conduits shall be run as straight and direct as possible. No more than four (4) 90 degree bends will be permitted in any run of conduit. Pull boxes shall be installed every 200 ft. which shall be reduced by 50 ft. for each 90-degree bend, unless otherwise indicated on drawings. In continuous runs of rigid PVC conduit of more than 90 ft., expansion joints shall be installed every 60 ft., and as required to compensate for linear thermal expansion and contraction of the conduit.
- S. No wires shall be installed in conduits, until all conduit work is completed and closed in such a manner as to prevent the possibility of water getting into the conduits.
- T. A separation of not less than 6 in. shall be maintained between all conduits and hot water or steam lines in the building, whenever possible. When it is not possible to provide the 6 in. separation an insulating pipe covering shall be installed on the electrical conduits.
- U. Provide a minimum of two spare two (2) inch conduit stub outs from each panelboard installed on the project for future use. Conduits shall be extended at least 24 inches beyond adjacent paved areas or foundations and capped. Mark exact locations on as-built drawings.
- V. No raceway smaller than 2-inch diameter shall be installed underground for field lighting circuits.

3.3 GROUNDING

- A. Provide grounding in accordance with requirements of NEC Article No. 250.
- B. Provide a reliable low impedance metallic ground path for short circuit currents, so that circuit protective devices can operate quickly and effectively. Route the ground path parallel to the circuit conductors and physically as close to them as possible, generally using the metallic conduit system as a conductor. Make the ground path continuous to each outlet and electrically operated device in the Project.
 - 1. Standard Materials to be used for grounding electronic surveillance equipment:
 - a. 5/8-inch * 8-ft3 Ground Rod
 - b. CAD CP58, 5/8-inch Ground Rod Clamp
- C. Ground frames of motors. Conduit system will be acceptable if connection box is bolted to motor frame. In other instances, provide grounding bushing on conduit and extend grounding conductor to a bolt on frame of motor. Where motor is part of apparatus, ground enclosure using connector furnished by manufacturer. Provide connector if none is furnished.
- D. At convenience receptacles, extend ground wire from grounding screw of receptacle to grounding connector of box.
- E. A code sized ground wire shall be provided in each feeder or branch circuit raceway installed on the project.
- F. Connect branch circuit ground conductor to each luminaire housing.
- G. Maximum resistance from a ground rod to ground shall not exceed three (3) ohms at any location.

3.4 CHASES, RECESSES AND OPENINGS

- A. This Contractor shall provide all openings, chases or recesses in the construction as may be necessary for his work and as approved by the Engineer.

3.5 Where openings in masonry are required, they shall be made by coring only.SLEEVES

- A. Sleeves shall be installed in all new construction. Sleeves shall be 22-gauge galvanized steel. The pipe sleeves shall be sized for passing conduit and extend approximately 2" above concrete pads.
- B. Sleeves shall be the proper design for waterproofing and flashing around the sleeves where required. The space between the piping and sleeve shall be caulked with an approved waterproof, high melting point sealing or asphalt compound.
- C. This Contractor shall furnish the sleeves and set them in the new construction as required for the installation of his work.

3.6 FLASHING AND COUNTERFLASHING

- A. This Contractor shall furnish and install the base flashing and the counter flashing materials for all work. This Contractor shall retain the services of an approved Roofing Contractor to perform this work.

3.7 FASTENINGS, SUPPORTS AND HANGERS

- A. Support all material from the building structural members in an approved manner.
- B. Where electrical equipment is mounted in suspended ceiling panels, provide support members to span between framing members of ceiling suspension system. Do not support electrical equipment from acoustical panels or other ceiling material; attach to this material for alignment only. Securely fasten support members to framing members.
- C. Electrical outlet boxes, cables and conduit shall not be supported from suspension wires of the ceiling suspension system. Do not attach equipment directly to tee bars, where boxes could interfere with lifting ceiling panels.
- D. Where electrical lighting fixtures and other equipment is installed on tee bars of suspended ceilings, use appropriate twist clips or scissors clips with threaded studs attached directly to tee bars.
- E. Provide mounting structures for electrical equipment where required. Use continuous slot channel or fabricate structure from galvanized structural steel angles and channels. Bolt or weld fabricated assemblies rigidly together, coat with suitable rust inhibiting primer and two finish coats of color as directed by Architect.
- F. Provide 1/4" spacers behind cabinets of electrical equipment to permit circulation of air.
- G. Provide racks of Continuous Slot Channel for parallel runs of conduit, and suspend on adjustable hangers. Use adjustable clevis hangers for individual runs of suspended conduit. Align suspended runs in horizontal plane for neat appearance. Perforated strap iron will not be permitted. Use approved beam clamps for connection to structural steel. Where structural steel has fireproof coating, cut coating as required to mount clamp and restore fireproofing to its original condition.
- H. Do not support from steel roof decks, joist bridging, ductwork, piping, or floor slabs less than 4" thick.

- I. Determine proper locations of anchors, inserts and supports, and maintain them in their proper locations during the period of construction.
- J. Use supporting hardware suitable for the purpose intended. Use expansion shields with machine screws to fasten to solid masonry. Use toggle bolts to fasten to hollow masonry. Use lag bolts to fasten to wood surfaces. Use approved methods for other conditions as required. No wood, plastic or fiber plugs will be permitted. Use approved beam clamps.
- K. Do not exceed manufacturer's load rating for mounting devices.
- L. In cast concrete, use box inserts which allow lateral adjustment of the threaded member for proper alignment. Use continuous box inserts where required.

3.8 EXCAVATION AND BACKFILLING

- A. This Contractor shall be responsible for the excavation, backfilling, shoring and care for all ground water for the complete installation of his work.
- B. This Contractor shall also provide suitable indemnity for all accidents to humans, animals or equipment caused by his excavation work. He shall provide suitable guards or barricades, red lanterns, flares and other precautions for an approved and safe installation.
- C. Conduit shall be laid on undisturbed earth and not in fill. Cinder fill and stones or bricks beneath the conduit are prohibited. If the earth is not firm, the conduit shall be laid on concrete supports.
- D. Backfill shall be well tamped in layers of not more than 6 inches. It shall consist of clean earth, as much as possible, but in no case shall it contain stones large enough to injure the installation.
- E. After backfilling, this Contractor shall remove all excess materials from the premises and, if the surface was paved or sodded, repave and replace sod with material equal to, and level with, the adjacent surface.
- F. Care should be taken to protect all existing trees, bushes and planting during the installation of all underground work.

3.9 EXPANSION FITTINGS

- A. Provide expansion fittings where raceways cross building expansion and control joints. Maintain continuity of raceway grounding system by attaching bonding jumper as recommended by manufacturer.
- B. Use manufactured expansion fittings for all conduit installed under the following conditions:
 - 1. 1" and larger when exposed or above a suspended ceiling.
 - 2. Grouped on racks where any of the group is 1" or larger.
- C. Flexible conduit may be used for runs smaller than 1" where exposed, or concealed above suspended ceilings. Leave sufficient slack conduit for movement, and fasten on each side of joint.

3.10 OUTLET BOXES

- A. Provide outlet box for each outlet shown in the wiring system. Use 4" minimum size with conduit, of appropriate size and configuration. Provide interior partitions where required. Use octagon box for each individual lighting fixture and each continuous row of lighting fixtures in the ceiling. Provide fixture stud

for box that supports lighting fixture. Provide other boxes as required.

- B. Install boxes square with building lines, fasten securely in place, and grout or patch plaster if masonry or wallboard does not fit snugly on all sides.
- C. Provide extension rings and raised cover plates in plaster, masonry and tile walls. Plug unused openings.
- D. Use sectional boxes with appropriate cable clamps for cable wiring. Provide green grounding screw for connection to ground wires.
- E. Do not install boxes back-to-back in partitions. Separate boxes in adjacent rooms at least 12" to prevent transmission of sound.

3.11 PULL AND JUNCTION BOXES - INTERIOR

- A. Provide pull boxes and junction boxes where required to facilitate installation of wiring, whether or not shown on drawings. Size boxes according to code, and provide interior partitions, insulated supports, hot dip galvanized angle iron braces, screw-on one-piece or split covers, ground connectors, and other accessories as required.
- B. Mount boxes in accessible but unobtrusive locations, such as closets and mechanical spaces. Provide access panels for boxes otherwise concealed in building construction.

3.12 PULL AND JUNCTION BOXES FOR UNDERGROUND WORK

- A. Install pull and junction boxes as detailed on the drawings.

3.13 WIRING DEVICES

- A. Mount receptacles vertically unless otherwise noted.

3.14 MOTOR STARTERS (IF REQUIRED AND/OR SHOWN)

- A. For installation of Manual and Magnetic Motor Starters, refer to DISTRIBUTION EQUIPMENT.
- B. Install manual motor starter switch in accordance with manufacturers recommendations. Do not gang switches or combine with other wiring devices unless starter switches have been properly de-rated.

3.15 SUPPORTS AT DRYWALL CONSTRUCTION

- A. Provide support members to carry weight of equipment; do not use drywall material to carry any weight. Attach to drywall material for alignment purposes only. Pierce drywall material as required to mount equipment on support members.
- B. Equipment normally supported from outlet box will require no additional support. Attach outlet boxes directly to studs of partitions. Provide support member to span between studs, if required, for location of box.
- C. Where equipment on partitions cannot be supported by attachment to outlet box alone, coordinate supports with general construction. Limit weights as indicated below:
 - 1. Recessed equipment, single stud: 100 pounds maximum.
 - 2. Recessed equipment, double stud: 500 pounds maximum.

3. Recessed equipment, greater than 500 pounds: Provide independent mounting structure inside partition.
4. Surface mounted equipment, double stud (do not use single stud to carry weight): 100-pound maximum.
5. Surface mounted equipment, greater than 100 pounds: Provide independent mounting structure outside partition.

3.16 WIRE INSTALLATION

- A. Exercise care in storage and installation of wire and cable to avoid damage to conductors and their covering. Use an approved pulling compound as lubricant for pulling wires into raceway.
- B. Numbering of circuits on drawings are intended panelboard connections. Make panel connections so that circuit protectors are in logical operating sequence, and so that loads are reasonably balanced across all phases.
 1. Use conduits to protect the wiring. Suggested PVC Conduit material:
 - a. LV PVC SCH40 2
 - b. MTA PVC SCH40 2
- C. Support conductors in vertical raceways in accordance with NEC requirements. provide manufactured clamps or compression fittings in bottom of panelboards if space permits, or provide separate pull boxes for such fittings where indicated.

3.17 SPLICES AND TAPS

- A. Make splices electrically and mechanically secure. Install small wire connectors so that no bare conductor is exposed. Tighten bolts on large conductor connectors so that conductor is deformed, but do not break strands of wire. Use compression tool with proper die for compression connectors in accordance with manufacturer's recommendations, so that conductors are deformed but not broken. Apply insulation over splice so that insulation thickness is at least 1-1/2 times that on conductor. Lap applied insulation at least 1" over conductor insulation so that no bare conductor is exposed.
- B. Terminate conductors on terminal strips in equipment where terminal strips are used. Provide appropriate connections, or hook conductors around terminal screws as required.
- C. Connect each wiring device to its neutral conductor by means of short jumper, so that removal of the device will not interrupt continuity of the neutral conductor feeding through the box.
- D. Provide encapsulated splice kits for all splices in areas subject to moisture, including wet locations inside buildings and underground hand holes, manholes and buried junction boxes. Install splice kit in accordance with manufacturers recommendations, and make splice waterproof. Apply sealing putty to surround each cable. Install mold body so that resin covers each cable sheath by a minimum of one inch.

3.18 BRANCH CIRCUITS

- A. Provide one neutral conductor for each single phase, 3 wire home run to a panelboard (or three phase, 4 wire home run, if applicable).
- B. Avoid excessive voltage drop by using No. 10 wire for 120-volt circuits that exceed 75 feet to outlet at center of load. Use minimum No. 10 wire for emergency lighting circuits regardless of voltage.

- C. Where home run indicates wire size larger than normal, continue this wire size throughout the circuit unless otherwise noted.

3.19 OVERSIZED WIRING

- A. Where oversized wiring has been indicated to overcome voltage drop and does not fit properly into the equipment served, provide a suitable junction box adjacent to the equipment for the change of wire size.
- B. Provide reduced wire size from junction box to equipment. Keep the reduced wire size as large as possible, but in no case use wire of ampacity less than that required by NEC to feed the equipment.
- C. Where home run indicates wire size larger than normal, continue this wire size throughout the circuit unless otherwise noted.

3.20 IDENTIFICATION, NAMEPLATES AND TAGS

- A. Identify and mark all electrical equipment to meet OSHA requirements, and as specified herein.
- B. In every pull box, terminal box, and all places where wires may not be readily identified by name plate markings on the equipment to which they connect, identify each circuit with a tag or plastic label.
- C. Mark all terminal boxes, safety switches, controllers, manual motor starters, push button switches and other control equipment with rigid laminated plastic legend plates having 3/16" lettering to clearly indicate the services or equipment for which they are provided.
- D. Mark all equipment furnished under Division 16 and where it is related to equipment furnished under other Divisions. Use nomenclature that corresponds to the markings on that equipment.
- E. Identify all panelboards with designation indicated on the drawings, and distribution voltage. Use rigid laminated plastic legend plates installed on the inside of the doors of flush mounted panels and outside of the doors of surface mounted panels with 1/4" lettering.
- F. Indicate circuit number corresponding to panelboard circuit directory.

3.21 FIRE RESISTANT SEALANT

- A. Apply sealant in compliance with manufacturer's recommendations. Clean surfaces before application, using primer where necessary. Install damming material to prevent undesirable flow, and remove after foaming action has stopped. Separate cables before injecting sealant to prevent voids. Provide sufficient thickness to equal fire rating of the barrier being penetrated

3.22 CONCRETE

- A. Concrete for the encasement of underground raceways shall be provided by the Electrical Contractor. Spacers shall be provided to assure clearance between layers of raceways and between the lowest raceways and the bottom of the trench, to assure complete encapsulation.
- B. Concrete shall have a minimum compressive strength of 3500 PSI. after 28 days.

SECTION 260500 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 16000 - General Electrical Provisions
- B. Section 16100 - Wiring Materials and Methods.

1.2 GENERAL REQUIREMENTS

- A. All materials and equipment furnished by this Contractor shall be new, the best in grade and quality, and manufactured in the United States of America with standards and ratings as specified herein. No substitution or deviation from the materials and equipment specified herein will be allowed except by written permission from the Engineer.
- B. All materials and equipment shall be of the latest type and design and, where applicable, shall bear the label, stamp or seal of UL, NFPA, IEEE, NEMA, ASME, ASTM, ASA and other industry regulatory groups.
- C. All items of the same kind shall be of the same make throughout the work.

PART 2 - PRODUCTS

2.1 PANELBOARDS

- A. Manufacturer: Square D, Siemens ITE or GE
 - 1. Manufacturer's designation: NQOB, NEHB, QMB
 - 2. Standards: NEC Article 384; UL; NEMA.
 - 3. Description: Dead front automatic circuit breaker type with enclosing cabinet.
 - 4. Circuit Breakers: Molded case bolted to bus bars.
 - 5. Electrical Characteristics: See drawings.
 - 6. Bus Bars: Copper; full distributed sequence phasing: connection straps for spaces; neutral bus unless otherwise indicated; ground bus.
 - 7. Line termination: Single or double compression type lugs, main breaker, or other type as shown on drawings; suitable for copper conductors.
 - 8. Cabinet: Steel, mount as noted in schedule; sufficient size to accommodate panelboard and adequate gutter space for wiring.
 - 9. Accessories & Modifications: Contactors, split busses and others as noted in schedule and as required by Project.
 - 10. All panelboard connections to main bussing for copper cables shall be with compression connectors.
 - 11. Suggested Model Type for Electrical Panelboard = P1C225BB18AH01 PANELBOARD

2.2 MOLDED CASE CIRCUIT BREAKERS

- A. Manufacturer: Square D, Siemens ITE or GE; same manufacturer as panelboards.
 - 1. Standards: NEC Article 240; UL; NEMA.
 - 2. Applications: Panelboards; individually mounted circuit protectors; switchboards.
 - 3. Construction: Plastic housing; internal arc chutes; internal barriers between poles; internal linkage for

simultaneous operation of all poles; on-off-trip indication by handle position. Suggested Light Pole model & type: LED Pole Kit with Three 80-watt LED Light; 15ft pole; 5000k; (120 → 277) Volt. The pole should have an above ground length greater than 10-ft, above the ground level or above the closest elevated platform.

4. Overload protection: inverse time mechanism using bimetallic tripping element. Circuit Breakers rated 200 amps and above shall be continuous rated.
5. Short circuit protection: Magnetic tripping element; adjustable instantaneous and interchangeable trip for frame sizes above 100 amperes in all main switchboards, or as noted on drawings.
6. Operation: Quick-make, quick-break; trip free from handle on automatic operation.
7. Rating: Voltage as required by system; overcurrent rating as noted in schedule; interrupting rating based on NEMA test procedures, 10,000 amp minimum RMS symmetrical or as indicated.
8. Accessories: As noted on drawings, including shunt trip; handle guards; handle breakers.
9. Not acceptable: External tie handles for multi-pole breakers; "Compact" breakers.

2.3 CABINETS

A. Manufacturer: Square D, Siemens ITE or GE, same manufacturer as panelboards.

1. Standards: NEC Article 373; UL; NEMA.
2. Application: Panelboards, communication terminals, other purposes noted.
3. Size: As noted on drawings and as required by equipment; sufficient space to accommodate equipment and adequate gutter space for wiring, minimum 20" wide and 5-3/4" deep, unless otherwise noted.
4. Housing: Code gauge galvanized sheet steel box.
5. Front: Code gauge cold rolled sheet steel, with prime coat and light gray finish; adjustable trim clamps; mount as noted in schedule; ventilated where required.
6. Door: Hinged, with card holder frame and plastic shield inside for circuit directory; catch and lock.
7. Lock: Flush combination pin-tumbler lock and catch; all locks keyed alike, with one key for each cabinet; 3-point latch and vault handle for doors over 48". Match Department's present keying system.'
8. Accessories: As noted on drawings; other modifications as required by Project.
9. Suggested Model # for Electrical Cabinet: ECP PE-425415R PECO CT CABINET 42" * 54" * 15" NEMA 3R

2.4 ENCLOSED CIRCUIT BREAKERS

A. Manufacturer: Square D, Siemens ITE or GE.

1. Description: Molded case circuit breaker as hereinbefore specified, enclosed NEMA 1 enclosure; arranged for cable connection on line and load side.
2. Accessories: Provisions for padlocks on handle; defeatable interlock to prevent opening cover unless breaker is off; solid neutral where required.
3. Regarding mounting a surveillance camera & surveillance recording equipment on top of a pole → The equipment should be mounted with a light pole length that is either 10-ft above finished grade, or 10-ft above the nearest/adjacent elevated platform.

2.5 SAFETY SWITCHES

A. Manufacturer: Square D, Siemens ITE or GE.

1. Manufacturer's description: Type HD
2. Standards: NEC Article 240; UL; NEMA.
3. Description: Metal enclosed switch with quick-make, quick-break mechanism; horsepower rated where used on motor circuits; fused or unfused as indicated; NEMA 1 or 3R enclosure as required,

- with external operating handle.
- 4. Accessories: Provision for padlocks on handle; defeatable interlock to prevent opening cover unless switch is off.
- 5. Fusing: NEC clips, rejection type.

2.6 FIELD SERVICE CABINETS

- A. The equipment cabinet shall be heavy-wall cast aluminum with gasketed doors, equipped with a lock equal to Fleming "ML" Series as required. Suggested Electrical Cabinet meets the minimum dimensions: 37-inch Height * 25-inch Width * 12-inch Depth"
- B. Larger cabinets shall be provided to suit equipment. Equipment shall be mounted on 3/4 inch painted plywood mounting board, which shall be fastened to the back of the interior. All conduit entries shall be via threaded hubs. Suggested Electrical Cabinet Model # & Type: ECP PE-425415R PECO CT Cabinet 42" * 54" * 15" NEMA 3R

or

- C. The equipment cabinet shall be .125 thick stainless steel enclosure Model ATS#10-1016 as manufactured by Advance Transit Services, Inc., Frank B. Clayton's Sons, Inc. or Penn Panel and Box Company. Provide enclosures as shown on drawings. The enclosure door frame shall be doubled flanged out on all four sides to increase strength of opening and keep all dust and liquids from entering the cabinet when the door is open. All exterior seams to be continuously welded and ground smooth. All external hardware shall be stainless steel. Enclosure shall have an open bottom for pad mounting. Enclosures shall contain 3/4" exterior grade plywood backpanels. Enclosures shall have ventilating holes top and bottom of enclosures. The door shall be equipped with a three point latching mechanism with nylon rollers at top and bottom. Door handle is 3/4" diameter stainless steel and has provisions for padlocking. Door lock shall be Corbin No. 15481RS (Right Hand) and Key no. Corbin 1R6382. Door shall be sealed with closed cell gasket. Door shall have heavy gauge continuous hinge with 1/4" diameter stainless steel hinge pin. Hinge shall be secured with 1/4-20 stainless steel carriage bolts and stainless steel nylock nuts. Provide stainless steel anchor bolts and nuts to install the enclosure on concrete pad. Finish shall be natural stainless steel.

PART 3 - EXECUTION

3.1 PANELBOARDS

- A. Provide panelboards with molded case circuit breakers. Provide handle locking attachments for all circuit breakers serving emergency lights, exit lights, and other functions indicated. Where lighting is controlled from panelboard, provide handle locking attachment for all circuit breakers other than those for lights. Provide handle padlock attachment for breakers feeding outside lighting.
- B. Refer to cable sizes on single line diagram for size and configuration of lugs. Refer to panel schedules for requirements such as main breakers, shunt trip, auxiliary contacts, and other accessories and modifications.
- C. Use panelboard with ground bus where separate grounding conductor is used and elsewhere as indicated. Keep ground bus insulated from neutral bus. Bond ground bus to panelboard cabinet.
- D. Mount panelboard on 3/4" exterior grade plywood mounting panel painted on all sides with two coats of black enamel paint.
- E. Include neatly typed circuit directory (inside door) for each new and existing panelboard included in the

project, indicating equipment supplied from each circuit breaker.

3.2 CABINETS

- A. Size cabinets to accommodate all equipment therein without crowding, and as noted in schedule. For panelboards, size gutters to meet NEC requirements. Provide cabinets with extra gutter space for double-lugged feeders, feeder splices, taps, compression lugs and cables passing through. For conduit risers allow extra space at side or in rear of cabinets. Provide a minimum of 1/4" air space behind all surface mounted cabinets to allow air circulation.

B. SAFETY SWITCHES

Provide safety switches rated for current and number of poles as shown on drawing. Use horsepower rated switches on motor circuits. Match voltage rating with system voltage. Use NEMA 1 enclosure indoors and NEMA 3R raintight enclosure outdoors unless otherwise noted. Use fused switches unless otherwise noted. For motor disconnecting means, circuit control wiring through auxiliary contact to disconnect all power to motor and controller when switch is opened. Connect solid neutral where it is required.

3.3 FUSES

- A. Provide a properly sized fuse for each fuse holder in the project. Include fuses for holders furnished under other Divisions of the Specifications, and under other contracts. In addition furnish a 10% complement of spare fuses of each type and size, and not less than 3 of each type and size.
 - 1. Provide time delay fuses, for all fuse holders.
 - 2. Provide other types of fuses as required by the Project.

3.4 FIELD SERVICE CABINETS

- A. Equipment shall be arranged so that meters, if any, can be read without exposing the meter reader to live parts, including current transformers.
- B. The cabinet shall be mounted as shown. Pad-mounted cabinets shall be fastened by means of bolts, channels or angles into the pad. Pad-mounting method shall be approved by the Department.

3.5 CONCRETE PADS

- A. Concrete pads for field service cabinets shall be furnished by the Electrical Contractor. Concrete pads shall be complete with anchor bolts located from templates furnished by the manufacturer and shall be reinforced according to the manufacturer's recommendations.
- B. Concrete shall have a minimum compressive strength of 3500 PSI. after 28 days.
- C. Standard Composition/Construction of Electrical Conduit Concrete Pad:
 - 1. Install 10-inch of $\frac{3}{4}$ crushed stone with layered compaction.
 - 2. Install #4 rebar grid with bars 16-inch on center
 - 3. Install necessary anchorage bolts for mounting steel enclosures.
 - 4. Pour the L * W * H Concrete Pad with a minimum Compressive Strength of 3500 lb/[in]².
 - 5. Mount enclosures for electrical & camera equipment."

SECTION 260526 – GROUNDING AND BONDING

1.1 QUALITY ASSURANCE

- A Quality Standard for Grounding and Bonding Materials and Equipment: UL 467.

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1.2 PRODUCTS

- A Insulated Conductors: Copper wire or cable.

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- B. Bare Copper Conductors:

1. Solid conductors.
2. Stranded conductors.
3. Tinned conductors.
4. Stranded bonding conductors.
5. Copper tape braided bonding jumpers.
6. Tinned-copper braided bonding jumpers.

- D. Grounding Bus: Predrilled rectangular copper bars with stand-off insulators.

- E. Connectors: Bolted and exothermic-welded type.

- F. Grounding Electrodes:

1. Ground Rods: Copper-clad steel.

1.3 FIELD QUALITY CONTROL

- A. Ground Resistance Testing: By Contractor-engaged agency.

SECTION 262713 – ELECTRICAL METERING

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. Section 260500 - General Electrical Provisions.

1.2 GENERAL REQUIREMENTS

- A. If required, Electric service shall be obtained from the lines of the PECO Energy Company, as indicated on the drawings, in strict compliance with the requirements of the Power Company and shall include all required metering facilities.

PART 2 - PRODUCTS

2.1 RACEWAYS AND CONDUCTORS

- A. Refer to Section 260100 - Wiring Materials and Methods.

PART 3 - EXECUTION

3.1 APPLICATION FOR SERVICE

- A. The Contractor shall submit a Service and Meter Application on the form furnished by PECO Energy Company prior to the start of work.

3.2 COORDINATION WITH OTHER UTILITIES

- A. The Contractor shall place "One-Call" to determine the locations of utilities, in the area of the work, that may be compromised or otherwise interfere with the work of this Contract. Any conflict found shall immediately be reported to the Department.
- B. The Contractor shall make all arrangements, secure necessary approvals, coordinate the work and notify each involved utility of trench openings, installation of raceways, conductors and trench closings.

3.3 POWER COMPANY RESPONSIBILITIES

- A. PECO Energy Company will furnish current transformers, as required.
- B. PECO Energy Company will make final connections to their lines.

3.4 CONTRACTOR RESPONSIBILITIES

- A. Confer and cooperate with PECO Energy Company in arranging for the installation, location and details of the incoming service. Pay all charges that may be levied by the Power Company for extraordinary work that they may be required to perform in conjunction with supplying service to the Project.
- B. Obtain approval of metering location and details from Power Company, prior to installation.
- C. Provide all required excavation, backfilling and restoration required for the installation of the electric service. If required, backfilling shall be done under the direction of a PECO Energy Company field inspector.

- D. Provide underground raceways, conductors, hand holes and other equipment and appurtenances required for a complete electric service installation.
- E. Provide all required metering facilities, where indicated, including meter sockets, troughs, junction boxes, current transformer enclosures, special channels and all accessories required by the Power Company for the installation of their metering instruments. Confer with PECO Energy Company to ascertain all items required for metering installation, prior to submitting bid.
- F. Install current transformers furnished by PECO.

SECTION 265119 –INTERIOR LED LIGHTING

1.1 WARRANTY

- A. Materials and Workmanship for Luminaires: Five years.

1.2 PRODUCTS

- A. Operating Nominal Voltage is dependent on service. Multi-voltage drivers are preferred.
- B. Luminaire Types:
 - 1. Cylinder.
 - 2. Downlight.
 - 3. Highbay, linear.
 - 4. Linear, industrial.
 - 5. Lowbay.
 - 6. Parking garage.
 - 7. Recessed linear.

8. Strip light.
9. Surface mount, linear.
10. Surface mount, nonlinear.
11. Suspended, linear.
12. Suspended, nonlinear.

1.3 MATERIALS

- A. Lighting Diffusers: prismatic glass.
- B. Housings:
 1. Vandal resistant
 2. Extruded-aluminum housing and heat sink.
 3. Color and finish selected by Architect.
- C. Factory-applied labels: Labels shall include the following lamp characteristics:
 1. "USE ONLY" and include specific lamp type.
 2. Lamp diameter, shape, size, wattage, and coating.
 3. CCT and CRI for all luminaires.
- D. Fixture Support Components:
 1. Single-Stem Hangers: Steel tubing with swivel ball fittings and ceiling canopy.
 2. Wires: Soft temper, zinc-coated steel, 12 gage.
 3. Rod Hangers: Cadmium-plated, threaded steel rod.
 4. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.
 5. Provide safety cable connected to structural member.

SECTION 265219 – EMERGENCY AND EXIT LIGHTING

1.1 WARRANTY

- A. Materials and Workmanship for Luminaires and Emergency Lighting Batteries: Two years.

1.2 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.
 1. Emergency Connection: Operate one lamp(s) continuously at an output of 1100 lumens each upon loss of normal power.
 2. Automatically operating relay.
 3. Nightlight connection to operate lamp continuously at 40 percent of rated light output.
 4. Test push-button and indicator light.
 5. Sealed, maintenance-free, nickel-cadmium battery.
 6. Fully automatic, solid-state, constant-current charger.
 7. Remote test switch.
 8. Automatic, integral self-test electronic device.

- B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more lamps, remote mounted from luminaire.
 - 1. Emergency Connection: Operate two lamp(s) continuously at an output of 1100 lumens each upon loss of normal power.
 - 2. Automatically operating relay.
 - 3. Nightlight connection to operate lamp continuously at 40 percent of rated light output.
 - 4. Sealed, maintenance-free, nickel-cadmium battery.
 - 5. Fully automatic, solid-state, constant-current charger.
 - 6. Test push-button and indicator light.
 - 7. Remote test switch.
 - 8. Automatic, integral self-test electronic device.

1.3 EMERGENCY LIGHTING

- A. System Description: Self-contained emergency lighting assemblies.
 - 1. Emergency Luminaires:
 - a. Internal External emergency power unit.
 - b. Operating at nominal voltage of 120 V ac.
 - c. Rated for installation in damp locations and for sealed and gasketed fixtures in wet locations.
 - 2. Emergency Lighting Unit:
 - a. Operating at nominal voltage of 120 V ac.
 - b. Wall mount with universal junction box adaptor.
 - c. UV stable thermoplastic housing, rated for damp locations.
 - d. Two LED lamp heads.
 - e. Internal emergency power unit.
 - 3. Remote Emergency Lighting Unit:
 - a. Operating at nominal voltage of 120 V ac.
 - b. Wall mount with universal junction box adaptor.
 - c. UV stable thermoplastic housing, rated for damp locations.
 - d. Two LED lamp heads.
 - e. Emergency connection.
 - f. Automatically operating relay.
 - g. Test push-button and indicator light.
 - h. Automatic, integral self-test electronic device.

1.4 EXIT SIGNS

- A. System Description: Exit Signs.
 - 1. Internally Lighted Signs:
 - a. Operating at nominal voltage of 120 V ac.
 - b. Lamps for AC Operation: LED, two for each fixture; 50,000 hours of rated lamp life.
 - c. Self-powered exit signs with internal emergency power unit.

1.5 MATERIALS

A. Housings:

1. Vandal resistant.
2. Extruded aluminum housing and heat sink.
3. Color and finish selected by Architect.

B. Lighting Diffusers: Prismatic glass.

C. Batteries: Nickel cadmium.

D. Lamps: LED.

SECTION 265668 – EXTERIOR ATHLETIC LIGHTING

PART 1 – GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. Lighting design: If not supplied by the City, the lighting design shall be provided by the Contractor and the selected lighting manufacturer. Light poles and foundations shall be designed for applicable code requirements for wind loading and weight. Light pole foundations designs shall be prepared by a qualified structural engineer licensed as Professional Engineer in the Commonwealth of Pennsylvania.

B. Facility Type: Recreational or social facility.

C. Illuminance Calculations: Computer-analyzed point method for grid pattern dimensions and glare control.

D. Electric Power: Dependent on service provided. Multi-voltage drivers or ballasts are preferred.

E. Baseball Fields:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).
2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 30 by 30 feet.

F. Softball Fields:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).
2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 20 by 20 feet.

G. Football Fields:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).

2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 30 by 30 feet.

H. Soccer Fields:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).
2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 30 by 30 feet.

I. Outdoor Tennis Courts:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).
2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 10 by 10 feet.

J. Basketball:

1. IESNA RP-6, Class of Play: III is recommended for the majority of sites, with limited exceptions to be considered for sites that are expected to serve many spectators (Class II) or areas with non-regulation play and lower lighting requirements (Class IV).
2. Speed of Sport: Slow.
3. Grid Pattern Dimensions: 10 by 10 feet.

1.2 FIELD QUALITY CONTROL

- A. Testing: By a qualified electrical inspection agent hired by the Contractor.

PART 2 – PRODUCTS

2.1 COMPONENTS

- A. Lighting Control: Manual, low voltage, or digital.
 1. Lighting Control Timer: Mechanical Intermatic Model ex (T-101)
- B. Electric Power: Dependent on service provided. Multi-voltage drivers or ballasts are preferred.
- C. Luminaires:
 1. Spill-light control devices.
 2. Bracket-mounted, full-cutoff type with integral drivers.
 3. LED, rated up to 1000 W.
- D. Driver Mounting: At location of associated luminaires.
- E. Support Structures: Light Standards for Sports Parking and Vandal lighting use shall be complete assemblies of 40'-0" to 80'-0" high poles with the number of luminaries indicated on the drawings.
- F. Poles shall be round tapered galvanized steel or aluminum, 40'-0" to 80'-0" high with 4" x 6" hand hole

(tamperproof screws), vibration dampener and nut covers at base. Finish of poles shall be polyester powder coat dark bronze, black, or dark bronze anodized. Color shall be approved by Philadelphia Parks and Recreation. Pole heights shall be the same for a specific field.

- G. Poles shall be provided with single, double, triple or quad arm pole top brackets for the configurations indicated.
- H. Poles shall be per Lighting Manufacturer's recommendations or equal to sports lighting poles manufactured by Valmont Industries, Inc.
- I. Pole Foundations: Reinforced concrete, min. 4,000 psi at 28 days, designed by a qualified structural engineer licensed as Professional Engineer in the Commonwealth of Pennsylvania.
- J. Wiring below Grade: Nonmetallic raceway.
- K. Weatherproof electrical enclosures.
- L. Panelboard surge suppressors.
- M. Pole Protection: Polyfoam pole pads.

2.2 APPROVED MANUFACTURERS

- A. Musco Lighting – 100 1st Avenue West, P.O. Box 808, Oskaloosa, IA 52577, Phone: (800) 825.6030, E-mail: lighting@musco.com, Web: <https://www.musco.com/>
- B. Eaton Sport Lighting – 1000 Cherrington Parkway, Moon Township, PA 15108, Phone: (412) 893-3300, Web: <https://www.eaton.com/>.
- C. Philadelphia Parks and Recreation (PPR) approved equal.

2.3 FLOODLIGHTS (Up to 1000 watt)

- A. Floodlights shall be LED of the voltage and wattage shown. Drivers shall be integral, prewired, -20 degrees F.
- B. Drivers and lamps shall be standard "off the shelf" items supplied by at least two manufacturers.
- C. Reflectors for round general purpose floodlights shall be one-piece, symmetrical, end-punched spun aluminum, of sphero-parabolic shape. Reflectors shall be protected by heavy-duty cast aluminum outer housing.
- D. Reflectors for rectangular floodlights shall be hydro-formed, semi-specular anodized aluminum protected by a die-cast aluminum housing.
- E. Lenses shall be clear flat, high-strength heat-resistant tempered glass, mounted with a one-piece silicone rubber gasket into a hinged stainless steel or cast aluminum lens frame or clear fluorinated hydrocarbon, 5 mil. minimum thickness, in a suitable frame. The lens frame shall be secured in at least four points with captive stainless steel hardware, producing a water-tight seal.
- F. Lenses shall be protected by a heavy gauge (.048) framed and welded stainless steel guard (3/4" x 3/4" grid) mounted to the lens frame with 1 inch stand-off bolts and tubing. Guard shall be furnished by luminaire manufacturer.

