ATLANTA PUBLIC SCHOOLS

Making A Difference

APS Standard Specifications v2.10

Issued: July 1, 2008

Latest Revision: December 1, 2010

ATLANTA PUBLIC SCHOOLS

Valerie Dial Thomas Facilities Services Center

1631 LaFrance Street NE

Atlanta GA 30307

Phone: 404-802-3736

Fax: 404-802-3897

TABLE OF CONTENTS

SECTION 06 41 13
SCIENCE LABORATORY CASEWORK FOR HIGH SCHOOLS

PART 1 GENERAL

1.1 SUMMARY

A. The work under this heading shall include furnishing of all prefabricated base, wall and tall cabinets, and related items for science classroom casework as shown on drawings and specifications as required to complete the work.

B. The types, location and extent of manufactured wood casework as shown on drawings.

1.2 DESCRIPTION OF WORK

A. Furnish all institutional science laboratory casework including tops, splashes, supporting structures, mechanical service fixtures and all other miscellaneous items of equipment as listed in the specifications, equipment schedules, or as shown on the drawings. Fabricate and deliver to building, unload, unpack, set in place, level and securely fasten and scribe to walls as required, ready for mechanical and electrical connections which will be done as specified under other divisions. All work shall be strictly in accordance with this specification.

B. The contractor shall remove all dirt and debris left in the casework. After the job is complete, the equipment and room shall be cleaned and ready for use.

C. The casework supplier shall make cutouts and drilled holes in counter tops for insertion of sinks, faucets, gas cocks and other electrical and plumbing items.

1.3 WORK PROCEDURE

A. All sinks, faucets, service fixtures, and electrical fixtures specified in equipment schedules or shown on drawings shall be furnished by the casework supplier and turned over to their respective trades ready for mounting onto countertops and to be mechanically connected as specified under other divisions of these specifications.

B. All sink traps to be furnished and connected to sinks under the plumbing section of these specifications.

C. Furnishing and installing of all framing, metal, wood grounds, reinforcements for walls, floors or ceilings to adequately support casework and related equipment shall be furnished and installed by the General Contractor.

D. The General Contractor shall be responsible for protection and security after installation is complete.

E. Faucets shall have volume control.

1.4 QUALITY ASSURANCE

A. Firm must have prior approval from the Atlanta Public Schools Construction Management Team and an individual assigned to handle Atlanta Public School Projects.

B. Firm shall submit verification that they have five years experience in the manufacturing and installation of science laboratory casework and equipment.

C. Firm must be capable of supplying oak or maple finishes.

1.5 SUBMITTALS

A. Shop drawings shall be prepared showing joining and dimensions of casework. Specified copies shall be submitted to the Architect for his written approval before work is performed. The Architect shall retain one copy of the approved shop drawings and shall forward remaining copies to the Contractor.

B. Product data for each type of product including service fixtures shall be provided.

C. At architects request full size base and wall cabinets shall be provided and kept on job site until project completion.

1.6 COORDINATION

A. Verify field conditions and dimensions.

B. Field measurements shall be taken to verify that the equipment will fit into the designated spaces. Entryways, corridors and door openings shall be verified to insure that the equipment is manufactured in a manner to permit it to be moved into the desired locations. The casework supplier shall be fully responsible for checking these conditions prior to fabrication.

C. Coordinate all work of this section with related trades.

1.7 WARRANTY

A. Casework contractor will guarantee to replace or repair, at no expense to the Owner, all materials of his manufacture found to be defective within one year of acceptance, due to defective materials and/or workmanship.

PART 2 GENERAL

2.1 WOOD CABINETS

A. Solid Woods

1. Exposed solid woods shall be Oak, air dried a minimum of one year, kiln dried to a moisture content of not more than 7 percent. All wood to be clear and free from knots and other defects.

2. Unexposed solid woods may be any suitable hardwood specie, unselect as to grain or color but free of defects affecting structural soundness.

B. Oak Veneer Plywood

1. Exposed panels for ends, tops, bottoms and shelves shall be ¾” thick oak veneer plywood. Face veneers shall be oak.

2. Unexposed panels for interior construction shall be ¾" thick oak veneer plywood. Face veneers will be unselect for color.

C. Hardboard

1. Hardboard may only be used for unexposed cabinet backs and shall be ¼" thick 48lb medium density fiberboard.

2.2 CABINET CONSTRUCTION

A. General

1. All cabinets shall be manufactured to the highest degree of cabinet making practice and shall be panel type construction.
2. Structural joints shall be assembled using glue and deep-thread screws for optimum strength.
3. Horizontal top frames or panels, intermediate rails and bottoms shall be tenoned and let into routed end panels
4. Back panels shall be recessed and let into routed end panels.

B. Base Cabinets

1. End Panels shall be ¾" thick, oak veneer, plywood panel with ¼" x ¾" Solid oak front edge band. End panels shall be machined to receive top frame, intermediate hardwood rails, bottom panels and backs.
2. Top frame shall be solid hardwood with ¼" x 1 1/8" " solid oak front edge band. Frame shall consist of 1 1/8" x 2 ¼" front rail; ¾"x1 ¾" back rail; ¾"x 1 ¾" side members, and be assembled using glue and brads, mortise and tenon construction. Frame will have full-length tenons that let into routed end panels and are glued and screwed. Dowel and pin construction ***not*** acceptable.
3. Bottom panels shall be ¾" thick, oak veneer, plywood panel with ¼" x ¾" solid oak front edge band. Bottoms shall have full-length tenons that let into routed end panels and glued and screwed. Dowel and pin construction ***not*** acceptable.
4. Intermediate horizontal rails between drawers shall be ¾" x 2 ¾" oak veneer plywood with 1/24" oak veneer edge band, let into end panels and are glued and screwed. Where locks are specified, ¼" thick medium density fiberboard dust panels shall be provided between rails and let into end panels.
5. Vertical partitions shall be ¾" thick, oak veneer, plywood panel with ¼" x ¾" solid oak front edge banding.
6. Unexposed back panels will be ¼" thick 48lb. Medium density fiber-board let into routed end panels and screwed to top frame and bottom
7. Exposed backs in open front cases shall be ¼" thick, oak veneer plywood, finish to match exterior.
8. Finished exterior backs shall be ¾" thick oak plywood panels.

9. Hanger rails to be ¾" x 3 ½" screwed into end panels with slot mortise screws, and screwed through back into top frame.
10. Adjustable shelves shall be adjustable on 32MM centers by use of shelf supports set into 5MM diameter holes.
11. Shelves shall be ¾" thick oak veneer plywood core panel with 1/24" oak veneer front edge banding. ¼" Solid oak banding available if specified.
12. Adjustable shelves over 35" long shall have ¾" x 1 ¼" solid oak front rail stiffener.
13. Fixed shelves shall have full length tenons that let into routes end panels and are secured with glue and mortise slot screws.
14. Hinged doors described under "HINGED DOORS".
15. Drawers described under "DRAWERS".
16. Toe board shall be ¾" thick of suitable material. Where finished wood base is specified, toe board shall be solid oak.

C. Wall Cabinets

1. End panels shall be ¾" thick oak plywood panel with ¼" x ¾" solid oak front edge band. End panels shall be machined to receive top panels, bottom panels and backs.
2. ¾" Thick oak veneer, top panel will have full length tenons let into routed end panels and top rail and securely glued and screwed using slot mortise screws. Dowel and pin construction *not* acceptable.
3. ¾" Thick, oak veneer, bottom panel will have full length tenons let into routed end panels and bottom rail securely glued and screwed using slot mortise screws. Dowel and pin construction *not* acceptable.
4. ¾" x 2 ¼" Solid oak top rail and ¾" x 1 ¾" solid oak bottom rail will be mortised and tenoned into end panels and top and bottom panels to make rigid the front frame.
5. Unexposed back panels will be ¼" thick 48lb. Medium density fiberboard let into end panels and screwed to top and bottom.
6. Exposed backs in open front cases shall be ¼" thick oak veneer plywood finished to match exterior finish.
7. Top hanger rails to be ¾" x 3 ½" screwed into end panels with slot mortise screws and screwed through back into top panel.
8. Bottom hanger rails to be ¾" x #1/2" screwed into end panels with slot mortise screws and screwed through back into bottom panel.
9. Adjustable shelves shall be adjustable on 32MM centers by use of shelf supports set into 5MM diameter holes.
10. Shelves shall be ¾" thick, oak veneer plywood panel with 1/24" oak veneer front edge banding. ¼" Solid oak banding available if specified.

11. Adjustable shelves over 35" long shall have ¾" x 1 ¼" solid oak front rail stiffener.
12. Fixed shelves shall have full-length tenons that let into routed end panels and glued and secured with mortise slot screws.
13. Hinged doors described under "HINGED DOORS".