- G. Integral driver housing shall be cast aluminum, with captive stainless steel access fasteners. The driver housing shall be physically and thermally isolated from the lamp socket and the optical assembly.
- H. All wiring between the power source and the driver, and between the driver and the lamp socket, shall be completely enclosed in a watertight metal structure, such as liquid tight flexible conduit.
- I. The entire floodlight including all wiring, shall be completely watertight and dust-tight even after repeated opening for lamp replacement and/or servicing.
- J. Floodlights shall be complete with rifle-type aiming sight, vertical degree scale, lockable repositioning device and two locking screws. Mounting shall be via two-inch slipfitter.
- K. Floodlights shall be mounted not less than 30 feet above finished grade.
- L. Each floodlight shall be furnished with a 1/8 inch stainless steel safety cable. Cable shall be supplied by the floodlight manufacturer.
- M. Each 250 watt HPS floodlight proposed for vandal lighting application shall be furnished with a twist-lock type photocell receptacle and compatible photocell, as previously specified.

2.4 POLES FOR FLOODLIGHTS

- A. Poles up to 40 feet in height shall be one-piece, tapered, spun aluminum, unless the applied loading exceeds the maximum rating of the heaviest available aluminum pole. If maximum rating is exceeded, use galvanized steel as specified herein. Poles greater than 40 feet in height may be round or octagonal, tapered, galvanized steel. Galvanizing on shaft shall meet all the requirements of ASTM A 123 and shall be factory applied by the pole manufacturer. All poles greater than 40 feet shall be provided with safety climbing device and pole steps above 40 feet (double steps at 5'-6" and 6'-9" from top of pole).
- B. Finish for all poles shall be 25 year life design.
- C. Poles shall be supplied complete with mounting bolts, template and manufacturers recommendations for reinforced concrete foundations. Anchor bolts shall be of such material and finish as to remain free from rust for the life of the installation.
- D. Complete installations of foundations, bolts, poles, floodlights and bracket arms or platforms, shall withstand winds to 80 mph, with gusts to 104 mph, without loosening, leaning or sustaining any other damage. All poles of each size shall be designed to withstand the wind loading of the maximum number of floodlights used on each project for that size.
- E. The Electrical Contractor shall be responsible for the construction of pole foundations and for setting the poles. Tops of foundations shall be at least twelve inches above grade with a one-inch chamfer all around.
- F. Poles shall be complete with a gasketed, covered handhole for wiring. Cover hardware shall be tamper-proof.
- G. After final leveling and tightening of pole base securing nuts, installations shall be made tamper-proof by filling at least three (3) threads above the nuts with plastic steel and by placing appropriate locktite compound under and around the bottom nuts.
- H. Bracket arms shall be provided by the pole manufacturer and shall be constructed of the same material as the pole on which they are mounted. Steel brackets shall consist of 2-3/8 inch steel tubular arm members welded to a bracket slipfitter. Slipfitter and arm members shall be fabricated from structural quality hot rolled carbon steel with a guaranteed minimum yield strength of 30,000 psi. The bracket shall include an

internal weather resistant wiring raceway (1-1/8 inch minimum) and commercial quality steel wedge cap when required. Galvanized finish of steel brackets shall meet all the requirements of ASTM A 123.

- I. Platforms shall be provided by the pole manufacturer and shall be constructed of galvanized tubular members to effectively reduce wind drag. The cage shall consist of at least one horizontal steel supporting member, a minimum of 5-1/2 inch OD, 10 gauge material and vertical luminaire supports of 2 inch Schedule 40 pipe. All angles shall conform to ASTM designation A36. The vertical luminaire supports shall be available with horizontal, angle luminaire supports with holes to accommodate luminaire adapter plates or pipe tenons to accommodate specific size slipfitters. All pipe and tubing components shall be 35 KS1 minimum yield strength. The platform shall be caged with vertical members, minimum 46 inches in height with two horizontal 3/16 inch diameter, 7 x 19 galvanized aircraft cables for enclosure and safety support of maintenance person. The floor shall be 3 pound expanded metal grating. The floor shall incorporate a hinged door for access to the cage and shall be capable of closing prior to uncoupling of climbing safety device. The entire basket shall allow for internal wiring from the pole shaft to the luminaire mounting supports. The pole top mounting bracket shall have internal drip shielding for wire entrance. Finish shall meet all the requirements of ASTM A123.
- J. Shop drawings for lighting poles shall be accompanied by the manufacturers certification for wind loading. Calculations of pole & bolt requirements shall be included indicating a safety factor of 2.0, based on ASSHTO Standards. The certification shall state the maximum EPA which may be imposed at full pole height and at the specified velocity. The Contractor shall append a list of EPA actually imposed on each pole in the installation. Shop drawings submitted without either one of these documents will be considered unacceptable.

2.5 LIGHT STANDARDS

- A. Light Standards for Sports Parking and Vandal lighting use shall be complete assemblies of 40'- 0" high poles with the number of luminaries indicated on the drawings.
 - 1. Regarding mounting a surveillance camera & surveillance recording equipment on top of a pole → The equipment should be mounted on a pole, with an above ground length greater than 10-ft above the ground level, or above the 10-ft above an adjacent elevated platform.
 - 2. Surveillance equipment (camera & recording equipment) should only be mounted & connected to a vandal light. Vandal Light emits power 24-hrs/day, which will provide the surveillance equipment with enough power to constantly record 24-hrs/day.
- B. Poles shall be round tapered aluminum, 40'- 0" high with 4" x 6" hand hole (tamperproof screws), vibration dampener and nut covers at base. Finish of poles shall be dark bronze anodized.
- C. Poles shall be provided with single, double, triple or quad arm pole top brackets for the configurations indicated.
- D. Poles shall be per Lighting Manufacturer's recommendations or equal to sports lighting poles manufactured by Valmont Industries, Inc.
- E. Luminaires shall be heavy duty aluminum weatherproof body with internal aluminum reinforcing back plate. It shall have a removable hinged extruded aluminum lens frame with ¼ turn, captive fasteners for easy lamp accessibility. A one piece E.P.D.M. high temperature gasket shall tightly seal the tempered glass lens and the extruded frame, eliminating bugs and light leaks. The lamp socket shall be a porcelain lamp grip socket with nickel plated screw shell and spring loaded contact. Additional lens protection shall be provided using heavy gauge (.048) framed and welded stainless steel guard (3/4" x 3/4" grid) mounted to the lens frame with 1 inch stand-off bolts and tubing. Guard shall be furnished by luminaire manufacturer.

- F. Luminaire reflector system shall be hydro-formed Alzak aluminum, designed to produce IES distribution Types II, III and IV as required.
- G. Finish of luminaire shall be pre-treated, primed baked, covered with a high solids polyester finish and baked again. The double finish shall meet or exceed all AAMA requirements for 1000 hour salt spray exposure. Color shall match poles.

PART 3 - EXECUTION

3.1 POLE LOCATIONS

- A. All poles locations shall be staked and locations approved by the Department prior to starting any work. Pole locations shown on the drawings are approximate.

3.2 DISTRIBUTION AND AIMING DIAGRAMS

- A. The Contractor shall obtain from the manufacturer of the floodlighting luminaries proposed for use on each project, computer generated Illuminance Distribution and Aiming Diagram for each sport indicated. The diagrams shall be submitted for approval with the luminaire shop drawings. Diagrams shall be prepared at a scale of not less than 20 feet to the inch on a grid of 1 inch by 1 inch.
- B. Final selection of beam spreads for each floodlight shall be based on the diagrams submitted and approved. Beam spreads used to generate the diagrams shall be indicated for each floodlight submission.
- C. The minimum criteria for acceptance shall be as follows:
 - 1. Average maintained illuminance shall meet or exceed current I.E.S Standards.
 - 2. Maximum to minimum illuminance shall not exceed a ratio of 3 to 1 for any sport.
 - 3. Average illuminance of infield shall be at least 1.5 times greater than outfield for softball and baseball fields.

3.3 POLE BASES

- A. Provide concrete bases for all lighting poles, as required. Bases shall be as recommended by the pole manufacturer, for the maximum EPA rating of the poles, at the specified wind loading. Pole base details shown on the drawings are the minimum that shall be installed.
- B. Concrete shall have a minimum compressive strength of 4000 p.s.i. after 28 days.

3.4 ANCHOR BOLTS

- A. Anchor bolts of the hook type and of proper size and length, as required for the various equipment specified hereinafter, shall be furnished and set by the Electrical Contractor, before any concrete is poured.
- B. This Contractor shall be responsible for the location and sizes of the anchor bolts. Anchor bolts shall be sized for the maximum EPA rating of the poles, at the specified wind loading, with a minimum yield of 55,000 psi.
- C. Anchor bolts shall be of such material and finish as to remain free from rust for the life of the installation.

3.5 NIGHT SET-UP AND FINAL ADJUSTMENTS

- A. The Contractor shall layout a grid on the playing areas using the approved aiming diagram using appropriate

markers placed on the field. Using the aiming sights provided with the luminaries, the Contractor shall carefully direct each light at the appropriate marker on the field.

- B. Final adjustments, if required, shall be made at night in the presence of Department representatives. After final approval of the system, all moveable parts of luminaries shall be secured.

SECTION 265600 – EXTERIOR LED LIGHTING

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes all labor, equipment and materials required for the following:

1. Exterior LED light fixtures and poles.
2. Installation and connections
3. Tests
4. Spare parts.

1.2 RELATED SECTIONS

- A. All work included in this section shall be coordinated with the requirements of the contract drawings, Division 0, Division 1, Division 3, and Division 26 specifications. Any discrepancies between sections shall be brought to the attention of the Owner.

1.3 GENERAL REQUIREMENTS

- A. All materials and equipment furnished by this Contractor shall be new, the best in grade and quality, and manufactured in the United States of America with standards and ratings as specified herein. No substitution or deviation from the materials and equipment specified herein will be allowed except by written permission from the Engineer.
- B. All materials and equipment shall be of the latest type and design and, where applicable, shall bear the label, stamp or seal of UL, NFPA, IEEE, NEMA, ASME, ASTM, ASA, IESNA, and other industry regulatory groups.
- C. All items of the same kind shall be of the same make throughout the work.
- D. All luminaires shall be controlled via photocell, however designer and contractor shall verify with Philadelphia Parks and Recreation (PPR) relative to lighting controls, lighting times, and security lighting. PPR may choose to have certain lights within a facility or site on a separate security circuit.
- E. No ground lights or bollard lights are allowed.

1.4 CODES AND STANDARDS

- A. The light fixtures shall comply with the latest applicable standards including, but not limited to the following:
 - 1. ANSI/IEC 60529 - Degrees of Protection Provided by Enclosures
 - 2. ANSI/IEEE C62.41.2 - IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
 - 3. IESNA LM-79-08 - Electrical and Photometric Measurements of Solid-State Lighting Products
 - 4. NEMA SSL 1-2010: Electronic Drivers for LED Devices, Arrays, or Systems
 - 5. UL 8750 - Outline of Investigation for LED Light Sources for Use in Lighting Products.
 - 6. ANSI C136.31-2010 – Standard for Roadway and Area Lighting Equipment— Luminaire Vibration.
 - 7. Codes and Standards referenced in Section 01410 shall also apply to this section.

1.5 SUBMITTALS

- A. Completely detailed working drawings and descriptive literature for all lighting fixtures, wiring devices and appurtenances shall be submitted by the Contractor for approval in conformance with the requirements of section 160511 – Requirements for Electrical Installation.
- B. Submittals shall be complete with catalog sheets, distribution curves, coefficients of utilization tables, and details of construction, assembly and installation. Electronic IES files of the fixture proposed if different from the fixture specified.
- C. Prior to ordering all lighting fixtures, order one sample fixture for the Owner to inspect on site and approve. Upon approval of the fixtures, order the remaining fixtures.

1.6 SUBSTITUTIONS

- A. Substitutions are not normally permitting. Substitutions must be approved by Philadelphia Parks and Recreation prior to bid.
- B. The lighting design shown on the drawings are based on the fixtures selected on the fixtures schedule. If substitutions are approved by PPR, contractor shall provide complete design drawings and photometric using the design basis specified on contract drawings at no additional cost.
- C. PPR will only approve substitutions if lighting design proves of equal or better design and the quality of product is equivalent to the products shown on the fixture schedule and meets all requirements of the contract.

PART 2 PRODUCTS

2.1 LIGHT FIXTURES

- A. All lighting fixtures shall be energy efficient solid state LED as shown on the drawings.
- B. All light fixtures shall operate at 120/240 volts and furnished as described in the fixture schedule on the drawings.
- C. All light fixtures shall be UL listed and manufactured in accordance with the latest applicable industry codes.
- D. Where shown on drawings, provide accessories and mounting options.
- E. All LED fixtures must appear on the Energy Star qualified product list or Design Lights Consortium products list to be eligible for rebates from PECO.

2.2 APPROVED FIXTURES

- A. Following are approved manufacturers and model for LED light fixtures, pole, and accessories:
 - 1. DISCERA 4 by Selux or approved equal.
 - 2. Model A35 or AT535/64 by Selux or approved equal.

2.3 CONSTRUCTION AND MATERIALS

- A. Luminaire housing shall be constructed of rugged cast aluminum with integral heat sink specifically designed for LED.
- B. The finish shall be durable, colorfast with excellent resistance to corrosion, ultraviolet degradation and abrasion. Preferred finish color shall be black or bronze. Designer may choose another color from the manufacturer's standard color palette with approval from Philadelphia Parks and Recreation.

2.4 MOUNTING AND ACCESSORIES

- A. Pole: Straight aluminum pole with powder coat finish. Mounting heights/pole lengths shall be the following:
 - 1. Pedestrian walkways, plazas, etc.: 14 feet from finished grade.
 - 2. Parking areas and drives: 20 feet from finished grade.
 - 3. Diameter to correspond with pole height as per manufacture recommendation.
- B. Mounting Brackets: Single or double long arm mounts.
- C. Photo Cell: Manufacturer's provided photocell to be included on all fixtures.
- D. Ground Fault Circuit Interrupter (GFCI) Receptacle: Where requested provide GFCI that is integrated into the pole by the manufacturer. Contractor/design shall confirm which poles receive GFCI outlets. The GFCI outlet shall meet the following criteria:
 - 1. GFCI shall be 120V 15A GFCI duplex receptacle with NEC approved weather-proof enclosure, self-closing cover; anything below 8' from base of pole to be reviewed by PPR, in-line with handhole. For use with 120V applications only.

2. GFCI shall be wired on a separate circuit from the luminaire.

2.5 RATINGS

E. Electrical;

1. Voltage and Frequency. 120V – 277V, 50/60Hz
2. System power factor shall be greater than 0.9
3. Total Harmonic Distortion (THD) less than 20%
4. Class “A” Sound rating
5. Electromagnetic Interference (EMI) per Title 47 CFR 15 Class A
6. Surge protection of 10Kv IEEE C62.41.2-002 Scenario 1, Location Category C

F. Enclosure Ratings

1. UL/cUL Listed, suitable for wet locations per UL 1598 when pendant mount.
2. IP66 rated optical enclosure per ANSI C136.25-2009
3. Temperature rated at –40° to 40°C.

2.6 OPTICS

- A. Structured LED array for optimized under canopy photometric distribution
- B. Symmetric photometric distribution suitable for mounting at 14 or 20 feet (see plans).
- C. Lenses produce Type I, II, III, or V distributions per IESNA. See lighting schedule.
- D. Reflective technology designed to optimize application efficiency and minimize glare.
- E. Utilizes high brightness LEDs with color rendition index (CRI) of 70. Acceptable color temperature may range from 4000K to 5100K. Standard LM-79 tests and reports shall be performed in accordance with IESNA standards

2.7 WARRANTY

- A. Provide Manufacturer’s warranty on all LED light fixtures and all its components for a period of 5 years based on fixture operation for 24 hours/ 7days or 50,000 hours.
- B. Contractor shall include 1 year of labor for lighting repairs, etc.
- C. The electrical contractor shall provide all warranty documents to the Owner along with original receipts.
- D. In the event any fixture(s) are not functional due to sole failure of the fixture during the warranty period of 5 years, the manufacturer shall ship upon request a new equivalent replacement fixture at no additional cost to arrive within 6 weeks. These replacement fixtures shall be covered under the original warranty and shall continue the remaining warranty period.

2.8 SPARE PARTS

- A. The Contractor shall furnish five percent (5%) spare light fixtures for each type fixture listed on the fixture schedule.
- B. All parts shall be delivered neatly wrapped or boxed, indexed and tagged with complete information for use and reordering.

PART 3 - EXECUTION

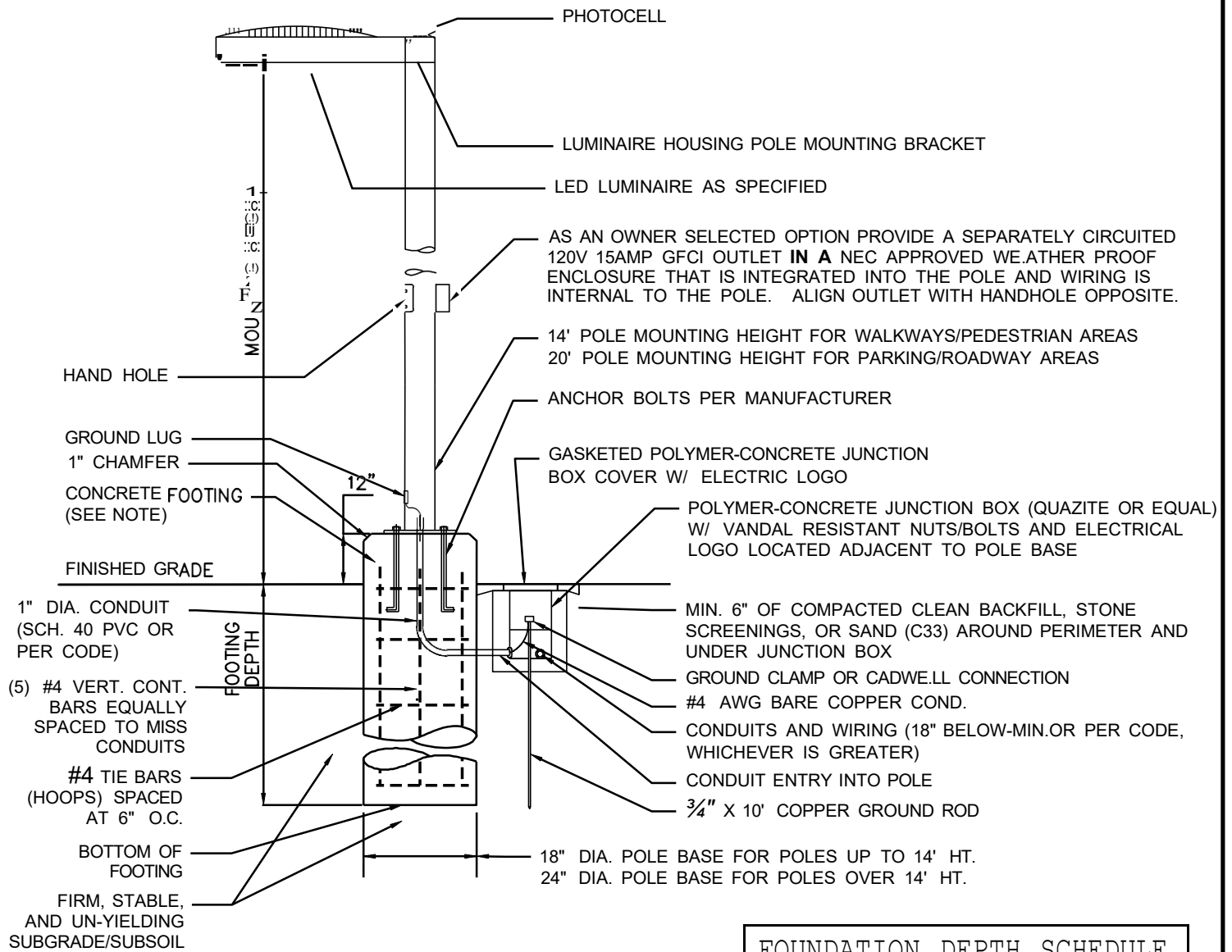
1.1 INSTALLATION AND CONNECTIONS

- A. The scheme of installation, connections, arrangement, and location of equipment and outline dimensions shall be as shown and specified. Contractor shall verify all locations with designer prior to installation.
- B. All installation shall meet the requirements of the National Electric code and Philadelphia Code where applicable.
- C. Lighting fixtures shall be installed as indicated on the drawings and as per manufacturer's instructions.
- D. Fixtures shall be clear of pipes, mechanical equipment, structural openings, and other obstructions.
- E. The exact mounting of lighting fixtures shall be approved on the job before installation.
- F. Pole based shall be installed relative to finish grade. Contractor shall verify top of footing elevations relative to finished grade elevation for conformance with the details and specifications prior to installation of concrete. Refer to pole base details for concrete and reinforcing information. Contractor shall use manufacturer's anchor bolt template for proper positioning of light pole base anchor bolts. Anchor bolts are to be cast into the footing.

3.1 TESTS

- A. The contractor shall test for continuity and balance after installation and prior to acceptance the entire lighting system. All lighting shall be tested for proper operation.
- B. The Contractor shall submit all foot-candle data along with a test report upon completion of all tests performed.

END OF SECTION



NOTE(S):

1. CONCRETE STRENGTH SHALL BE A MINIMUM OF 3,500 PSI @ 28 DAYS OR PER CIVIL/STRUCTURAL DRAWINGS, WHICHEVER IS GREATER. PROVIDE 3" OF CONCRETE COVER SHALL BE PROVIDED OVER ALL REINFORCEMENT BARS. REINFORCEMENT SHOWN IS MINIMUM, ENGINEER/DESIGNER OF RECORD IS RESPONSIBLE FOR FOOTING DESIGN.
2. COORDINATE ELECTRICAL CONDUIT AND GROUNDING WITH ELECTRICAL DRAWINGS.
3. REFER TO LIGHTING SCHEDULE ON LIGHTING PLAN FOR LUMINAIRE TYPE AND MOUNTING HEIGHT.
4. SEE GRADING PLANS FOR FINISHED GRADE ELEVATIONS.
5. USE GASKETED CONDUIT HUBS BETWEEN HAND HOLES/JUNCTION BOX AND CONDUITS TO PREVENT ENTRY OF SOIL, DEBRIS, AND WATER INTO HANDHOLE/JUNCTION BOX.
6. FOOTING DEPTH MAY VARY DUE TO UNSUITABLE SUB-SURFACE SOIL CONDITIONS, VERIFY IN FIELD WITH CIVIL/GEOTECHNICAL ENGINEER AND/OR SOILS INSPECTOR.

FOUNDATION DEPTH SCHEDULE	
MOUNTING HEIGHT	MIN. FOOTING DEPTH
8 TO 14 FEET	4'-6" MIN.
14 TO 25 FEET	5'-0" MIN.

Date: _____ Customer: _____

Project: _____

Type: _____ Qty: _____

selux

Discera 4



Order Code: _____

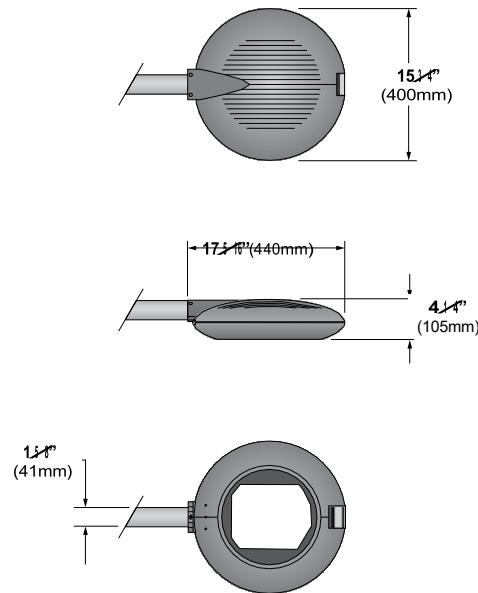
Pole Order Code: _____

Series Height Finish Options

Series	DSC4L Discera 4					
Optics	R1 Type I Distribution	R2 Type II Distribution	R3 Type III Distribution	R5 Type V Distribution		
Mounting	S1 Single Short Arm Mount	S2 Double Short Arm (180°)	L1 Single Long Arm Mount	L2 Double Long Arm Mount (180°)	LW Long Arm Wall Mount	SW Short Arm Wall Mount
Light Engine	LG4500 500mA / 51W	LG4700 700mA / 65W	LG4105 1050mA / 100W			
CCT	30 ¹ 3000K	35 3500K	40 4000K	50 5000K	1 IDA Approved	
Power Cord Length	12 12'	15 15'	18 18'	20 20'	25 25'	XX ² XX'
Finish	WH White	BL Semi-Matte Black	BK Black	BZ Bronze	SV Silver	SP Specify Premium Color
Voltage	120 [*] 120V	208 [*] 208V	240 [*] 240V	277 277V	* Specify for HL option	
Options	DM ⁵ Dimming (0-10V)	HLXX ^{3,4,5} Hi-Lo Switching	PC Photocell	3120V, 240V, & 277V only. 4LG4700 & LG4105 Light Engine only. 5HL or DM only. Cannot be combined		
	<div>MS Motion Sensor w/ Optional Photocell (Meets Title 24 Requirements) See page 3 for Order Code</div>					

¹120V, 240V, & 277V only.
⁴LG4700 & LG4105 Light Engine only.
⁵HL or DM only. Cannot be combined

DSC4L



Specifications

Fixture Housing - Made from high pressure die cast, low copper aluminum alloy.

Gasketing - Continuous molded silicone gasket provides weatherproofing, dust and insect control at all luminaire connections.

Fitter - Cast fitter for direct connection to standard short and long arms.

LED Array - LEDs mounted to PC boards and directly attached to aluminum heat sink for maximum LED performance and life. CCT tolerance 1/4 step binning for 3000K, 3500K, 4000K and ANSI standard for 5000K. Complete light engine can be easily removed for future upgrade. LED light engine provides a reported lumen maintenance of 91% at 60,000 hours. L70 calculated greater than 100,000 hours.

LED Optics - High precision injection molded lenses consisting of Total Internal Reflection (TIR) collimator and one of 3 precision light spahing lenses. Lenses produce a Type I, II, III or V distribution and IDA-Approved™ Dark Sky Friendly at 3000K CCT only.

LED Driver - LEDs are driven by RoHS compliant high-efficiency driver. Minimum starting temperature is -35°C (-31°F).

Surge Protection - Surge protection device safeguards electrical components from indirect lighting strikes and surges up to (20kA standard). RoHS compliant.

Pole Adapter - Made from high pressure die cast, low copper aluminum alloy. To fit Ø 3" Tenon.

Glass Lens - Tempered and screened glass lens protects and helps seal optical chamber.

Tool-Less Latch - Tool-less steel latch for easy access to light engine.

Access Door - Lower casting features tempered glass lens and a stainless steel hinge that attaches to upper casting on mounting arm side. Other side is secured with tool-less latch for ease of maintenance.

Surge Protection - Designed to protect luminaire from electrical surge (up to 10kA).

Heat Sink Fins - Fins add significant surface area for maximized thermal cooling.

Mounting Arm - Welded steel with powder coat finish.

Exterior Luminaire Finish -

Selux utilizes a high quality Polyester Powder Coating. All Selux luminaires and poles are finished in our Tiger Drylac certified facility and undergo a five stage intensive pretreatment process where product is thoroughly cleaned, phosphated and sealed. Selux powder coated products provide excellent salt and humidity resistance as well as ultra violet resistance for color retention. All products are tested in accordance with test specifications for coatings from ASTM and PCI.

Standard exterior colors are White (WH), Black (BK), Semi-Matte Black (BL), Bronze (BZ), and Silver (SV). Selux premium colors (SP) are available, please specify from your Selux color selection guide. Hot Dip Galvanized finish (GV) on all steel parts also available.

5 Year Limited LED Luminaire Warranty -

Selux offers a 5 Year Limited Warranty to the original purchaser that the Selux LED luminaire shall be free from defects in material and workmanship for up to five (5) years from date of shipment. This limited warranty covers the fixture, LED driver and LED light engine when installed and operated according to Selux instructions. Fixture suitable for ambient temperatures of 40° C (104° F). For details and exclusions, see "Selux Terms and Condition of Sale."

Listings and Ratings: Luminaire and LEDs tested to IP66, IK10 and IESNA LM-79-08 standards. LEDs tested to LM-80 standards. LEDs tested at 25° C ambient temperature.

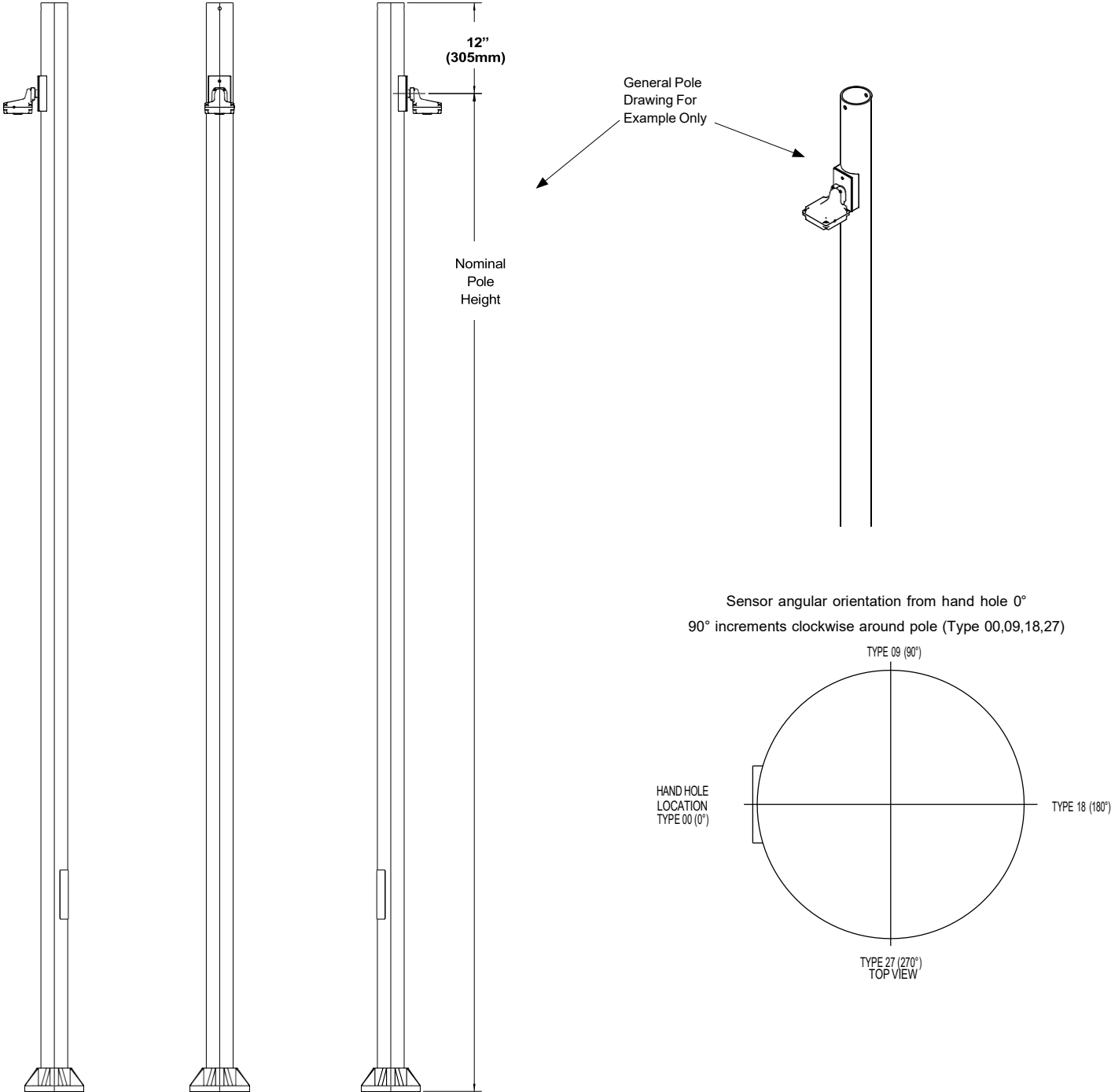
Visit selux.us for our LED End of Life recycling policy.

Motion Sensor Features

The Selux outdoor rated sensor incorporates Passive Infrared (PIR) technology for motion sensing and also includes a built in photocell. Designed to mount directly through a 1/2" KO in a single gang faceplate on pole/column, the SBO utilizes 100% Digital Passive Infrared (PIR) technology that is tuned for walking size while preventing false tripping from the environment.

Series	Optics	Hand Hole Orientation	Program	Color	Photocell Feature	Voltage
MS Motion Sensor	1 270° coverage - Single Sensor	00	D0 (0V=0%)	WH White	Y Yes	UNV
		09	D1 (1V=10%)	BK Black	N No	347
		18	D3 (3V=30%)	BZ Bronze		480
		27	D5 (5V=50%)			

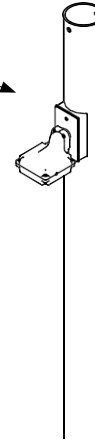
NOTE: Motion sensor comes programmed at 30% dimmed level with a 5 min. delay as default. All programming required after shipping by others.