D. Tall Cabinets

1. End panels shall be ¾"thick, oak veneer plywood panel with ¼" x ¾" solid oak front edge band. End panels shall be machined to receive top panel, bottom panels and backs.
2. Top panel shall be ¾" thick, oak veneer, plywood oak with ¾" x 2¼" solid oak rail mortised to receive tenoned top. Top panel will have full length tenons that are let into routed end panels and securely glued and screwed using slot mortise screws. Dowel and Pin construction is *not* acceptable.
3. Bottom panels shall be ¾" thick oak plywood panel with ¼" x ¾" solid oak front edge band. Bottom panels will have full-length tenons that are let into routed end panels, glued and screwed, using slot mortise screws. Dowel and pin construction is *not* acceptable.
4. Unexposed back panels will be ¼" thick 48 lb. Medium density fiberboard let into end panels and screwed to top and bottom.
5. Exposed backs in open-front cases shall be ¼" thick, oak veneer plywood, finish to match exterior.
6. Center hanger rails to be ¾" x 3 ½" screwed into end panels with slot mortise screws and screwed through back into top panel.
7. Bottom hanger rails to be ¾" x 3 ½" screwed into end panels with slot mortised screws.
8. Adjustable shelves shall be adjustable on 32MM centers by use of shelf supports set into 5MM diameter holes.
9. Shelves shall be ¾" thick, oak veneer, plywood panel with 1/24" oak veneer front edge banding. ¼" Solid oak banding available if specified.
10. Adjustable shelves over 35" long shall have ¾" x 1 ¼" solid oak front rail stiffener.
11. Fixed shelves shall have full-length tenons that let into routed end panels and are glued and secured with slot mortised screws.
12. Hinged doors described under "HINGED DOORS".
13. Toe board shall be ¾" thick of suitable material. Where finished base is specified, toe board shall be solid oak.

F. Hinged Doors

1. All panel and glazed doors shall be contoured edge, flush overlay design. Panel doors to be ¾" thick, oak veneer, medium density fiber wood with a 3/8" solid oak edge band with ¼" radius on all outside edges. Doors shall

over-lap door opening ½" on all sides. Glazed doors shall have ¾ x 3" solid oak rails and stiles, and be lapped and dowel construction. Frames will be glazed with 1/8" DSB glass secured with a plastic panel retainer on backside of door. Each door will have two hinges per door except doors over 48" high, which will have three hinges per door.

G. Drawers

1. Drawer fronts shall be ¾" thick solid oak radiused ¼" on outside edges to match door style. Fronts shall be applied to sub-box consisting of ½" thick, 9 ply birch plywood sides, front and back, and featuring French dovetail joinery. Sub-box sides, front and back shall be grooved to receive ¼" hardboard bottom. Bottoms shall be additionally reinforced by use of hot malt glue bead on perimeter of underside. Drawers shall operate on powder coated metal drawer slides having 100 lb load rating. Dowel and pin construction is an acceptable alternative for drawer boxes only.

H. Cabinet Hardware and Accessories

1. Pulls shall be bar type 4" long aluminum with satin anodized finish and mounted with two #8-32 plated machine screws.
2. Hinges shall be five-knuckle wrap-around institutional type, allowing for 270 degree swing, 2 ¾" high, 0.095 gauge steel with powder coated chrome satin finish. Hinges shall be secured to cabinet body with four screws and to doors with four screws.
3. Door catches on base and wall cabinets without locks shall be heavy-duty roller type (Ives 338) mounted on inside of each door. Strike shall be plated steel mounted on inside of cabinet.
4. Locks where specified on base and wall cases shall be cam type Re-Mov-A-Core with nickel-plated lock noses. Locks shall be furnished with two keys each and subject to master keying.
5. Locked base and wall cabinets shall have one roller on active door catch and one elbow catch on inactive door.
6. Tall cases shall have a latching handle with an integral lock mechanism operating with a one-quarter turn. Double door cases shall have an inactive handle on the LH door. Locks shall be cam type with nickel-plated noses. Locks shall be furnished with two keys each and subject to master keying. Activation of the three point latching system tightly closes the doors (or door) by engaging keepers secured to the top and bottom panels and by a latch plate, which engages the end panel of single door cabinets or falls behind the LH door of double door cabinets.
7. Drawer slides shall be powder-coated steel with nylon rollers and a load capacity of 100 pounds per pair (Grass 6620 or equal).

I. Glass Doors

1. Framed glass sliding doors shall be constructed of solid oak ¾" x 3" top and bottom rails mortised into ¾" x 3" stiles. Frames glazed with 1/8" DSB glass secured with a plastic panel retainer on backside of door. Each door to have recess mounted pull. Doors to operate on plastic track with plastic

top guide and plastic roller with adjustable steel spindle let into bottom of door.

2. Frameless glass sliding doors shall be ¼" plate with all exposed edged polished. Doors shall operate on an aluminum track assembly with steel ball bearing rollers.

J. Table Assemblies

1. Table frames shall be solid oak with ¾" thick x 5" high rails. Rails over 72" long shall be 1 1/8" thick. Rails with book compartments or drawers shall have cross rails grooved and glued into front and back rails on either side of the drawer or book compartment opening. Rails shall be joined at corners by means of metal corner brace tenoned and screwed into rails.

2. Table legs shall be 2 ¼" square oak. Legs shall be secured to rails with a 3/8" diameter steel lag bolt passing through metal brace and threaded into leg.

K. Finish

1. All cabinets, storage, and specialized units shall be factory finished with an acid, alkali, solvent, water and abrasive resistant finish. Surfaces must be thoroughly sanded for removal of loose fibers, scratch marks, or abrasions. Finish on all exposed exterior surfaces shall consist of one coat of stain, one coat of sealer and two coats of synthetic top coat; sanded between coats to give proper color and sheen to surface. Unexposed interiors shall be finished with one coat of sealer and one coat of synthetic topcoat. Stain colors to be selected from manufacturer's standard finishes. The exterior finish of laboratory casework shall be capable of withstanding the following tests, with no change or slight change of gloss, slight discoloration or slight temporary softening of film with no loss of adhesion and no loss of film protection.

Spot Testing – Sixteen different liquids were applied to the surface for one hour at room temperature. The reagents were then removed by washing with water and wiping with soft cloth. The results were as follows:

Reagents	**Results**
Hydrochloric Acid, 37%	No visual effect or softening
Nitric Acid, 25%	No visual effect or softening
Phosphoric Acid, 75%	No visual effect or softening
Sulfuric Acid, 50%	No visual effect of softening
Glacial Acetic Acid	Softening and slight discoloration
Sodium Hydroxide, 29%	No visual effect or softening
Ammonium Hydroxide, 28%	No visual effect or softening
Methyl Alcohol	No visual effect or softening
Ethyl Alcohol	No visual effect or softening

Methyl Ethyl Ketone	No visual effect of softening
Chloroform	No visual effect or softening
Carbon Tetrachloride	No visual effect or softening
Formaldehyde	No visual effect or softening
Tomato Juice	No visual effect or softening
Orange Juice	No visual effect or softening
Merthiolate	No visual effect or softening

Ultraviolet Exposure

One panel was exposed to UV light in an ultraviolet condensation cabinet in accordance with ASTM G-53. The testing consisted of 24 hours of continuous exposure using UVB – 313 bulbs. Slight darkening was noted.

Abrasion Resistance

The abrasion resistance was tested in accordance with ASTM D-4060, taber abrasion. For this testing a load of 1000gms and CS10 wheels were used. The panel was weighed before and after testing which revealed a weight loss of 0.156 grams per cycle.

L. Counter Tops

1. Epoxy resin tops molded from epoxy resin compounds and cured to give optimum physical and chemical resistance properties. Tops shall be a uniform mixture throughout their full thickness and not depend upon a surface coating for chemical or stain resistance. All exposed edges shall have 1/8” x 45-degree chamfer. Tops shall be non-glaring Black in color and 1” thick. 4” high loose back splashes shall be supplied and installed at wall elevations.

2.3 MECHANICAL SERVICE FIXTURES

A. General

1 All sinks, faucets, service fixtures and electrical fixtures specified in equipment schedules or shown on drawings shall be especially designed for laboratory use and comply with all local codes.

B. Description

1. Fixtures for water, gas and other related services should be of the highest quality, 85% copper content, brass castings and forgings. Fixtures shall be provided complete with supply nipples, locknuts and tailpieces where applicable for attachment and connection to laboratory furniture and casework. Finish shall be polished chrome over nickel unless otherwise specified.

2. Electrical receptacles shall be 3-wire grounded type, 15A, 125V.AC, unless otherwise specified. Electrical boxes mounted in rails shall be

cadmium-plated steel. Pedestal type boxes shall be polished, cast aluminum with nipples and locknuts. Provide stainless steel cover plates.

3. Epoxy resin sinks; sink outlets and overflows shall be modified epoxy resin, molded in one piece and cured to give optimum physical and chemical resistance. All items shall be Black with low gloss and possess high resistance to mechanical and thermal shock. Interior corners coved to 1 ½ "radius with bottom pitched to outlet opening. Sinks and outlets shall be installed in accordance with the manufacturers recommendations and shall comply with all local codes. *(Tail pieces to be provided by the plumbing contractor.)*

2.4 FUME HOODS

A. Description

1. Superstructure: Rigid self-supporting assembly of double wall construction with a minimum 16-gauge powder coated channel.
2. Exhaust outlet: corrosion resistant stainless steel.
3. Sash: full view type with clear unobstructed view.
4. Fume hood liner: white poly-resin.
5. By-Pass type hood to allow no more than 3-1/2 times increase in face velocity as measured when sash is fully open.
6. Hood to be provided with explosion proof light.
7. Blower and light switch to be mounted on face of hood.
8. Hood should have capability of being provided with electric outlet, gas outlet and cold-water outlet if desired.
9. Blower and ductwork to be provided and installed by mechanical contractor.

PART 3 INSTALLATION

3.1 DESCRIPTION

A. Install casework in accordance with approved shop drawings and manufacturers recommendations.

B. All components shall be fully assembled, installed and securely fastened in place, plumb and level, in complete working order. Final mechanical and electrical connections shall be made as outlined in other divisions of these specifications.

C. Casework contractor shall be responsible for verifying all dimensions and conditions in field prior to fabrication and delivery.

D. Casework contractor shall coordinate installation of all casework with plumbing, mechanical, and electrical contractor.

SECTION 06 41 16
LAMINATE CASEWORK

PART 1 GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Plastic laminate cabinets (casework)
2. Countertops
3. Reception Counters
4. Mail units
5. Tall storage and teacher wardrobe units
6. Coat Racks

1.2 SUBMITTALS

A. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

B. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples for verification purposes of the following:

1. Plastic laminate
2. Core materials
3. Plastic laminate interior lining
4. Hardware

D. Qualification data for firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, architects and owners, and other information specified.

1.3 QUALITY ASSURANCE

A. Firm must have prior approval from the Atlanta Public Schools construction management team, and an individual or individuals specifically assigned to handle Atlanta Public Schools projects.

B. Single source manufacturing, fabrication, and installation responsibility is required.

C. Firm must have capability of supplying sizes other than standard nominal sizes of materials at no additional cost.

D. Firm must have capability of supplying equivalent styles of casework with oak or maple veneer, in lieu of plastic laminate, at an additional charge.

E. Firm must have capability of supplying casework within six (6) weeks notice, pending availability of accurate dimensions.

F. Only firms with financial stability and a minimum of five (5) years experience in similar scope casework manufacturing will be considered.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect casework during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver casework until painting, wetwork, grinding, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas.

1.5 PROJECT CONDITIONS

A. Environmental Conditions: Obtain and comply with casework manufacturer's and installer's coordinated advice for optimum temperature and humidity condition for casework during its storage and installation. Do not install casework until these conditions have been attained and stabilized, so the casework is within plus or minus one percent (1%) of optimum moisture content from date of installation through remainder of construction period.

B. Field Measurements: Check actual project field dimensions before manufacturing casework. Show recorded measurements on final shop drawings. Coordinate fabrication with construction schedule to avoid delay of work.

C. Verify locations of necessary concealed framing and supports with prospective trades.

PART 2 PRODUCTS

2.1 MATERIALS

A. Corestock: All case members, tops, bottoms, sides, doors, drawer fronts, and drawer bodies shall be ¾"–thick 9-ply closed grain plywood. Casebacks shall be ¼"-thick closed grain hardwood plywood. All base cabinets shall have ¾" 9-ply hardwood solid tops (base cabinet is independent of countertop). Plywood shall have Type-II water-resistant glue. (*Particle board is not acceptable.*)

B. Laminated Plastic: All laminated plastic shall be high-pressure laminate, conforming to N.E.M.A. Specification LD3-1985. The laminated sheets shall be laminated to the corestock, under pressure with water-resistant adhesive, to accomplish a Type-II bond for all components.

1. Provide high-pressure laminates manufactured by one of the following:

   a. Ralph Wilson Plastics

   b. Formica Corporation

   c. Nevamar Corporation

2. Surfaces laminated as follows:

   a. Countertop and Backsplash: .050 general purpose grade laminate

   b. All other exposed surfaces: .030 high-pressure plastic laminate

   c. Semi-exposed surfaces: .030 high-pressure plastic laminate (melamine is not acceptable)

   d. Concealed surfaces: .030 high-pressure plastic laminate backer sheet

C. Cabinet Body Edge Banding: Color coordinated 1mm PVC edgebanding shall be applied to all edges with 100% solids adhesive at 215-degrees Celsius, under 3000 pounds pressure. Colors as selected from a manufacturer's standard color chart.

D. 3mm PVC edgebanding shall be applied to door and drawer fronts.

2.2 FABRICATION, GENERAL

A. All cabinet members, bottoms, sub-top, sides, and back shall be joined by dado and rabbet joints, secured with glue, and concealed mechanical fasteners. All case backs shall have 3" anchor cleat the full width of the unit at the top and at the bottom, secured in rabbet over the back.

B. Case construction butt joints with dowel pins are ***not*** acceptable. Cabinet interior sides drilled to receive shelf pins, leaving core exposed is ***not*** acceptable.

C. Toe kick shall be constructed from solid lumber and integral with case. Loose toe kicks are ***not*** acceptable.

2.3 HARDWARE

A. Hinges shall be heavy-duty institutional type 2-Kl "five knuckle", hospital tip, .095 gauge, 270-degree swing, with satin chrome finish. Hinge wings shall overlap interior cabinet side and back of door.

B. Door and drawer pulls shall be ¼" wire pull with satin chrome finish and mounting hole 4" o.c.

C. Door catches shall be heavy-duty magnetic type, attached with two (2) screws and slotted for adjustment.

D. Elbow catches shall be spring-type with strike, zinc plated.

E. Shelf supports shall be heavy-duty with horizontal slots spaced ½" o.c., with removable clips. Shelf pins and holes are ***not*** acceptable.

F. Drawer slides shall be epoxy powder-coated and have a minimum of 75 pounds of support capacity.

G. Locks shall be disc tumbler, grooved key type, with bright plated cylinder and cam. Locks shall be installed as shown on plans or as instructed by Owner.

H. Tote trays shall be vacuum-formed of high-impact polystyrene plastic, unbreakable in normal use. Each tray shall be equipped with label holder.

2.4 COUNTERTOPS

A. All countertops shall be high-pressure decorative laminate with surface, edging, and backsplashes to have .050 grade laminate.

B. Countertop core material shall be ¾"-thick 9-ply closed grain hardwood plywood. Front and exposed sides countertop thickness shall be 1-1/2". Particleboard is *not* acceptable.

C. ¾"-thick plywood backsplashes are to be supplied loose at heights and lengths, per job requirements.

PART 3 EXECUTION

3.1 PREPARATION

A. Before installing, examine shop-fabricated work for completion, and then finish work as required.

3.2 INSTALLATION

A. Quality Standard: Use factory-certified installers with a minimum of five (5) years experience in similar scope casework installation

B. Install casework plumb, level, true, and straight with no distortions. Shim, as required, using concealed shims. Install to a tolerance of 1/8" in 8'0" for plumb and level and with no variation in adjoining surfaces.

C. Scribe and cut fillers to fit adjoining work.

D. Anchor casework to contractor-furnished backing or drywall studs. Counter-sink or use finish washers on all anchors. Backsplashes shall be screwed to countertop. Glued down backsplashes are *not* acceptable. Side splashes may be glued.

E. Caulk between countertop and backsplash, backsplash and wall, and cabinet/filler and wall. Color of caulking shall be compatible with finishes used for particular project.

3.3 ADJUSTMENT AND CLEANING

A. Repair any damaged or defective casework. If not repairable, replace any damaged or defective casework.

B. Clean, lubricate, and adjust hardware.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner that is acceptable to manufacturer and installer and that insures casework is being without damage or deterioration at the time of final acceptance.

END OF SECTION 06 41 16

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes items know commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:

1. Hinges
2. Continuous hinges
3. Key control system
4. Lock cylinders and keys
5. Lock and latch sets
6. Bolts
7. Exit devices
8. Push / Pull units
9. Closers
10. Overhead holders
11. Door trim units
12. Protection plates
13. Weatherstripping for exterior doors
14. Sound stripping for interior doors
15. Automatic drop seals (door bottoms)
16. Astragals for meeting seals on pairs of doors
17. Thresholds
18. Electric Strikes
19. Magnetic Door Holders

C. Related Sections: The following Sections contain requirements that relate to this section:

1. Section 08 11 00: Metal Doors and Frames
2. Section 08 14 00: Wood Doors
3. Section 08 41 13: Aluminum Framed Entrances and Storefronts
4. Division 26 Electrical
5. Section 28 13 00: Access Control Systems

1.3 REFERENCES

A. Standards of the following as referenced:

1. American National Standards Institute (ANSI)
2. Door and Hardware Institute (DHI)
3. Factory Mutual (FM)
4. National Fire Protection Association (NFPA)
5. Underwriters' Laboratories, Inc. (UL)
   a. UL 10C – Fire Test Door Assemblies
6. Warnock Hersey

B. Regulatory standards of the following as referenced:

1. Department of Justice, Office of the Attorney General, Americans with disabilities Act, Public Law 101-336 (ADA)
2. Georgia Accessibility Code for Buildings and Facilities 120-3-20
3. ICC / ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People, 2003 edition.
4. 2006 International Building Code (IBC).
5. 2006 National Electric Code (NEC)

1.4 SYSTEM DESCRIPTION

A. Refer to applicable headings for system description for electric and electro-pneumatic hardware products

B. The general intent of the door hardware system is to use cylindrical locksets on interior doors and mortise locksets with deadbolt functions on exterior doors.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final hardware schedule coordinated with doors, frames and related work to ensure proper size, thickness, hand, function and finish or door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "Hardware Sets" indicating complete designations of every item required for each door opening. Use specification heading numbers with any variations suffixed a, b, etc. Include the following information:

a. Type, style, function, size, and finish of each hardware item.

b. Name and manufacturer of each item.

c. Fastening and other pertinent information.

d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

e. Explanation of all abbreviations, symbols, and codes contained in the schedule.

f. Mounting locations for hardware.

g. Door and frame sizes and materials.

h. Keying information.

i. Cross-reference numbers used within schedule deviating from those specified.

1) Column 1: State specified item and manufacturer.

2) Column 2: State prior approved substituted item and its manufacturer.

2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.

3. Keying Schedule: Submit a separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks have been fulfilled.

D. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

E. Contract closeout submittals:

1. Operation and maintenance data: Complete information for installed door hardware.

2. Warranty: Completed and executed warranty forms.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the projects vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project that employees an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

2. Prior to installation of hardware, the manufacturers' representatives shall hold a jobsite meeting to instruct the installing contractors' personnel on the proper installation of their respective products. The training shall be attended by installers of hardware (including electrical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedule, templates and physical product samples.