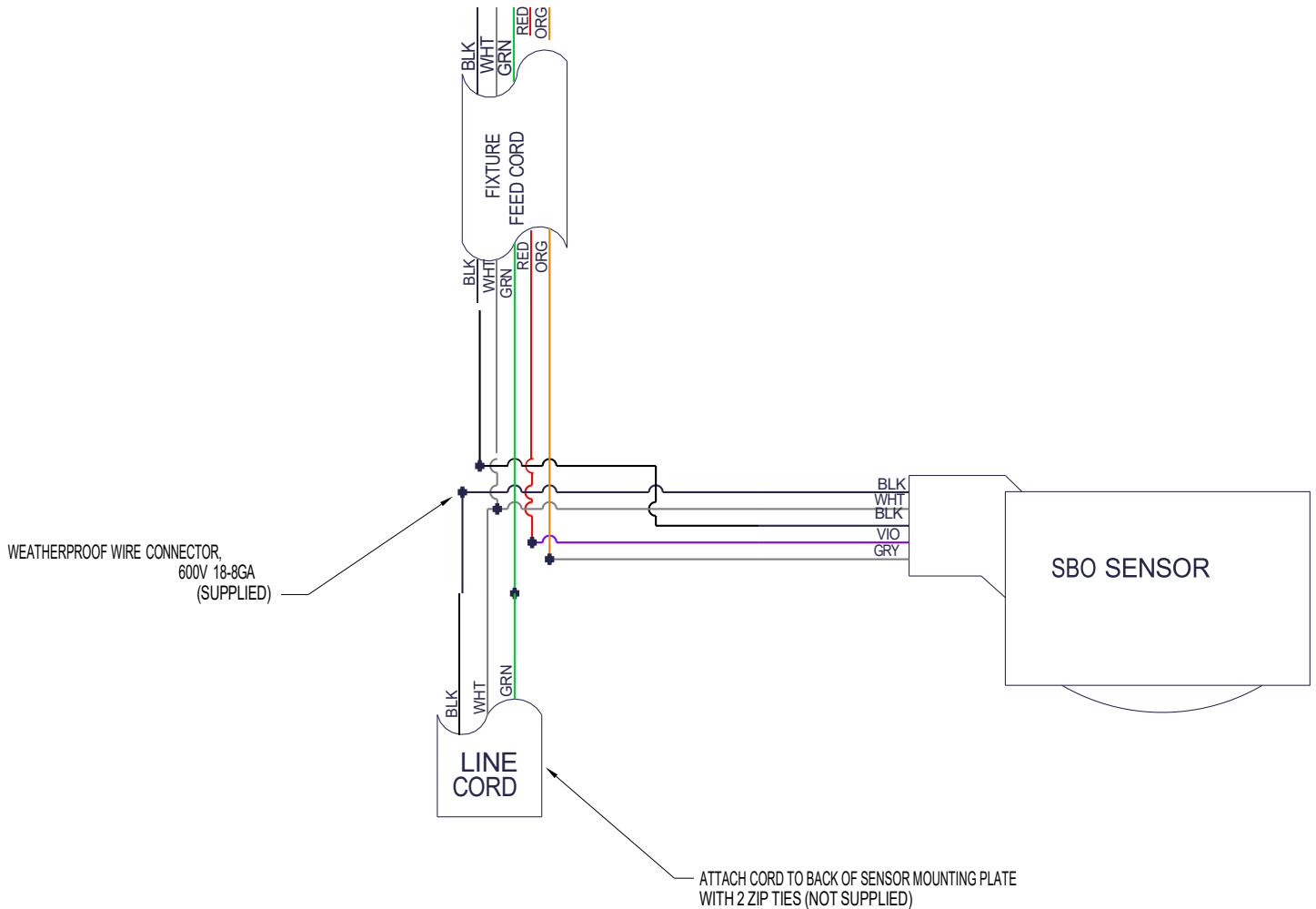
Motion Sensor Features

- 100% Digital PIR Detection, excellent RF Immunity
- 270° coverage pattern
- Up to 30ft mounting
- IP66 Rated for outdoor applications
- Built-in 1kV surge protection
- No minimum load requirements
- Made for LED light source
- Interchangeable hot and load wires - impossible to wire backwards
- Adjustable time delays, max/min dim levels and ramp rates
- Programming button accessible without opening sensor or removing gaskets
- No field calibration or sensitivity adjustments required
- Non-volatile setting memory
- Convenient test mode
- Suitable for Title 24 applications

General Pole
Drawing For
Example Only

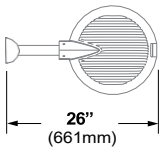


Motion Sensor Wiring Diagram

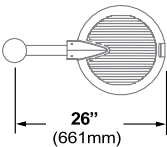


Mounting

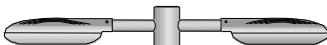
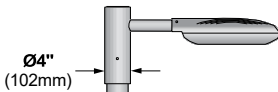
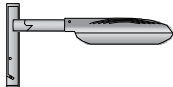
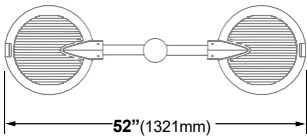
SW Short Arm Wall
EPA = 0.65ft² (0.13m²)
Weight = 23 lbs. (10kg)



S1 Single Short Arm
EPA = 0.65ft² (0.13m²)
Weight = 23 lbs. (10kg)



S2 Double Short Arm
EPA = 1.2ft² (0.11m²)
Weight = 46 lbs. (21kg)



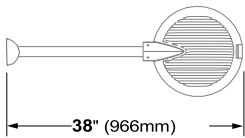
Ø4"
(102mm)

3/4"
(19mm)

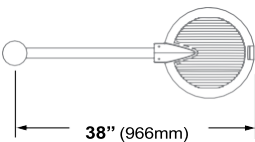
Pole Height: 12' shown

Mounting

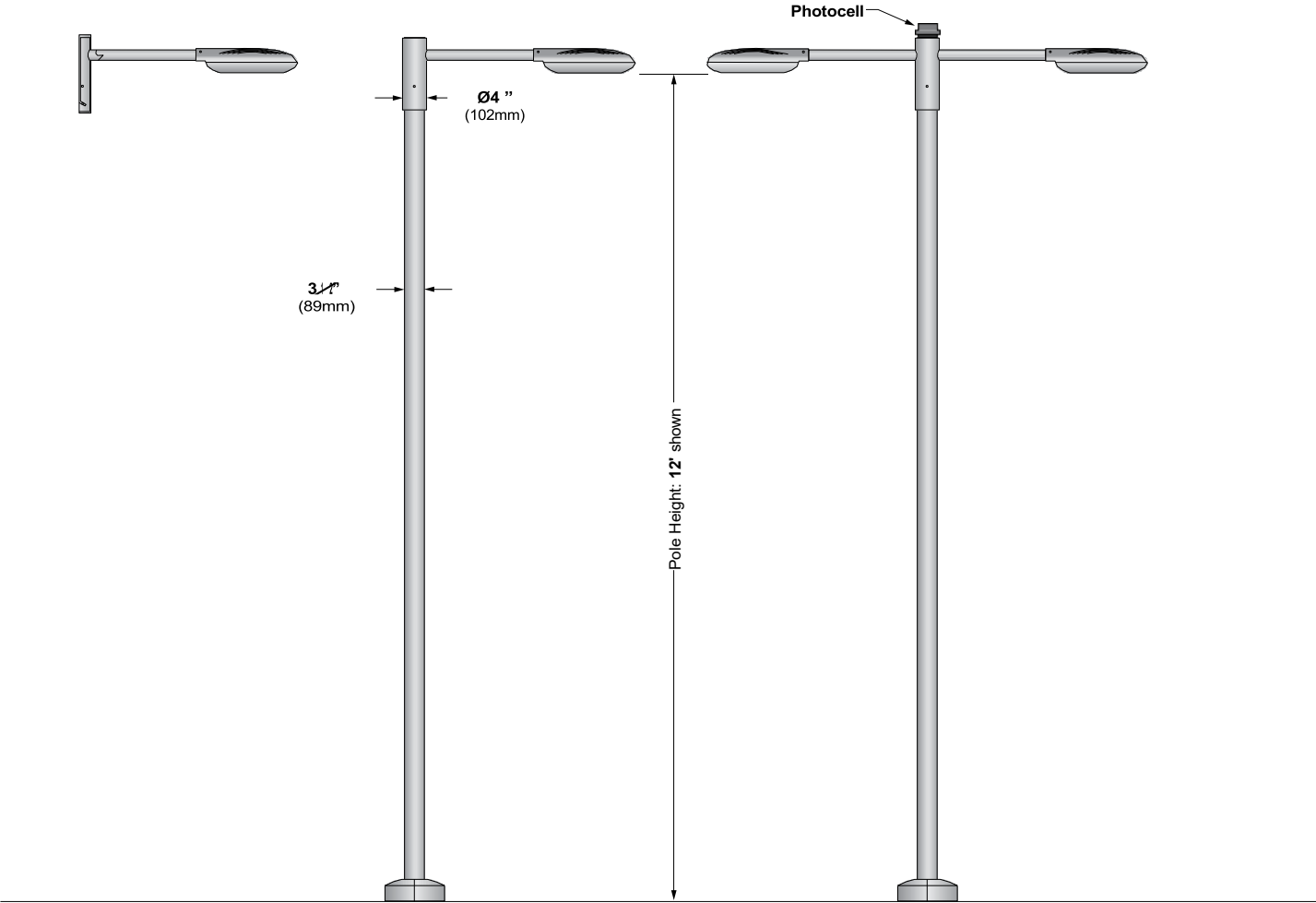
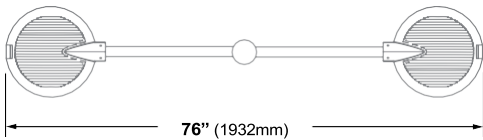
LW Long Wall Mount
EPA = .75ft² (0.13m²)
Weight = 23 lbs. (10kg)



S2 Double Short Arm
EPA = 1.7ft² (0.16m²)
Weight = 52 lbs. (23.6kg)

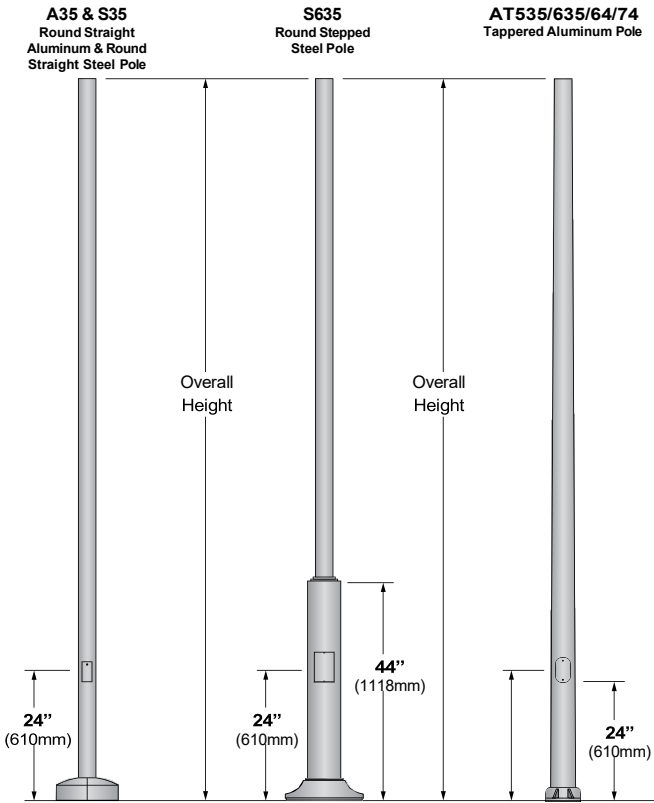


L2 Double Long Arm
EPA = 2.5ft² (0.23m²)
Weight = 69.7 lbs. (31.7kg)



Pole Information

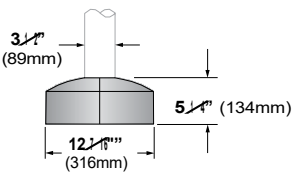
Refer to pole specification sheets for construction details, anchorage information and additional options.



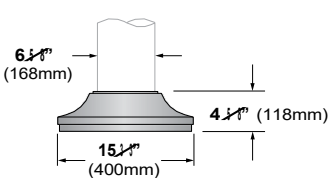
Optional Base Covers for Poles

Die cast aluminum, two-piece field installable base covers.

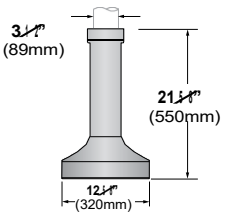
BC5 Optional Base Cover (A35 & S35)
Die cast aluminum, two-piece field installable base cover.



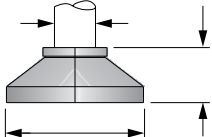
BC6 Optional Base Cover (S635)
Die cast aluminum, one-piece field installable base cover.



BC1 Optional Base Cover (A35 & S35)
Die cast aluminum, one-piece field installable base cover.



BC10 Optional Base Cover (AT74)
Die cast aluminum, two-piece field installable base cover.



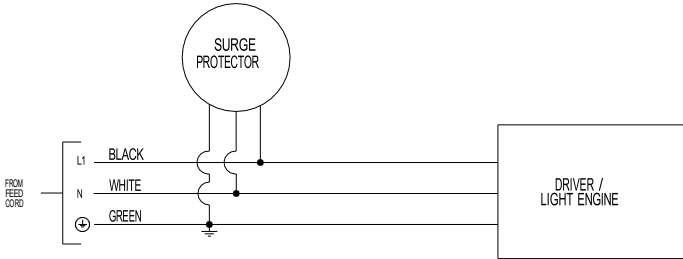
Pole Data Chart

Pole Series	Bolt Circle	EPA Information					Height	Finish	Options
		70mph	80mph	90mph	100mph	110mph			
S635 3/4" Diameter Stepped Steel Pole	Ø9"	45.6	35.0	27.3	21.6	17.8	10 10 ft.	WH White	BC1 Decorative Cast Aluminum Base Cover (A35 & S35 poles only)
A35 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	12.4	9.3	7.1	5.4	4.3		BK Black	
S35 3/4" Diameter Straight Steel Pole	Ø7 1/4"	11.4	8.6	6.5	4.9	3.9		BL Semi-Matte Black	BC3 Decorative Cast Aluminum Base Cover (AT535 poles only)
S635 3/4" Diameter Stepped Steel Pole	Ø9"	37.6	28.7	22.3	17.5	14.4	12 12 ft.	BZ Bronze	BC9 Decorative Cast Aluminum Base Cover (AT64 poles only)
A35 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	9.9	7.3	5.4	4.0	3.1		SV Silver	
S35 3/4" Diameter Straight Steel Pole	Ø7 1/4"	9.1	6.7	4.9	3.6	2.8		SP Specify Premium Color	BC10 Decorative Cast Aluminum Base Cover (AT74 poles only)
AT535 5" to 3/4" Tapered Aluminum Pole	Ø8 1/4"	19.4	14.4	10.9	8.6	6.9			REC GFCI Receptacle with weatherproof cover¹ (120V only)
S635 3/4" Diameter Stepped Steel Pole	Ø9"	31.7	24.2	18.6	14.6	11.9	14 14 ft.		REC2 GFCI Receptacle with padlockable in-use cover¹ (120V only)
A35 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	8.0	5.8	4.2	3.0	2.2			MS Motion Sensor w/ Optional Photocell (Meets Title 24 Requirements)
S35 3/4" Diameter Straight Steel Pole	Ø7 1/4"	7.3	5.3	3.8	2.7	1.9			T35 3/4" Tennon (Required for AT64/AT74 poles for arm mounting)
AT535 3/4" Diameter Straight Steel Pole	Ø8 1/4"	12.9	9.4	7.1	5.5	4.4			
S635 3/4" Diameter Stepped Steel Pole	Ø9"	21.7	15.8	12.3	9.6	7.6	16 16 ft.		
A35 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	4.9	3.2	2.2	1.4	0.8			
S35 3/4" Diameter Straight Steel Pole	Ø7 1/4"	4.4	2.8	1.9	1.2	0.6			
AT535 5" to 3/4" Tapered Aluminum Pole	Ø8 1/4"	10.7	7.7	5.6	4.2	3.3			
AT535 5" to 3/4" Tapered Aluminum Pole	Ø8 1/4"	11.1	7.8	5.6	4.2	3.2	18 18 ft.		
AT64 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	15.7	11.5	8.7	6.9	5.5			
AT64 3/4" Diameter Straight Aluminum Pole	Ø7 1/4"	13.5	9.6	7.1	5.6	4.4	20 20 ft.		

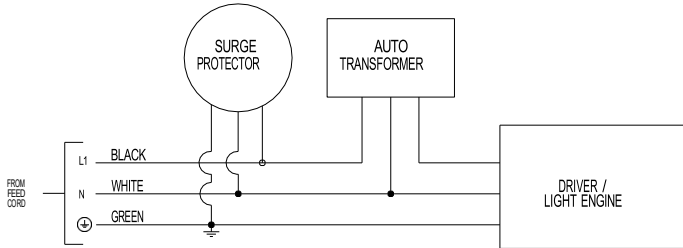
Allowable EPA calculated according to AASHTO 1994 and include allowance for 1.3 gust factor. See Mounting Configuration pages for fixture arm weight and EPA values.

Wiring Diagrams

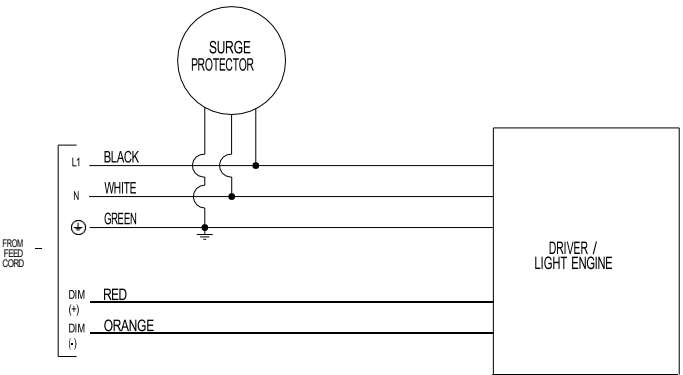
Standard Wiring for UNV
Standard wiring for 120-277V with no additional options.



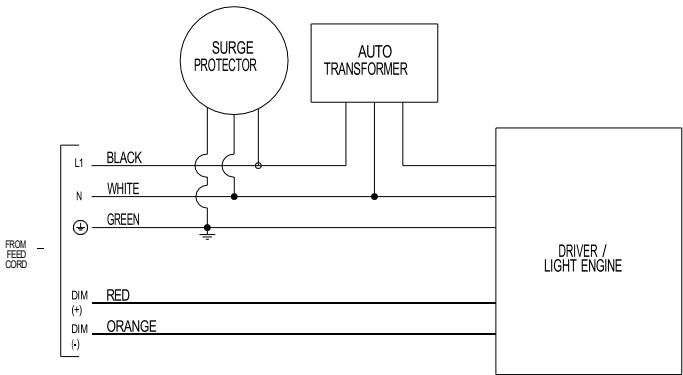
Standard Wiring for 347/480V
Standard wiring for 347/480V with no additional options.



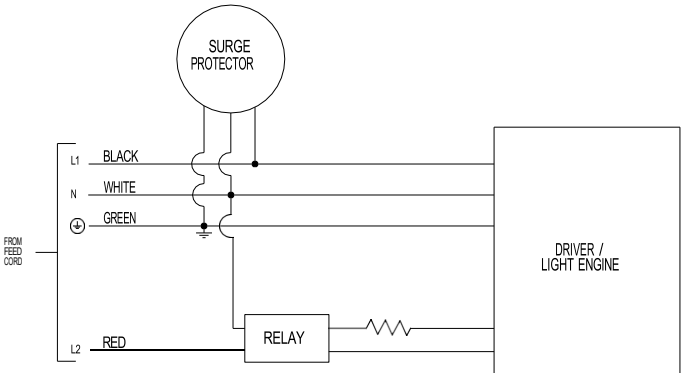
0-10V Dimming Option (DM) Wiring for UNV
100% light output at 10V, down to 1% light output at 0V.



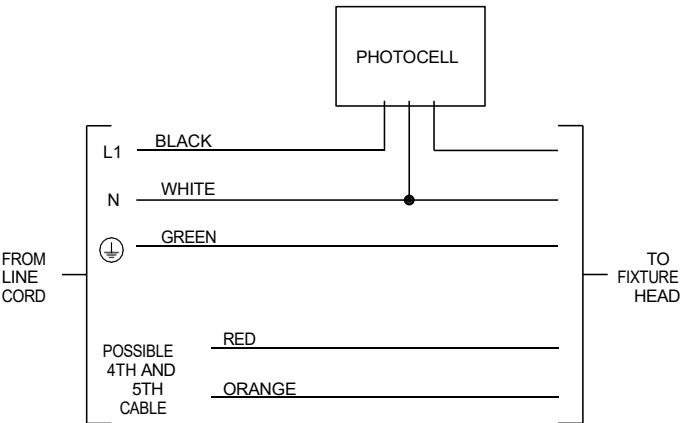
0-10V Dimming Option (DM) Wiring for 347/480V
100% light output at 10V, down to 1% light output at 0V.



Hi-Lo Switching Option (HLXX) Wiring
120/240/277V. When red is energized, light output will be at "Lo" level.



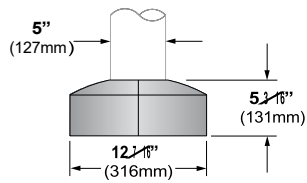
Photocell Wiring
Available for all configurations except Short Arm Wall Mount (SW), Single Pole Adapter (SA)



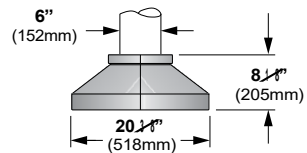
Optional Accessories

BC3 Optional Base Cover (AT535)

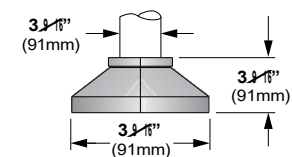
Die cast aluminum, two-piece field installable base cover.

**BC9 Optional Base Cover (AT635/AT64)**

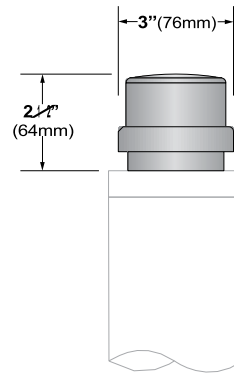
Die cast aluminum, two-piece field installable base cover.

**BC10 Optional Base Cover (AT74)**

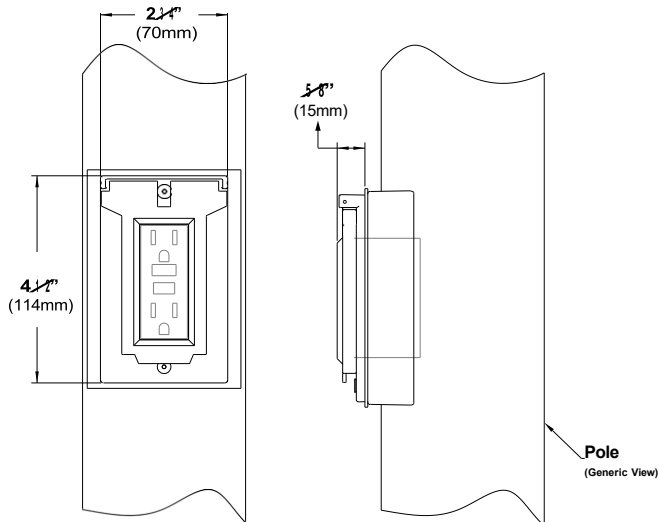
Die cast aluminum, two-piece field installable base cover.

**PC (Photocell) Option Detail**

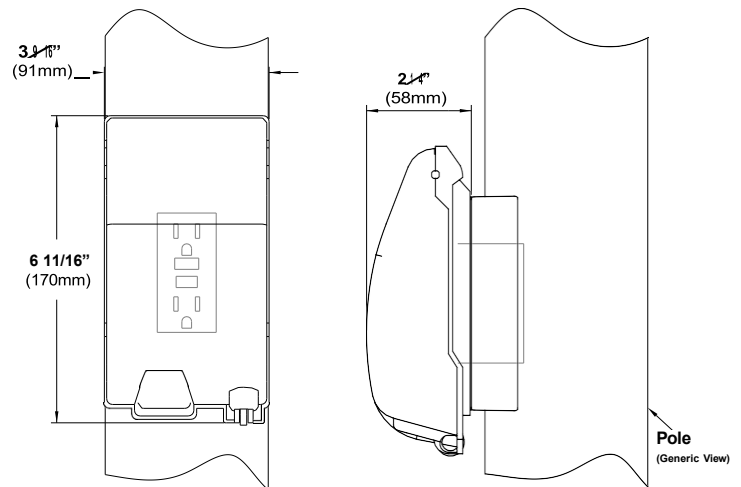
Note: Photocell is available for all pole and arm mounting configurations except Direct Mount



GFCI Receptacle (REC) - 120V 15A GFCI duplex receptacle with weather-proof, self-closing, non-lockable cover; located 36" (915mm) from base of pole, inline with handhole. Receptacle is intended only for portable tools or other portable equipment to be connected to outlet only when attended by operating personnel. For use with 120V applications only. For use with luminaires with other than 120V rating, please consult factory for wire segregation.



GFCI Receptacle (REC2) - 120V 15A GFCI duplex receptacle with weather-proof, self-closing, padlockable in-use cover; located 36" (915mm) from base of pole, inline with handhole. Receptacle is intended only for portable tools or other portable equipment to be connected to outlet only when attended by operating personnel. For use with 120V applications only. For use with luminaires with other than 120V rating, please consult factory for wire segregation.



USB & Duplex Receptacle (REC3) (not shown) - 120V 15A duplex receptacle with USB combination ports. (1) type A and (1) type C high power 5 Amp, 5 Volt USB outlets.

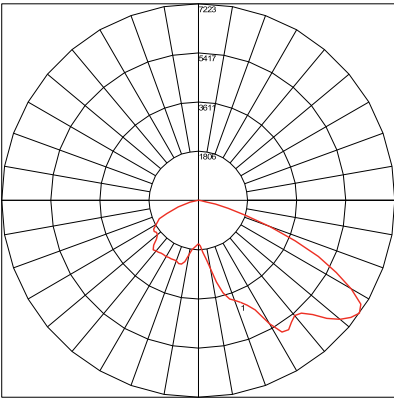
With weather-proof, self-closing cover; located 36" (915mm) from base of pole, inline with handhole. Receptacle is intended only for portable tools or other portable equipment to be connected to outlet only when attended by operating personnel.

USB & Duplex Receptacle (REC4) (not shown) - 120V 15A duplex receptacle with USB combination ports. (1) type A and (1) type C high power 5 Amp, 5 Volt USB outlets.

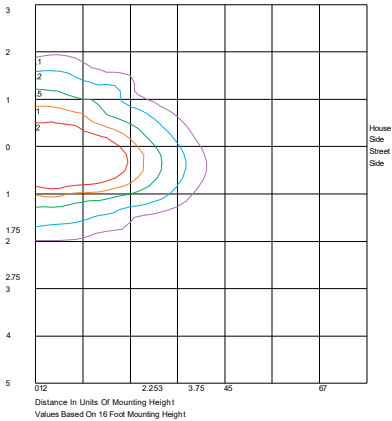
With weather-proof, self-closing padlockable in-use cover; located 36" (915mm) from base of pole, inline with handhole. Receptacle is intended only for portable tools or other portable equipment to be connected to outlet only when attended by operating personnel.

R1 Optics / 103W / 5000K CCT

Catalog #: DSC4L-XX-LG4105-R1-50-120
Report #: LM-63-1995
Delivered Lumens: 8918
Input Watts: 102.5W
Efficacy: 87
CCT: 5000K
CRI (Ra): 72
Maximum candela of 7222 at 55° from vertical.
IES classification: Type I
BUG Rating: B2-U0-G1
Power Factor: 0.992
Total Harmonic Distortion: 6.82%

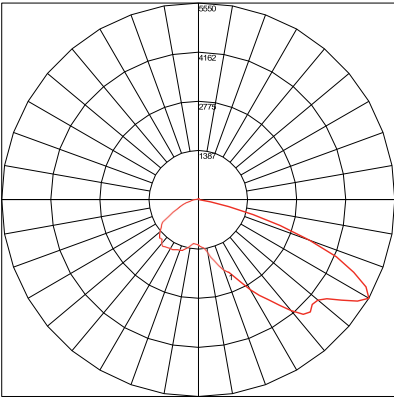


Maximum Candela = 7222.955 Located At Horizontal Angle = 77.5, Vertical Angle = 55
1 - Vertical Plane Through Horizontal Angles (77.5 - 257.5) (Through Max. Cd.)

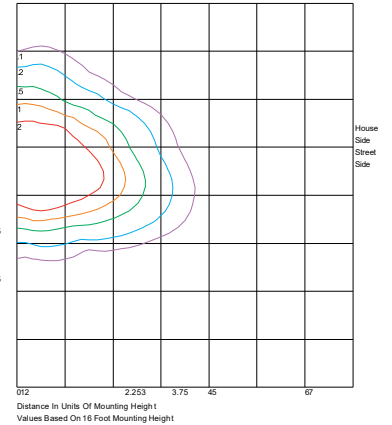


R2 Optics / 102W LED / 5000K CCT

Catalog #: DSC4L-XX-LG4105-R2-50-120
Report #: LM-63-1995
Delivered Lumens: 8779
Input Watts: 102W
Efficacy: 86
CCT: 5000K
CRI (Ra): 72
Maximum candela of 5549.5 at 60° from vertical.
IES classification: Type II
Mounting Height: 16' (4.9 m)
BUG Rating: B2-U0-G1
Power Factor: 0.992
Total Harmonic Distortion: 6.82%

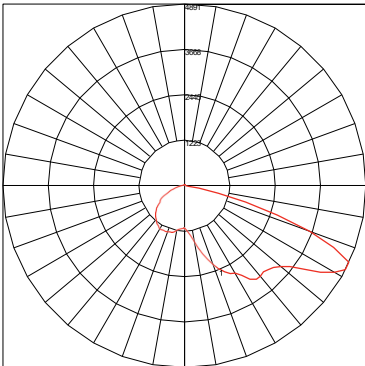


Maximum Candela = 5549.586 Located At Horizontal Angle = 65, Vertical Angle = 60
1 - Vertical Plane Through Horizontal Angles (65 - 245) (Through Max. Cd.)

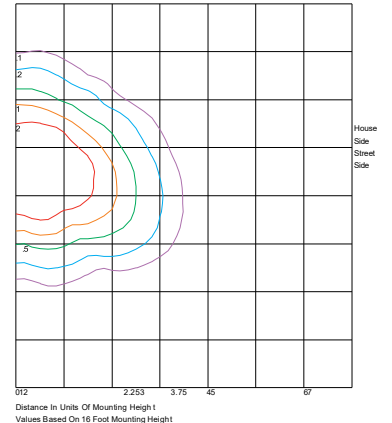


R3 Optics / 102W LED / 5000K CCT

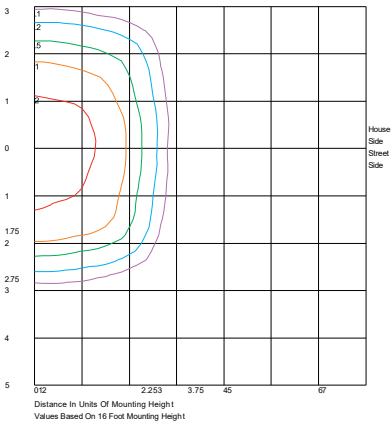
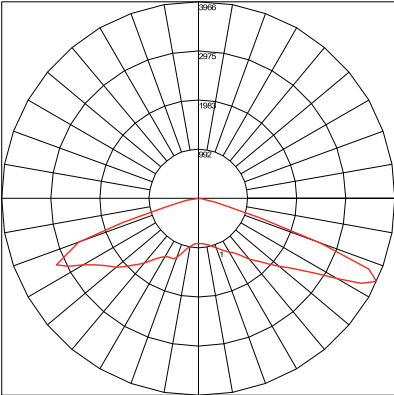
Catalog #: DSC4L-XX-LG4105-R3-50-120
Report #: LM-63-1995
Delivered Lumens: 8393
Input Watts: 102W
Efficacy: 82
CCT: 5000K
CRI (Ra): 72
Maximum candela of 4891 at 65° from vertical.
IES classification: Type III
Mounting Height: 16' (4.9 m)
BUG Rating: B2-U0-G1
Power Factor: 0.992
Total Harmonic Distortion: 6.82%



Maximum Candela = 4890.85 Located At Horizontal Angle = 60, Vertical Angle = 65
1 - Vertical Plane Through Horizontal Angles (60 - 240) (Through Max. Cd.)



R5 Optics / 103W / 5000K CCT
Catalog #: DSC4L-XX-LG4105-R5-50-120
Report #: LM-63-1995
Delivered Lumens: 8406
Input Watts: 102W
Efficacy: 82
CCT: 5000K
CRI (Ra): 72
Maximum candela of 3966 at 65° from vertical.
IES classification: Type VS
BUG Rating:B3-U0-G1
Power Factor: 0.992
Total Harmonic Distortion: 6.82%



Conversion Chart

Values based on 16' (4.9) mounting height

Mounting Height	Multiply
10' (3.0 m)	1.27
12' (3.7 m)	1.16
14' (4.3 m)	1.07
16' (4.9 m)	1.00
18' (5.5 m)	0.84

LED CCT Prorate Table

Values based on Flux Binning

CCT	Theoretical Multiply
3000K	1.000
3500K	0.961
4000K	1.073
5000K	1.115

LED Information		Standard Power Electrical Specification (Type W Shown)											
Color Temperature		5000K			4000K			3500K			3000K		
Drive Current (mA)		1050	700	500	1050	700	500	1050	700	500	1050	700	500
Performance													
Delivered Lumens (lm)		8406	6023	4480	8094	5800	4314	7251	5196	3865	7540	5403	4019
Wattage (W)		102	68	50	102	68	50	102	68	50	102	68	50
Efficacy (lm/W)		82	88	89	79	85	86	71	76	77	73	79	82

Division 27

Communications

Division 27 Outline Specifications

271500 Communication Cabling and
Equipment

Division 27 – Communications

Division 27 Outline Specifications – Communications

SECTION 271500 – COMMUNICATIONS CABLING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1) UTP (Unshielded Twisted Pair) cabling.
 - a) Types of UTP Cabling
 - i) CAT 3 → 10-Mbps for 100m
 - ii) CAT 4 → 16-Mbps for 100m
 - iii) CAT 5 → 100-Mbps for 100m
 - iv) CAT 5e → 1-Gbps for 100m
 - v) CAT 6 → 1-Gbps for 100m & 10-Gbps for 50m"
- 2) UTP Cable Hardware
- 3) UTP Patch Cords
- 4) Telecommunications outlet/connectors.
- 5) Communications Equipment Cabinets and Communications Equipment
- 6) WiFi Kits

- B. Related Sections:

- 1. Division 27 Section 270528 "Pathways for Communications Systems" for horizontal cabling pathways.

1.3 DEFINITIONS

- A. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
- B. BICSI: Building Industry Consulting Service International.
- C. Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.
- D. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

- E. EMI: Electromagnetic interference.
- F. IDC: Insulation displacement connector.
- G. LAN: Local area network.
- H. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.
- I. RCDD: Registered Communications Distribution Designer.
- J. UTP: Unshielded twisted pair.

1.4 HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.
 - 1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
 - 2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
 - 3. Bridged taps and splices shall not be installed in the horizontal cabling.
 - 4. Splitters shall not be installed as part of the optical fiber cabling.
- B. A work area is the area identified on the drawings.
- C. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to equipment. The maximum allowable length does not include an allowance for the length of 16 feet in the horizontal cross-connect.
- D. Follow: TIA/EIA-568-B.1 the Commercial Building Telecommunications Cabling Standard

1.5 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For coaxial cable, include the following installation data for each type used:
 - a. Nominal OD.

- b. Minimum bending radius.
- c. Maximum pulling tension.

B. Shop Drawings:

- 1. System Labeling Schedules: Electronic copy of labeling schedules, for all horizontal cabling and termination equipment.
- 2. Wiring diagrams to show typical wiring schematics, including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.
- 3. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For splices and connectors to include in maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.9 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Patch-Panel Units: One of each type.
 - 2. Connecting Blocks: One of each type.
 - 3. Device Plates: One of each type.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.

- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- E. Grounding: Comply with ANSI-J-STD-607-A.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 - 1. Test each pair of UTP cable for open and short circuits.

1.12 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Project Manager.
- B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

1.13 WARRANTY

- A. Twenty-Five (25) Year Extended Product Warranty
 - 1. The 25 Year Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of TIA/EIA 568A and ISO/IEC IS 11801, exceed the attenuation and NEXT requirements of TIA/EIA TSB 67 and ISO/IEC IS 11801 for cabling links/channels, that the installation will exceed the loss bandwidth requirements of TIA/EIA TSB 67 and ISO/IEC 11801 for fiber links/channels, for a twenty-five (25) year period. The end-to-end passive product shall be capable of delivering 1Gb/s half-duplex mode/2Gb/s full-duplex mode to the workstation.
 - 2. The Twenty-Five (25) Year Extended Product Warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for a twenty-five (25) year period.
- B. Twenty-Five (25) Year Application Assurance
 - 1. The Twenty-Five (25) Year Application Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional applications(s) introduced in the future, up to 1Gb/s parallel transmission schemes, by recognized standards or user forums that use the TIA/EIA or ISO/IEC IS 11801 component and link/channel specifications

for cabling, for a twenty-five (25) year period.

C. System Certification

1. Upon successful completion of the installation and subsequent inspection, the customer shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. General Requirements: Comply with TIA/EIA-569-A
- B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 1. Support brackets with cable tie slots for fastening cable ties to brackets.
 2. Lacing bars, spools, J-hooks, and D-rings.
 3. Straps and other devices.
- C. Conduit and Boxes: Comply with requirements in Division 26 Section 260533 "Raceway and Boxes for Electrical Systems."
 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
- D. Comply with requirements in Division 26 Section 260533 "Raceways and Boxes for Electrical Systems."
 1. ALL horizontal cabling connected to a CCTV camera shall be installed in min. 3/4" conduit, no exceptions.

2.2 UTP CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
 1. Berk-Tek; a Nexans company
 2. SYSTIMAX Solutions; a CommScope Inc. brand.
 3. Superior Essex and Leviton Network Solutions.
- B. 100 Ohm Enhanced Category 6 Unshielded Twisted Pair (UTP) Cable
 1. Physical Characteristics:
 - a. Shall be plenum rated and meet applicable requirements of ANSI/ICEA S- 80-576. All 4 pairs must be insulated with F.E.P. No constructions that use mixed insulation materials will be allowed.

- b. The diameter of the insulated conductor shall be .026 in. nominal.
 - c. Shall consist of (4) 23 AWG twisted pairs.
 - d. Shall be suitable for the environment in which they are to be installed.
 - e. The color coding of pairs shall be:
 - f. Pair 1: W-BL; BL
 - g. Pair 2: W-O; O
 - h. Pair 3: W-G; G
 - i. Pair 4: W-BR; BR
 - j. The overall diameter of the cable shall be no larger than 0.250 inches.
 - k. The ultimate breaking strength measured in accordance with ASTM D 4565 shall be 400 N minimum.
 - l. Cable shall withstand a bend radius of 1 inch at -20 degrees Celsius without jacket or insulation cracking.
 - m. Cable shall be third party verified to meet ANSI/TIA/EIA-568-B.2-1.
- C. All horizontal data station cable and voice cable shall terminate on modular patch panels or 110 cross-connecting blocks in their respective Telecommunications Room or Equipment Room as specified on the project Drawings.
- D. All cables in a cable run shall be from the same manufacturer and shall be the same type.
- E. A mix of UTP cables from different manufactures shall not be used.

2.3 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Berk-Tek/Ortronics a Nexans company.
 - 2. SYSTIMAX Solutions; a CommScope Inc. brand.
 - 3. Superior Essex and Leviton Network Solutions.
- B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.
 - 1. Number of Terminals per Field: One for each conductor in assigned cables.
- D. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
 - 1. Number of Jacks per Field: One for each four-pair UTP cable indicated.
- E. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

- F. Patch Cords: Factory-made, 4-pair cables in 36-inch lengths; terminated with 8-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.

2.4 UTP PATCH CORDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Berk-Tek a Nexans company.
2. SYSTIMAX Solutions; a CommScope Inc. brand.
3. Superior Essex and Leviton Network Solutions.

- B. The contractor shall provide factory terminated and tested UTP and patch cords and equipment cords for the complete cabling system. The UTP patch cables shall meet the requirements of ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2-1 for patch cord testing.

- C. Copper (UTP) patch cords shall:

1. Use 8 position connector with impedance matched contacts and designed using dual reactance.
2. Be constructed of 100 ohm, 4 pair, 24 AWG, stranded conductor, unshielded twisted pair copper per the requirements of the ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2-1 standard.
3. Meet TIA category 6 component specifications in ANSI/TIA/EIA-568-B.2-1
 - a. 100% factory tested to meet category 6 performance and
 - b. ETL or any other nationally recognized 3rd party verification
4. Be center tuned to category 6 performance specifications by using paired bi-level contact array.
5. Be capable of universal T568A or T568B wiring schemes.
6. Modular connector shall maintain the paired construction of the cable to facilitate minimum untwisting of the wires.
7. Have a performance marking indelibly labeled on the jacket (by the manufacturer).
8. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.
9. Have “snagless” protection for the locking tab to prevent snagging and to protect locking tab in tight locations and provide bend relief.
10. Be available in two standard colors.
11. Be available in 3 foot, 5 foot, 7 foot, 9 foot, and 15 foot standard lengths.
12. Be backwards compatible to Category 3, 5 and 5e.

- D. Patch cords shall be furnished by the Contractor as required to meet the design requirement of the project, whether indicated on the project drawings or not.

- E. The Contractor shall furnish modular patch cords for each assigned port of any Ethernet patch panel installed as part of the project.

- F. Jacket:
1. Data Applications: Blue (unless noted otherwise)
 2. Voice Applications: Grey (unless noted otherwise)

2.5 TELECOMMUNICATIONS OUTLET/CONNECTORS

- A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.
- B. Workstation Outlets: Two -port-connector assemblies mounted in single faceplate.
1. Plastic Faceplate: High-impact plastic.
 2. Metal Faceplate: Stainless steel.
 3. For use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords.
 - a. Flush mounting jacks, positioning the cord at a 45-degree angle.
 4. Legend: Factory labeled by silk-screening or engraving for stainless steel faceplates.
 5. Legend: Machine printed, in the field, using adhesive-tape label.
 6. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

2.6 COMMUNICATIONS EQUIPMENT CABINETS AND EQUIPMENT

- A. Each recreational center shall have one new equipment cabinet installed at a location to be directed by the owner.
- B. Equipment Cabinet Shall Include
1. Equipment Cabinet
 - a. 13U locking wall mount or floor mountable cabinet - Quantity 1,
 - b. Color - Black,
 - c. 19" mounting rails
 2. Uninterruptable Power Supply 2000VA Rack Mounted
 - a. Quantity 1
 - b. Suggested Model: UPS 2000; Catalog # = R1-E2000RT2U
 3. 24 Port CAT6 Patch Panel
 - a. Quantity 1
 4. 24 Port POE Network Switch
 - a. 10/100/1000x24 - POE
 - b. Managed
 - c. Rack mountable

- d. Quantity 1
- 5. Horizontal Cable Management
 - a. Quantity 1
- 6. 120V 20A Receptacle
 - a. Quantity 1
- 7. Network Video Recorder
 - a. See Specification Section 282300 "Video Surveillance"
- C. Contractor shall furnish and install one new 20A, 120V single phase circuit from an existing electrical panel to a new duplex receptacle within new equipment cabinet for UPS power.

2.7 GROUNDING

- A. Comply with requirements in Division 26 Section 260562 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
- B. Comply with ANSI-J-STD-607-A.

2.8 IDENTIFICATION PRODUCTS

- A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
 - a. Identification info & labels include Intrabuilding pathway, interbuilding pathway, Outdoor Space descriptors, Pathway descriptors, Space descriptors, and device descriptors.
- B. Comply with requirements in Division 26 Section 260553 "Identification for Electrical Systems" for labeling requirements.

2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test UTP cables on reels according to TIA/EIA-568-B.1.
- C. Factory test UTP cables according to TIA/EIA-568-B.2.
- D. Cable will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Wiring Method: Install cables in raceways except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.
 - 1. Comply with requirements for raceways and boxes specified in Division 26 Section 260533 "Raceway and Boxes for Electrical Systems."
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 INSTALLATION OF PATHWAYS

- A. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- B. Comply with requirements in Division 26 Section 260533 "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.
- C. Install manufactured conduit sweeps and long-radius elbows whenever possible.

3.3 INSTALLATION OF CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 - 1. Comply with TIA/EIA-568-B.1.
 - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - 3. Install 110-style IDC termination hardware unless otherwise indicated.
 - 4. MUTOA shall not be used as a cross-connect point.
 - 5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:
 - a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
 - b. Locate consolidation points for UTP at least 49 feet from communications equipment room.
 - 6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - 7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

8. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 12. In the communications equipment room, install a 10-foot- long service loop on each end of cable.
 13. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- C. UTP Cable Installation:
1. Comply with TIA/EIA-568-B.2.
 2. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.
- D. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- E. Group connecting hardware for cables into separate logical fields.
- F. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.

- c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
- 4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
- 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
- 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 FIRESTOPPING

- A. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
- B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.5 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with ANSI-J-STD-607-A.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 28 Section 282300 "Video Surveillance."
- B. Using cable management system software specified in Part 2, develop Cabling Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable and label cable, jacks, connectors, and terminals to which it connects with same designation. At completion, cable and asset management software shall reflect as-built conditions.
- C. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 level of administration.

- D. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- E. Cable and Wire Identification:
1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet.
 4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - b. Label each unit and field within distribution racks and frames.
 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- F. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
 2. Visually confirm Category 6, marking of outlets, cover plates, outlet/connectors, and patch panels.
 3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

- a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

5. UTP Performance Tests:

- a. Test for each outlet. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:

- 1) Wire map.
- 2) Length (physical vs. electrical, and length requirements).
- 3) Insertion loss.
- 4) Near-end crosstalk (NEXT) loss.
- 5) Power sum near-end crosstalk (PSNEXT) loss.
- 6) Equal-level far-end crosstalk (ELFEXT).
- 7) Power sum equal-level far-end crosstalk (PSELFEXT).
- 8) Return loss.
- 9) Propagation delay.
- 10) Delay skew.

- C. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.8 IT GUIDELINES AND COORDINATION

- A. Refer to IT coordination guidelines, available upon request.

Division 28

Electronic Safety and Security

Division 28 Full Specifications

**282300 Video Surveillance and
Mosquito Sonic Security
Devices**

**283111 Digital and Addressable Fire
Alarm System**

SECTION 282300 – VIDEO SURVEILLANCE AND MOSQUITO TYPE SONIC SECURITY DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a video surveillance system consisting of cameras, network video recorder, data transmission wiring, and a control station with its associated equipment.
- B. Video surveillance system shall be integrated with existing PPR network equipment.

1.3 DEFINITIONS

- A. AGC: Automatic gain control.
- B. BNC: Bayonet Neill-Concelman - type of connector.
- C. B/W: Black and white.
- D. CCD: Charge-coupled device.
- E. FTP: File transfer protocol.
- F. IP: Internet protocol.
- G. LAN: Local area network.
- H. MPEG: Moving picture experts group.
- I. NTSC: National Television System Committee.
- J. PC: Personal computer.
- K. PTZ: Pan-tilt-zoom.
- L. RAID: Redundant array of independent disks.
- M. TCP: Transmission control protocol - connects hosts on the Internet.
- N. UPS: Uninterruptible power supply.
- O. WAN: Wide area network.

1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Video surveillance system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
 - 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
 - 4. UPS: Sizing calculations.
 - 5. Wiring Diagrams: For power, signal, and control wiring (if provided).
 - 6. Storage Device Calculations.
 - 7. Network Bandwidth Requirements and Fiber Optic Channel Link-Loss Budgets .
 - 8. Existing Equipment Frame Elevations, where new equipment is being added.
- C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

1.6 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For video surveillance, cameras, camera-supporting equipment, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

- 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Field quality-control reports.
- C. Warranty: Sample of special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. Include the following as well:

1.8 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NECA 1.
- C. Comply with NFPA 70.
- D. Electronic data exchange between video surveillance system with an access-control system shall comply with SIA TVAC, if access-control system is provided.

1.9 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 - 1. Control Station: Rated for continuous operation in ambient temperatures of 50 to 95 deg F (10 to 35 deg C) and a relative humidity of 20 to 80 percent, noncondensing.
 - 2. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F (2 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
 - 3. Interior, Uncontrolled Environment: System components installed in non- temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of 0 to 122 deg F (minus 18 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.
 - 4. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h) and snow cover up to 24 inches (610 mm) thick. Use NEMA 250, Type 4X enclosures.

5. Hazardous Environment: System components located in areas where fire or explosion hazards may exist because of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers shall be rated, listed, and installed according to NFPA 70.
6. Corrosive Environment: System components subject to corrosive fumes, vapors, and wind-driven salt spray in coastal zones. Use NEMA 250, Type 4X enclosures.
7. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Three years from date of Final Acceptance by the City.
- B. Warranty Requirements: Contractor shall warrant DPP (or PPR) that the equipment will be free and clear of any lien or encumbrance on the final acceptance date. Contractor shall further warrant for a period of three (3) year from the date of Substantial Completion that the Security System will, under normal use and service, be free from defects and faulty workmanship except as set forth below:
 1. Contractor's obligation under this warranty is to repair or replace defective equipment, parts, and associated labor thereto at its expense. Contractor shall warrant that replacement or repaired equipment furnished hereunder and labor shall be in accordance with current industry standards.
 2. PPR is granted a nontransferable fully paid license (Genetec) to use all software furnished by the Contractor as part of furnishing the security system equipment provisions under terms established by the software manufacturer. The Authority will be provided with a copy of all applicable licenses. Contractor shall warrant that it has the right to grant such licenses.
 3. A copy of Contractor's standard warranty agreement must be provided and must match or exceed manufacturer's warranty, minimum of 3 years.
 4. Upgrade of software during warranty period.
 5. Provide Service for three (3) years after substantial completion, includes all labor and material cost associated with the repair, with the exception of third party negligence or acts of vandalism.
 6. Contractor's personnel shall respond to all system failures within four (4) hours of the occurring event. All failure shall be corrected within eight (8) hours of the arrival on site of Contractor's personnel.

PART 2 - PRODUCTS

2.1 GENERAL SYSTEM REQUIREMENTS

- A. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.

- B. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.
- C. Compatibility: Video Management Software must be compatible with IP video equipment. The contractor, if submitting components from different manufactures must submit with either shop drawings, or product data, statements of compatibility from each manufacturer guaranteeing IP video components are compatible with the IP video management software submitted.
- D. D. All systems and components are subject to compliance with Delaware Valley Intelligence Center (DVIC) requirements, available upon request.

Follow Up: From the Genetec Supported Device List (<https://www.genetec.com/supported-device-list>) Server must be Genetec.

2.2 IP VIDEO SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Genetec
 - 2. Vivotek
 - 3. Axis Communications
 - 4. DVTEL
- B. Description:
 - 1. System shall provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
 - 2. System shall have seamless integration of all video surveillance and control functions.
 - 3. Graphical user interface software shall manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management. IP system shall also be capable of integrating into larger system environments.
 - 4. System design shall include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4 video and H.264 video. Unit shall provide connections for all video cameras, bidirectional audio, discreet sensor inputs, and control system outputs.
 - 5. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
 - 6. Camera system units shall be ruggedly built and designed for extreme adverse and urban environments, complying with NEMA Type environmental standards. Where required provide vandal proof exterior camera housings.
 - 7. Encoder/decoder combinations shall place video, audio, and data network stream that can be managed from multiple workstations on the user's LAN or WAN at the same time.
 - 8. All system interconnect cables, workstation PCs, and network intermediate devices shall be provided for full performance of specified system.

9. Wireless transmitters are allowed where appropriate.

2.3 STANDARD IP CAMERAS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Genetec (AutoVu SharpV)
 2. Vivotek
 3. Axis Communications
 4. DVTEL
- B. Network Indoor Dome Camera, HD/2Megapixel: Assembled and tested as a complete manufactured unit.
 1. Image Sensor - 1/3" Progressive scan CMOS
 2. Lens - 2.7-9mm Motorized Verifocal
 3. Day/Night Sensor – Electronic or True
 4. Minimum Illumination/Light Sensitivity (lux) - 0.5 color, 0.1 black and white
 5. Maximum Resolution (pixels) - 1920x1080 (2MP)
 6. Video Compression - H.264/MPEG4/M-JPEG
 7. Frames per Second - 30
 8. Alarm Inputs/Outputs - 2
 9. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP/RTSP, PPPoE, SMTP, NTP
 10. Power - PoE or DC Input
 11. Vandal Resistant - Yes
 12. Digital Pan/Tilt/Zoom
 13. 20M IR LED
 14. Mounting:
 - a. Indoor Ceiling Mount (Vandal Proof)
 - b. Wall Mount (Vandal Proof)
- C. Network Indoor Dome Camera, HD/3Megapixel: Assembled and tested as a complete manufactured unit.
 1. Image Sensor - 1/3" Progressive scan CMOS
 2. Lens - 2.7-9mm Motorized Verifocal
 3. Day/Night Sensor – Electronic or True
 4. Minimum Illumination/Light Sensitivity (lux) - 0.8 color, 0.1 black and white
 5. Maximum Resolution (pixels) - 2048x1536 (3MP)
 6. Video Compression - H.264/MPEG4/M-JPEG
 7. Frames per Second – 30
 8. Alarm Inputs/Outputs - 2
 9. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP/RTSP, PPPoE, SMTP, NTP
 10. Power - PoE or DC Input
 11. Vandal Resistant - Yes
 12. Digital Pan/Tilt/Zoom
 13. 20M IR LED
 14. Mounting:
 - a. Indoor Ceiling Mount (Vandal Proof)
 - b. Wall Mount (Vandal Proof)
- D. Network Outdoor Dome Camera, HD/ (2) Megapixel: Assembled and tested as a complete manufactured

unit.

1. Image Sensor - 1/3" Progressive scan CMOS
2. Lens – 2.7-9mm Motorized Verifocal
3. Minimum Illumination/Light Sensitivity (lux) - 0.08 color, 0.1 black and white
4. Maximum Resolution (pixels) - 1920x1080
5. Video Compression - H.264/MPEG4/M-JPEG
6. Frames per Second - 30
7. Intelligent Alarm
8. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP, RTSP, PPPoE, SMTP, NTP, SNMP, HTTPS, FTP, 802.1x, Qos
9. Power - PoE
10. Outdoor Use - Outdoor Ready
11. Vandal Resistant - Yes
12. Digital Pan/Tilt/Zoom
13. 20M IR LED
14. Heater - Integrated with housing
15. Mounting:
 - a. Outdoor Wall Mount (Vandal Proof)
 - b. Outdoor Wall Mount on Pole Mount Adapter, Min. Three Clamps (Vandal Proof)

E. Network Outdoor Dome Camera, HD/ (3) Megapixel: Assembled and tested as a complete manufactured unit.

1. Image Sensor - 1/3" Progressive scan CMOS
2. Lens – 2.7-9mm Motorized Verifocal
3. Minimum Illumination/Light Sensitivity (lux) 0.5 color, 0 black and white
4. Maximum Resolution (pixels) - 2048x1536 (3MP)
5. Video Compression - H.264/MPEG4/M-JPEG
6. Frames per Second - 30
7. Intelligent Alarm
8. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP, RTSP, PPPoE, SMTP, NTP, SNMP, HTTPS, FTP, 802.1x, Qos
9. Power - PoE
10. Outdoor Use - Outdoor Ready
11. Vandal Resistant - Yes
12. Digital Pan/Tilt/Zoom
13. 20M IR LED
14. Heater - Integrated with housing
15. Mounting:
 - a. Outdoor Wall Mount(Vandal Proof)
 - b. Outdoor Wall Mount on Pole Mount Adapter, Min. Three Clamps(Vandal Proof)

F. Mini Dome Camera, HD/ 2 Megapixel: Assembled and tested as a complete manufactured unit.

1. Image Sensor - 1/3" Progressive scan CMOS
2. Lens - 4mm
3. Day/Night Sensor - Automatic
4. Minimum Illumination/Light Sensitivity (lux) - 0.5 color, 0.1 black and white with dynamic capture, 1.1 color, 0.2 black and white with light finder
5. Maximum Resolution (pixels) - 1920x1080 (2MP)

6. Video Compression - H.264/MPEG4/M-JPEG
7. Frames per Second - 15
8. Intelligent Alarm
9. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP/RTSP, PPPoE, SMTP, NTP
10. Power - PoE
11. Outdoor Use - Outdoor Ready
12. Vandal Resistant – Yes
13. Mounting:
 - a. Indoor Ceiling Mount (Vandal Proof)
 - b. Wall Mount (Vandal Proof)

G. Network Outdoor PTZ Camera HD/ 3Megapixel: Assembled and tested as a complete manufactured unit.

1. Image Sensor - 1/3" Progressive scan CMOS
2. Lens - 2.7-9mm Motorized Verifocal
3. Day/Night Sensor - Auto
4. Minimum Illumination/Light Sensitivity: 0.05LUX at (F1.6, on color), 0.01LUX at (F1.6, on black and white)
5. Maximum Resolution (pixels) - 2048x12536 (3MP)
6. Video Compression - H.264/MPEG4/M-JPEG
7. Frames per Second min– 30
8. Alarm Inputs/Outputs – 7/2
9. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP/RTSP, PPPoE, SMTP, NTP
10. Power - PoE or DC Input
11. Vandal Resistant - Yes
12. PTZ Function: 360deg. Endless pan range and -20deg to 90der. Tilt range
13. 20M IR LED
14. Mounting:
 - a. Indoor Ceiling Mount (Vandal Proof)
 - b. Wall Mount (Vandal Proof)

H. Network Indoor Dome Camera (360deg. or fish eye lens), HD/2Megapixel: Assembled and tested as a complete manufactured unit.

1. Image Sensor – 1/1.8" Progressive scan CMOS
2. Lens – 1.27mm, F2.8 angle of view 180 deg. (wall mount) 360 deg. (ceiling mount).
3. Day/Night Sensor - Auto
4. Minimum Illumination/Light Sensitivity: 0.05 LUX at (F1.2, AGC on color), 03 LUX at (F2.8, AGC on color), 0.0 LUX black and white
5. Maximum Resolution - 3072x2048
6. Video Compression - H.264/MPEG4/M-JPEG
7. Frames per Second - 50
8. Network Protocol - TCP/IP, HTTP, DHCP, DNS, DDNS, RTP/RTSP, PPPoE, SMTP, NTP
9. Power - PoE or DC Input
10. Vandal Resistant - Yes
11. Mounting:
 - a. Indoor Ceiling Mount (Vandal Proof)
 - b. Wall Mount (Vandal Proof)

2.4 VIDEO DECODERS

A.

1. Network - IPv4 or IPv6
2. Power - PoE, DC
3. Monitor Support - Up to 2 DVI or Analog
4. Network Configurable
5. Camera Viewing capability only, no control

2.5 POWER SUPPLIES

- A. Low-voltage power supplies matched for voltage and current requirements of cameras and accessories, and of type as recommended by manufacturer of camera and lens.

B.

1. Enclosure: NEMA 250, Type 3.
2. Input - 115VAC
3. Output - 16 fuse protected outputs:
 - a. 12VDC or 24VDC
 - b. 4A total continuous supply
 - c. 3.5A rated outputs
4. Temperature Operating Range - 0 to 49 C
5. Input/Output LED Indicators
6. On/Off Switch
7. Locking Enclosure

2.6 CAMERA-SUPPORTING EQUIPMENT

- A. Manufacturers: Subject to compliance with requirements of:

1. Genetec

- B. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.

- C. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.

- D. Protective Housings for Fixed Cameras: Steel enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed.
1. Tamper switch on access cover sounds an alarm signal when unit is opened or partially disassembled. Central-control unit shall identify tamper alarms and indicate location in alarm display.
 2. Camera Viewing Window: Polycarbonate window, aligned with camera lens.
 3. Duplex Receptacle: Internally mounted.
 4. Alignment Provisions: Camera mounting shall provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
 5. Built-in, thermostat-activated heater units. Units shall be automatically controlled so the environmental limits of the camera equipment are not exceeded.
 6. Sun shield shall not interfere with normal airflow around the housing.
 7. Mounting bracket and hardware for wall or ceiling mounting of the housing. Bracket shall be of same material as the housing; mounting hardware shall be stainless steel.
 8. Finish: Housing and mounting bracket shall be factory finished using manufacturer's standard finishing process suitable for the environment.

2.7 MONITORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. NEC Display (security monitor not TV)
 2. Samsung (security monitor not TV)
 3. Sharp (security monitor not TV)
 4. LG (security monitor not TV)
 5. TATUNG (security monitor not TV)
- B. Monitors shall be sized per the drawings. If size is not specified, the size shall be 26" to 32" minimum.
- C. Monitors shall be mounted within a see through vandal proof enclosure. Vandal proof enclosure shall be lockable and wall mountable.

2.8 NETWORK VIDEO RECORDERS/VIDEO SERVERS

- A. Manufacturers: Subject to compliance with requirements, provide products:
1. Genetec
- B. Internal 12 TB min hard disk.

1. Contractor shall provide storage calculations based on quantity of cameras and recording parameters, 40TB shall be the minimum size NVR acceptable, contractor shall increase size based on number of cameras maintaining 20% spare capacity for recording and expansion.
2. Video and audio recording over TCP/IP network.
3. Video recording of MPEG-2 and MPEG-4 streams.
4. Video recording up to 48 Mbps for internal storage and up to 100 Mbps for external storage.
5. Duplex Operation: Simultaneous recording and playback.
6. Continuous and alarm-based recording.
7. Full-Featured Search Capabilities: Search based on camera, time, or date.
8. Automatic data replenishment to ensure recording even if network is down.
9. Digital certification by watermarking.
10. Internal RAID storage of up to 40 TB.
11. Full integration with LAN, Intranet, or Internet through standard Web browser or video management software, see next section.
12. Integrated Web server FTP server functionality.
13. Network video recording/storage devices shall be sized to store video at 2MP for 30 days with 20% capacity remaining, 30 fps, record on motion. Multiple storage devices shall be required as necessary. At a minimum, one storage device per facility will be required.

C. Minimum Device Requirements:

1. OS Windows 10 Enterprise LTSC.
2. Intel Core i5-8500 3.00GHz
3. RAM 16 GB DDR4
4. Onboard 1GB Network adapter

D. Each NVR shall be supplied with a keyboard and mouse for IP camera control at the viewing station. The Keyboard shall be connected directly to the NVR. The keyboard shall allow user login, display selection, monitor configuration and camera control.

E. Contractor shall configure all new cameras for each building or each specified location for viewing, recording and playback on the NVR. Each NVR setup will be unique and configuration will be determined by the Department of Public Property. Contractor shall submit NVR and recording setup and configuration of cameras for review and approval.

F. NVR shall be mounted with a vandal proof enclosure. Vandal Proof enclosure shall be lockable and mountable.

2.9 POWER OVER ETHERNET (POE) POWER INJECTORS

A. Minimum Device Requirements:

1. Ports - 16 (min.) actual device quantities on drawings, use 24 port if necessary.
2. Power Input - 115VAC.
3. Max Power - 30W per port, Total Power 300W.
4. 19" Rack Mountable

2.10 MOSQUITO TYPE SONIC SECURITY DEVICES

- A. Mosquito Sonic Devices Model Number–MK 4 with Multi-Age as manufactured by Moving Sound Technologies, or PPR approved equal.
- B. Devices shall be secured with Standard Security Cage as manufactured by Moving Sound Technologies, or PPR approved equal.
- C. Devices shall be connected to existing electrical panel and circuited through a new time clock. Electromechanical timer model number Tork 7200 or PPR approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN, WAN, and IP network before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING

- A. Comply with requirements in Division 26 – Raceways and Boxes for Electrical Systems. If Division 26 is not provided, install wiring per below.
- B. Wiring Method: Install cables in raceways unless otherwise indicated.
 - 1. Except raceways are not required in accessible indoor ceiling spaces and attics.
 - 2. Except raceways are not required in hollow gypsum board partitions.
 - 3. Conceal raceways and wiring except in unfinished spaces.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. For LAN connection and fiber-optic and copper communication wiring, comply with Section 271500-1.4 "Horizontal Cabling Description."
- F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras and infrared illuminators level and plumb.
- B. Install cameras with an 84-inch minimum clear space below cameras and their mountings to the finished floor or grade. Change type of mounting to achieve required clearance. For exterior camera mount cameras on building exteriors or steel poles to match exterior lighting system poles.
- C. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.
- D. Install power supplies and other auxiliary components at control stations unless otherwise indicated.
- E. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.
- F. Avoid ground loops by making ground connections only at the control station.
 - 1. For 12- and 24-V dc cameras, connect the coaxial cable shields only at the monitor end.
- G. Identify system components, wiring, cabling, and terminals.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections:
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pre-testing: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list described in "Informational Submittals" Article.
 - b. Verify operation of auto-iris lenses.
 - c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.

- d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet (17 to 23 m) away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
 - e. Set and name all preset positions; consult Owner's personnel.
 - f. Set sensitivity of motion detection.
 - g. Connect and verify responses to alarms.
 - h. Verify operation of control-station equipment.
- 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
 - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
 - 5. Video surveillance system will be considered defective if it does not pass tests and inspections.
 - 6. Prepare test and inspection reports and submit to PPR for review.

3.5 LABELING OF CAMERA DEVICES AND CONTROL SYSTEMS

- A. Contractor to provide a recommended Labeling System to Project Coordinator prior to camera installation.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits for this purpose at 6 months and 12 months. Tasks shall include, but are not limited to, the following:
 - 1. Check cable connections.
 - 2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
 - 3. Adjust all preset positions; consult Owner's personnel.
 - 4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
 - 5. Provide a written report of adjustments and recommendations.
 - 6. Cleaning per Section 3.7

3.7 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.

- B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.8 DEMONSTRATION/TRAINING

- A. Provide a minimum of 8 hours of training to Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION

SECTION 283111 – DIGITAL ADDRESSABLE FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes the design and provision of a new, complete, multiplex/addressable fire alarm system as described herein and on the Contract Drawings. The system shall include all wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, alarm, and supervisory signal initiating devices, alarm notification appliances, and all other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described. The system layout on the drawings is generic. A single fire alarm control panel is indicated. The Fire Alarm System shall include a Digital Communicator Transmitter that uses a dialer transmission format that is able to be read by the Digital Alarm Communicator Receiver in the Keltron DR703Le Fire Alarm Receiver Equipment (feeding the Keltron LS7000 Graphical Automation System) in the City of Philadelphia's Central Radio Room via two dedicated telephone lines and can transmit alarm signals via radio signal to cellular telephone network to a remote central station fire alarm receiving equipment at a PPR approved fire alarm monitoring service.
- B. Extent of the Work: The system shall be installed in accordance with the drawings, specifications and referenced publications.
- C. Existing Fire Alarm Equipment: Existing fire alarm equipment shall be maintained fully operational until the new equipment has been tested and accepted by the Owner. As new equipment is installed, it shall be labeled "NOT IN SERVICE" until the new equipment is accepted. Once the new system is completed, tested, and accepted by the Owner it shall be placed in service and connected to a UL listed central station service. All new equipment shall have tags removed and the existing equipment shall be tagged "NOT IN SERVICE" until removed from the building.
- D. Equipment Removal: After acceptance of the new system by the Owner, all existing equipment not connected to the new system shall be removed and all damaged surfaces shall be restored. The material shall be removed from the site and disposed of by the Contractor.
- E. Repair Service/Replacement Parts: Repair services and replacement parts for the system shall be furnished under this contract and be available for a period of 10 years after the date of final acceptance of this work by the Owner. On-site service during the guarantee period shall be provided within 24 hours after notification. All repairs shall be completed within 48 hours after notification.
- F. Section Includes:
 - 1. Fire-alarm control unit
 - 2. Manual fire-alarm boxes
 - 3. System smoke detectors (photo-electric and beam type)

4. Combination System Smoke and Carbon Monoxide Detector
5. Heat detectors
6. Notification appliances
7. Remote annunciator
8. Addressable interface device
9. Digital alarm communicator transmitter

1.3 REFERENCES AND REQUIREMENTS OF REGULATORY AGENCIES AND STANDARDS

- A. Codes and Standards: The fire alarm equipment and installation shall conform to the requirements of all applicable codes, rules, regulations and standards being enforced by agencies having jurisdiction. Codes, rules, regulations, and standards shall be latest version to date or version being enforced by the local approving agencies or code official(s), including, but not limited to, the following:

1. International Code Council (ICC)
 - a. International Building Code
 - b. International Fire Code
 - c. International Mechanical Code
2. National Fire Protection Association (NFPA)
 - a. NFPA 13 – Standard for the Installation of Sprinkler Systems
 - b. NFPA 70 – National Electrical Code
 - c. NFPA 72 – National Fire Alarm Code
 - d. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems
 - e. NFPA 720 – Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment
3. FM Global/Factory Mutual (FM)
 - a. Factory Mutual Approval Guide
4. Underwriters Laboratories (UL)
 - a. UL 38 – Standard for Manual Signaling Boxes for Fire Alarm Systems
 - b. UL 268 – Smoke Detectors for Fire Alarm Systems
 - c. UL268A – Standard for Smoke Detectors for Duct Application
 - d. UL 464 – Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
 - e. UL 486A/B – Wire Connectors
 - f. UL 521 – Standard for Heat Detectors for Fire Protective Signaling Systems
 - g. UL 864 – Standard for Control Units and Accessories for Fire Alarm Systems
 - h. UL 1449 – Standard for Surge Protective Devices
 - i. UL 1971 – Standard for Signaling Devices for the Hearing Impaired
 - j. UL 2034 – Standard for Single and Multiple Station Carbon Monoxide Alarms

- k. UL 2075 – Standard for Gas and Vapor Detectors and Sensors
 - l. UL Electrical Construction Equipment Directory
 - m. UL Fire Protection Equipment Directory
- 5. IEEE Standards Association (IEEE)
 - a. IEEE C62.41.1 – Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits
 - b. IEEE C62.41.2 – Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits
 - c. IEEE 1100 - IEEE Recommended Practice for Powering and Grounding Electronic Equipment
- 6. National Electrical Manufacturers Association (NEMA)
 - a. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
- 7. American National Standards Institute (ANSI)
 - a. ANSI S1.4: Specifications for Sound Level Meters
- 8. United States Department of Justice
 - a. Americans with Disabilities Act (ADA)
 - b. Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- 9. National Institute for Certification in Engineering Technologies (NICET)
 - a. Fire Alarm Systems Certification
 - b. Inspection & Testing of Fire Alarm Systems

1.4 DEFINITIONS

- A. Alarm Signal: A signal which indicates a state of emergency requiring immediate notification of the fire department and of the building occupants. These are signals such as the operation of a manual pull station or the activation of a smoke detector with alarm-verification feature.
- B. Class A Wiring: A circuit that is monitored for integrity such that a single break, a single wire-to-wire short, or a single loss of carrier condition will be indicated by a trouble signal on the FACP no matter where the break, short or loss of carrier condition occurs. This circuit will allow all functions of the affected circuit to remain operational in the event of a single open or single ground. In accordance with NFPA 72, this would be Style 6, Class A wiring for signaling line circuits, Style 7 Class A wiring for network circuits, and Class A wiring for Initiating Device Circuits and for Notification Appliance Circuits.
- C. Class B Wiring: A circuit that is monitored for integrity such that a single break, a single wire-to-wire short, or a single loss of carrier condition will be indicated by a trouble signal on the FACP no matter where the break, short or loss of carrier condition occurs, but which would prohibit devices beyond the fault, short or carrier loss from remaining operational. In accordance with NFPA 72, this would be Style 4, Class B wiring for signaling line circuits and Class B wiring for, initiating device circuits and notification appliance circuits.

- D. Fire Alarm Control Panel (FACP): A master control panel having the features of a fire alarm control unit and to which all fire alarm control units are interconnected. The panel has central processing, memory, input and output terminals, and video display units (VDUs).
- E. Initiating Device: A system component that originates transmission of a change of state condition, which initiates an appropriate response via the fire alarm system.
- F. Initiating Device Circuit: A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated.
- G. Interface Device: An addressable device which interconnects hard wired systems or devices to a multiplex system.
- H. Install: To set in position and connect or adjust for use.
- I. LED: Light-emitting diode.
- J. Manual Pull Station: A fire alarm box as indicated in NFPA 72.
- K. Monitor/Control Modules: Addressable fire alarm devices installed to provide supervised monitoring or control of accessory equipment.
- L. Multiplex System: A system in which multiple signals are transmitted via the same conduction path to a remote fire alarm control unit and fire alarm control panel, decoded and separated so that each signal will initiate the specified response.
- M. NICET: National Institute for Certification in Engineering Technologies.
- N. Notification Appliance Circuit: A circuit to which notification appliances are connected to visually and audibly indicate an alarm signal.
- O. NRTL: Nationally Recognized Testing Laboratory.
- P. Pathway Survivability
 - 1. Level 1. Pathway survivability Level 1 shall consist of pathways in buildings that are fully protected by an automatic sprinkler system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, with any interconnecting conductors, cables, or other physical pathways installed in metal raceways.
 - 2. Level 2. Pathway survivability Level 2 shall consist of one or more of the following:
 - a. 2-hour fire-rated circuit integrity (CI) cable
 - b. 2-hour fire-rated cable system [electrical circuit protective system(s)]
 - c. 2-hour fire-rated enclosure or protected area
 - d. 2-hour performance alternatives approved by the authority having jurisdiction
 - 3. Level 3. Pathway survivability Level 3 shall consist of pathways in buildings that are fully protected by an automatic sprinkler system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, and one or more of the following:
 - a. 2-hour fire rated circuit integrity (CI) cable
 - b. 2-hour fire rated cable system (electrical circuit protective system(s))

- c. 2-hour fire rated enclosure or protected area
 - d. 2-hour performance alternatives approved by the authority having jurisdiction
- Q. PPR: Philadelphia Department of Parks and Recreation
- R. Provide: To furnish and install the stated equipment or materials.
- S. Remote Fire Alarm Control Unit: A control panel, remote from the fire alarm control panel, that receives inputs from automatic and manual fire alarm devices; may supply power to detection devices and interface devices; may provide transfer of power to the notification appliances; may provide transfer of condition to relays or devices connected to the control unit; and reports to and receives signals from the fire alarm control panel.
- T. Signaling Line Circuit: A circuit to which any combination of circuit interfaces, control units, or transmitters are connected and over which multiple system input signals or output signals, or both, are carried.
- U. Supervisory Signal: A signal which indicates the impairment of a fire protection system which may prevent its normal use. These are signals from switches, such as a tamper switch, a fire pump phase reversal switch, or a fire pump loss of phase switch.
- V. Tamper Switch: A valve monitor switch as indicated in NFPA 72.
- W. Terminal Cabinet: A steel cabinet with locking, hinge-mounted door in which terminal strips are securely mounted. Minimum size is 200 mm x 200 mm (8 inch x 8 inch).
- X. Trouble Signal: A signal which indicates that a fault, such as an open circuit or ground, has occurred in the fire alarm system or in a separate subsystem, whose control panel is monitored by the fire alarm system.