3. The manufacturer's representative(s) for the life safety and security products shall inspect and approve the installation of the products they represent. Any identified installation of product issues shall be directed to the attention of the Architect for the purpose of generation the final punch list.

C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80, and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type / size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the hardware scheduled or not. All hardware shall comply with standards of the 2000 IBC and UL 10C.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with fire exit hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

1.7 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is the responsibility of the supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in the same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation.

1.8 WARRANTY

A. Special warranties:

1. Door Closers: Ten-year period
2. Exit devices: Five-year period
3. Locks and cylinders: Three-year period
4. Electric Strikes: One-year period
5. Mechanical Pushbutton Lock: Two-year period
6. Hinges and Power Transfer Hinge: Three-year period

1.9 MAINTENANCE

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

PART 2 PRODUCTS

1.1 MANUFACTURED UNITS

A. Hinges:

1. Acceptable manufacturers:
   a. Hager Hinge Company
   b. Bommer
   c. McKinney
2. Characteristics:
   a. Templates: Provide only template-produced units.
   b. Screws: Provide Phillips flat-head screws complying with the following requirements:
      1) For metal doors and frames install machine screws into drilled and tapped holes.
      2) For wood doors and frames install threaded-to-the –head wood screws.
      3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.

4) Finish screw heads to match surface of hinges or pivots.

c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:

1) Out-Swing Exterior Doors: Non-removable pins.

2) Interior Doors: Non-rising pins.

3) Tips: Flat button and matching plug. Finish to match leafs.

d. Provide security studs on all exterior door hinges.

e. Size: Size hinges in accordance with specified manufacturer's published recommendations.

f. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2 –1/2 feet or fraction thereof.

g. Provide matching power transfer hinge when required to provide power and /or monitoring circuitry to door-mounted hardware. Coordinate gage and quantity of wires required.

B. Continuous Hinges:

1. Acceptable manufactures:

a. ABH.

b. Select Products

c. Zero

d. McKinney

2. Characteristics:

a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.

b. All Hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.

c. Vertical door loads shall be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180 Degrees.

d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.

e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix – FR) shall meet the required ratings without the use of auxiliary fused pins or studs.

C. Cylinders and Keying:

1. Acceptable manufacturers:

a. Best Access Systems Standard 7-pin IC core.

b. *Best Access MX-8 for exterior, MDF and IDF Rooms*

2. Characteristics:

a. Exterior and Interior doors that require a keyed cylinder must be able to accept small format 7 pin interchangeable cylinder cores by Best Access Systems.

b. Cores shall be of the shall format size and material to conform to the present industry standards, Cores and Keys will be stamped with applicable key mark for identification. This key mark will not include the actual key cuts.

c. Permanent keys will be stamped with a word or phrase which will visually identify the as patented or restricted from duplication.

d. Permanent cores and keys shall either be delivered through secure Mail, or picked up by the Owners Representative.

e. Permanent core shall be keyed by the manufacturer, combinated in sets master keyed or grand master keyed as directed by the Owner. Permanent keys and cores shall be stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts, Permanent keys will also be stamped “DO NOT DUPLICATE”. Key and core identification stamping to be approved by Owner. Failure to properly comply with these requirements may be cause to require replacement of all or any part of the cylinders and keys involved a deemed necessary at no additional cost to the Owner.

f. Equip locks with cylinders for interchangeable-core pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.

g. Furnish final cores and keys for installation by Owner.

h. Comply with Owner’s instructions for master keying and , except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE".

i. Key Quantity: Furnish 3 change keys for each lock, This system will consist of a Grandmaster, Masters, Sub-Masters, Operating and Control keys.

1). Deliver keys to Owner

j. Provide a permanent interchangeable Core (IC) patented keying system. Patent will not expire before the year 2013

k. Provide owner or its designated representative, with a copy of all keying codes associated with the system.

l. Provide the Owner with all Service Equipment and Booklets required to properly maintain system equipment and hardware.

m. Provide the services of a hardware supplier within a 50 mile radius of Atlanta, GA which will have the required material and supplies on hand at all times.

n. Provide a consultant, which shall be available to the Owner during normal work hours.

C. Locksets, Latchsets, and Deadbolts:

1. Acceptable manufacturers:

a. Best Access Systems 40H Series (for exterior doors when exit devices is not required)

b. Best Access 93K Series (for interior doors) All classroom doors shall be equipped with the "INT" INTRUDER lock function.

c. Best Access 83T7S (for student restrooms when applicable)

d. Mortise Locksets and Latchsets: as scheduled

a. Chassis: cold-rolled steel, handing field changeable without disassembly.

b. Latchbolts: ¾- inch throw stainless steel anti-friction type.

c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent breakaway.

d. Thumbturns: accessible design not requiring pinching or twisting motions to operate.

e. Deadbolts: stainless steel 1-inch throw.

f. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.

g. Certifications:

1) ANSI A156.13, 1994 Grade 1 Operational, Grade 2 Security.

2) ANSI/ASTM F476-84 Grade 30 UL Listed.

h. Back set Dimension (2 ¾")

E. Exit Devices:

1. Acceptable manufacturers:

a. Von Duprin 98/99 Series

2. Characteristics:

a. Exit devices shall be "UL" Listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."

b. All exit devices mounted on labeled wood doors shall be thru-bolted mounted on the door per the door manufacture's requirements.

c. All trim shall be thru-Bolted to the lock stile case.

d. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, plated, anodized, or powder coated to the standard architectural finishes to match the balance of the door hardware.

e. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.

f. All exit devices shall be by one manufacturer. No deviation will be considered.

g. All series exit devices shall incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. All exit devices shall be non-handed. Touchpads shall extend minimum of half of the door width and shall be minimum of 2-3/16" in height. Plastic touchpads are ***not*** acceptable. All Latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated Latchbolts are ***not*** acceptable. Plastic linkage and "dogging" components are ***not*** acceptable.

h. Equip rim exit devices with a roller strike # 299 with raised ridge plate attachment # 970323.

i. When removable mullions are listed provide the type controlled by as key cylinder under the master key system (Keyed removable mullions). On new additions use keyed mullions on doors where removable mullions are needed. All wiring/cable inserted into

mullion shall have quick disconnect at top of mullion and mullion fitting. Removable Mullion preference: Von Duprin KR54F

j. Rod protection will be installed on exit devices with exposed vertical rods.

k. Dogging mechanism shall be keyed cylinder type. No plastic dogging cams shall be allowed. Where listed in the hardware sets, dogging mechanism shall be eliminated on exterior doors, especially at the electrically controlled access points.

l. Exit Device to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap shall be of heavy-duty metal alloy constriction and provide horizontal adjustment to provide flush alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

F. Electric Strikes:

1. Use the following electric strikes under the following conditions:

a. Von Duprin 6111 – compatible with rim mounted panic devices, single or double doors on mullions (less than ½" stop).

b. Von Duprin 6113 – compatible with rim mounted panic devices, single doors (on jambs with ½" or greater stops).

c. Von Duprin 6210 – compatible with mortised locks without deadbolts, Electric Strike for installation into (existing) standard ANSI prepped hollow metal frame.

d. Von Duprin 6311 – compatible with mortised locks without deadbolts, Electric Strike for installation into new Hollow Metal frames.

2. Strikes shall fail to secure position.

3. Use Manufacture installed continuous duty solenoids, 24-volt DC operation.

4. Strikes shall be UL listed as both a burglary protection device and fire door accessory.

G. Mechanical Pushbutton Lock:

1. Product shall be: Simplex 5000

2. Characteristics:

a. Non handed ADA compliant lever handle

b. Stainless steel construction

c. Key override

d. ANSI / BHMA 156.2 Grade 1 Certified

H. Programmable Lock, Stand Alone Access Control System with ProxCard Access

1. Product shall be: Trilogy PDL4100/PDL4500 Series
2. Characteristics:
   a. Microprocessor-based programmable keypad-entry lock
   b. Features an HID compatible ProxCard reader
   c. Three methods of programming: manually through the keypad, transfer programming instructions directly from your laptop or desktop PC using DL Windows software and a special AL-PCI cable, data can be transferred from your PC to your PDL lock via the AL DTM2 handheld Data transfer Module
   d. 2000 Users, 6 predefined Administration User Levels including Master, Installer, Manager,Supervisor, Print-only and Basic User Codes
   e. Used typically at Staff/Adult Restrooms

I. Closers and Door Control Devices:

1. Acceptable manufacturers:
   a. LCN Closers, 4040, 4041
   b. Closer Covers: 4040 closer with 4040-72 st3596 cover
2. Characteristics:
   a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
   b. All closers shall utilize a stable fluid withstanding temperature range of 120 degree F to –30 degree F without seasonal adjustment of closer speed to properly close the door. Closer for fire-rated doors shall be provided with temperature stabilizing fluid that complies with UBC 7-2 (1997) and UL 10C.
   c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
   d. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe (“CNS”). Where door travel on out-swing doors must be limited, use “CNS or S-CNS” type closers. Auxiliary stops are not required when cush type closers are used.
   e. Overhead concealed closers shall have spring power adjustable for 50% increase in closing power and fully mortised door tracks.

f. All surface closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).

g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.

h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

i. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, and independent testing laboratory used by BHMA for ANSI certification.

j. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

I. Overhead Door Holders:

1. Acceptable manufacturers:

a. Glynn Johnson

b. Rixson Firemark

2. Characteristics:

a. Provide heavy-duty door holders of stainless steel.

b. Holder to be installed with the jamb bracket mounted on the stop.

J. Floor Stops and Wall Bumpers:

1. Acceptable manufactures:

a. Glynn Johnson

b. Ives

c. Rockwood Manufacturing

d. McKinney

2. Characteristics: Refer to Hardware Headings.

K. Push Pull Sets:

1. Acceptable manufacturers:

a. Glynn Johnson

b. Ives

c. Rockwood Manufacturing

d. McKinney

2. Characteristics:

a. Provide mounting systems as shown in hardware sets.

b. Material to be solid rod, stainless steel

c. Provide Push/Pull sets sized as shown in Hardware Headings.

L. Protective Plates:

1. Acceptable manufacturers:

a. Glynn Johnson

b. Ives

c. Rockwood Manufacturing

d. McKinney

2. Characteristics:

a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-taping screws.

b. Materials:

1) Metal Plates: Stainless Steel, .050 inch (U.S. 18- Gauge).

c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side.

d. Heights:

1) Kick Plates to be 8 inches in height.

2) Mop plates to be 8 inches in height.

3) Armor plates to be 30 inches in height. Armor plates on fire doors to comply with NFPA 80.

M. Latch Guards:

1. Acceptable manufacturers:

a. Glynn Johnson

b. Latch-Gard

2. Characteristics:

a. Stainless Steel

b. Locate on all exterior doors

c. Provide largest size to fit door hardware, cut edge if required to fit around rose.

N. Thresholds:

1. Acceptable manufacturers:
    a. National Guard Products, Inc.
    b. Reese Industries
    c. Zero Weatherstripping Co. Inc.
    d. McKinney
    e. Pemko
2. Types: Indicated in Hardware Headings.

O. Door Seals / Gasketing:

1. Acceptable manufacturers:
    a. National Guard Products, Inc.
    b. Reese Industries
    c. Zero Weatherstripping Co. Inc.
2. Types: Indicated in Hardware Headings.

P. Silencers:

1. Acceptable manufacturers:
    a. Glynn Johnson
    b. Ives
    c. Rockwood Manufacturing
    d. McKinney
2. Three for each single door; four for pairs of doors.

Q. Key Cabinet and System:

1. Acceptable Manufacturers:
    a. Telkee, Inc.
2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturers, with capacity for 150 percent of the number of locks required for the project.
    a. Provide hinge-panel type cabinet for wall mounting.

R. Magnetic Door Holders:

1. Acceptable manufacturers:
    a. LCN

b. Rixson-Firemark

c. Edwards

2. Wall mounted 24 vdc units with finish to match door hardware.

S. Security Key Box

1 Acceptable Manufacturers

a. Knox Box 3200 Series Key Box and provide 3 keys

1.2 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturer's products that have manufacturer's name or trade name displayed in a visible location (Omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to the Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinder only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI / BHMA A156 series standard for each type of hardware item and with ANSI BHMA A156.18 for finish designations indicated. Do no furnish "Optional " materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

1. Do not provide hardware that has been prepared for self-taping sheet metal screws except as specifically indicated in this specification. Self-taping screws are not an acceptable installation method.

2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware. Coordinate with wood and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

1.3 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or Push-Pull units if no latch or lock sets).

B. Provide finishes that match those established by ANSI or , if none established, match the Architects sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. The designations used to indicate hardware finishes are those listed in ANSI / BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

1. Hinges (Exterior) : 630 (US32D) Satin Stainless Steel
2. Hinges (Interior): 652 (US26D) Satin Chrome Plated Steel
3. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
4. Flush Bolts: 626 (US26D) Satin Chrome plated Brass / Bronze
5. Locks: 630 (US32D) Satin Stainless Steel
6. Exit Devices: 628 (US28) Chassis, 689 (Powder Coated) Covers, and 630 US32D Touchpads.
7. Door Closers: 689 (AL) Powder Coat
8. Push Plates 630 (US32D) Satin Stainless Steel.
9. Pull Plates: 630 (US32D) Satin Stainless Steel.
10. Protective Plates: 630 (US32D) Satin Stainless Steel.
11. Door Stops: 626 (US26D) Satin Chrome Plated Brass / Bronze
12. Overhead Holders: 630 (US32D) Satin Stainless Steel.
13. Thresholds / Weatherstripping: 627 / 628 (US27 / US28) Aluminum

PART 3 EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by the Architect.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal , storage, and reinstallation or application of surface protection with finishing work specified in the division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

F. Weatherstripping and Seals: Comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilation equipment

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier’s Field Services

1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.

2. Instruct Owner’s personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

3. File written report of this inspection to Architect.

D. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturer(s) shall inspect and adjust all units and certify that all units are installed in accordance with the manufacturer’s instructions, and are regulated properly and functioning correctly, A written report shall be provided to the Architect as to the inspection and shall include appropriate certificates.

3.3 HARDWARE SCHEDULE - *“ARCHITECT TO INSERT”*

END OF SECTION 08 71 00

SECTION 09 65 13
RESILIENT BASE / ACCESSORIES / STAIR ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Resilient wall base.
2. Resilient stair tread/nosing, risers, and landing tile.
3. Resilient flooring accessories.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 9 Section Resilient Tile Flooring and Carpet.

1.3 SUBMITTALS

A. Product data for each type of product specified.

B. Samples for Verification: In manufacturer's standard sizes, but not less than 6-inches long, in form of pieces cut from type of product specified, showing color and pattern as indicated on the APS color board.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Installer Qualifications: Engage an experienced installer to perform work of this Section, who has supervised or is supervised by someone specialized in installing resilient products similar to those required for this Project, for ten (10) years and with a record of successful in-service performance.

C. Fire Performance Characteristics: Provide products with the following fire performance characteristics as determined by testing products per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to the Architect.

1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
2. Smoke Density: Less than 450 per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather with ambient temperatures maintained within range recommended by manufacturer, but not less than 50-degrees Fahrenheit or more than 90-degrees Fahrenheit.

C. Move products into spaces where they will be installed at least 48 hours prior to installation.

1.6 PROJECT CONDITIONS

A. Maintain a minimum temperature of 70-degrees Fahrenheit in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and not less than 48 hours after installation. After this period, maintain a temperature of not less than 55-degrees Fahrenheit.

B. Do not install products until they are at the same temperature as that of the space where they are to be installed.

C. Install products specified in this Section after other finishing operations, including painting, have been completed.

D. Close spaces to traffic during installation of products specified in this Section.

1.7 SEQUENCING AND SCHEDULING

A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.

1. Furnish not less than 2 percent attic stock of each variety installed; i.e., color of resilient wall base installed, etc.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of the following:

1. Allstate - (404) 388-6368

B. Other Acceptable Manufacturers:

1. Burke Flooring Products - (800) 447-8442
2. Roppe Rubber Corporation - (877) 726-7534
3. Other manufacturers if approved and selected by Atlanta Public Schools.

2.2 RESILIENT WALL BASE

A. Rubber Wall Base: Products complying with FS SS-W-40, Type I, and ASTM F 1861-98 #3.1 + 6.1 TYPE TS-Rubber, Vulcanized Thermoset, 3.2.1 Group 1 Solid (homogeneous) + 5.2.1 Solid Wall Base, and the following requirements:

1. Style: Straight base at carpet and standard cove base at all other locations.
2. Height: 4”
3. Lengths: 120’ coils or manufacturer’s standard lengths (if 120’ length not available).
4. Thickness: 1/8 gage.
5. Outside Corner: Pre-formed cove for flush fit to wall surface.
6. Inside Corner: Job-formed for flush fit to wall surface.

2.4 RESILIENT FLOORING ACCESSORIES

A. Rubber Transition Accessories: Product of same manufacturer as resilient wall base and stair accessories, and same material specifications as resilient wall base, 1/8” thick, not less than 1” wide, tapered or bull nose edge, color to match wall base, flooring, or as selected by Architect from APS color board.

2.5 INSTALLATION ACCESSORIES

A. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

B. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

C. Stair Tread Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates not conforming to tread contours.

D. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.

2.6 COLOR AND PATTERN (edit selections from APS color board.)

A. Colors: Match APS standard palette of colors for the following:

1. At VCT and carpeting:
   a. Allstate #48 Beige

2.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas where installation of products specified in this Section will occur, with installer present, to verify that substrates and conditions are satisfactory for installation, and comply with manufacturer's requirements and those specified in this Section.

3.2 PREPARATION

A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.

B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates to achieve a plumb and level substrate surface.

C. Use stair tread nose filler per tread manufacturer's directions to fill nosing substrate, conforming to tread/nosing contours.

D. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

E. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

F. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.

B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates. Use factory edges as often as possible.

1. On irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

2. Use pre-formed outside corner material only.

3. Install outside corners before installing straight pieces.

C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install transition strips at edges of flooring that otherwise would be exposed.

D. Apply resilient treads/risers/nosing/stringers/landing tiles and accessories to stair as indicated and according to manufacturer's installation instruction.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing installation:

1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by manufacturer.
4. Damp mop resilient accessories to remove black marks and soil.

B. Protect flooring against marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.

1. Apply protective floor polish to resilient accessories that are free from soil, visible adhesive, and surface blemishes.
    a. Use commercially available metal, cross-linked, acrylic product acceptable to resilient accessory manufacturer.
    b. Coordinate selection of floor polish with Owner's maintenance service.

C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Final Acceptance. Clean products using methods recommended by manufacturer.

END OF SECTION 06 65 13

SECTION 09 65 19
RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Vinyl composition tile (VCT).