1.5 SYSTEM DESCRIPTION

- A. General: System shall be a complete, supervised, noncoded, addressable system fire alarm system with multiplexed signal transmission dedicated to fire alarm service only. System shall conform to NFPA 72. System shall have automatic sensitivity control of certain smoke detectors. The system shall have Style 4 Class B circuits for each floor. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal. The system shall provide the following functions and operating features:
- 1. The FACP and fire alarm control units shall provide power, annunciation, supervision and control for the system.
 - 2. Provide Class B initiating device circuits.
 - 3. Provide Style 4 Class B signaling line circuits for each floor.
 - 4. Provide Class B notification appliance circuits.
 - 5. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.

6. Provide an audible and visual trouble signal to activate upon a single break or open condition, or ground fault which prevents the required operation of the system. The trouble signal shall also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory panel modules. Provide a trouble alarm silence feature which will silence the audible trouble signal, without affecting the visual indicator. After the system returns to normal operating conditions, the trouble signal shall again sound until the trouble is acknowledged. A smoke detector in the process of being verified for the actual presence of smoke shall not initiate a trouble condition.
7. Provide a notification appliance silencing switch which, when activated, will cause the notification appliances to cease operating, but not affect the liquid crystal display or the automatic notification of the Fire Alarm receiver equipment in the City's Radio Room . This switch shall be overridden upon activation of a subsequent alarm.
8. Provide alarm verification capability for area smoke detectors.
9. Provide program capability via switches in a locked portion of the FACP to bypass the automatic notification appliance circuits, air handler shutdown, door release, features. Operation of this programming shall indicate this action on the FACP display and printer output.
10. All alarm, supervisory, or trouble signals shall be automatically transmitted to a UL listed central station.
11. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.
12. The system shall be capable of being programmed in the field. All programmed information shall be stored in nonvolatile memory.
13. The system shall be capable of operating, supervising, and/or monitoring both addressable and nonaddressable alarm and supervisory devices.
14. There shall be no limit, other than maximum system capacity, as to the number of addressable devices which may be in alarm simultaneously.
15. Where the fire alarm system is responsible for initiating an action in another emergency control device or system, such as an HVAC system, the addressable fire alarm relay shall be within 3 feet of the emergency control device.
16. An alarm signal shall automatically initiate the following functions:
 - a. Transmission of an alarm signal to fire alarm receiving equipment in the City's Central Radio Room.
 - b. Transmission of an alarm signal to remote central station fire alarm receiving equipment at a PPR approved fire alarm monitoring service via radio transmission over cellular telephone network.
 - c. Visual indication of the device operated on the fire alarm control panel (FACP). Indication on the graphic annunciator shall be by floor, zone or circuit, and type of device.
 - d. Continuous actuation of all alarm notification appliances.
 - e. Release of doors held open by electromagnetic devices.
 - f. Operation of a duct smoke detector shall shut down the appropriate air handler and/or smoke damper(s) in accordance with the International Mechanical Code and NFPA 90A

17. A supervisory signal shall automatically initiate the following functions:
 - a. Transmission of a supervisory signal to fire alarm receiving equipment in the City's Central Radio Room.
 - b. Transmission of a supervisory signal to remote central station fire alarm receiving equipment at a PPR approved fire alarm monitoring service via radio transmission over cellular telephone network.
 - c. Visual indication of the device operated on the fire alarm control panel (FACP),
18. A trouble condition shall automatically initiate the following functions:
 - a. Transmission of a trouble signal to fire alarm receiver equipment in the City's Central Radio Room.
 - b. Transmission of a trouble signal to remote central station fire alarm receiving equipment at a PPR approved fire alarm monitoring service via radio transmission over cellular telephone network.
 - c. Visual indication of the system trouble on the FACP.
19. The maximum permissible elapsed time between the actuation of an initiating device and its indication at the FACP shall be fifteen seconds.
20. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP shall not exceed 200 seconds.

1.6 SUBMITTALS

- A. General Submittal Requirements:
 1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
 2. The fire alarm equipment distributor shall submit, in accordance with Division 1 requirements, documentation as specified in the Quality Assurance portion of this Section. When the distributor intends to utilize the services of a manufacture-affiliated company in the system design, the distributor shall submit a letter of intent to do so, addressed to the Architect, which includes the name of the manufacturer-affiliated company, the names and qualifications of the NICET-certified employees of the company, and which describes the delegation of fire alarm system design responsibilities.
 3. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction.
 - d. Drawings and Calculations to be sealed by a registered Professional Engineer in Pennsylvania.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Provide point-to-point wiring diagrams showing the points of connection and terminals used for all electrical field connections in the system, including all interconnections between the equipment or systems which are supervised or controlled by the system. Diagrams shall show all connections from field devices to the FACP and remote fire alarm control units, initiating circuits, switches, relays and terminals. Provide isometric drawing showing device locations, terminal cabinet locations, and all circuit layouts for all floors. Submit shop drawings not smaller than 30 inches by 42 inches. Shop drawings shall be prepared on a Computer Aided Drafting (CAD) system.
3. Provide a complete description of the system operation.
4. Provide a complete list of devices, device addresses, and corresponding messages.
5. Include voltage drop calculations for notification appliance circuits.
6. Include battery-size calculations.
7. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
8. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
9. Include annotated catalog data showing manufacturer's name, model, voltage, and catalog numbers for all equipment and components. Where multiple configurations of equipment or options are available, indicate specific configuration being submitted.
10. Provide complete battery calculations for both the alarm and supervisory power requirements. Ampere hour requirements for each system component shall be submitted with the calculations.
11. Provide complete riser diagrams indicating the wiring sequence of all devices and their connections to the control equipment. Provide a color code schedule for the wiring.
12. Provide floor plans showing the location of all devices and equipment. Show locations for all conduit and for all junction boxes used for T-taps. Indicate conduit fill percentages on the plans.
13. Provide data on each circuit to indicate that there is at least 25% spare capacity for notification appliances, 25% spare capacity for initiating devices. Provide circuit numbers for audible devices and load calculations for each circuit.
14. Provide a schedule of initiating device addresses and indicating device zones and subzones.
15. Include submittal data for all wire, terminal cabinets, and raceways.
16. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

17. Working drawings shall indicate 24 VDC power circuits necessary for system functionality. System vendor shall verify the functionality and capacity of circuits.
- D. Qualification Data: For qualified Design, Installer.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. Provide bound copies of an operation and maintenance manual. The manual shall include an index, copies of all approved shop drawings and submittal materials updated to "As Built", and a complete parts list of all components. The manual shall also include a list of recommended spare parts. The spare parts list shall include, for each item, the manufacturer's name, the serial number of the part, an ordering number, if appropriate, and a physical and electrical description of the part. In addition to items specified in Division 01 "Operation and Maintenance Manuals," include the following:
1. Prepare and submit detailed CAD-based "As-Built" drawings. The drawings shall include complete plan view wiring diagrams showing connections between all devices and equipment, both factory and field wired, including, but not limited to, locations for all conduit and for all junction boxes used for T-taps. Indicate conduit fill percentages on the plans. All equipment in panels shall be shown in the as-built orientation. Include a riser diagram and drawings showing the as-built location and address or circuit number of all devices and equipment.
 2. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 3. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 4. Record copy of site-specific software.
 5. Matrix of Operations including all system inputs and outputs.
 6. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components
 - b. Frequency of inspection of installed components
 - c. Requirements and recommendations related to results of maintenance
 - d. Manufacturer's user training manuals
 7. Manufacturer's required maintenance related to system warranty requirements.
 8. Abbreviated operating instructions for mounting at fire-alarm control unit.
 9. Include an electronic copy of the programming on CD for use by the Owner.
- G. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
 2. Program Software Backup: On magnetic media or compact disk, complete with data files.

3. Device address list.

1.7 QUALITY ASSURANCE

A. Designer Qualifications:

1. The Fire Alarm System Designer shall be capable of field surveying, design, and preparation of submittals required as part of this specification and certified as a Registered Professional Engineer in the Commonwealth of Pennsylvania who is experienced in fire protection systems or an individual who is certified as a Level III or IV Technician by NICET in Fire Alarm Systems.
2. The Fire Alarm System Designer shall have a minimum of 5 years of experience in the preparation of fire alarm system design including shop drawings, battery and voltage drop calculations, field surveying, and shall be regularly engaged in the design of the type and complexity if system required or specified in the contract documents.

B. Installer Qualifications:

1. Installation shall be accomplished by a Contractor with a minimum of five years experience in the installation of fire alarm systems. Contractor shall show evidence of certification of at least one employee directly responsible for the work by the National Institute for Certification in Engineering Technologies (NICET) at Level II, III, or IV in the Fire Alarm Systems subfield of Fire Protection Engineering Technology. Any proposed installer who cannot show evidence of such qualifications may be rejected. The services of a technician provided and certified by the control equipment manufacturer shall be provided to supervise installation adjustments and tests of the system. Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

C. Distributor Qualifications:

1. The manufacturer's equipment distributor shall show evidence of certification by the manufacturer in the technical support of the system installed under this contract.
2. The distributor shall show evidence of certification of at least one employee by the National Institute for Certification in Engineering Technologies (NICET) at Level III or IV in the Fire Alarm Systems subfield of Fire Protection Engineering Technology. At a minimum, training and experience shall consist of five years of progressive experience in the installation and design of fire alarm systems of similar size and complexity to that specified herein

D. Manufacturer Qualifications:

1. Testing Services or Laboratories: Construct all fire alarm and fire detection equipment in accordance with the latest edition of the following publications from Underwriters Laboratories (UL) and Factory Mutual Engineering Corporation (FM):
 - a. UL Fire Protection Equipment Directory.
 - b. UL Electrical Construction Materials Directory.
 - c. UL 464 - Audible Signal Appliances.
 - d. UL 864 - Control Units for Fire Protective Signaling Systems.
 - e. UL 1971 - Signaling Devices for the Hearing Impaired.

f. Factory Mutual Approval Guide.

- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Owner no fewer than 3 days in advance of proposed interruption of fire-alarm service.
2. Do not proceed with interruption of fire-alarm service without Owner's written permission.

1.9 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.10 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.11 APPROVALS

- A. Any deviations from this specification shall be approved in writing by the Philadelphia Department of Parks and Recreation prior to design, bidding, or installation, whichever occurs first.

1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Silent Knight Alarm System by Honeywell, Models 6820 (Larger Installations) or 6808 (Smaller Installations), or comparable non-proprietary product approved by the design professional and by PPR by one of the following:
 - 1. Silent Knight Alarms (non-proprietary); a Honeywell company
 - 2. Fire Lite Alarms (non-proprietary); a Honeywell company

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 - 1. Manual stations
 - 2. Heat detectors
 - 3. Smoke detectors
 - 4. Beam smoke detectors
 - 5. Verified automatic alarm operation of smoke detectors (alarm verification feature)
 - 6. Carbon monoxide detectors
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances.
 - 2. Identify alarm at fire-alarm control unit and remote annunciators.
 - 3. Transmit an alarm signal to the remote alarm receiving station.
 - 4. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 - 5. Recall elevators to primary or alternate recall floors.
 - 6. Activate emergency lighting control.
 - 7. Record events in the system memory.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
 - 1. Open circuits, shorts, and grounds in designated circuits.

2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal ac voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Loss of communication of any panel.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

2.3 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by a Nationally Recognized Testing Laboratory (NRTL).
 2. Addressable initiation devices that communicate device identity and status.
 - a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at fire-alarm control unit.
 - b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
 3. Addressable control circuits for operation of mechanical equipment.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 4 lines of 20 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- C. Circuits:
1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class B.
 - a. Initiating Device Circuits: Class B
 - b. Notification Appliance Circuits : Class B
 - c. Signaling Line Circuits: Style 4 Class B
 - d. Each circuit shall be provided with 20% spare capacity

D. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
3. Record events by the system printer.
4. Sound general alarm if the alarm is verified.
5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

E. Notification Appliance Circuit: Fire Alarm Signal Operation shall sound as follows:

1. The alarm signal shall be a square wave or provide equivalent awakening ability.
2. The wave shall have a fundamental frequency of $520\text{Hz} \pm 10$ percent.
3. CO detection shall operate a Temporal 4 pattern.

F. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

G. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

H. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals digital alarm communicator transmitters shall be powered by 24-V dc source. Provide and install a dedicated fused safety switch for power service connection to new fire alarm system. Switch box to be red and labeled "FIRE ALARM CIRCUIT CONTROL."

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

I. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch. Provide the battery powered secondary power system with sufficient capacity to operate the complete alarm system in normal or supervisory (nonalarm) mode for a period of 24 72 hours. Following this period of operation on battery power, the batteries shall have sufficient capacity to operate the system during a fire or other emergency condition for a period of 5 minutes.

1. Batteries: Sealed, valve-regulated, recombinant lead acid.

J. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 2. Station Reset: Key- or wrench-operated switch.
 3. Stations shall be supplied with screw terminals for making connections.

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-V dc, nominal.
 2. Comply with UL2034, Standard for Single and Multiple Station Carbon Monoxide Alarms.
 3. Detectors shall be two-wire type.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 7. Detectors shall have alarm verification capability and environmental compensation feature.
 8. Smoke detectors shall be listed for use with the fire alarm control panel.
 9. Provide self-restoring type detectors which do not require any readjustment after actuation to restore it to normal operation.
 10. All detectors shall have an insect screen and, as required, one set of auxiliary contacts, one each normally open and normally closed (Form "C").
 11. Base to include integral audible sounding device capable of Temporal 4 code and 520 Hz square Fire Alarm "waking" compliant square wave.
 12. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15

- deg F per minute.
- b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 deg F (57 deg C) for general building spaces and 194 deg F (90 deg C) for boiler rooms.
- c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting. Detector sensitivity to be between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status
 - b. Device type
 - c. Present average value
 - d. Present sensitivity selected
 - e. Sensor range (normal, dirty, etc.)

C. Single-Ended Reflected Beam Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting per the manufacturer's recommendations based upon the location, spacing, and length of beam per the applicable UL listing.
2. Comply with UL268A.
3. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status
 - b. Device type
 - c. Present average value
 - d. Present sensitivity selected
 - e. Sensor range (normal, dirty, etc.)

D. Carbon Monoxide Detectors

1. General: Carbon monoxide detector listed for connection to fire-alarm system.
 - a. Mounting: Adapter plate for outlet box mounting.
 - b. Testable by introduction test carbon monoxide into the sensing cell.
 - c. Detector shall provide alarm contact and trouble contacts.
 - d. Detector shall send trouble alarm when nearing end-of-life, power supply problems or internal faults.
 - e. Comply with UL 2075.
 - f. Locate, mount, and wire according to manufacturer's written instructions.
 - g. Provide means for addressable connection to fire-alarm system.
 - h. Test button simulates an alarm condition.

E. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status
 - b. Device type
 - c. Present average value
 - d. Present sensitivity selected
 - e. Sensor range (normal, dirty, etc.)
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Duct smoke detectors shall be furnished, wired and programmed by the Division 28 contractor and installed by the Division 23 contractor. The Division 28 contractor shall coordinate sampling tube sizes and locations with Division 23.
5. Each sensor shall have multiple levels of detection sensitivity.
6. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
7. All duct smoke detectors located above finished ceilings or otherwise hidden from view shall be furnished with remote alarm indicator lamps, identification nameplates, and test stations.
8. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) for general building spaces or 194 deg F (90 deg C) for boiler rooms or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.7 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism

behind a grille. Comply with UL 464. Horns shall produce a sound- pressure level of 90 dBA, measured 10 feet from the horn, using:

1. The alarm signal shall be a square wave or provide equivalent awakening ability.
 2. The wave shall have a fundamental frequency of 520 Hz \pm 10 percent.
- C. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch high letters on the lens.
1. Rated Light Output: field selectable to 15/30/75/110 cd, Set as shown on drawings.
 2. Mounting: ceiling mounted unless otherwise indicated.
 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 4. Flashing shall be in a temporal pattern, synchronized with other units.
 5. Strobe Leads: Factory connected to screw terminals.
 6. Mounting Faceplate: Factory finished, red.
 7. Field selectable wattage taps from ¼ to 2 watts. Setting determined by contractor's final certification / test.
 8. Mounting: Flush
 9. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.8 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Surface cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.9 ADDRESSABLE INTERFACE DEVICE

- A. Monitor Module Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts. Addressable monitor module shall provide an individual address for each device below using a supervised Class B circuit:
1. Each nonaddressable initiating device

- B. Control Module Description: Addressable control module shall provide normally-open, normally-closed Form C contacts for auxiliary control purposes. Integral Relay: Capable of providing a direct signal to circuit-breaker shunt trip for power shutdown. All activation and power circuits required shall be provided from the fire alarm system for the following:

2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station at the City's Central Radio Room. Unit shall also receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically transmit radio signals via cellular telephone network for a remote central station at a PPR approved fire alarm monitoring service. When contact is made with central station(s), signals shall be transmitted. If service on either line or radio signal is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line or radio signal to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines or radio signal, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
 - 1. Verification that both telephone lines are available.
 - 2. Programming device.
 - 3. LED display.
 - 4. Manual test report function and manual transmission clear indication.
 - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
 - 1. Address of the alarm-initiating device.
 - 2. Address of the supervisory signal.
 - 3. Address of the trouble-initiating device.
 - 4. Loss of ac supply or loss of power.
 - 5. Low battery.
 - 6. Abnormal test signal.
 - 7. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

- G. A ¾ inch conduit with the required conductors shall be extended from the dialer to the nearest telephone terminal board. The telephone company shall provide and install interface terminal block. Electrical Contractor shall terminate conductors on one side of this terminal block as directed by the telephone company. The Owner shall contract with the telephone company for a private line for the dialer.

2.11 SURGE SUPPRESSION

- A. Provide line voltage and low voltage surge suppression devices to suppress all voltage transients which might damage the control panel and transmitter components. Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL listed or FM approved for mounting inside the control panel and transmitter provided and approved for such use by the control panel and transmitter manufacturer[s].
 - 1. Line Voltage Surge Suppressor shall be UL 1449 listed with a maximum 330 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall also meet IEEE C62.41.1 and IEEE C62.41.2 category B tests for surge capacity. Suppressor shall be a multi-stage construction which includes inductors and silicon avalanche zener diodes. Suppressor shall have a long-life indicating lamp (light emitting diode or neon lamp) which extinguishes upon failure of protection components. Fuses shall be externally accessible. Wire in series with the incoming power source to the protected equipment using screw terminations.
 - 2. Low Voltage Surge Suppressor shall be provided for all circuits which leave the building shell and as shown on the contract drawings. When circuits interconnect two or more buildings, provide an arrestor at the circuit entrance to each building. Suppressor shall be UL 497B listed with a maximum 30 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall have multi-stage construction and both differential/common mode protection.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, the plan drawings, specifications, manufacturer's recommendations, and all applicable codes for installation of fire-alarm equipment. All wiring shall be installed in compliance with NFPA 70, *National Electrical Code*®.
- B. Smoke- or Heat-Detector Spacing:
 - 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed 30 feet.
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A or Appendix B in NFPA 72.
 - 5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.

- 6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- 7. Detectors located on the ceiling shall be installed not less than 4 inches from a side wall to the near edge.
- C. Single-Ended Reflected Beam Smoke Detectors: Comply with NFPA 72 and manufacturer's recommendations for location, horizontal and vertical spacing, distance from ceilings, and clearances from obstructions such as walls, joists, beams, columns, ductwork, etc.
- D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- E. Remote Status and Alarm Indicators: Install near each smoke detector that is not readily visible from normal viewing position.
- F. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- G. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling.
- H. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- I. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
- J. Manual Pull Stations: Locate manual pull stations where shown on the drawings. Provide recessed back boxes in which the station operating mechanisms shall be mounted. Manual pull stations shall be comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- K. Annunciator: Install with top of panel not more than 72 inches above the finished floor.

3.2 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to activate emergency lighting control.
 - 2. Supervisory connections at valve supervisory switches.

3.3 FIELD WIRING

- A. Wire Nuts are not permitted. Multiple wires on a single terminal are prohibited.
- B. Signaling Line circuits, initiating device circuits, and notification appliance circuits shall be supervised in

accordance with the requirements of NFPA 72.

- C. Provide wiring within cabinets installed parallel with or at right angles to the sides and back of the enclosure. All conductors which are terminated, spliced, or otherwise interrupted in any enclosure associated with the fire alarm system shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with either crimp-on terminal spade lugs or with pressure type terminal blocks.
- D. Provide a terminal cabinet where any circuit tap is made.
- E. For alarm and supervisory initiating device circuit and alarm indicating circuit wiring for the low voltage portion of the fire alarm system, provide all wiring as recommended by the equipment manufacturer. Provide wiring operating at 120 VAC as minimum No. 12 AWG solid copper having similar insulation.
- F. Conductors shall be run in conduit or EMT as a minimum.
- G. Signaling Line Circuits, Initiating Device Circuits and Notification Appliance Circuits:
 - 1. Power-Limited Circuits: For interior wiring (in raceways) use power-limited insulated multiconductor cable types except where a 2-hour fire rated cable assembly is required.
 - a. Number of conductors and conductor size as recommended by the Company producing the system, except that conductor size shall not be less than No. 18 AWG for signaling line circuits and not less than No. 16 AWG for initiating device circuits and notification appliance circuits.
 - b. Using Non-power-Limited Wiring On Power-Limited Circuits: Wiring size and types specified for NONPOWER-limited circuits may be used for power-limited circuits if power-limited circuits are reclassified and the power-limited markings are eliminated. Refer to NEC Article 760-52(a) Exception No. 3.
 - 2. Nonpower-Limited Circuits: For interior wiring (in raceways) use nonpower-limited insulated single conductors or multiconductor cable types .
 - a. Number of conductors and conductor size as recommended by the Company producing the system, except that conductor size shall not be less than No. 18 AWG for signaling line circuits, not less than No. 16 AWG for initiating device circuits, and not less than No. 14 AWG for notification appliance circuits.
- H. Distinctively color code all wiring differently from the normal building wiring. Audible alarm indicating devices shall be color coded differently from alarm initiating circuits. Use different colors for visual alarm indicating devices.
- I. Where the fire alarm system is responsible for initiating an action in another emergency control device or system, such as an HVAC system or elevator system, the addressable fire alarm interface module shall be within 10 feet of the emergency control device.
- J. Provide a terminal cabinet where any circuit tap is made.
- K. Provide wiring within cabinets installed parallel with or at right angles to the sides and back of the enclosure. All conductors which are terminated, spliced, or otherwise interrupted in any enclosure associated with the fire alarm system shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with either crimp-on terminal spade lugs or with pressure type terminal blocks.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 "Electrical (CCTV)".
- B. All junction boxes and conduits shall be sprayed red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.
- C. Install framed instructions in a location visible from fire-alarm control unit.
- D. Provide fire alarm circuit conductors with color coded insulation, or use color coded tape at each conductor termination and in each junction box and interface panel.
- E. Distinctively color code all wiring differently from the normal building wiring. Audible alarm notification appliance circuits shall be colored differently from signaling line circuits. Use different colors for visual alarm notification appliance circuits.

3.5 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by The Owner.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72. After final testing is complete provide a letter certifying that the installation is complete and fully operable. The letter shall include the names and titles of the witnesses to the preliminary tests. An authorized representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.
 7. Audibility tests shall be performed to verify compliance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). If the system does not meet the intended performance of the ADAAG, the fire alarm system distributor shall provide additional speakers and system expansion parts to accommodate them, as required to meet the required audibility levels.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
 - F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
 - G. Prepare test and inspection reports.
 - H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
 - I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
- B. Provide training session at all site(s) or facility(s) as part of the project.
- C. Training sessions shall cover all aspects of system performance, including system architecture, signaling line circuit configurations, sensor and other initiating device types, locations, and addresses, fire alarm control panel function key operation, and other functions as designated by the Owner.
- D. Comprehensive system troubleshooting training shall be provided for a single individual designated by the Owner. This session shall be separate and distinct from the above described sessions.
- E. All training sessions shall be conducted following final system certification.
- F. All training sessions shall be conducted by an authorized fire alarm system distributor representative.

3.8 SERVICE/MONITORING/INSPECTION/CERTIFICATION AGREEMENT

- A. Included in the bid price shall be a 3 year service and central station monitoring contract, effective upon final system acceptance, to provide all service required beyond the capability of the facility personnel. Contract shall include all service and repairs required and annual system testing and inspection in accordance with NFPA 72. Central station monitoring shall be 24 hours per day, 365 days per year. Contract shall also include annual inspections and preparation and filing of City of Philadelphia Department of Licenses + Inspections Annual Certification for Fire Alarm Systems (see attached form).

3.9 WARRANTY

- A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

END OF SECTION

Division 31 Outline Specifications – Earthwork

SECTION 310000 – GENERAL EARTHWORK REQUIREMENTS

1.1 General earthwork requirements shall conform to the following minimum standards:

- A. Provide positive drainage away from all structures.
- B. Unless otherwise noted, minimum slope shall be ¼ inch per foot or 2% and a maximum slope shall not exceed 3:1 (h:v) or 33% for non-paved surfaces. Paved surfaces shall have a minimum grade or 1% and have positive drainage off of the pavement.
- C. Grades on designated handicapped accessible areas/routes shall comply with the provisions of the Americans with Disabilities Act.
- D. Notify the PPR immediately if slope requirements cannot be met. At no time will slopes in excess of those above the maximum allowed, be accepted, unless prior approval is received in writing by PPR.
- E. Grade earthen, non-paved, surfaces to a smooth finish. Slope lawn areas in swales to a gentle crown along the centerline.
- F. Grade all seeded fine lawn areas flush with finish grade. Adjust finished grade to the proper depth where sod abuts paved areas.
- G. Grade all tree/shrub/groundcover planting beds to 3 inches below top of abutting curbs, paving, or lawn areas to allow for mulching.
- H. Adjust existing and new manhole, catch basins, and drains rim/grate elevations to new grade elevations (pavement or soil).
- I. Finished surfaces shall be graded smooth and even with no abrupt or awkward changes in grade.
- J. Provide properly compacted subgrades of native soil or approved fill. Native soils, fill, or subgrades deemed insufficient shall be removed and replaced with appropriate material. Subgrades shall be inspected by a qualified inspector to ensure compaction requirements are met. Submit test reports and field logs to PPR for review and for record.
- K. Existing on-site soils should be evaluated for both suitability for use in construction as well as environmentally for contaminants by licensed and qualified professionals such as geotechnical engineers and environmental scientists. Many sites throughout the City include various types of urban fill. In some cases there may be abandoned structures below grade. These soils and features should be evaluated before design and engineering newly planned features. Also, environmental due diligence and/or testing should be completed near the beginning of design and engineering to ascertain if on-site materials are clean or regulated. Testing of existing on-site soils and materials shall comply with the requirements of Pennsylvania Department of Environmental Protection requirements for fill management whether it is determined to be clean or regulated. Submit geotechnical testing and environmental due diligence reports to PPR for review and for record.
- L. Any soil materials leaving the site or being brought to the site shall comply with the Pennsylvania Department of Environmental Protection requirements for fill management.

- M. Environmental due diligence: investigative techniques, including, but not limited to, visual property inspections, electronic data base searches, review of property ownership, review of property use history, sanborn maps, environmental questionnaires, transaction screen, analytical testing, environmental assessments or audits. Submit all environmental due diligence reports to PPR for review and for record.
- N. Analytical testing is not a required part of due diligence unless visual inspection and/or review of the past land use of the property indicates that the fill may have been subjected to a spill or release of a regulated substance. If the fill may have been affected by a spill or release of a regulated substance, it must be tested to determine if it qualifies as clean fill. Testing should be performed in accordance with appendix a of PADEP's policy "management of fill".
- O. Fill material that does not qualify as clean fill is regulated fill. Regulated fill is waste and must be managed in accordance with the municipal or residual waste regulations in 25 pa code chapters 287 residual waste management or 271 municipal waste management, whichever is applicable.
- P. Designers and contractors shall comply with the Pennsylvania Underground Utility Line Protection Law, Act 287 of 1974, as amended by Act 50 of 2017. This includes contacting the Pennsylvania One Call System or 811 as required by law.
- Q. Designers and contractors, in addition to complying with the Pennsylvania Underground Utility Line Protection Law requirements shall research available utility records from the project owner for the site or facility. Upon evaluation of these records the designer or contractor can evaluate the need for extensive underground utility locating depending the project. The designer or contractor shall determine the need and level of underground utility located needed for the project in conformance with the American Society of Civil Engineers (ASCE) National Consensus Standard – ASCE C-I 38-02, Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data. The designer or contractor shall determine the Quality Level of utility located required by the project, Levels D, C, B, or A. The costs associated with underground utility locating services shall be evaluated and balanced with the available utility information, conditions in the field, the type of project being proposed, the risks associated with utility conflict and/or damage, and the ability of a utility locator to obtain information. These evaluations shall be done in consultation with Philadelphia Parks and Recreation.

Division 32 Exterior Improvements

Division 32 Outline Specifications

321216 Asphalt Paving
321313 Concrete Paving
321316 Decorative Concrete Paving
321813 Synthetic Grass Surfacing
321816 Playground Protective Surfacing
321823 Asphalt Athletic Court Color
Coating
323113 Chain-link Fencing and Gates
323119 Decorative Metal Fences and
Gates
319200 Turf Grass
329300 Landscape Planting
328400 Planting Irrigation
General Playground Design
General Aquatic Play Area /
Sprayground / Splash Pad Design
General Dog Park Design
General Drainage and Stormwater
Management Design
General Waste and Recycling Infrastructure
Details

Division 32 Outline Specifications – Exterior Improvements

SECTION 321216 – ASPHALT PAVING

- 1.1 Asphalt paving sections shall be designed to withstand the use and traffic conditions they will be subjected to as well as the local soil conditions the pavements will be placed upon.
- 1.2 Asphalt paving shall conform to the following minimum standards:
 - A. Walkways and Trails:
 1. Minimum Asphalt Thickness: 3.5 inches total thickness in two (2) layers/lifts:
 - a. Wearing Course: 1.5 inches thick PennDOT ID-2 Wearing meeting PennDOT Pub 408
 - b. Binder Course: 2 inches thick PennDOT ID-2 Binder meeting PennDOT Pub 408
 2. Minimum Stone Base: 6” compacted gravel base (PennDOT 2A modified or approved equal).
 3. Subgrade: Compacted and un-yielding to 95% minimum Standard Proctor ASTM D698
 - B. Drive Aisles and Parking Areas:
 1. Minimum Asphalt Thickness: 4 inches total thickness in two (2) layers/lifts:
 - a. Wearing Course: 1.5 inches thick PennDOT ID-2 Wearing meeting PennDOT Pub 408
 - b. Binder Course: 2.5 inches thick PennDOT ID-2 Binder meeting PennDOT Pub 408
 2. Minimum Stone Base: 6” compacted gravel base (PennDOT 2A modified or approved equal)
 3. Subgrade: Compacted and un-yielding to 95% minimum ASTM D698 Standard Proctor
 - C. Asphalt Sports Courts:
 1. Minimum Asphalt Thickness: 4 inches total thickness in two (2) layers/lifts:
 - a. Wearing Course: 1.5 inches thick PennDOT ID-2 ¼” gradation wearing meeting PennDOT Pub 408
 - b. Binder Course = 2.5 inches thick PennDOT ID-2 Binder meeting PennDOT Pub 408
 2. Minimum Stone Base: 6” compacted gravel base (PennDOT 2A modified or approved equal)
 3. Subgrade: Compacted and un-yielding to 95% minimum ASTM D698 Standard Proctor
 4. Aggregate: No larger than ¼”

- D. Porous/Pervious Asphalt: Porous/pervious asphalt paving is not approved for use unless otherwise approved Philadelphia Parks and Recreation.

SECTION 321313 – PLAIN CEMENT CONCRETE PAVING

1.1 Concrete paving shall conform to the following minimum standards:

- A. Minimum Strength: 4,000 psi at 28 days.
- B. Provide sealed/caulked expansion joints.
- C. Provide control joints at a spacing as required to prevent cracking within panels.
- D. Finish shall be non-slip broom type finish.
- E. Joints shall be tooled prior to broom finishing to eliminate “window pane” appearance. Sawcut joints are not preferred. If designer/contractor wishes to utilize sawcut joints prior approval shall be obtained from Philadelphia Parks and Recreation.
- F. Concrete paving shall conform to the following standards:
 - 1. ACI 117 – Specification for Tolerance for Concrete Construction and Materials
 - 2. ACI 318 – Building Code Requirements for Reinforced Concrete
 - 3. PennDOT 408 – Construction Specifications
 - 4. PennDOT RC-67M – Curb Ramp and Sidewalk Construction Details
- G. Concrete shall contain either a water-reducing, plasticizing admixture or a high-range water-reducing admixture. All concrete shall contain an air-entraining admixture to provide 5%-7% air entrainment. Maximum chloride content shall be 0.15%. Maximum water/cement ratio shall be 0.45. Maximum design slump of 3 inches without super plasticizers. Aggregate size shall be 3/4 of an inch with a designation of 4S per ASTM C33.
- H. Reinforcing: PPR prefers most pavements be unreinforced to facilitate future repairs and/or replacements. In some cases, reinforcing is required either by site conditions or by design requirements such as some sprayground elements require reinforcing. If reinforcing is provided it shall meet the following:
 - 1. Welded wire fabric shall be galvanized and comply with ASTM A185.
 - 2. Reinforcing steel bars shall be grade 60 per ASTM A615.

- I. Submit mix design to the owner's representative for approval. The owner's representative may reject design mix for non-compliance.
- J. Moist cure all concrete work and commence moist curing as soon as finishes will not be marred. Insulating blankets waterproofed kraft paper, or polyethylene film as per ASTM C171 shall be used to keep the concrete continuously moist during the curing process.
- K. Minimum Paving Thickness:
1. Pedestrian Walkways: Minimum 4 inches thick, no reinforcement, on 4 inches compacted crushed aggregate (PennDOT 2A Modified or 2B Clean Aggregate or AASHTO No. 57 Stone or equivalent).
 2. Vehicular and Access Drives: Minimum 6 inches thick on 6 inches compacted crushed aggregate (PennDOT 2A Modified or 2B Clean Aggregate or AASHTO No. 57 Stone or equivalent). Specification of reinforcement shall be evaluated based upon vehicular use. Thickness should be evaluated based on vehicle weights, axil loading, amount of usage, and local soil conditions and increased above the minimum if conditions warrant. Designer shall provide thickness.
 3. Driveway Aprons and Sidewalks within Rights of Way: Follow Department of Streets standards of construction.
 4. Spraygrounds: 6 inches thick on 6 inches of compacted crushed aggregate (PennDOT 2A Modified or 2B Clean Aggregate or equivalent). Reinforcement shall be per sprayground equipment manufacturer's recommendations/specifications. Thickening of slabs and or foundations for sprayground features shall be per sprayground equipment manufacturer's recommendations/specifications.
- L. Drainage: Pavements shall have positive drainage off of the surface. Provide a minimum cross pitch of 1.0% and a maximum cross pitch of 2.0%. Plaza and sprayground areas shall have maximum grades of 2.0% in any direction.
- M. Tolerances for Paving:
1. Pavements in longitudinal direction, the gap below a 10 ft unleveled straightedge resting on high spots shall not exceed 1/8 inch.
 2. Pavements in transverse direction, the gap below a 10 ft unleveled straightedge resting on high spots shall not exceed 1/4 inch.
 3. Ramps, sidewalks, and intersections, in any direction, the gap below a 10 ft unleveled straightedge resting on high spots shall not exceed 1/4 inch.
 4. In no case shall grades on any pavements either designated or intended to be accessible per the Americans with Disabilities Act (ADA) exceed the grade maximums noted in the ADA or ADA Accessibility Guidelines (ADAAG).