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: Full-size units of each color and pattern of resilient floor tile required.

C. LEED Submittals:

1. Credit EQ 4.1: Manufacturers' product data for adhesives, including printed statement of VOC content.

1.3 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F , in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After postinstallation period, maintain 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 covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION TILE

A. Vinyl Composition Tile (VCT): ASTM F 1066.
1. Products: Subject to compliance with requirements, provide one of the following:

a. Armstrong World Industries, Inc.; Standard Excelon Imperial Texture (per APS Appendix"A" Finishes Chart

B. Class: 2 (through-pattern tile).

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch.

E. Size: 12 by 12 inches.

F. Fire-Test-Response Characteristics:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2. Smoke Generation: Maximum Specific Optical Density of 450 or less per ASTM E 662.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. VCT and Asphalt Tile Adhesives: 50 g/L.

b. Cove Base Adhesives: 50 g/L.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations 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. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:

    a. Perform 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. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Lay out 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 square with room axis.

B. Match 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 **Architect select: [with grain running in one direction]** [**with grain direction alternating in adjacent tiles (basket-weave pattern)**] [**in pattern of colors and sizes indicated**].

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures pipes, outlets, edgings, door frames, thresholds, and nosings. Lay tile under millwork and cabinets.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. 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, nonstaining marking device.

F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere tiles to flooring 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.

H. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

a. Do not wash surfaces until after time period recommended by manufacturer.

I. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.

   Contractor to apply a total of eight (8) coats of wax. Apply eight (8) coats of wax in the halls/corridors and six (6) coats of wax in all classrooms to finished flooring using the Atlanta Public Schools approved site contracted custodial firm. The final two (2) coats of wax in the classrooms are applied after school furniture move-in. Contractor shall include costs of waxing in their bids and must use the approved site custodial firm for wax application. Wax will be supplied by the APS site contracted custodial firm.

   a. Coordinate selection of floor polish with Owner's maintenance service.

   b. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09 65 19

SECTION 09 67 23
RESINOUS FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Work of this section includes installation of low-odor, seamless, liquid applied epoxy flooring and integral base at areas indicated.

1.2 SUMMARY

A. Definitions: Resinous flooring includes penetrating two-component epoxy primer, three-component mortar consisting of epoxy resin, curing agent and finely graded quartz silica aggregate, three-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer.

B. Related Work

1. Division 3 Section Cast-in-place Concrete
2. Division 7 Section Fluid Applied Waterproofing
3. Division 7 Section Joint Sealers

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.

B. Samples: Submit, for verification purposes, 1-foot square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.

1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

C. Maintenance data: Submit bound brochures containing manufacturer’s detailed maintenance and care instructions.

1.4 QUALITY ASSURANCE

A. Applicable standards; standards of the following, as referenced herein:

1. American Society for Testing and Materials (ASTM).
2. American National Standards Institute (ANSI).

B. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least ten projects of similar size and complexity. Provide secondary materials only of type and from source recommended by manufacturer of primary materials. All materials, including

primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9002 registered quality system.

C. Manufacturer's Field Service: manufacturer's representative shall be present on the site to assist in evaluation of substrates and to provide recommendations in the proper installation of system before any work is performed and during installation.

D. Color and texture: As selected by Architect from manufacturer's standard colors. Texture to be 'medium' and able to be cleaned with a cotton mop, subject to owner's acceptance through submittal process, and on-site mock up.

1.5 DELIVERY, STORAGE AND HANDLING

A. Material shall be delivered to job site and checked by awarded flooring manufacturer for completeness and shipping damage prior to job start.

B. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

C. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85^{o}F.

1.6 PROJECT CONDITIONS

A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

B. Utilities, including electric, water, heat (air temperature between 60 and 85^{o}F) and finished lighting to be supplied by General Contractor.

C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.

D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.2 1.7 WARRANTY

A. Manufacturer and installer shall furnish a single, written warranty covering both material and workmanship for a period of three (3) full years, for its normal and intended use, from date of project substantial completion. A sample warranty letter describing scope of work for this project must be included with bid package or bid shall be disqualified. If flooring needs repair or replacement due to unaccepted workmanship or installation, the Owner will not incur in any cost for the repair of the replacement.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Stonhard

B. General Polymers Corporation

C. Tnemec Company, Inc.

2.2 SEAMLESS EPOXY PRINCIPAL FLOORING MATERIALS

A. Seamless epoxy flooring system will be a nominal 3/16" thick system comprised of a penetrating two-component epoxy primer, three-component mortar consisting of epoxy resin, curing agent and finely graded silica aggregate, three-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer. Epoxy flooring system will not be used in coolers and freezers. Refer to 2.3 Secondary Materials Section C for proper cooler and freezer seamless urethane flooring system.

1. Physical Properties: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:

Compressive Strength .....10,000 psi
(ASTM C-579)

Tensile Strength .....2,000 psi
(ASTM C-307)

Flexural Strength .....4,300 psi
(ASTM C-580)

Hardness 85-90
(ASTM D-2240/Shore D Durometer)

Bond Strength .....>400 psi
(ASTM D-4541) (100% concrete failure)

Impact Resistance .....>160 in. lbs.
(ASTM D-4226)

Abrasion Resistance .....0.06 gm max. weight loss
(ASTM D-4060, Taber
Abrader CS-17 wheel)

Coefficient of Friction..... 0.7-0.8
(ASTM D-2047)

Flexural Modulus of Elasticity .....2.0 x 10^6 psi
(ASTM C-580)

Flammability .....Self Extinguishing

(ASTM D-635) Extent of burning 0.25 inches max.

Thermal Coefficient of

Linear Expansion.....1.8×10^{-5} in

(ASTM C-531)

Water Absorption..... 0.1%

(ASTM C-413)

Heat Resistance Limitation.....140^{o}F

(for continuous exposure)

.....200^{o}F

(for intermittent spills)

Cure Rate allow..... 24 hours for normal operations

(at 77^{o}F)

2.3 SECONDARY MATERIALS

A. Joint Sealant: Two-component, pourable, polyurethane sealant.

B. Crack Treatment: Two-component flexibilized epoxy membrane in conjunction with a 10 oz. fiberglass engineering fabric for use in the isolation of dynamic cracks.

C. Cooler/Freezer Seamless Floor System: If selected and approved by owner in writing, this floor system will be a nominal 1/4" thick system. System is a self-priming, textured, four-component, notch trowel applied polyurethane mortar system consisting of a urethane-urea binder, pigments, powders and quartz aggregates including a high performance chemically resistant urethane sealer.

PART 3 EXECUTION

3.3 3.1 PREPARATION

A. Substrate: Concrete slab preparation shall be by mechanical means and include use of a scabbler, scarifier or shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

3.2 APPLICATION

A. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other

types of joints (if any), indicated or required. Refer to end of section for required details.

B. Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between resinous flooring materials and substrate.

C. Troweled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Hand trowel apply mixed material over freshly primed substrate using steel finishing trowels or power trowel material.

D. Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.

E. Broadcast: Immediately broadcast quartz silica aggregate into the undercoat using manufacturer's specially designed spraycaster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.

F. Sealer: Remove excess unbonded granules by lightly brushing and vacuuming the floor surface. Mix and apply sealer with strict adherence to manufacturer's installation procedures.

3.3 FIELD QUALITY CONTROL

A. Core Sampling: At the direction of the Architect and at location designated by the Architect, take 1 core sample 2” in diameter per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples of the same size. Repair damage caused by coring making it look uniform with the rest of the floor area where core samples are taken and correct deficiencies at no cost to owner.

3.4 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use industrial strength cleaner and degreasing materials and procedures recommended by resinous flooring manufacturer. Seamless floor system manufacturer will demonstrate the cleaning procedures to the school cleaning staff.

SECTION 09 68 16
CARPET TILES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Work includes but is not limited to providing carpeting and installation.

B. All bidders shall quote in accordance with the exact specifications as detailed in this document. All bidders must submit all products, specifications, product testing, and all warranties. All information must be submitted to architect and/or owner ten (10) days before the BID DATE for approval in accordance with the conditions detailed under Section 1.3.

1.2 REQUIREMENTS FOR PRIOR APPROVAL

A. Submit to Architect and/or Owner ten (10) days before bid date, manufacturer's documentation showing a minimum of ten (10) years experience in the manufacture of the specific types of carpet selected for installation.

B. Submit to Architect and/or Owner ten (10) days before bid date, manufacturer's product specifications, product testing reports and other required documents referenced within this text for all specified carpets. *A Certified Independent Testing Laboratory must have conducted all product test reports.*

C. Submit at least three (3) references of installations that have been in use for two (2) years or more using the same backing technology of all carpets, as described within this text. Include contact names and telephone numbers.

D. Submit to Architect and/or Owner ten (10) days prior to bid, two (2) 12" x 12" finished samples or two (2) standard size carpet tiles of the exact type of carpet proposed, including quality, pattern, color, and backing in accordance with the APS Color Board.

E. Submit manufacturer's warranties, installation instructions, and maintenance instructions before bid date.

1.3 DELIVERY AND STORAGE

A. Deliver all materials to the installation site in the manufacturer's original packaging. Packaging to contain manufacturers name, identification number and related information.

B. Product to be delivered as required by manufacturer.

C. All materials are to be delivered (24 hours) before the start of installation and

stored in (above 65 degrees F and below 95 degrees F), dry location, safe from damage and soiling. Store in pallet form as supplied by manufacturer. Do not stack pallets.

D. Delivered and stored materials must be available for inspection as required by the owner, architect, general contractor, and/or the manufacturer.

1.4 INSTALLATION QUALITY ASSURANCE

A. Flooring contractor to be specialty contractor normally engaged in this type of work and shall have five (5) years minimum documented experience in the installation of these materials.

B. Flooring contractor and his/her sub-contractors must be approved by the architect and/or the carpet manufacturer.

C. Flooring contractor will be responsible for the proper product installation, *including floor preparation in all the areas indicated in the drawings to receive carpet*. The carpet tile installation standard will be as listed in The Carpet and Rug Institute's Standard for Installation of Commercial Carpet CRI-104. This standard establishes the minimum installation procedures.

D. Flooring contractor to provide owner a written warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of two (2) years after final job completion.

E. Carpet tile manufacturer to provide experienced field service experts to assist in project start-up as required by the job. Manufacturer will notify owner, architect, general contractor, or another designated contact if any installation instructions are not followed, or if the quality of installation is not what is expected.

F. Qualifications of Installers: All work shall be done by installation firms specializing in commercial carpet tile installation. It is APS' preference that the firm shall be a member of the Floor Covering Installation Contractors Association (FCICA) and/or certified by the Floor Covering Installation Board (FCIB). If requested, the awarded Flooring Contractor must present documentation of this criterion.

1.5 JOB CONDITIONS

A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document. Sub-floor preparation shall meet all conditions as specified in the manufacturer's installation manual instructions. It is the sole responsibility of the awarded Flooring Contractor to request and review *ALL* installation guidelines as provided and recommended by the carpet manufacturer.

B. Sub-floor preparation will include, as required, the removal and repair of the existing floor surface**.** It is required that the floor of a renovation project be

inspected by *ALL* prospective bidders before the bid date.

C. Carpet tile installation shall not commence until painting and finishing work is complete and ceiling and overhead work is tested, approved, and completed.

D. Site conditions shall include those specified in the carpet tile manufacturer's installation manual and shall also include sufficient heat, light, and power required for effective and efficient working conditions.

E. The maximum amount of moisture evacuation from the floor is 3.0 pounds per 1,000 square feet in 24 hours. The acceptable pH level of the substrate is between 7.0 and 9.0. Flooring contractor is responsible for floor testing. Results of test shall be provided to the CM and APS Project Manager.

1.6 EXTRA MATERIALS

A. Provide five percent (5%) extra material for shelf stock of carpet tile of each color and type specified. Deliver as requested to owner's storage.

1.7 WARRANTY - CARPET

A. Warranties must be the standard, printed warranties on the carpet manufacturer's letterhead. All warranty items to be full term, not pro-rated for the indicated period. All warranties must be issued by the manufacturer as standard published warranties on all types of carpet tile within this document. If the product fails to perform as warranted when properly installed and maintained according to procedures, the affected area will be repaired or replaced at the expense of the manufacturer. The carpet tile manufacturer will provide standard published written performance warranties for the following:

1. Lifetime warranty preferred, 20-year minimum warranty acceptable against excessive surface wear. Excessive wear means no more than 10% loss of pile fiber weight measured before and after use, as tested under ASTM D-3936.

2. Lifetime preferred, 20-year acceptable, static protection, meaning built-in protection below 3.0 kv as tested under AATCC-134.

B. The carpet manufacturer shall warrant carpet manufactured with an appropriate secondary backing for the useful life of the original installation against product failure from:

1. Tuft Bind (edge ravel, yarn pulls, zippering)
2. Surface wear, Static
3. Backing resiliency loss
4. Delamination
5. Moisture Penetration

C. All warranties to be sole source responsibility of the carpet tile manufacturer. Second source warranties are unacceptable.

D. Warranties shall not be written only for this purchase or purchaser. All warranties shall be standard issue nationally of official documents.

1.8 PERFORMANCE ASSURANCE – GENERAL

A. The carpet and secondary backing composite when tested shall meet or exceed all flammability requirements for floor coverings as established by the following nationally recognized codes:

1. NFPA 11 Life Safety Code to Life in Buildings and Structures Standard Building Code (SBC)

2. Uniform Fire Code (UBC)

3. *See Section 2.0 for testing requirements*

B. Flammability and Indoor Air Quality Requirements

1. Pill Test / DOC-FF-1-70 (ASTM D-2589)

   Requirement: Pass

2. Flooring Radiant Panel / ASTM E-648

   Requirement: Class II (Above .45 w/cm)

3. Optical Smoke Density Test / NFPA-258 NBS Smoke Chamber (ASTM E-662)

   Requirement: Less than 450, Flaming Mode

4. Comply with the Carpet and Rug Institutes (CRI) Severe Traffic VOC Chamber Test/Indoor Air Quality test (CRI-IAQ) Green Label Test (ASTM D-5116)

C. Face Fiber Characteristics for ***all*** Carpets

1. 100% Bulked Continuous Filament (BCF)

2. 100% Nylon – Type 6,6 Nylon with permanent static protection; 100% solution or yarn dyed

3. Fiber Performance: As listed in, *Section 2.1,D,1-8.*

4. Minimum fiber face weight: 24 Oz./ Sq. Yd.

D. The carpet and backing shall pass the Dow Modified British Spill Test for moisture impermeability.

E. Adhesive System Characteristics

1. Carpet tile product to be installed in compliance with Americans with Disabilities Act (ADA), Section 4.5.3.

2. Product to be installed according to carpet manufacturer's recommendations as outlined in the carpet manufactures installation manual and meeting the Standard for Installation of Commercial Carpet CRI-104.

3. Floor Adhesive: Must be manufacturer's recommended adhesive. All bidders must include manufacturer's recommended adhesive.

4. Adhesives must comply with the Carpet and Rug Institute Green Label Testing Program for IAQ and provide a lifetime product performance warranty.

F. Environmental Impact Characteristics

1. The carpet will, as suggested by the October 1993, Maryland State Dept. of Education Technical Bulletin, pass the Carpet and Rug Institute Green Label Testing Programs, as a minimum acceptable threshold or "first hurdle" for carpet product selection. "Carpet not meeting the CRI test program should not be considered for use in schools."

2. Carpet manufacturer and/or fiber producer must be a signatory of the National Carpet Recycling Agreement memorandum of understanding. The MOU is a voluntary agreement to promote reducing the amount of carpet that goes to landfills by specific goals and to foster the eventual sustainability of carpet.

3. Carpet manufacturer must be a member of the U.S. Green Building Council and participate in the LEED (Leadership in Energy & Environmental Design) Green Building Rating System.

PART 2 PERFORMANCE AND PRODUCTS

2.1 PERFORMANCE ASSURANCE - CERTIFIED TESTING

A. Certified test reports shall be submitted by the carpet manufacturer, for all performance assurance specifications listed below.

B. Requirements listed below must be met by all products being submitted for approval.

C. All submitted test numbers should represent average for standard production goods.

D. Required Test Reports:

1. Pill Test / DOC-FF-1-70 (ASTM D-2589)

Requirement: Pass

2. Flooring Radiant Panel / ASTM E-648

   Requirement: Class II (Above .45 w/cm)

3. Optical Smoke Density Test / NFPA-258 NBS Smoke Chamber

   Requirement: Less than 450, Flaming Mode

4. Moisture Penetration Test meeting the: Dow Modified British Spill Test

5. CRI VOC Chamber Test/Indoor Air Quality test (CRI-IAQ) Green Label Test – Severe Traffic

6. Lightfastness: Rating of not less than 4 on International Grey Scale after 40 SFU's when tested in accordance with AATCC Test Method 16E

7. Crockfastness: Minimum stain rating on International Grey Scale of 4 or better wet or dry when tested in accordance with AATCC Test Method 165

8. Atmospheric Fading: Burned Gas shall not be 4 or better on International Grey Scale after two cycles on each test when tested in accordance with AATCC Test Method 129 Ozone and AATCC Test Method 2

2.2 APPROVED MANUFACTURERS

A. Acceptable manufacturers:

InterFace
Tandus
J&J

B. Any other acceptable manufacturer and/or product must meet or exceed the requirements specified under all sections of this document in pattern, color, and fiber, and must comply with products and colors of the APS Color Board.

2.3 CARPET SPECIFICATIONS:

A. Style: Interface FLOR The Standard Style # 1467302500 Guave 9359 and The Standard Style # 1467302500 Aegean 9371 as manufactured by Interface FLOR or Tandus C& A Crayon #01957 Outside the Lines 48005 and Tandus C & A Applause II 02803 Marine 28517 (See APS Color Chart for all products)

B. Yarn**:** At least 75-80% Encore® SD and 20-25% Type 6 or Dupont 6.6 Nylon with permanent static protection, Bulk continuous Filament

C. Dye Method: Solution/Yarn Dyed or 1005 solution dyed

D. Surface Texture: Dense textured Patterned Loop

E. Pattern Repeat: N/A

F. Gauge: 1/12 in

G. Yarn Weight: 14 oz/SY minimum

H. Stitches Per Inch: 8./ inch

I. Finished Pile Thickness: .074 inch minimum (ASTM D-418)

J. Density: 6810minimum (ASTM D-418-82)

K. Smoke: Less than 450 Flaming Mode

L. Color: As selected by Owner from the APS Color Board

M. Special Treatments: ProTex® Fluorochemical

END OF SECTION 09 68 16

SECTION 10 11 00
MARKERBOARD, TACKBOARD, AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed porcelain enamel markerboards
2. Moveable porcelain enamel markerboards
3. Fixed radius porcelain enamel markerboards
4. Fixed tackboards
5. Moveable tackboards
6. Fixed radius tackboards
7. Tack strips
8. Lecture Units
9. Skins
10. Trophy and Display Cases

1.2 SUBMITTALS

A. Shop Drawings: Provide shop drawings for each type of visual display board required including anchorage, accessories, finish colors, patterns and textures.