SECTION 321316 – DECORATIVE/COLORED CONCRETE PAVING

- 1.1 Decorative/colored concrete paving shall conform to the following minimum standards:
- A. Comply with the requirements and specifications as set forth in Section 321313 Plain Cement Concrete Paving.
 - B. Decorative/colored concrete paving use should be limited and not utilized extensively as it can be challenging to replace if it needs to be repaired or replaced.
 - C. Stamped and surface colored concrete paving is not preferred. If designer/contractor wishes to utilize stamped and surface colored concrete paving prior approval shall be obtained from Philadelphia Parks and Recreation.
 - D. If decorative/colored concrete is to be used it should be integrally colored with coloring agent(s) combined as an add mixture into the concrete mix prior to pouring. Color shall be through the entire slab thickness and not added on top.
 - E. Approved coloring agent manufacturers:
 - 1. Sika Scofield - 4155 Scofield Road, Douglasville, GA 30134, Phone: (800) 800-9900, Web: <http://www.scofield.com>
 - a. CHROMIX Admixture for color conditioned concrete
 - 2. Davis Colors - 3700 East Olympic Blvd., Los Angeles, CA 90023, Phone: (844) 341-4780, Web: www.daviscolors.com
 - a. MIX-READY Pigments
 - 3. Equal approved Philadelphia Parks and Recreation.
 - F. Approved Colors: Selected colors for decorative/colored concrete shall be from manufacturer's standard color lines. Custom or specialized colors are not preferred.
 - G. Colored concrete admixtures shall comply with ASTM C 979.
 - H. Installer Qualifications: Installer must have a minimum of 5 similar jobs completed and a minimum of 5 years prior experience installing decorative/colored concrete.

SECTION 321813 – SYNTHETIC TURF SURFACINGⁱ

Facility design considerations

1.1 Approved uses for Synthetic Turf Surfacing:

- a. Athletic Fields:
 - i. Soccer Fields
 - ii. Football Fields
 - iii. Baseball Fields
 - iv. Softball Fields
 - v. Lacrosse Fields
 - vi. Field Hockey Fields
 - vii. Or other approved athletic activities by PPR
- b. Other activities explicitly approved by PPR
- c. Dog Parks, only when explicitly approved by PPR.

1.2 Prohibited uses for Synthetic Turf Surfacing:

- a. Certain track and field activities are not permitted on turf – javelin, shot put, discus and any other activities that can pierce the turf field.

1.3 ADA accessibility

- a. Confirm that the chosen synthetic turf assembly is ADA accessible where necessary or appropriate.
- b. Consider accessible bathroom availability in facility design.

1.4 Maintenance Considerations

- a. Before specifying synthetic grass surfacing, careful consideration must be made as to on-going and long-term maintenance of the synthetic turf, particularly for athletic fields with high usage, and who will be doing the required maintenance. Many of the synthetic turf manufacturers base the application of their warranties on their specifications for maintenance.
- b. Maintenance and operation activities related to the synthetic turf field and any associated field elements (like netting, goals, lighting, etc.) must be to be done in close coordination with the project manager and approved by PPR. Maintenance trucks are not permitted to drive on top of the synthetic turf surface.
- c. Secure storage of Attic Stock for synthetic turf, synthetic turf lines, and infill must be considered during the design phase.

1.5 Stormwater Management

- a. Existing on-site soils and stormwater management must be accounted for in the design and installation of any synthetic turf application. Geotechnical studies must be conducted to assess soil construction requirements for a synthetic turf installation.

- b. It is preferred that underground stormwater management systems are NOT under turf fields.
- c. For installations requiring stormwater management, infiltration testing must be conducted during the design phase. The design team must confirm that a synthetic turf installation can occur on top of the designed stormwater system. Additionally, any stormwater management placed directly under the synthetic turf area shall have written approval from the manufacturer.

1.6 Fencing

- a. The perimeter of the synthetic fields should be surrounded by black chain link fence, 8' min. height.
- b. Separate gate access should be provided at appropriate locations for pedestrians and maintenance vehicles.
- c. Field Netting to block balls should be included in areas where a ball may breach the perimeter fence and cause damage to the surrounding area.

1.7 Landscape and planting

- a. Consider the location of existing trees when designing the synthetic turf field. New trees should not be planted near the perimeter of the turf field in order to ensure a clear player safety zone and reduced leaf fall.
- b. Natural grass and plantings should not be inside the perimeter fence.

1.8 Seating

- a. Player benches are to be permanently installed in-ground in the appropriate locations based on the sports being played. In instances where various sports overlap, portable player benches may be permitted, however, secure storage on site must be planned, as portable benches cannot remain on the field when not in use.
- b. Permanent spectator seating, primarily as bleachers, is to be ADA accessible.
- c. If bleachers are included, provide separate seating for each team's spectators.
- d. Outdoor spectator bleachers are to be three rows in height and be a steel frame with natural pine wood boards.
- e. Note that including bleachers may trigger other zoning or building code requirements.

1.9 Lighting

- a. Appropriate-height athletic field lighting is expected at synthetic turf fields; however, PPR may approve the project to move forward with installing conduit and light pole foundations only for future fielding lighting installs.

1.10 Field markings

- a. Design for permanent line striping / permanent field markings are to be done in close coordination with the project manager and approved by PPR. Temporary line striping is not

- permitted on synthetic turf fields.
- b. Logos on synthetic turf are not permitted, unless explicit written approval from PPR.
 - c. Line colors by sport:
 - i. Baseball - yellow
 - ii. Football - white
 - iii. Soccer - light blue
 - d. Do not use alternating panels with color or turf texture direction changes every 10 yards on football fields.
 - e. Infields:
 - i. Use brown turf to represent the infield dirt and green to represent the infield grass.
 - ii. Softball - fully brown infield
 - iii. Baseball – includes a green turf inner infield
 - iv. If necessary, baseball can be played on a solid brown softball infield, but this is not preferred

1.11 Accessory elements

- a. Hydration stations near turf fields are desired.
- b. Trash cans should be secured in-ground and the concrete foundations should be under the turf.
- c. Scoreboards - Synthetic turf fields should include conduit to allow for future installation of an outdoor scoreboard and should consider scoreboard foundation placement, if required.
- d. Baseball and softball fields should have bases included in the project
- e. Baseball fields should have a portable pitching mound.
- f. Not permitted without written approval from PPR:
 - i. Public Address (PA) System. If approved, ensure proper permitting is followed.
 - ii. Elevated press box / coaches box
- g. Other elements related to the use of the field may be required and should be designed in close coordination with the project manager and approved by PPR.

1.12 Signage

- a. Donor recognition may be permitted on scrims or other approved signage with written approval from PPR

Products

2.1 General

- a. Athletic fields are typically in-fill type synthetic turf systems with long pile height carpets infilled

with a natural infill material and appropriate underlayment. Crumb rubber or a crumb rubber and sand mixture are not permitted for infill. Selection of infill material and associated underlayment to occur in close coordination with the project manager and approved by PPR.

- b. Shorter pile height non-infill systems set on shock pads may be used for specific sports; however, selection of a turf system shall be done in close coordination with the project manager and approved by PPR.
- c. Dog parks are typically surfaced with synthetic turf specifically designed for use by animals, is a short pile height carpet, that is also resistant to urine, feces, and microbial growth. PPR only allows non-infill type systems for dog parks.
- d. Permanent and portable athletic goals are permitted, and combination goals are acceptable. Selection of goals and placement of the goals on the field, and secure storage on site (if necessary) are to be done in close coordination with the project manager and approved by PPR.

2.2 Synthetic grass surfacing shall conform to the following standards:

- a. Synthetic turf fields for athletic use are to follow regulation field sizes as outlined by the National Federation of State High School Associations (NFHS) in the “Court and Field Diagram Guide” document. If regulation size is not able to fit, an accompanying memo outlining the constraints and decision is to be included with design submissions.

2.3 Approved Synthetic Turf Manufacturers/Product for Athletic Fields:

- a. A-Turf, Inc. www.aturf.com
- b. AstroTurf – www.astroturf.com
- c. FieldTurf – www.fieldturf.com
- d. Shaw Sports Turf – www.shawsportsturf.com
- e. SPRINTURF www.sprinturf.com
- f. Equal approved by Philadelphia Parks and Recreation

2.4 Suggested Natural Infill Manufacturers/Products for Athletic Fields:

- a. A-Turf - Ecore A-R
- b. AstroTurf – Brockfill/Supernatural
- c. Field Turf - Pure Select Olive
- d. Motz – Envirofill,
- e. Shaw Sports Turf - Natural Play
- f. Sprinturf – Greenplay fill.
- g. Other natural infill recommended by manufacturers listed above
- h. Equal approved by Philadelphia Parks and Recreation

2.5 Approved Synthetic Turf Manufacturers/Products for Dog Parks:

- a. K9 Grass® by Forever Lawn – www.k9grass.com
- b. Equal approved by Philadelphia Parks and Recreation

2.6 Maintenance Equipment

- a. Turf maintenance equipment must be part of the project and includes a vehicle, groomer, and sweeper/magnet. Vehicles must be electric power and there needs to be a plan for storage and

charging of the equipment.

b. The Basis of Design Manufacturers and Products:

- i. Synthetic Sports Turf Utility Vehicle: John Deere, TE 4x2 Electric Utility Vehicle, 16.4 cu. ft. bed volume capacity.
- ii. Synthetic Sports Turf Groomer: Wiedenmann, Terra Clean 100
- iii. Synthetic Sports Turf Sweeper and Magnet: Wiedenmann, associated tow behind magnet that works with the Terra Clean 100
- iv. Or approved equivalents

2.7 Testing & Warranties

a. For sports fields, design must comply with current Head Injury Criterion (HIC) and GMAX impact testing and allow for compliance over the life of the field.

- i. Synthetic turf manufacturer and installer shall retain an independent certified testing firm, acceptable to the Owner to perform dynamic cushioning, G-Max testing of the synthetic turf playing field at project completion. The project will not be accepted for Substantial Completion until this test is passed.

b. PFAS Testing: Manufacturer shall provide laboratory analytical results for materials testing of per- and polyfluoroalkyl substances (PFAS) and PFAS precursors demonstrating compliance with the requirements.

- i. Turf Manufacturer shall provide a letter certifying that the materials used to package the turf do not contain PFAS.
- ii. PFAS Testing Report: Manufacturer shall conduct testing of turf to be installed immediately following manufacture, prior to packaging. This testing may occur up to 8 weeks prior to shipment or storage of materials scheduled for installation. The report shall contain the following:
 1. Solid samples must be collected using the equipment and procedures specified in USEPA Method 1633, Section 4, 5 and 6 for the collection and processing of solid samples (<https://www.epa.gov/system/files/documents/2024-01/method-1633-final-for-web-posting.pdf>).
 2. Testing of representative turf samples (minimum of three (3) samples) and equipment blanks using the Synthetic Precipitation Leaching Procedure (SPLP) with analysis for total PFAS in Water by USEPA Method 537 Modified and TOP Assay.
 3. Analytic results shall be provided in nanograms per liter (ng/L), which is equivalent to parts per trillion.
 4. Laboratory detection limits shall be less than the PADEP, Statewide Health Standards for residential groundwater and the USEPA Maximum Contaminant Levels (MCLs) for public drinking water.
 5. Samples shall be submitted for testing under standard chain of custody procedures.

6. The laboratory conducting the testing shall be accredited or certified to perform PFAS testing (e.g., TNI NELAC, ISO, DOD, DOE).
7. The City requires that the PFAS Testing Report indicate PFAS compounds are not present above analytical detection limits. In the event that EPA or PADEP regulatory standards are developed for synthetic turf, analytical results that meet those standards may be acceptable.
 - a. Any additional costs incurred due to the rejection of synthetic turf materials due to PFAS Testing Report results shall be the Contractor's responsibility.
- c. Warranty Period: Min eight (8) years after Date of Substantial Completion.

SECTION 321816 – PROTECTIVE PLAYGROUND SURFACING

1.1 Protective playground surfacing shall conform to the following minimum standards:

A. Protective playground surfacing shall meet or exceed the following standards (current version):

1. The Americans with Disabilities Act (ADA) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
2. ASTM F1951 – Determination of Accessibility of Surface Systems under and Around Playground Equipment.
3. U.S. Consumer Product Safety Commission – Public Playground Safety Handbook Publication No. 325.
4. ASTM F1292 – Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.
 - a. Impact attenuation of 200 G's or less from the actual fall height and test results shall meet or exceed HIC (Head Injury Criteria) test results shall be less than 1000 at this fall height. At initial installation surface shall be a minimum of 25% below required G's (150 or less) or HIC (750 or less) ratings to allow for compaction of the surface over time.
 - b. Installed playground area shall be impact/drop tested per the requirements of ASTM F1292 to show conformance with the G-Max and HIC criteria listed above. Per ASTM F1292 the impact/drop test shall be performed at the most adverse location on the playground. The impact/drop test shall be conducted by a Certified Playground Safety Inspector (CPSI) who will prepare a certification report of the results. If the surface fails to meet the stated criteria the surface shall be corrected/removed and reinstalled.
5. ASTM F2479 – Standard Guide for Specification, Purchase, Installation and Maintenance of Poured-In-Place Playground Surfacing.

6. ASTM F2223 – Standard Guide for ASTM Standards on Playground Surfacing.

B. Approved Types of Surfacing:

1. Poured-In-Place (PIP) Rubber Safety Surfacing:

- a. A two (2) layer surface system consisting of a Cushion Course and Surface/Wearing Course placed on a crushed aggregate or paved (asphalt or concrete).
- b. Cushion Course: A layer of SBR (Styrene Butadiene Rubber) recycled crumb rubber granules bound with a solvent free MDI polyurethane prepolymer binder. SBR recycled crumb rubber shall be free of contaminants and metals.
 - 1) All cushion course depths shall meet ASTM-F1487-11 for fall heights as dictated by the specified play and/or fitness equipment.
- c. Wearing Course: A layer of TPV (Thermoplastic Vulcanised) rubber granules (1-4mm size) bound with a solvent free MDI polyurethane prepolymer binder.

Thickness: ½ inch minimum. Thicken to ¾ inch under swings, ends of slides, play equipment entrances/exits, and areas where there will be increased foot traffic such as around spinning play equipment. Provide a ¼” minimum radius on edges when abutting concrete.
- d. MDI Polyurethane Prepolymer Binder: Binders shall be aliphatic. Aromatic binders shall only be used with the approval of Philadelphia Parks and Recreation. The following are approved binder manufacturers:
 - 1) VORAMER by DOW Chemical Company
 - 2) STOBIELAST by Stockmeier Urethanes USA, Inc.
 - 3) FLEXILON by Rosehill
 - 4) Equal approved Philadelphia Parks and Recreation.
- e. Base Requirements: Poured-In-Place (PIP) Rubber Safety Surfacing shall be installed on a stable and compacted crushed aggregate base or a paved (asphalt or concrete) base. The paved base may be existing pavement as long as it is in good condition.
 - 1) Compacted Crushed Aggregate Base: Minimum 6 inches thick of compacted crushed aggregate (PennDOT 2A modified, 2B Clean Aggregate, AASHTO No. 57 Stone, or equivalent) placed on a compacted un-yielding subgrade compacted to 95% minimum per ASTM D698 Standard Proctor.
 - 2) Asphalt Pavement Base (New): Minimum 3 inches thick ID-2 Binder Course placed on minimum 6 inches thick of compacted crushed aggregate (PennDOT 2A modified or equivalent) placed on a compacted un-yielding subgrade compacted to 95% minimum per ASTM D698 Standard Proctor.
 - 3) Concrete Pavement Base (New): Comply with Plain Cement Concrete Pedestrian Walkway

requirements.

- f. Poured-In-Place Surface Coloring: All poured-in-place safety surfacing shall be a mixture of a minimum of two (2) but not more than three (3) chip colors plus a 20% to 30% black colored chips.
- g. Designers can create colorful forms in colored safety surfacing; however intricate patterns with numerous joints are discouraged. Joints are encouraged to be broad and sweeping. Joints shall be back-cut and receive a heavy coat of polyurethane to ensure firm connection between colored areas and joints.

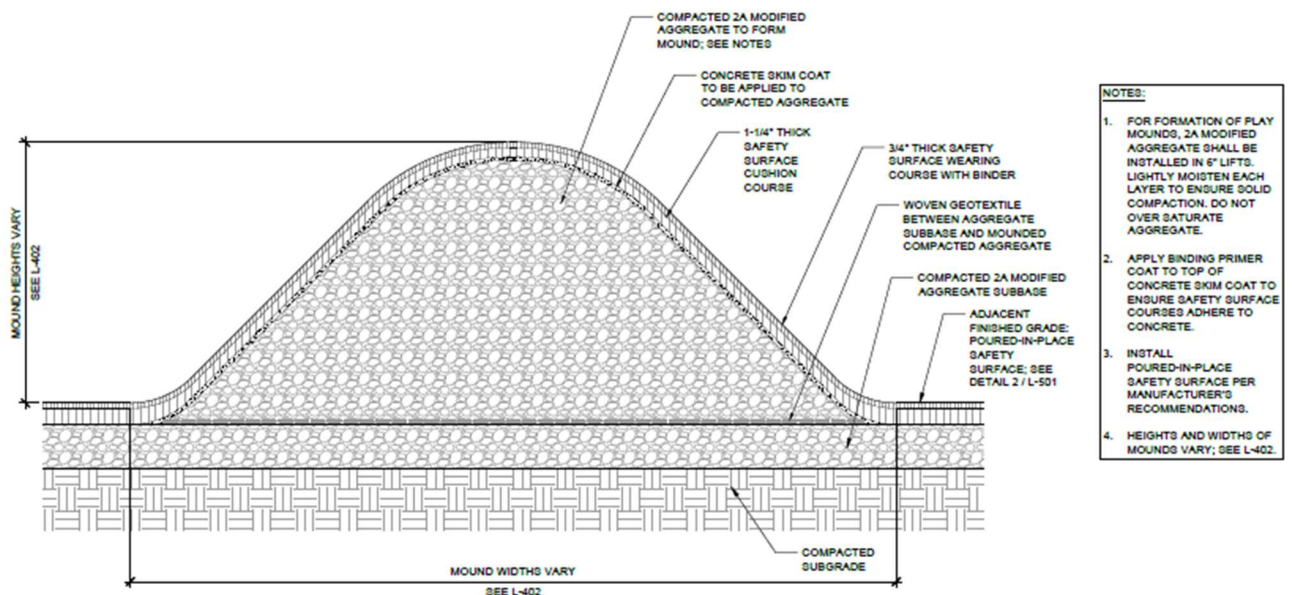
C. Approved Poured-In-Place (PIP) Rubber Safety Surfacing Manufacturers:

- 1. Safety Turf, Inc. – 201 N. 4th Ave., Royersford, PA 19468, Phone: (800) 804-4595, Web: www.safetyturf.com
- 2. Surface America, Inc. - 45 Earhart Drive, Suite 102-A, Williamsville, NY 14221, Phone: 716-632-8413 [Rubber Playground Surfacing | Surface America](#)
- 3. Equal approved Philadelphia Parks and Recreation.

D. Types of Surfacing not permitted:

- 1. Rubber tile systems.
- 2. Bonded rubber.
- 3. Engineered wood fiber.
- 4. Rubber mulch.
- 5. Sand.
- 6. Synthetic grass surfacing.

E. Safety Surface Mound Detail:



6 PLAY MOUND - TYPICAL

SCALE: NTS

SECTION 321823 ASPHALT ATHLETIC COURT COLOR COATING

1. MATERIALS

- a. Acrylic Patching System: Shall be court patch binder conforming to manufacturer's specifications.
- b. Crack Filler: Shall be a fortified acrylic type filler for use in fine cracks (less than 3/16" wide) conforming to manufacturer's specifications.
- c. Acrylic Resurfacer: Shall be a 100% acrylic emulsion binder conforming to manufacturer's specifications.
- d. Finish Coating: Shall be a reinforced acrylic finish coating conforming to manufacturer's specifications.

e. MANUFACTURERS

- i. California Products Corporation, Plexipave.
- ii. Approved equal.

2. EXECUTION

a. EXAMINATION

- i. Verify that existing paving surface is ready to receive work.
- ii. Beginning of colorcoating application means acceptance of existing conditions.

3. PREPARATION

a. Surface Preparation

- i. The asphalt paving surface shall be thoroughly cleaned, removing all loose dirt, oil, grease, leaves, and drippings and scrub with a detergent and water. Remove all traces of detergent.

b. Holes and Cracks

- i. Where asphalt paving surface cracks occur, they shall be milled to remove all asphalt humps, cleared of all debris, dirt, and vegetation, sprayed with an approved soil sterilant, and filled with court patch binder as recommended by colorcoating manufacturer. Hairline fissures will not be considered as surface cracks.
- ii. Where open joints or cracks occur (more than 3/8 inch wide and less than 1 inch wide), they shall be milled to remove all debris, dirt, and vegetation. Spray with an approved soil sterilant, backfill with crushed stone, and seal with bituminous paving.
- iii. Where open joints or cracks occur (1 inch wide or greater), they shall be milled to remove all debris, dirt, and vegetation. Spray with an approved soil sterilant, backfill with No. 8 coarse aggregate, and seal with 1 1/2" of bituminous paving

c. Depressions

- i. Depressions holding enough water to cover a five cent piece shall be filled with court patch binder patching mix, as recommended by the surface colorcoating manufacturer.

d. Curing

- i. New asphalt concrete surface should be allowed to cure a minimum of 10 to 14 days prior to application of colorcoating.
- ii. Do not apply colorcoating when ambient air temperature is less than 50 degrees F, nor during fog, rain, or other unsuitable conditions. Do not apply when surface temperature is below 40 degrees F or in excess of 140 degrees F.
- iii. Surfacing system shall be asbestos free.

4. APPLICATION

a. General

- i. All areas to be color coated shall be clean, free from sand, clay, grease, dust, salt, or other foreign matters. The Contractor shall obtain the Owner's approval, prior to applying any surface treatment. The storage of materials, mixing, and surface preparation shall be in accordance with the manufacturer's instructions.
- ii. The Contractor shall arrange for a representative of the surfacing material manufacturer to be present at the start of the work, to check installation conditions, and to instruct the applicators as to proper methods and procedures, and also as may be necessary during the course of the work, to insure a satisfactorily completed installation.
- iii. The application shall be done by thoroughly experienced and skillful workmen, in strict accordance with the manufacturer's instructions.

b. Filler Coat

- i. Filler coat (acrylic resurfacer) shall be applied to the clean underlying surface in one application to obtain a total quantity of not less than 15-20 yards per gallon based on the material prior to any dilution. Apply filler coat as recommended by the surface colorcoating manufacturer.
- ii. Allow filler coat to dry thoroughly. Scrape off all ridges and rough spots prior to any subsequent application of acrylic resurfacer or color surface system.

c. Finish Coating

- i. The Contractor shall apply two (2) coats of Fortified Plexipave reinforced acrylic finish coating.
- ii. Each finish coat shall be applied at a rate of 0.4 - 0.5 gallons per square yard. Allow each coat to dry thoroughly prior to any subsequent applications of color surface system.
- iii. Apply the second coat at a 90 degree angle to the previous coat.
- iv. The finished surface shall have a uniform appearance and be free of ridges and tool marks.
- v. Request on-site color mixing and establish mockup control sample to minimize variation across site.

d. PROTECTION

- e. Do not permit traffic over pavement for 24 hours.

SECTION 323113 – CHAIN-LINK FENCING AND GATES

1.1 Chain-Link Fencing shall conform to the following minimum standards:

A. General Site Fencing Standards (Chain-link):

1. Height: All chain-link fencing will either measure 6' tall (72") or 8' tall (96") in height from the finished grade, unless otherwise requested or approved by Philadelphia Parks and Recreation.
2. Gates: All gates are to match the height of the new fencing that they are linked to. Gate widths will either be 4' (48") for single man gates or 8' (96") for double man gates. Fabric will match the specifications of the new fence that it is linked to.
3. Fabric: All chain-link fabric will be vinyl coated and have a minimum weave of 2"x2" with 9GA tie wire, knuckled on both top and bottom. Cut ends of fence fabric shall be turned or knuckled over in the field to sharp wire ends are not exposed. Tie wires will be 24" on center, unless otherwise approved by Philadelphia Parks and Recreation. The color will be black, unless otherwise stated/approved by Philadelphia Parks and Recreation.
 - a. For fencing along the perimeter of athletic fields, baseball/softball fields, and sport courts that fabric shall be installed on the field or court side facing the field or court.
4. Posts: Minimum 2" (outside diameter) galvanized steel, painted black. Posts should have a maximum spacing of 8' (96") on center per section of chain-link fencing. All Terminal posts will have caps and tension bar. All line posts will have top and bottom connectors.
5. Rails: Minimum 1-5/8" (outside diameter) galvanized steel, painted black. The bottom rail will be a 2" from finished grade.
 - a. For chain-link fences taller than 6', a mid-rail shall be provided.
6. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.
7. Approved Manufacturers:
 - a. Northeast Fence and Iron Works – 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, Phone: (215) 335-1681, Web: <http://www.northeastfence.net/>
 - b. Stephens Pipe and Steel, LLC – 300 Streibeigh Lane, Montoursville, Pennsylvania 17754, Phone: (888) 275-1638, Web: <http://www.spsfence.com>

c. Master Halco – 3010 Lyndon B Johnson Freeway, Suite 800, Dallas, Texas 75234, Phone: (800) 883-8384, Web: www.masterhalco.com

d. Equal approved Philadelphia Parks and Recreation.

B. Dog Park Fencing Standards (Chain-link):

1. Height: The minimum height for all dog park enclosures is 72 inches (6 feet).
2. Gates: All gates are to match the height of the fence they are abutting. Gate widths will either be 4 feet (48 inches) wide for single man gates or 8 feet (96 inches) for double wide man gates. The fabric on the gate will match the specifications of the new fence they are linked to.
3. Fabric: All chain-link fabric will be coated vinyl with a maximum weave of 1"x1" for the safety of both dogs and pedestrians outside of the fenced in area. The color will be black, unless otherwise stated/approved by Philadelphia Parks and Recreation.
4. Posts: Minimum 2" (outside diameter) galvanized steel, painted black. Posts should have a maximum spacing of 8' (96") on center per section of chain-link fencing. All Terminal posts will have caps and tension bar. All line posts will have top and bottom connectors.
5. Rails: Minimum 1-5/8" (outside diameter) galvanized steel, painted black. The bottom rail will be a 2" from finished grade.
6. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.
7. Approved Manufacturers:
 - a. Northeast Fence and Iron Works – 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, Phone: (215) 335-1681, Web: <http://www.northeastfence.net/>
 - b. Stephens Pipe and Steel, LLC – 300 Streibeigh Lane, Montoursville, Pennsylvania 17754, Phone: (888) 275-1638, Web: <http://www.spsfence.com>
 - c. Master Halco – 3010 Lyndon B Johnson Freeway, Suite 800, Dallas, Texas 75234, Phone: (800) 883-8384, Web: www.masterhalco.com
- d. Equal approved Philadelphia Parks and Recreation.

SECTION 323119 – DECORATIVE METAL FENCING AND GATES

1.1 Decorative metal fencing will conform to the following standards:

A. General Fencing Standards (Decorative Metal):

1. Approved Materials:
 - a. Steel
 - b. Wrought Iron
2. Height: The minimum height for decorative metal fences is 4' (48"), unless otherwise requested or approved by Philadelphia Parks and Recreation.
3. Gates: Gates are to match the height of the new fencing that it is linked to. Color to match.
4. Color: All decorative metal fences are to be powder coated flat black.
5. Fabric: Fabric is only applicable if decorative metal fencing is being used in an area of restriction, such as a dog park or stormwater planter.
6. Posts: Minimum 2" Square galvanized steel, painted black. Posts should have a maximum spacing of 8' (96") on center per section of fencing. All Terminal posts will have caps. All line posts will have top and bottom connectors.
7. Rails: Minimum 1-1/2" square rail (2 top rails, 2 bottom rails), painted black. The bottom rail will be a maximum 2" above finished grade.
8. Footings: Footings will be minimum 3500 PSI concrete at 36" depth below finished grade and have a 12" diameter, unless otherwise required. The new post will be set at a depth of 30" from finished grade within the new footing.
9. Approved Manufacturers:
 - a. Northeast Fence and Iron Works, 8451 Hegerman Street, Philadelphia, Pennsylvania 19136, (215) 335-1681
 - b. Stephens Pipe and Steel, LLC, 300 Streibeigh Lane, Montoursville, Pennsylvania 17754, (888) 275-1638
 - c. Iron World Fencing, 9390 Davie Avenue, Laurel, Maryland 20723, (301) 776-7448
 - d. Ameristar Fence – 1555 N. Mingo Rd Tulsa, OK 74116, Phone: (888) 333-3422, Web: www.ameristarfence.com
 - e. Equal approved Philadelphia Parks and Recreation.

SECTION 329200 – TURF GRASS LAWN

- 1.1 Turf grass lawn areas or athletic fields can be seeded or sodded depending on project needs, project budget, time of planting, etc. Ideally lawns are easily maintained with standard commercial lawn mowing equipment and maintenance access must be considered and incorporated into any design. Design considerations include:
- A. Maintain proper drainage with lawns pitched no less than 1.5%, preferably 2.0% with surface drainage (drains/inlets) as appropriate. Flatter lawns or special drainage concerns may require underdrainage.
 - B. Many of the project sites have poor, insufficient, or non-existent topsoil to support proper lawn growth. The designer should perform topsoil testing to detect the existence of topsoil, to assess if new topsoil needs to be imported or manufactured, and what soil amendments are needed. Many sites contain urban fill which may need to be screened to remove debris or other deleterious materials that are not appropriate for a general lawn or athletic field.
 - C. In the design or specification of any soil improvement the designer should consider compaction over time and specify a soil to resist compaction if possible.
 - D. Small isolated lawn areas that are difficult to access with commercial mowing equipment are not preferred.
 - E. “No-Mow” lawns are not to be specified for playgrounds, recreation centers, or athletic fields. “No-Mow” lawns would only be appropriate in areas that do not get extensive use by the public. Specification of “No-Mow” lawns should be approved by Philadelphia Parks and Recreation prior to specification.
 - F. The lawn seed mixture listed below is a general recommendation for drought and heat tolerance as well as maintenance. Specific site and micro-climatic conditions must be considered when specifying a seed or sod mixture.
 - G. Designer shall include in specifications instructions for proper lawn establishment including responsibilities of the contractor for watering, mowing, protection, etc.
- 1.2 Turf grass lawn will conform to the following standards:
- A. General standards for Turf Grass Lawn:
 - 1. Seeding:
 - a. Approved Time Periods/Seasons: Seeding will occur during the following periods, unless otherwise approved by Philadelphia Parks and Recreation:
 - 1) Spring: April 1st – June 15th
 - 2) Fall: September 1st – October 15th

- b. Soil Conditions: Soil must not be frozen, excessively wet or in unsatisfactory condition prior to tilling or any other soil preparation.
- c. Temperature: Seeding will only commence when the average low temperature has reached above freezing (40 degrees Fahrenheit)
- d. Mixtures: Areas of permanent turf will adhere to the following mixture ratios, unless otherwise stated or approved by Philadelphia Parks and Recreation:

Seed Type	Proportion by Weight	Minimum Purity	Minimum Germination
Turf-Type Tall Fescue (3 Varieties Min.)	60%	95%	80%
Perennial Rye Grass	30%	95%	85%
Kentucky Blue Grass	10%	90%	80%

2. Sodding:

a. Types of Sod:

- 1) Fresh cut within 48 hours of installation at the site.
- 2) Mixture: Majority of seed to be Turf Type Tall Fescue (3 varieties min.) with remaining volume of seed to be Perennial Rye Grass, Kentucky Blue Grass, and/or Fine Fescue depending on sod farm.

SECTION 329300 – LANDSCAPE PLANTING

1.1 Landscape planting design and specifications shall include the following design considerations:

- A. Maintenance abilities of Philadelphia Parks and Recreation, unless outside groups or entities will be maintaining landscape plantings. Elaborate plantings, large areas of shrubs, perennials, and/or herbaceous plantings can be challenging to maintain and should be kept to a minimum. Large areas of planting other than shrubs or trees should have protection to keeps users from disturbing the planting.
- B. Security should be considered with the placement of plant materials including providing views into the site from the surrounding streets to allow for police patrols to see into the site. Likewise placement of plantings should be considered with the placement and location of security cameras and systems. Shrubs and tall plantings should be designed so that they do not create hiding spots or places of concealment. Eye-level viewing should be available to pedestrians to view across a park or a space.
- C. Many of the project sites have poor, insufficient, or non-existent topsoil to support proper plant growth. The designer should perform topsoil testing to detect the existence of topsoil, to assess if new topsoil needs to be imported or manufactured, and what soil amendments are needed. Many sites contain urban fill which may need to be screened to remove debris or other deleterious materials that are not appropriate plant beds.

- D. Specific site and micro-climatic conditions must be considered when specifying plant species.
- E. Designer shall include in specifications instructions for proper landscape planting establishment including responsibilities of the contractor for watering, plant warrantee, protection, etc.

1.2 Landscape plantings will conform to the following standards:

A. General standards for Landscape Plantings:

1. Trees:

a. Canopy Trees:

- 1) Sizes: All canopy trees will be a minimum 2-1/2" caliper size, unless otherwise requested or authorized by Philadelphia Parks and Recreation. All trees must conform to ANSI Z60 standards for nursery stock, latest edition.
- 2) Condition: The central leader and branches will be free of breakage or damage. Trees that are suckering before installation will be rejected.
- 3) Mulch: All canopy trees should be covered with 3-4" of brown, doubled ground hardwood mulch, where applicable.
- 4) Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.

b. Ornamental Trees

- 1) Sizes: All understory/ornamental trees will be installed at a minimum of size of 6' tall, unless otherwise requested or authorized by Philadelphia Parks and Recreation. All trees must conform to ANSI Z60, latest edition.
- 2) Condition: The central leader (crown in the case of multi-stem trees) will be free of breakage or damage. Trees that are suckering before installation will be rejected.
- 3) Mulch: All understory trees should be covered with 3-4" of brown, double ground hardwood mulch, where applicable.
- 4) Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.

c. Evergreen Trees

- 1) Sizes: All evergreen trees will be installed at a minimum of size of 6' tall, unless otherwise requested or authorized by Philadelphia Parks and Recreation. All trees must conform to ANSI Z60, latest edition.

- 2) Condition: The central leader will be free of the breakage or damage. The tree must be structurally sufficient based on the species. Trees that are suckering before installation will be rejected.
 - 3) Mulch: All evergreen trees will be covered with 3-4" of brown, double ground hardwood mulch, where applicable.
 - 4) Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.
2. Shrubs:
- a. Deciduous Shrubs:
 - 1) Sizes: All deciduous shrubs will be installed in a minimum size of a 3 gallon container or 18-24" in height, unless otherwise requested or authorized by Philadelphia Parks and Recreation.
 - 2) Condition: All shrubs will be free of damage or breakage.
 - 3) Mulch: All deciduous shrubs will be covered with 3-4" of brown, double ground hardwood mulch, where applicable.
 - 4) Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.
 - b. Evergreen Shrubs:
 - 1) Sizes: All evergreen shrubs will be installed in a minimum size of a 3 gallon container or 18-24" in height, unless otherwise requested or authorized by Philadelphia Parks and Recreation.
 - 2) Condition: All shrubs will be free of damage or breakage.
 - 3) All evergreen shrubs will be covered with 3-4" of brown, double ground hardwood mulch, where applicable.
 - 4) Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.
3. Ornamental Grasses:
- a. Sizes: All ornamental grasses will be installed at a minimum size of a 2 gallon container or 15-18" height, unless otherwise requested or authorized by Philadelphia Parks and Recreation.
 - b. Condition: All ornamental grasses will be free of damage.

- c. All ornamental grasses will be covered with 3-4” of brown, double ground hardwood mulch, where applicable.
- d. Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.

4. Perennials and Ground Cover:

- a. Sizes: All perennials or ground covers will be installed at a minimum size of a 1 gallon container, unless otherwise requested or authorized by Philadelphia Parks and Recreation.
- b. Condition: All perennials or ground covers will be free of disease or damage.
- c. All perennials and ground covers will be covered with 3-4” of brown, double ground hardwood mulch.
- d. Planting Procedure: Comply with the latest International Society of Arboriculture recommendations.

SECTION 015639 – TEMPORARY TREE & PLANT PROTECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work described herein includes all necessary preventative and corrective measures to ensure the health of existing and proposed trees and plantings that may encroach upon the work performed under other Sections. Tree protection is required for all trees being preserved in this project within or adjacent to the limit of disturbance (LOD) or near designated access points. The Contractor is responsible for providing, maintaining, and removing any temporary plant protection and/or remediating any damaged vegetation to the satisfaction of Philadelphia Parks and Recreation (PPR).

1.02 REFERENCE SANDARDS

- A. All tree repairs, pruning, fertilizing, watering, bracing, and other corrective work under this Contract shall conform to all applicable requirements of the ANSI A300 Tree Care Operations Standards and/or ANSI Z133.1 Safety Standards.
- B. ANSI Z133.1 Safety Standards
- C. Tree and Soil Protection, Philadelphia Parks and Recreation Department Item 6-9002

1.03 PHILADELPHIA PARKS AND RECREATION (PPR) CONTACTS

- A. For street trees, contact Street Tree Management Division, at 215-685-4363
- B. For park trees, contact PPR Division Operations Manager, at 215-683-0216

1.04 SUBMITTALS

- A. ISA Certified Arborist qualifications should be submitted to PPR prior to the start of construction.
- B. Submit email notification to Philadelphia Parks and Recreation (PPR) for invitation to pre-construction meeting and after proper installation of construction tree protection.

1.05 MEASUREMENT AND PAYMENT

- A. The cost of all work and materials described in this section shall be distributed among the prices bid for the various items of work. There will be no separate or additional payment for this work.

1.06 QUALITY ASSURANCE

- A. All tree repairs, pruning, fertilizing, watering, bracing and other corrective work under this Contract shall be performed under the direction of an ISA Certified Arborist engaged by the Contractor.

1.07 DEFINITIONS

- A. Diameter at Breast Height (DBH) - The diameter at breast height (DBH) refers to the diameter of the tree at four and a half feet (4 ½') from ground surface. This is a standard measurement used by tree professionals.
- B. Tree Protection Zone (TPZ) – The tree protection zone (TPZ) refers to the arborist defined area surrounding the trunk intended to protect the roots and soil to ensure future tree health and stability. The TPZ is comprised of tree protection fencing using the dimension of the CRZ, unless otherwise authorized by PPR Arborist. The TPZ shall be installed as shown on the Drawings.
- C. Critical Root Zone (CRZ) - The critical root zone (CRZ) shall be a zone surrounding a tree equal to one (1) foot in radius for each one (1) inch DBH of the tree to be protected. Excavation within the CRZ by mechanical means is prohibited; all excavation shall be performed with hand tools and care taken to disturb as little of the existing root formations as possible. The CRZ shall be delineated using tree protection fencing. Tree protection fencing shall be as indicated on the Drawings. If no tree protection fencing is identified on the Drawings, the tree protection fencing shall be as depicted in the Erosion and Sediment Control Detail attached to these Specifications.
- D. Prohibited Root Zone (PRZ) - The prohibited root zone (PRZ) shall be a zone surrounding a tree equal to one-half (1/2) foot in radius for each one (1) inch DBH of the tree to be protected. Excavation within the PRZ is prohibited, unless specifically authorized by the City/Project Arborist. In no instance shall excavation within six (6) feet of the base of a tree be authorized. Tree replacement or equivalent compensation may be required for any extensive root system damage caused by construction activities.

PART 2 PRODUCTS

2.01 ROOT BUFFER PROTECTION

- A. For access roads that must go through the CRZ, a temporary protective root buffer is required. The temporary protective root buffer shall consist of shredded wood chips spread on a non-woven geotextile drainage fabric, over the roots at a minimum of six (6) inches in depth (keeping the trunk clear of chips),

and layered by ¾-inch plywood. Wood chips shall be 2-inch unpainted, untreated shredded wood or approved material. Extents of root buffer protection shall be referenced on the Drawings.

2.02 TREE PROTECTION FENCING FOR PARK TREES

- A. Tree protection fencing for park trees shall be used to establish the TPZ as indicated on the Drawings. If no tree protection fencing is identified on the Drawings, the tree protection fencing shall be as depicted in the Erosion and Sediment Control Detail attached to these Specifications and described herein.
 - 1. Tree protection fencings is to consist of six foot (6') high chain link fencing (2" mesh opening max) with two inch (2") diameter galvanized posts at a minimum of ten feet (10') spacing. Fence posts are to be set in modular concrete blocks (8"x16") or tubular steel base with sand bags; do not stake into the ground. Silt socks should be used on the inside of the fencing to prevent sediment from entering the dripline.

2.03 WARNING SIGN

- A. A heavy duty warning sign shall be prominently displayed on each tree protection fence. The sign shall be 24 x 36-inches with a white background and black two inch (2") high or larger block letters. The sign shall clearly state: TREE PROTECTION ZONE – DO NOT ENTER.

2.04 TREE TRUNK PLANKING FOR STREET TREES

- A. For work that must occur within the CRZ of Street Trees, tree trunk planking must be used. Four foot (4') wide x 0.25" thick closed-cell foam pads shall be wrapped around the trunk of the tree with untreated 2"x4" wood planks on the outside. Straps or galvanized wire shall be used to bind the planks and foam pads in place, and shall not drive fasteners into the trunk of the tree. If protective planks are to be in place longer than 6 months, Contractor shall loosen and adjust planks every 3 months to allow for growth.

PART 3 EXECUTION

3.01 GENERAL

- A. Before starting construction work under this Contract, contact Philadelphia Parks and Recreation (PPR). Invite the appropriate contact listed above to a pre-construction meeting for the project. At the meeting, the TPZs shown on the Drawings will be confirmed and the potential for tree damage due to construction-related activities will be discussed, in addition to appropriate tree damage preventative and corrective measures.
- B. After the pre-construction meeting has taken place, tree protection fencing shall be installed using the CRZ dimensions to establish the TPZ as shown on the Drawings.
- C. After construction tree protection fencing has been installed, send email notification to PPR confirming that proper fencing has been installed in accordance with the Drawings and this specification..
- D. Obtain PPR approval in writing of proposed tree damage preventative and corrective measures before hand excavating, trenching, or boring within the CRZ or PRZ of any tree if required to complete work as shown on the Drawings.

- E. Throughout the period of construction-related activity under this Contract, install all forms of tree protection and perform all appropriate tree damage preventative measures and corrective work as identified by the PPR.
- F. Engage a qualified ISA Certified Arborist acceptable to PPR to perform all tree repairs and other corrective work, including tree removals. Engage a qualified nursery acceptable to the PPR to furnish and plant all replacement trees.

3.02 TREE PROTECTION FENCE AND PLANKING

- A. Do not proceed with any work, until Construction Tree Protection Fencing and Planking has been installed and reviewed by PPR. Construction Tree Protection Fencing and Planking shall be maintained in good repair throughout construction period and shall not be removed until construction is complete and is approved by PPR.
- B. If tree protection fencing is damaged, Contractor shall immediately execute the necessary repairs to re-establish the fencing to original condition.

3.03 PROHIBITED ACTIVITIES

- A. No construction activity shall occur within the TPZ fence without prior written approval from PPR. If construction activities must be conducted within the TPZ, PPR shall be given 24 hours notice prior to anticipated commencement of construction activities and work shall not occur without the presence an ISA Certified Arborist. Prohibited work includes but is not limited to:
 - 1. Dumping of construction waste
 - 2. Storage of materials
 - 3. Storage of vehicles and equipment
 - 4. Trenching
 - 5. Changing soil grade
 - 6. Compacting soil with vehicle or equipment traffic
 - 7. Installing pavement of any kind
 - 8. Attaching anything to trees using nails, screws, and/or spikes
 - 9. Or causing injury by fire or excessive heat
- B. There shall be no excavation within the CRZ of a tree by mechanical means. If construction must occur within the CRZ, all excavation shall be performed with hand tools and care taken to disturb as little of the existing root formations as possible. If necessary, and pre-approved by PPR, all excavation or trenching within the tree protection areas shall be completed with an ISA Certified Arborist present on site. The Arborist shall be responsible for cutting all tree roots larger than one inch (1") diameter.
- C. There shall be absolutely no excavation within the PRZ of a tree unless specifically authorized by PPR Arborist. There shall be no excavation whatsoever within six (6) feet of the base of any tree within the Limit of Disturbance.
- D. There shall be no swinging of backhoes or cranes into the canopies of the trees.
- E. There shall be no storing or dumping of supplies and materials, including stockpiling, changing site grades (raising or lowering) which could cause drainage to flow onto or to collect near protected trees – except for grading shown on Grading Plan.

- F. There shall be no driving or parking of equipment, machinery, or vehicles of any type.
- G. Trees shall not be used for crane stays, guy anchors, or other fastenings.

3.04 PREVENTATIVE MEASURES

- A. Before starting other construction work under this Contract, furnish and install substantial tree protection fencing around each tree potentially vulnerable to damage by construction-related activities as shown on the Drawings.
- B. Should any tree roots be exposed through construction activities, extreme care shall be taken to limit the damage to the roots. Perform all construction activities using rubber tracked or low ground bearing pressure equipment to avoid compaction and damage to shallow root zones. Root buffer protection shall also be required when working within the CRZ, as approved by PPR. Hand tools will be used in any trench, or excavation area with root intrusion, even if said area is outside the CRZ.
- C. Do not attach guy-ropes, cables, wires, signs, lights, or other fixtures to any tree, tree-guard, or support thereof.
- D. Do not climb upon, cut, break, bark, or otherwise injure or disturb any tree, tree-guard, or support thereof.
- E. Do not pile or place materials against any tree, or in the open spaces within the TPZ around any tree.
- F. Do not park vehicles or equipment within TPZ of any tree.

3.05 TREE REPAIRS

- A. Avoid damaging existing trees. Damage includes cutting, breaking, skinning, or compacting soil around roots, skinning and bruising of bark and breaking of branches and limbs. Contractor shall be held liable for any damage to existing trees to remain and for all remedial measures required to treat broken limbs, or damaged trees and roots or for the unauthorized removal of existing trees or plants.
- B. Should any tree be damaged during construction operations, notify PPR immediately.
- C. Should PPR determine that the compacting effect of construction-related activities (including movement or parking of vehicles, or operation of heavy equipment) will have a detrimental effect on the health of the tree, the Contractor shall be responsible to aerate, fertilize, and water the soil around each affected tree as directed by PPR and ISA Certified Arborist.
- D. Promptly repair all trees damaged by construction-related activities under the direction of an ISA Certified Arborist.
- E. Should tree roots be damaged, sever cleanly perpendicular to the long axis of the root, and backfill with clean soil as soon as possible to prevent desiccation. Thoroughly disinfect all tools both before and after use.
- F. Perform corrective pruning, fertilizing, watering, bracing, etc., of damaged trees as directed by the PPR and ISA Certified Arborist.

- G. Photographic documentation shall be performed in accordance with Section 01110 (Photographic Documentation) of these Specifications.

3.06 TREE REMOVAL AND REPLACEMENT

- A. Where necessary to the prosecution of work under this Contract, remove obstructing trees. Obtain written approval from the PPR Arborist before removing any tree.
- B. Should PPR or the PPR Arborist determine that permanent, irreparable damage has been done to any tree by construction-related activities, the Contractor shall remove that tree. The Contractor shall replace the irreparably damaged tree with the appropriate number of suitable replacement trees, as selected by the PPR Arborist at no additional cost to PPR.
- C. Tree replacement shall be based on the diameter of the tree that is irreparably damaged. Replacement trees shall be at minimum two to two-and-a-half-inch (2-2.5") caliper selected by PPR; no trees under this dimension shall be considered acceptable. The contractor shall be required to replace an equivalent number of diameter inches by supplying the appropriate number of 2-2.5" caliper balled and burlapped (B&B) trees. For instance, if a 10" tree is irreparably damaged, the contractor shall purchase, plant and maintain for one-year, five (5) B&B trees that are 2-2.5" caliper. Tree species shall be selected by the PPR Arborist who will also provide planting locations. Planting locations may or may not be in the same park where the irreparably damaged tree was located.
- D. Exercise extreme care during excavation to prevent damage to roots of trees which are to remain. If necessary and pre-approved by PPR when excavating or grading within the root zone of the trees to remain, use air tool such as Air Spade® or Air Knife®, or equivalent, to identify location of existing roots. Cut the minimum amount of roots possible to cause minimum damage to the root system. Arborist shall prune injured roots cleanly and backfill excavation area with soil or mulch immediately to provide cover for the exposed roots. Make all attempts to preserve in good condition roots two inches (2") in diameter and larger.
- E. Tree removal shall include grinding the stump to a depth of four inches (4") below the existing surface if the planting site is to be abandoned, or to a minimum depth of twenty-four inches (24") if new plantings are proposed for the location of the removed tree.
- F. Plant replacement trees in locations selected by the PPR Arborist. Maintain replacement trees for an eight (8)-week maintenance period and warranty replacement trees for a period of twelve (12) months after replacement planting is approved as directed by Section 02900 (Planting) of these Specifications.
- G. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover if necessary. Water and maintain in a moist condition.
- H. Replacement trees shall be watered twice within the first twenty-four (24) hours of the time of planting and not less than twice per week during the eight (8)-week maintenance period. Trees shall be watered at the roots, to minimize wetting of the leaves. Water shall be released slowly to prevent runoff and in sufficient quantity to saturate the soils (approximately fifteen to twenty (15-20) gallons per watering). In the event of steady rainfall, frost, or yellowing of the leaves, watering may be temporarily reduced with the approval of PPR. Suitable water for planting and maintenance will be the responsibility of the Contractor. The Contractor shall furnish his own hose and hose connections or other watering equipment.

SECTION 32840 – IRRIGATION

- 1.1 Automatic irrigation for plantings and/or lawns is not typically utilized on Philadelphia Parks and Recreation or Department of Public Property sites. Automatic irrigation is occasionally installed associated with a natural lawn athletic field. Prior to specifying automatic irrigation obtain approval from Philadelphia Parks and Recreation allowing its use. Alternative irrigation may be to provide yard hydrants in strategic locations to allow for hose hookups.

A. General standards for automatic irrigation:

1. Approved manufacturers of automatic irrigation systems:
 - a. Toro Irrigation – 5825 Jasmine St., Riverside, CA 92504, Phone: (877) 345-8676, Web: www.toro.com
 - b. Rain Bird Corporation – 970 West Sierra Madre Ave., Azusa, CA 91702, Phone: (626) 812-3400, Web: www.rainbird.com
 - c. Hunter Industries – 1940 Diamond St., San Marcos, CA 92078, Phone: (760) 744-5240, Web: www.hunterindustries.com
 - d. Equal approved Philadelphia Parks and Recreation.
2. Approved manufacturers of manual valves, pressure reducing valves, and/or backflow prevention devices:
 - a. NIBCO – 1516 Middlebury Street Elkhart, IN 46516-4740, Phone: (800) 234-0227, Web: www.nibco.com
 - b. Watts – 815 Chestnut Street, North Andover, MA 01845, Phone: (978) 689-6066, Web: www.watts.com
 - c. Equal approved Philadelphia Parks and Recreation.
3. Automatic irrigation controller shall be located within a Recreation Center Building or other accessible building on the site. Both locations should be secure with limited access.
4. If automatic irrigation is specified pop-up sprayers and rotors are preferred. Drip irrigation is not permitted unless prior approved by Philadelphia Parks and Recreation.
5. Water services for irrigation can be dedicated for the field only or can be connected to a building City water supply. The designer should verify capacity and pressure is available to support the irrigation

system and not degrade building water service or incorporate necessary upgrades to building water service as required. Likewise designer should evaluate water pressure to assess if it is too high and requires a pressure reducing valve.

6. Designer shall comply with the Philadelphia Plumbing Code for connection and backflow prevention requirements.
7. Maintenance of underground irrigation systems shall be coordinated with Philadelphia Parks and Recreation and accounted for in the design.

B. General standards for yard hydrants:

1. Approved Manufacturers:
 - a. Elkay – 2222 Camden Court, Oak Brook, IL 60523, Phone: (800) 476-4106, Web: www.Elkay.com
 - b. Murdock Manufacturing – 15125 Proctor Avenue, City of Industry, CA 91746, Phone: (800) 591-9081, Web: www.murdockmfg.com
 - c. Equal approved Philadelphia Parks and Recreation.
2. Yard hydrants may be above or below grade, but must be frost protected with secure keyed access.

DESIGN – PLAYGROUNDS

- 1.1 Playgrounds that are to be designed and installed on City of Philadelphia, Department of Public Property, and/or for Philadelphia Parks and Recreation sites shall include the following:
 - A. Playgrounds and play areas should be designed to be as inclusive as possible to allow children with a wide array of abilities the opportunity to enjoy high quality opportunities to play together. Particular attention should be given to designing for children with Autistic Spectrum Disorder. Designers are encouraged to be creative in terms of equipment selection, playground positioning, colors used, accessibility, visibility, etc. The following guidelines and resources can be utilized for inclusive design:
 1. Designing for Inclusive Play: Applying the Principles of Universal Design to the Playground by Jennifer K. Skulski, CPSI at the National Center on Accessibility, Indiana University – Bloomington. <http://www.ncaonline.org/resources/articles/playground-universaldesign.shtml>
 2. Inclusive Playspace Design Planning Guide by Landscape Structures, Inc. <http://viewer.zmags.com/publication/c878a7ae#/c878a7ae/1>
 3. Inclusive Play Design Guide by Playworld Systems, <https://playworld.com/play-guides>

4. Me2® - 7 Principles of Inclusive Playground Design by PlayCore,
<http://www.inclusiveplaygrounds.org/me2/overview>
- B. Bright and/or vibrant colors are not recommended for Children within that autism spectrum. Colors like Red, Blue, or Yellow should not be used. Cooling and/or Calming colors are recommended.
 - C. Inclusive playground shall be designed to comply with the attached project inclusivity checklist.
 - D. Playground and play area designers should also incorporate the principals and guidelines contained in the Philadelphia Playful Learning Playbook by Playful Learning Landscapes -
<https://playfulllearninglandscapesphl.org/>.
 - E. At minimum playgrounds must be designed to meet the requirements set forth in the Americans with Disabilities Act.
 - F. Provide multiple accessible routes to the various play areas, equipment, playground entrances, recreation center, etc.
 - G. It is preferred to have separate play areas and play equipment for 2 to 5 year olds and 5 to 12 year olds. The separate play areas should be visible from each other and potentially in close proximity to allow for play across the play areas. If space is constrained the play areas can be combined, but there should still be separate play equipment for each age group.
 - H. Play structures and equipment should have a variety of activities and challenges to allow children to engage in play but also physical development and learning.
 - I. Slides shall be stainless steel. Position slides to face north away from direct solar exposure. “Roller” slides are not allowed by Philadelphia Parks and Recreation.
 - J. Swings should be located away from entrances and not along major paths of travel within the playground to reduce conflicts with children playing on the swing and children on foot. Ensure that swings include belt type seating for 5 to 12 year olds and bucket type seats for smaller children. Also, if feasible include at minimum at least one ADA swing seat that a children can be loaded into and secured for safe play. All swings shall include anti-wrap assemblies.
 - K. Provide adequate seating for adults and locate seating to allow for visual monitoring across the playgrounds.
 - L. Fencing at a playground or recreation center should be evaluated to assess if there is adequate access control as well as prevent children from leaving the site unmonitored or into surrounding streets. Fencing fabric shall be placed on the playground side of the fence.
 - M. Consider shading of the playground when designing/planning the facility. Playgrounds with open solar exposure with metal play equipment and rubberized play surfaces can become very hot. Consider utilizing existing large trees or other structures that could provide shade. Add tree plantings strategically

placed to provide future shade of the play areas. Pergolas can be utilized for shading. Pergolas shall be steel construction. Overhead shade sails are not permitted.

- N. Design shall incorporate the playground equipment manufacturer's required safety signage. In addition, the design shall also include the installation of the attached warning signage to be installed at the park/playground entrance from the surrounding sidewalks or parking. The signage is intended to warn users of slippery surfaces and hot surfaces, to use caution, and that proper footwear and clothing are to be worn at all times.
- O. Stormwater management facilities are not preferred to be placed below playground areas with equipment footings and rubberized safety surfacing. Stormwater management facilities, if required, should be placed outside of the footprint of playground areas if possible. Obtain approval from Philadelphia Parks and Recreation prior to placing stormwater management facilities below playground areas.
- P. Avoid placing or locating underground utilities or storm sewer piping below playground areas.
- Q. The following playground equipment manufacturers have been approved by Philadelphia Parks and Recreation as providers for play equipment:
 - 1. Landscape Structures, Inc. – 601 7th Street South, Delano, MN 55328, Phone: (888) 438-6574, Web: www.playlsi.com. Local Representative: General Recreation, Inc. – P.O. Box 440, Newtown Square, PA 19073, Phone: (610) 353-3332, Web: www.generalrecreationinc.com
 - 2. little tykes® Commercial – 878 E Highway 60, Monett, MO 65708, Phone: (800) 325-8828, Web: www.littletikescommercial.com. Local Representative: Boyce Associates, P.O. Box 885, Trexlertown, PA 18087, Phone: (800) 441-9400, Web: www.boyce4playgrounds.com
 - 3. Kompan®, Inc. – 605 W Howard Ln - Suite 101, Austin, TX 78753, Phone: (800) 426-9788, Web: www.kompan.us.
 - 4. GameTime® - A Playcore Company – 150 PlayCore Drive SE Fort Payne, Alabama 35967, Phone: (800) 235-2440, Web: www.gametime.com. Local Representative: MRC Recreation – 2130 Route 35, Building B, Suite 222, Sea Girt, NJ 08750, Phone: (800) 922-0070, Web: www.mrcrec.com
 - 5. Equal approved Philadelphia Parks and Recreation.
- R. Playgrounds shall be designed to comply with the following standards (current version):
 - 1. The Americans with Disabilities Act (ADA) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
 - 2. U.S. Consumer Product Safety Commission – Public Playground Safety Handbook Publication No. 325.

3. ASTM F1487 – Standard Consumer Safety Performance Specification for Playground Equipment for Public Use.
 4. ASTM F1951 – Determination of Accessibility of Surface Systems under and Around Playground Equipment.
 5. ASTM F1292 – Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.
 6. ASTM F2479 – Standard Guide for Specification, Purchase, Installation and Maintenance of Poured-In-Place Playground Surfacing.
 7. ASTM F2223 – Standard Guide for ASTM Standards on Playground Surfacing.
 8. ASTM F2049-11 (2017) Standard Safety Performance Specification for Fences/Barriers for Public, Commercial, and Multi-Family Residential Use Outdoor Play Areas.
- S. Playground surfacing shall meet the requirements set forth in Section 321816 - Protective Playground Surfacing. This includes testing and certification.
- T. Include EPDM connector sleeves to reinforce chain connections to safety surface. Connections should be detailed to avoid degradation of the safety surface by chain movement.
- U. After installation, playground/play area shall have a safety audit completed by a Certified Playground Safety Inspector (CPSI) showing the playground/play area complies with all applicable safety criteria and playground standards noted above.

DESIGN – AQUATIC PLAY AREAS / SPRAYGROUNDS / SPLASH PADS

- 1.1 Aquatic Play Areas / Spraygrounds / Splash Pads that are to be designed and installed on City of Philadelphia, Department of Public Property, and/or for Philadelphia Parks and Recreation sites shall include the following:
- A. Aquatic Play Areas / Spraygrounds / Splash Pads should only be installed at staffed facilities.
 - B. The City of Philadelphia current design standard is for spraygrounds / splash pads to be fed with potable City water and the flows from the spray features are to drain to waste or flow through. Recirculation systems are not permitted for use. Drain lines from spray grounds are to connect to combined sanitary sewer or separate storm sewer flowing to sewer lines in the surrounding streets per direction of Philadelphia Department of Licenses + Inspections. Care should be taken so that sprayground drainage is not connected to or is connected downstream of any green stormwater infrastructure or stormwater management facilities. Total daily flows should not exceed Philadelphia Water Department requirements for an exemption request of the Act 537 Sewerage Planning Facilities Module requirements. Designer

shall evaluate waste line capacity to handle both the potential spray ground flows as well as any existing or new building waste flows.

- C. The designer shall assess the existing building water service(s) for potential connection to serve spray ground area. The designer should verify capacity and pressure is available to support the spray ground system and not degrade building water service or evaluate potential upgrades to the existing building water service or obtain a separate dedicated water service for the spray ground as required. In general, water service specifically for a spray ground should not be less than 2 inches in diameter.
- D. The designer shall evaluate the available water pressure at the existing building and in the area. There are parts of the City where there is insufficient pressure to support a spray ground. Likewise there are other parts of the City where the water pressure is too high and a pressure reducing valve must be installed to reduce working pressures acceptable for spray ground use. Allowable and required pressures will be dependent on the spray ground equipment manufacturer's requirements.
- E. Spray grounds require backflow prevention to maintain separation from the site's/building's potable water supply but also the City water supply in the street. If connecting to a building water supply where there is existing backflow prevention between the building and the City water in the street, provide backflow prevention between the building and spray ground. If a dedicated water service is being installed separate from the building service backflow prevention must be provided between the spray ground and the City water in the street. Backflow prevention must meet Philadelphia Water Department's Cross Connection Control requirements. Philadelphia Parks and Recreation prefers any backflow prevention equipment between the City water in the street and the spray ground be located within the recreation center building, if there is room available preferably in a mechanical room. If the backflow prevention equipment cannot be located within a building it will need to be located in an above-grade heated exterior enclosure (hot box). The exterior enclosure shall be steel with maintenance access doors. See attached detail for reference.
- F. In general, PPR classifies spraygrounds/splash pads in 2 categories: Small and Large.
 - 1. Small Spraygrounds / Splash Pads: Small spraygrounds typically only include up to 8 to 10 water play features and only include ground jets, no above grade mounted features. The piping systems for these spraygrounds are typically much simpler and do not require a larger underground manifold pit (described below). Typically water is distributed via underground piping and a basic pipe manifold with balancing ball valves located in a low depth/at-grade utility or irrigation box. Care should be taken with the selection of the spray features and design of the piping system so that the ground spray flows are balanced and even. Control of a small sprayground is accomplished via a single solenoid valve connect to a timer switch (located inside the Recreation Center or Rec Leaders Office). Include a manual override to the timer switch. The intent is for all of the water features to be on for specified times as established by PPR or the Rec Leader. Small spraygrounds typically have lower flows. Add a monitor sensor in combination with the timer.
 - 2. Larger Spraygrounds / Splash Pads: Large spraygrounds typically include 10 or more water features and include a variety of in-ground and above ground/vertical spray features. The piping systems for these spraygrounds are typically more complicated and would include a

manufacturer's distribution manifold with automatic solenoid control valves connected to the manufacturer's electronic controller system. The controller has the ability to turn the solenoid valves on and off in a sequence. The manifold is typically located in an exterior pit, as described below, or can be located with the Recreation Center mechanical room if there is adequate space and aligns with the plumbing needs for the sprayground. Above grade/vertical spray features can include a variety of water jets, misters, and sprays in a variety of themes and colors, but should not include moving parts such as spinners or buckets. Above grade features shall be stainless steel. Fiberglass features are not acceptable.

- G. Water to spray ground features are generally distributed via a manufacturer's distribution manifold with control valves. The manifold is typically housed in a below grade pit with an on-grade access double doorway (Bilco type doors). Access door opening shall be a minimum of 4 feet clear. Access doors shall be aluminum. Doors shall be painted with a ceramic paint. The manifold pit shall be located outside of the spray ground or adjacent paved areas, typically in a lawn or landscape area outside of pedestrian foot traffic. The location of the manifold pit shall be coordinated with the spray ground equipment manufacturer. Top of the manifold pit is preferred to be flush with grade, but shall be set no higher than 2 feet above finished grade,
- H. Water service to the manifold pit shall meet the Philadelphia Plumbing Code.
- I. Distribution piping from manifold to spray features shall meet manufacturer's requirements.
- J. Manifold pit shall be the low point of the spray ground system to allow for draining via gravity for winterization. It is preferred to provide a drain connection to the pit connected to storm sewer or combined waste sewer and meet the Philadelphia Plumbing Code. If connection to storm sewer or combined sewer is not feasible a dry well can be installed below a portion of the manifold pit using clean stone (No. 57) and leaving a 12" square opening in the floor of the manifold pit. Designer shall ensure there is no high water table, impermeable soils, or contaminated soils present for this option.
- K. Provide for winterizing drains within the sprayground water piping system within the manifold pit to include the sprayground feature supply lines and the city water service feeding the sprayground. Provide isolation valves to segregate city water from manifold pit.
- L. Provide isolation valves to segregate city water from manifold pit as well as segregate the manifold pit or water supply from the spray features.
- M. Spray grounds paving shall be cast-in-place concrete meeting the requirements of Section 321313 or decorative/colored concrete paving meeting the requirements of Section 321316. Concrete reinforcing shall be per spray feature manufacturer's requirements. In-ground spray features can be generally cast into the concrete slab or the slab may be thickened, verify with manufacturer's requirements. Above-ground spray features may be anchored to the thickened slab or to a separate below grade footing, verify with manufacturer's requirements. Grade sprayground surface a minimum of 1.0% and maximum of 2.0% in any direction.

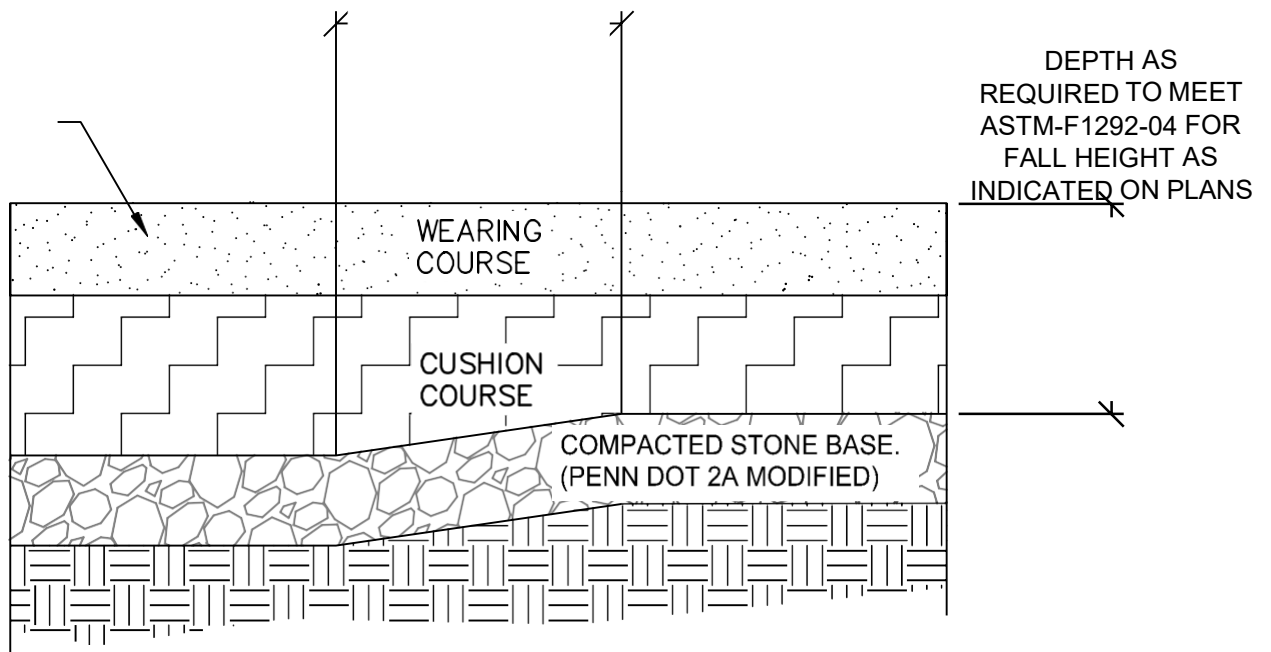
- N. Provide adequate drainage for the full flow of the spray ground so that water does not backup or stand on the pad. Drains shall be trench or area type. Metal grates shall be painted light colored pool deck type paint approved by Philadelphia Parks and Recreation. Grates opening spacing should be small in size to meet ADA requirement and avoid feet entrapment.
- O. Activation bollards or buttons are not permitted. Non-mechanical activation systems may be approved on a case by case basis by Philadelphia Parks and Recreation.
- P. Above-grade spray features shall be stainless steel and finished with a polyester powder color coating.
- Q. Spray features and drains shall be bonded to the nearest grounding rod.
- R. Spray grounds / splash pads shall be designed to meet Philadelphia Water Department stormwater management requirements.
- S. Stormwater management facilities shall not be placed below spray ground areas due to conflicts with spray ground piping, etc.
- T. The following spray ground equipment manufacturers have been approved by Philadelphia Parks and Recreation as providers for spray feature equipment:
 - 1. Aquatix by Landscape Structures Inc. – 6500 Carlson Drive, Eden Prairie, MN 55346-1729, Phone: (877) 632-0503, Web: www.aquatix.playlsi.com. Local Representative: General Recreation, Inc. – P.O. Box 440, Newtown Square, PA 19073, Phone: (610) 353-3332, Web: www.generalrecreationinc.com
 - 2. WaterPlay, 1451B Ellis Street, Kelowna, BC Canada V1Y 2A3, Phone 800-590-5552, Web: www.waterplay.com . Local Representative: Recreation Resource USA, 503 N. Walnut Road #200 Kennett Square, PA 19348, Phone: 610-444-4402, Email: info@recreation-resource.com
 - 3. Equal approved Philadelphia Parks and Recreation.

DESIGN – DOG PARKS

- 1.1 Dog parks will be allowed only after a local park “Friends Group” has been identified as the “Caretaker” of the park. Dog parks that are to be designed and installed on City of Philadelphia, Philadelphia Parks and Recreation sites shall include the following:
 - A. Depending on location and local community desire the dog park could have a single combined play/use area or separate areas for small dogs and large dogs. If a single use area is being proposed obtain approval from Philadelphia Parks and Recreation.
 - B. Perimeters are to be fenced with 6 foot high fencing. If using chain-link fencing use small opening fabric (1 inch by 1 inch) to prevent dogs from placing body parts through the fence. If the perimeter is using

TRANSITION = 12"
OF HORIZONTAL
DISTANCE FOR
EVERY 1" IN
VERTICAL CHANGE

1/2" WEARING
COURSE



NOTES:

1. ALL DIMENSIONS ARE THE RECOMMENDED MINIMUMS.

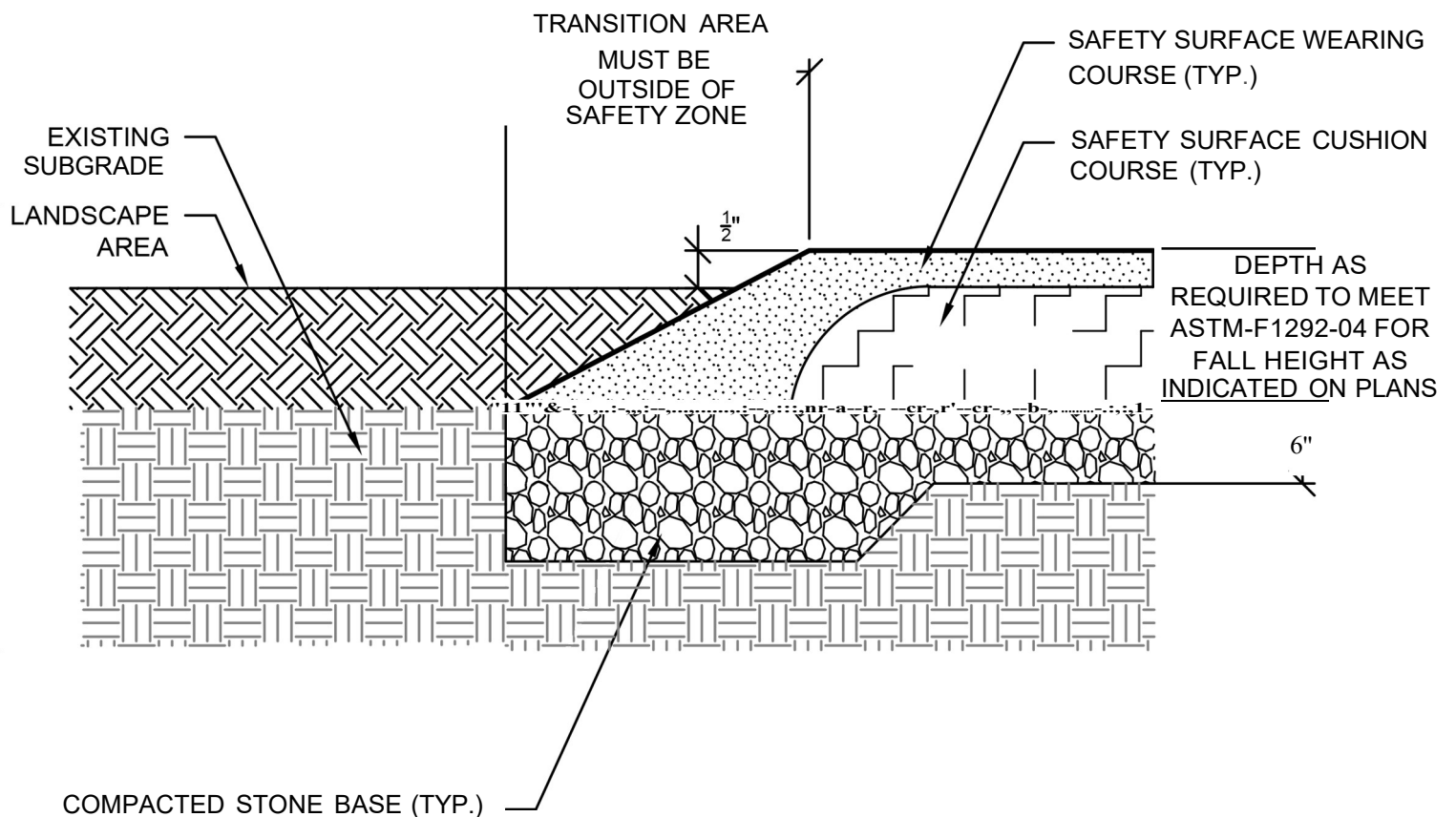
SCALE : NTS

DATE : JANUARY



PHILADELPHIA
PARKS & RECREATION

SAFETY SURFACE AND DEPTH TRANSITION DETAIL



NOTE(S):

1. POURED-IN-PLACE TPV SURFACING SHALL MEET THE REQUIREMENTS OF ASTM F-1292 AND THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT PROVISIONS FOR ACCESSABLE PLAYGROUNDS AND RECREATION AREAS.
2. ALL DIMENSIONS ARE THE RECOMMENDED MINIMUMS.



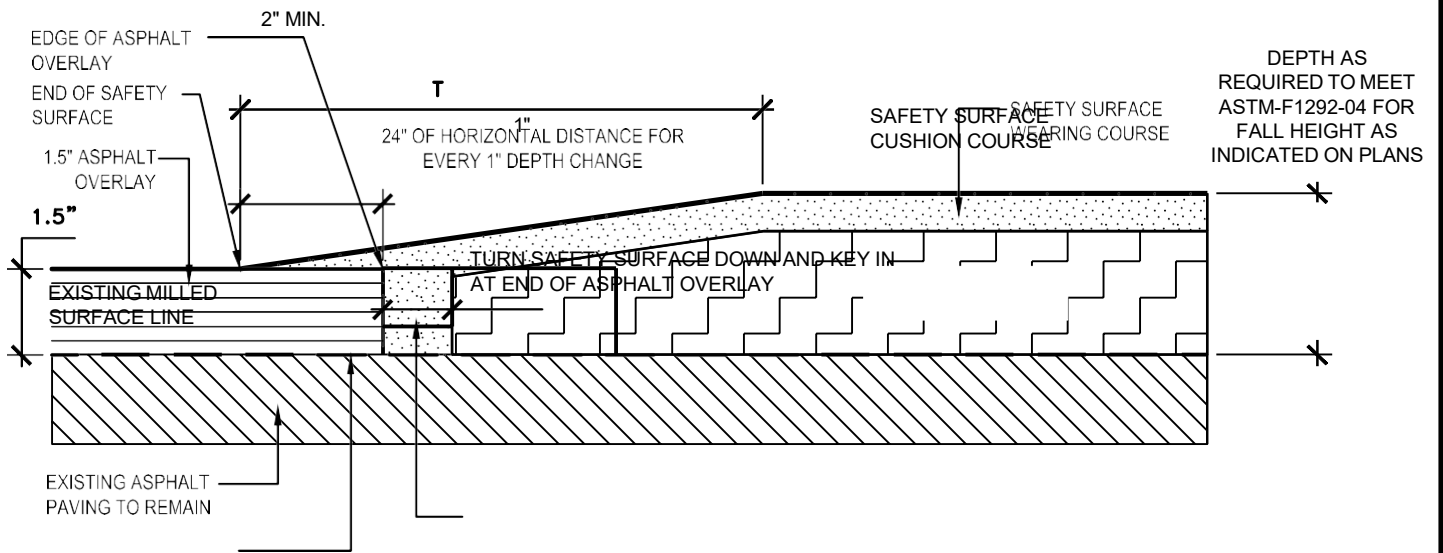
PHILADELPHIA
PARKS & RECREATION

SAFETY SURFACE TO LANDSCAPE DETAIL

SCALE: NTS

DATE: JANUARY

RANSITION =



SCALE : NTS

DATE : JANUARY

APPLY HEAVY COAT OF POLYETHYLENE
PRIMER PAINT TO CONCRETE FACE JUST
PRIOR TO RUBBER WEARING COURSE
INSTALLATION.

WEARING COURSE TURN DOWN,
THOROUGHLY COMPACT FOR
ADHESION TO ADJACENT
CONCRETE PAVING/ STRUCTURE

1/2" MIN.

FLUSH WITH ADJACENT
SURFACE

NOTCH CONCRETE 3"

SEE PLAN

AS REQUIRED TO
MEET ASTM-F1292-13

WEARING COURSE

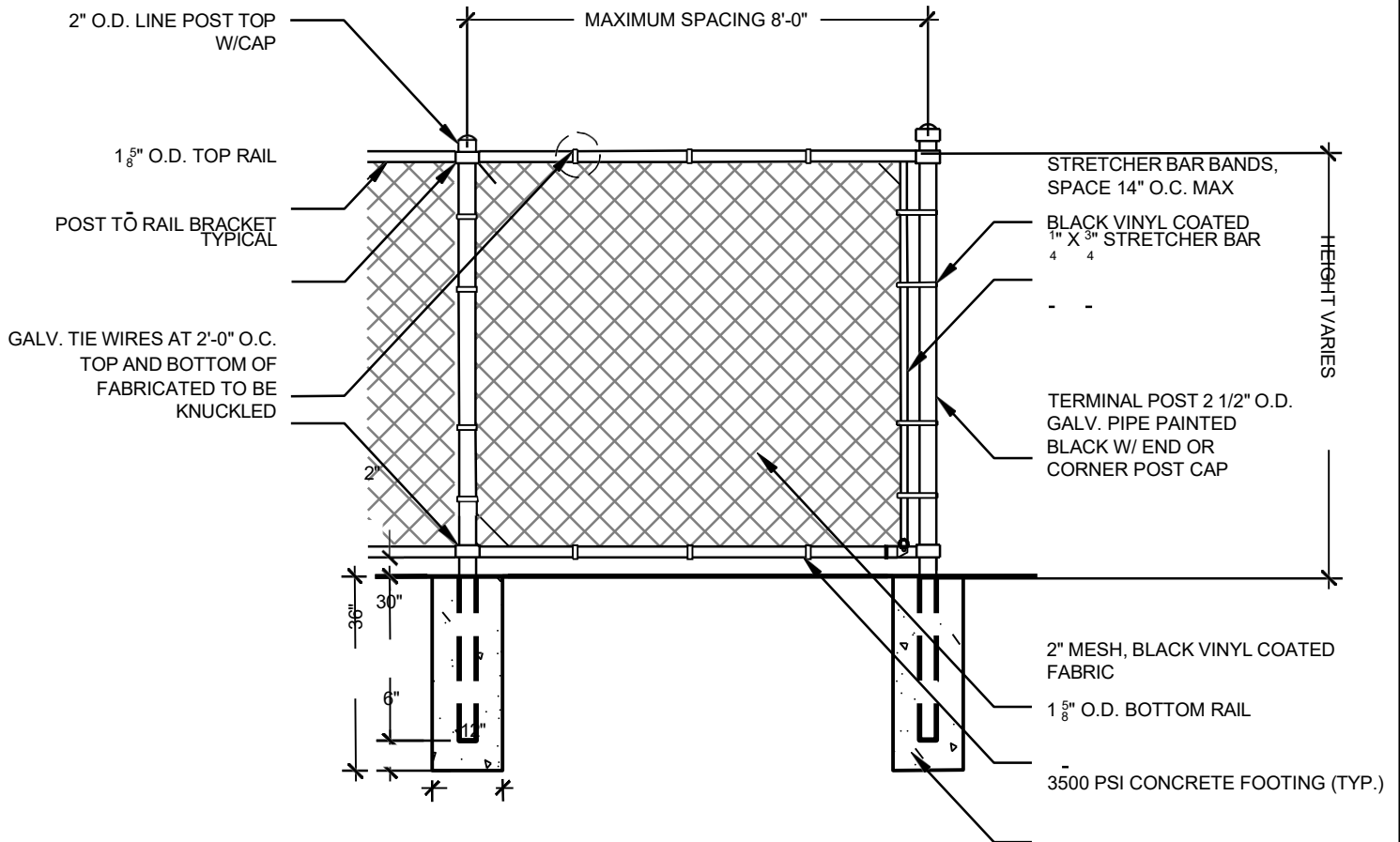
CUSHION COURSE

CONCRETE PAVING
OR STRUCTURE AS
DETAILED

GRAVEL BASE

12" WIDE, 6" DEEP
CONCRETE FOOTER

STABLE &
NON-YIELDING
SUBGRADE



NOTES:

1. ALL POSTS, FRAMING AND ACCESSORIES SHALL BE BLACK PVC COATED, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE MINIMUM STANDARDS FOR THE ASSOCIATED OBJECT.

SCALE : NTS

Electronic Timer Control - 7-Day/365 Day 2-Circuit Electronic Control, 120-277 VAC, 2-SPST/DPST, Indoor Metal Enclosure

Item ET2725C



PRODUCT DESCRIPTION

The ET2000 Series offers an easy-to-use interface, while still allowing to-the-minute scheduling capabilities for nearly any application. This series provides 50 holiday blocks with independent scheduling to ensure the loads are always in the proper ON/OFF state. This series also includes 96 ON/OFF events for even the most demanding schedules. The scheduling capabilities, configurable outputs, and a 100-hour backup without the need of batteries, make this series ideal for nearly any application.

FEATURES

- ▶ 100-hour supercapacitor eliminates the need for batteries
- ▶ Up to 96 set points or events
- ▶ Up to 50 holiday blocks with schedule capabilities
- ▶ Automatic input voltage selection from 120 to 277 VAC, 60 Hz
- ▶ Additional mode of operation turns the ON/OFF buttons into 2-hour overrides
- ▶ Configurable outputs allow the control of various voltages and applications
- ▶ Relays incorporate zero-crossing technology to extend the life of the control
- ▶ Non-volatile EEPROM memory protects programming indefinitely
- ▶ LED compatible
- ▶ USB port makes transferring and saving of schedules easy

APPLICATIONS

- ▶ Indoor Lighting Control
- ▶ Timing/Scheduling ON/OFF
- ▶ Machinery & Pump Controls

TECHNICAL DATA

General	
Model Number	ET2725C
Description	7-Day/365 Day 2-Circuit Electronic Control, 120-277 VAC, 2-SPST/DPST, Indoor Metal Enclosure
UPC Code	078275148147
Brand	Intermatic
Country of Origin (Intermatic)	MEXICO
Warranty Period	2-Year limited
Control Specifications	
Minimum ON/OFF Times	1 min
Minimum Pulse Time	2 sec
Maximum Pulse Time	2 sec
Maximum ON/OFF Times	Indefinite
Maximum ON/OFF Operations	96
Setpoint Program Count	96
ON/OFF Operations	96
Operation Features	Holiday
Operation Mode	7 day
Daylight Savings Adjustment	Automatic
Backup Restoration Time	30 Minutes
Backup Type	Supercapacitor

Technical specifications and other information are subject to change without notice. Images can vary from original.

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Backup Protection Time	100 Hour
Application Compatibilities	LED

Mechanical Specifications

Enclosure Type	Indoor type 1 metal
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Dimensions

Product Dimensions (H x W x D) in	7.875 x 5.125 x 3.4375 in
Wire Size Min	#14 AWG
Wire Size Max	#8 AWG
Knockout Dimensions Bottom	(2) combination 1/2" - 3/4"
Knockout Dimensions Back	(1) combination 1/2" - 3/4"

Load Ratings

Electronic Ballast LED	10 A
Magnetic Ballast (NO) Range(s)	20 A, 120-277 VAC
Resistive (NO) Range(s)	20 A, 28 VDC; 30 A, 120-240 VAC
Inductive Load Ratings NO Ranges	30 A, 120-240 VAC
Electronic Ballast Load Ratings NO Ranges	10 A, 120/277 VAC
Tungsten (NO) Range(s)	5 A, 120-277 VAC
Motor Load Ratings NO Ranges	1 HP, 120 VAC; 2 HP, 240 VAC

Electrical Specifications

Voltage Selection Type	Auto Voltage
Wiring Option	Terminals
Input Voltage Range(s)	120-277 VAC, 60 Hz
Number of Circuits	2
Switch Type	2xSPST, 1xDPST or Pulse
Maximum Power Consumption (W)	5 W
Electronic Series	ET2000 Series

Packaging

Shipping Weight (lbs)	2.75
Unit Carton Dimensions (H x W x L) in	8 x 3.15 x 5.238 in

Environmental Specifications

Temperature (operation)	-40 °F to 104 °F / (-40 °C to 40 °C)
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Standards and Certifications

UL Certification	cULus
Other Certifications and Compatibilities	LED; Title 20
California Proposition 65	Lead

DRAWINGS AND DIAGRAMS



WATTS SERIES 957N REDUCED
PRESSURE ZONE ASSEMBLY
(OR APPROVED EQUAL)
SEE TABLE FOR MODEL BY
WATER SUPPLY SIZE.

6" MIN.
ALL SIDES

WATTS MODEL # WB 4000 AE
ALUMINUM ENCLOSURE
AS MANUFACTURED BY
WATTS. WWW.WATTS.COM,
OR APPROVED EQUAL

REDUCER AS
NECESSARY (TYP.)

4000 P.S.I.
CONCRETE SLAB

#4 REBAR 12" O.C., E.W

MIN. 6" WELL COMPACTED
NO. 57/ 2B CLEAN STONE
BASE
UNDER BOTTOM OF FOOTING

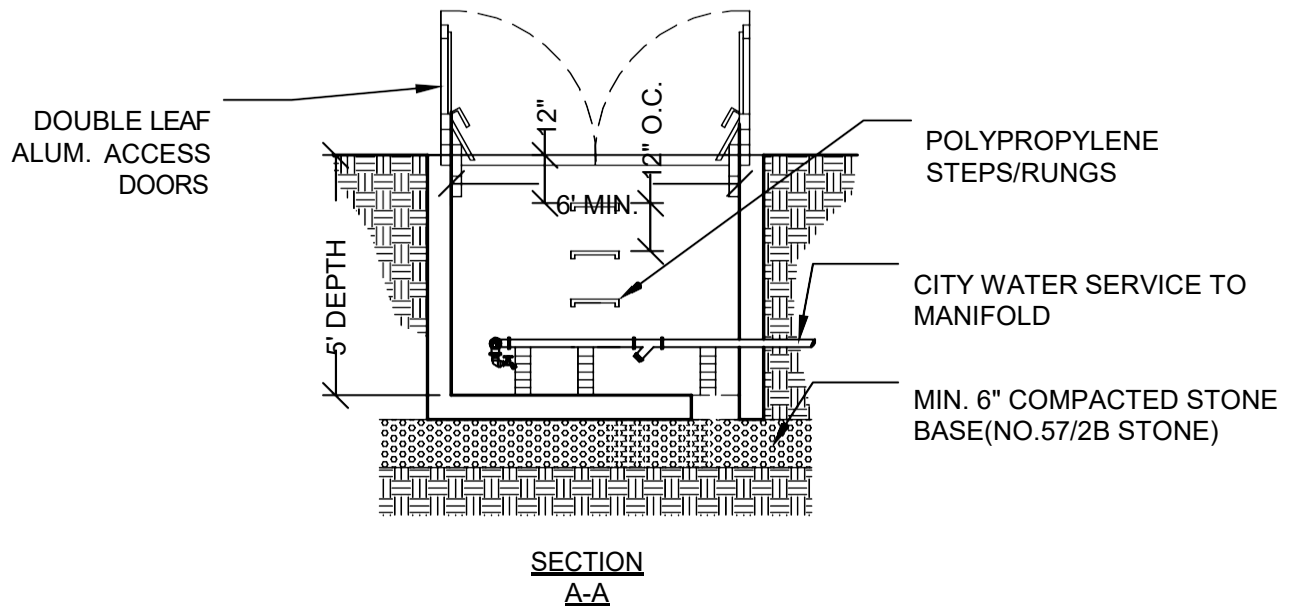
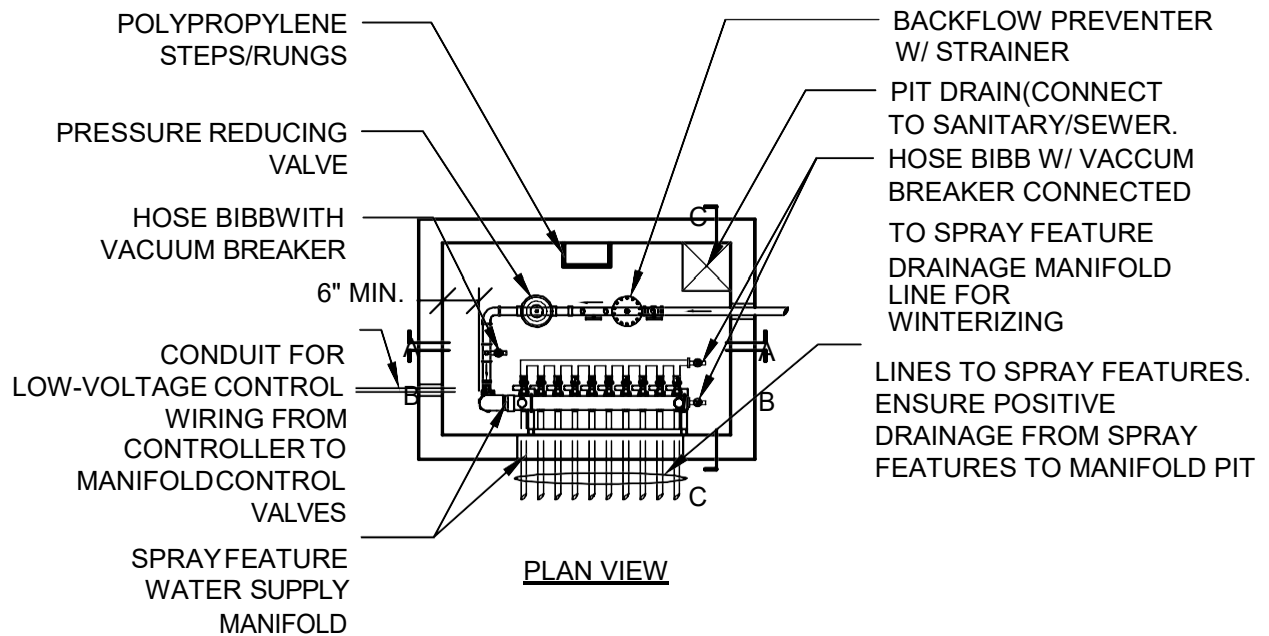
FINISH GRADE

WATER SUPPLY
FROM METER

WATER SUPPLY TO
SPRAY EQUIPMENT

NOTES:

REFER TO ELECTRICAL PLANS
ALL INSTALLATIONS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS.
HEAT IS PROVIDED BY A 1000 WATT, 120V SINGLE PHASE HEATER.
HEATER SHALL BE SIZED TO MAINTAIN EQUIPMENT AT 40 F, IN ACCORDANCE WITH N.F.P.A.
3-3.1.8 & 3-6.1.3.2
HEAT SOURCE SHALL BE MOUNTED A MINIMUM OF 7" ABOVE THE SLAB UNLESS IT IS UL OR ETL
CERTIFIED AND NEC APPROVED FOR SUBMERSION.
POWER SOURCE SHALL BE INSTALLED INSIDE THE ENCLOSURE BY OTHERS, PROTECTED WITH A
GROUND FAULT INTERRUPTING RECEPTACLE (GFI) OR GFI CIRCUIT.
FOUR INTERNAL BRACKETS AND CONCRETE ANCHORS ARE SUPPLIED WITH THE ENCLOSURE.
ENCLOSURE SHALL BE PROVIDED IN ALUMINUM.
ALL CONNECTIONS, JOINTS, ETC. SHALL MEET THE REQUIREMENTS OF THE PHILADELPHIA
WATER DEPARTMENT AND PHILADELPHIA PLUMBING CODE.
PROVIDE SUPPORT OF ELEVATED PIPING AS REQUIRED.



STAINLESS STEEL
FASTENERS AND
ANCHOR BOLTS BY
INSTALLER
LINES TO SPRAY FEATURES.
ENSURE POSITIVE
DRAINAGE FROM SPRAY
FEATURES TO MANIFOLD PIT

4'

TOP OF BOX/DOOR
FINISH GRADE
WATER HAMMER ARRESTOR
SPRAY GROUND WATER
SUPPLY MANIFOLD
CITY WATER SUPPLY
BACKFLOW PREVENTER
PRESSURE REDUCING VALVE

DRAINAGE MANIFOLD PIPE WITH
HOSE BIBB AND VACUUM BREAKER
FOR DRAINAGE AND WINTERIZING OF
SPRAY FEATURE WATER SUPPLY
LINES

PIT DRAINAGE LINE TO WASTE

SECTION C-C

PIPE SUPPORT AS REQUIRED
(TYP)

ACCESS DOOR AND PAINTING SPECIFICATIONS:

1. ACCESS DOORS BE DOUBLE LEAF ALUMINUM ACCESS DOOR W/ A MINIMUM H-20 LOADING OR APPROVED EQUAL. ACCESS DOORS SHALL BE FINISHED WITH MANUFACTURER'S CERAMIC PAINT. SEE BELOW FOR ADDITIONAL FIELD PAINTING INFORMATION.
2. DOUBLE LEAF ACCESS DOOR TO BE LOCKABLE WITH A LATCH AND PAD LOCK CONFIGURATION. CONTRACTOR TO PROVIDE PAD LOCK MEETING RECREATION DEPARTMENT REQUIREMENTS - COORDINATE W/ PPR COORDINATOR.
3. EXTERIOR PORTIONS OF THE ACCESS DOORS AND FRAME SHALL BE FIELD PRIMED AND THEN PAINTED. THE CONTRACTOR SHALL FOLLOW SPECIFICATION SECTION 09900 AND THE MANUFACTURER'S INSTRUCTIONS FOR THE INSTALLATION OF PRIMER AND PAINT COATINGS. CONTRACTOR SHALL INSTALL A MINIMUM OF (1) ONE COAT OF PRIMER AND A MINIMUM OF (3) COATS OF PAINT. PRIMER AND PAINT COLOR SHALL BE WHITE AND INCLUDE A CERAMIC INSULATING ADDITIVE.

ALUMINUM
DOORS AND FRAME
(SEE NOTE)
WATER SUPPLY
MANIFOLD

6'

CONDUIT FOR
LOW-VOLTAGE CONTROL
WIRING FROM CONTROLLER
TO MANIFOLD

HOSE BIB W/ VACUUM
BREAKER CONNECTED
TO SPRAY FEATURE
DRAINAGE MANIFOLD
LINE FOR WINTERIZING

5' DEPTH

GROUT HOLE WATER TIGHT
2" CI CITY WATER SUPPLY

NOTES/SPECIFICATIONS:

SECTION B-B

1. THE MANIFOLD PIT SHALL BE PRECAST CONCRETE BOX STRUCTURE. CONCRETE SHALL OBTAIN A STRENGTH OF 4000 PSI IN 28 DAYS. REINFORCING STEEL HAS A YIELD STRENGTH OF 60,000 PSI. THE PRECAST STRUCTURE SHALL MEET ASTM C-913, "PRECAST CONCRETE WATER AND WASTEWATER STRUCTURES."
2. PRECAST CONCRETE BOX SHALL BE CAST TO ACCOMMODATE SPECIFIED DOUBLE DOOR.
3. ALL PIPE OR CONDUIT PENETRATIONS SHALL BE GROUTED SOLID WITH NON-SHRINK GROUT.
4. ALL CONNECTIONS, JOINTS, ETC. SHALL MEET THE REQUIREMENTS OF THE PHILADELPHIA WATER DEPARTMENT AND PHILADELPHIA PLUMBING CODE.
5. PROVIDE SUPPORT OF ELEVATED PIPING AS REQUIRED.
6. WATER SUPPLY PIPING AND FITTINGS TO SPRAY FEATURES SHALL BE SCH. 80 PVC.
7. CONTRACTOR SHALL PROVIDE A MANIFOLD AND VALVE/HOSE BIBB W/ VACUUM BREAKER TO ALLOW FOR DRAINAGE OF SPRAY FEATURES AND WATER SUPPLY PIPING FOR WINTERIZATION.
8. CONTRACTOR SHALL VERIFY ELEVATION AND DEPTHS OF THE PIT AND LINES WILL PROVIDE POSITIVE DRAINAGE TO PIT.
9. CONTRACTOR SHALL KEEP DRAINAGE GRAVEL BELOW PIT FROM BEING CONTAMINATED WITH FINE MATERIALS AND SOIL.

SCALE: NTS

DATE: JANUARY

Appendix A

Philadelphia Parks & Recreation

Policy on Tree Preservation and Green Stormwater Infrastructure Projects

Objectives:

To ensure that the planting and removal of trees during Philadelphia Water Department (PWD) Green Stormwater Infrastructure (GSI) projects is consistent with the mission of the City of Philadelphia and the Parks & Recreation Department (PPR) goal of achieving 30% tree canopy cover in each neighborhood by the year 2025.

The City of Philadelphia has an existing tree canopy cover of 20%, with 50% of the existing canopy cover occurring within forested parks. The environmental benefits of trees are well known and include the significant capture of stormwater, lessening the burden to the city's combined sewer system.

This policy shall apply to all GSI projects proposed by PWD on land under the jurisdiction of PPR.

Guidelines:

During project design, PWD and/or their subcontracted designers and engineers, shall not create designs that result in the removal of healthy trees and/or disturbance to the critical root zone(CRZ)(1) or prohibited root zone(PRZ)(2) of adjacent trees. PPR arborists must have prior review of proposed GSI project designs located on PPR property, including projects that may impact street trees, to evaluate the health, species and condition of any trees that may be affected by GSI projects. PWD must provide a survey of the potentially impacted trees that includes the location and diameter at breast height (DBH) of each tree that might be impacted by any phase of the proposed construction, staging, storage, and access routes.

PPR shall allow PWD to remove trees that are in poor health, structurally unsound, potentially hazardous, or are an undesirable or invasive species. There shall be no requirement for replacement of these trees. PPR arborists shall be the defining authority on these decisions.

Under certain circumstances, individual healthy trees may need to be removed in order to maximize the benefits of a proposed GSI project. If PPR arborists determine this to be acceptable, PWD is required to provide replacement trees(3). If a project design will impact the CRZ(1) of adjacent trees, a PPR arborist will determine the level of that impact and recommend either appropriate action or the replacement of trees(3). PPR shall only allow a single disturbance (on one side) to the CRZ of an individual tree. Under no circumstances will PPR authorize the PRZ(2) of an adjacent tree be impacted by a proposed project. Trees that are 12" DBH or less shall not be considered to

possess a CRZ for the purposes of project review. However, they shall possess a PRZ.

Approvals for the removal, replacement, and CRZ disturbance compensation for all trees impacted by a proposed project shall be provided in writing by a PPR arborist, and confirmed by a PWD project manager. Replacement and/or compensation trees may be planted within the park that is being disturbed during the GSI project or in a nearby park, if feasible. If not feasible, PPR arborists will determine the location(s) for the replacement or compensation trees.

PWD must notify PPR arborists when any replacement trees have been planted so the work can be inspected and verified. If any replacement trees are street trees, it is required that the planting be completed by a qualified contractor who must obtain a street tree planting permit in advance. PWD shall provide a one year warranty and one year of maintenance for all replacement trees planted.

(1) The critical root zone is the area surrounding a tree equal to a distance of one foot radius for each one inch DBH of the adjacent tree, regardless of the presence of pavement and/or sidewalks.

(2) The prohibited root zone is the area surrounding a tree equal to a distance of one-half foot radius for each one inch DBH of the adjacent tree.

(3) Replacement trees shall be provided based on the DBH of the removed tree, with an equivalent number of caliper inches of 2-2.5" caliper balled and burlapped (B&B) trees. For example, the removal of a healthy 10" DBH tree shall require PWD to replant four B&B trees that are 2-2.5" caliper. Two trees shall be provided as compensation for the disturbance to the CRZ of one adjacent tree. Replacement trees shall be 2-2.5" caliper B&B trees.

Issued By:



Date: 22 January, 2018

Appendix B

PROJECT INCLUSIVITY CHECKLIST

Project Name:

Bid No.:

Contract No.:

Project Coordinator

NO.	DESCRIPTION	Designed	Installed
1	Accessible Route and orientation path around or through the playground		
2	Accessible restrooms		
3	Colors selected for autistic syndrome		
4	Surrounding fence		
5	Presence of a quiet space		
6	Signage for wayfinding		
7	Unitary surface (Poured in Place)		
8	Divide playground in zones of different level of challenge		
9	Sensory rich features to engage at least 5 of their sensory systems		
10	Swings to have at least one ADA seat and anti-wrap		
11	Social play - include different types of social play: solitary, parallel, cooperative		
12	Ground Level Play percentage above 25%		

PROJECT MANAGER (Signature):

Date:

PROJECT DIRECTOR (Signature):

Date:

Appendix C

PPR Signage Standard Manual.

Latest version available upon request.

Appendix D

Philadelphia Parks & Recreation

Policy to Address Tree Removal on Proposed improvements within lands under the Jurisdiction of Philadelphia Parks & Recreation

- 1) The City of Philadelphia has an existing tree canopy cover of 20% with the goal of achieving 30% tree canopy cover in each neighborhood by the year 2025. Approximately 50% of our existing canopy cover occurs within our forested parks.
- 2) Among other environmental benefits, trees are known to provide significant capture of stormwater.
- 3) The removal of trees for the installation of new projects is counter to both the Philadelphia Parks & Recreation (PPR) goal to increase tree canopy cover and PW's goal of reducing stormwater runoff discharging to the Combined Sewer System (CSS).
- 4) During project design, PPR and/or their subcontracted design professionals, shall avoid creating designs that result in the removal of healthy trees and shall also avoid disturbance to the Critical Root Zone of adjacent trees. The CRZ is the area surrounding a tree equal to a distance of one (1) foot radius for each one (1) inch diameter of the adjacent tree, measured at breast height (DBH). It shall be understood that the CRZ extends in a complete circle surrounding a tree, uninterrupted by pavement or structures.
- 5) PPR Arborists will work with design professionals to review projects located within parks/recreation centers or those that are under the jurisdiction of the Street Tree Management Division (STMD) during early phases of design development (Concept Design and 30% design) in order to evaluate the health, species and condition of trees that may be impacted by new projects. Design professionals survey must include the location and diameter at breast height (DBH) of any trees that might be impacted by proposed construction, including, staging, storage, and access routes.
- 6) PPR shall allow design professionals to remove trees that are in poor health; that are structurally unsound and pose a risk to the public; or are of an undesirable species (i.e. invasive). There shall be no requirement for replacement of these trees. PPR/STMD Arborists shall be the sole arbiter to make these determinations.
- 7) It is understood that under certain circumstances, individual healthy trees may need to be removed in order to maximize the capture of stormwater within GSI, reducing discharges to CSS, which results in long-term benefits to all citizens of the City of Philadelphia.
- 8) Under the circumstances described above under item #7, PPR Arborists shall allow the removal of healthy trees; however, design professionals shall be required to designate replacement trees. Replacement trees shall be provided based on the DBH of the tree that is removed. with an equivalent number of caliper inches of 2-2.5" caliper Balled and Burlapped (B&B) trees. For instance, the removal of a healthy 10"DBH tree shall require design professionals to replant four (4) B&B trees that are 2-2.5" caliper.

9) It is understood that certain project designs will impact the CRZ of adjacent trees. Under these circumstances, and with the approval of PPR Arborist, design may impact the CRZ.

10) Under the circumstances described above under item #9, PPR shall allow the disturbance to the CRZ; however, Designer shall be required to provide compensation trees. Two (2) trees shall be provided as compensation for the disturbance to the critical root zone of an adjacent tree. Replacement trees shall be 2-2.5" caliper B & B trees. PPR shall only allow a single disturbance (i.e. "on one side") to the CRZ of an individual tree.

11) Replacement and/or compensation trees may be planted within the park that is being disturbed for installation of improvements; in a nearby park, if feasible. If not feasible, PPR arborists will determine the location(s) for the replacement/compensation trees.

12) Under no circumstances will design be allowed to impact the Prohibited Root Zone (PRZ). The PRZ is the area surrounding a tree equal to a distance of one-half (1/2) foot radius for each one (1) inch diameter of the adjacent tree, measured at breast height (DBH).

13) Trees that are 12" DBH or less shall not be considered to possess a CRZ zone for the purposes of project review under this agreement. They shall however possess a PRZ.

14) Approvals for removal of healthy unhealthy trees; removal of healthy trees; disturbance to CRZ's; and requirements for replacement or compensation trees shall be provided, in writing, by PPR Arborists and confirmed by design professionals.

15) Design professionals must notify PPR Arborists when any replacement or compensation trees have been planted so the work can be inspected and verified. If any replacement or compensation trees are street trees, it is required that the planting be completed by a qualified contractor who must obtain a street tree permit before planting the trees. PPR arborists can provide an up-to-date list of qualified contractors upon request.