B. Product data: Provide technical data for materials specified. Include Material Safety Data Sheet when applicable.

C. Samples and Color Charts: Provide manufacturer's color charts and composition samples of face, core, backing and trim to illustrate finish, color and texture, where required.

D. Manufacturer's Instructions: Manufacturer's installation instructions.

E. Provide sample of standards for moveable units at time of bid.

1.3 QUALITY ASSURANCE

A. Manufacturers of, Markerboards and Tackboards must comply with the letter of these specifications and are subject to approval by APS.

B. Operation and Maintenance: Include data on regular cleaning, stain removal, and precautions.

1.4 PROJECT CONDITIONS

A. Field measure prior to preparation and fabrication to ensure proper fit.

B. Comply with manufacturer's recommendations for acclimatizing area for interior moisture and temperature to approximate normal occupied conditions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delay.

B. Delivery: Deliver materials in original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.6 WARRANTY

A. Submit "Life of the Building" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel chalkboards and marker boards are guaranteed for the life of the building. Guarantee covers replacement of defective boards but does not include cost of removal or reinstallation.

B. Warranty Period: One year commencing on Date of Substantial Completion.

1.7 MANUFACTURER'S REPRESENTATIVE OR DEALER

A. Manufacturer's representative must have an office and warehouse locally in the state of Georgia and must be able to serve all the required needs of APS.

B. Manufacturer's representative must be able to provide storage of a small quantity of stock material for emergency use by Atlanta Public Schools.

C. Manufacturer's representative must be able to transport materials from Atlanta Public Schools warehouse to the job site when required by APS.

D. Manufacturer's representative must also respond in a timely manner to any communication from Atlanta Public Schools: email, telephone, fax or letter.

E. Manufacturer's representative must be able to meet with personnel from Atlanta Public Schools at their offices or the job site whenever they request it.

F. Manufacturer's representative must be able to provide installation of the products and must provide the name of the company that will do the installation when bidding any projects.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer of, Markerboards and Tackboards must be presented to APS Project Manager for review . Acceptable products; subject to compliance with specified requirements:

a. AARCO Products, Inc. Series 10-320, Vitre –Steel

b. Aywon, Reddi-Frame, P3 Ceramicsteel

c. Claridge Products and Equipment, Inc. Series 1 LCS

d. Marsh, Inc. Series 1600

e. PolyVision Corp. Traditional Plus (500 Series)

B. All fixed and moveable boards must be provided by one manufacturer.

2.2 MATERIAL

A. All fixed markerboards and tackboards shall be factory laminated and factory framed marker boards or tack boards.

B. Porcelain enamel marker boards: All porcelain enamel markerboards shall be manufactured in exact accordance with the Porcelain Enamel Institute's specifications, using the DuPont process or an approved equal. Face sheets with high-fired brittle ground and finish coats are not acceptable. Porcelain enamel finish shall be fired at approximately 1000 degrees F. or lowest possible temperature thereunder to reduce steel and porcelain stresses and achieve superior enamel bond and hardness.

1. Face Sheet: minimum 24 gauge, porcelain enameled steel

2. Core Material: particle board, (ANSI A208.1, Grade 1-M-1, 3/8" thickness, made with binder containing no urea formaldehyde

3. Backing sheet: .minimum 0.005 aluminum

4. Frame/trim: clear anodized extruded aluminum, .062 thickness or greater

5. Laminations: Shall be hot-type neoprene contact adhesive applied to both surfaces automatically. Each substrate to have a minimum of 80% covering with 1.5-2.0 dry mils of adhesive. Panel components shall have uniform pressure applied mechanically over entire area. Laminations shall be made by face sheet manufacturer.

6. Sizes: Standard height is 4 feet. Fixed markerboards and tackboards shall be available up to 16 feet in one piece. Moveable markerboards and tackboards shall be available up to 8 feet in one piece.

C. Tackboards: Atlanta Public Schools to select from:

1. Cork tackboards composed of 1/4" thick cork laminated to a burlap and 1/4" thick hardboard backing made with binder containing no urea formaldehyde. Typical compositions include:

a. 1/4" Natural Pebble Grain Cork laminated to ¼" tempered hardboard

b. Fabricork vinyl fabric on 7/32" cork with 1/4" hardboard back

c. Hook-Fab nylon fabric on 7/32" cork underlay with 1/4" hardboard back

d. Designer fabric on 7/32" cork underlay with 1/4" hardboard back

D. Metal Trim and Accessories: Provide aluminum extrusions. Trim shall be heavy gauge extruded aluminum and shall meet or exceed ASTM B221 Alloy Standards. Finish to be etched and anodized satin finish or optional powder coat finish.

1. Marker Trough:

a. Standard continuous, solid type extruded aluminum marker-tray with ribbed section and injection molded end closures.

b. Standard continuous hollow marker-trough with injection molded end closures.

2. Music Staff: Ruled graphics: Painted lining, heat fused to porcelain writing surface. To be placed in Music rooms only.

3. Map Rail:

a. Standard continuous 2" map rail with cork insert and wrap around end stops at the top of each markerboard with the following accessories:

1. Map Hooks: Provide 1 map hook for each 4 ft. of map rail.

2. Roller Brackets: Provide 2 per map rail.

3. Flag Holder: Provide 1 per map rail.

E. Moveable markerboards and tackboards: Provide moveable markerboards and tackboards as indicated. Consult with APS Project manager for locations, if required.

1. Markerboard and tackboard panels same as specified in fixed units.

2. Frame shall be extruded aluminum with satin anodized finish, 5/8" face with 1" wide map rail and full-length chalk-trough. Back of unit to have left and right hooks installed at top corners. These hooks to be 10-gauge flat steel to fit slots in standards; bottom rear corner of unit shall have clip of 16-gauge spring steel which shall engage in slot of standards.

3. Moveable markerboards and tackboards must be able to be interchangeable with existing standards.

4. Wall Standards shall be 6' or 4' long of heavy-duty T-shaped extruded aluminum with double row of slotted openings to receive units. Supporting wall brackets shall be T-shaped heavy extruded aluminum with 1/4" bolt and nut to secure standard and bracket. Standards shall be furnished and installed on 4' centers regardless of board length. Clips to be furnished with standards. Standards to be interchangeable with existing markerboards and tackboards.

F. Fixed Radius Markerboards and Tackboards (Special use areas: principal's offices, corridors, teachers' lounge and conference rooms)

1. Provide radius corner markerboards and tackboards with 3" radius at each corner and 5/8" face trim in choice of satin or powder coat finish. Markerboard and tackboard panels to be the same as fixed units. Markerboard to have continuous chalk trough at bottom and optional map rail at top.

G. Tackstrips:

1. Provide map rail for corridors in optional 1", 2" or 3" aluminum strips with cork insert and wrap around end stops in satin anodized finish. Verify with APS Project Manager if this product shall be utilized in the specific project.

H. Lecture Units:

1. Provide lecture units in either oak, walnut or mahogany wood, with markerboard back panel and 2 hinged doors with tackboard inside of each. Map rail with accessories inside of each door. Optional projection screen located inside top of unit.

I. Skins:

1. Provide replacement marker board face sheets (skins) of 24 gauge. porcelain enamel or approved equal. Can be field applied directly over existing chalkboards; skins can be installed using a commercial contact adhesive by a qualified installer. A pressure sensitive adhesive tape may also be used; contact manufacturer for more detailed instructions. Note: Field measure prior to fabrication.

J. Trophy and Display Cases:

1. Provide Trophy and Display cases (wall mounted and or recessed) as indicated, manufactured by same manufacturer as identified above.

END OF SECTION 10 11 00

SECTION 10 14 19
EXTERIOR SIGNAGE

PART 1 GENERAL

1.1 SUBMITTALS:

A. Submittals shall be in accord with Section 01300 – Submittals.

B. Shop drawings: Submit for aluminum letters and building plaque. Indicate sizes, finishes and installation details. Shop drawings of plaque shall include a full size rubbing. Casting of plaque shall not be started prior to Project Manager's approval of rubbing.

C. Product data: Submit manufacturer's standard specifications and installation instructions.

1.2 DELIVERY, STORAGE AND HANDLING:

A. Delivery signs and plaque for interior installation only after building is enclosed and designed areas are ready to receive work.

B. Cover or otherwise protect finished surfaces from damage or stains for remainder of work.

1.3 QUALITY ASSURANCE:

A. Applicable standards:

1. Aluminum Association (AA), standards as referenced herein.
2. Copper Development Association (CDA).

PART 2 PRODUCTS

2.1 ALUMINUM LETTERS:

A. Characteristics:

1. Letter style and height: "Huxley Modern" or "Times Roman", 12" High
2. Base material: Aluminum alloy.
3. Finish. Clear anodized, AA-A41 or manufacturer's baked enamel, in color selected by Project Manager from manufacturer's standard colors.

2.2 BUILDING PLAQUE:

A. Characteristics:

1. Plaque: Aluminum plaque with raised polished lettering. (22" H x 34" W)
2. Border style: Beveled edge, polished finish.
3. Background: Leatherette-finished

4. Letter style, design and sizes: APS prepared standard

5. See “Exhibit A” attached for typical plaque layout.

B. Mounting: Furnish manufacturer’s standard concealed mounting hardware for attachment to masonry surface.

C. Copy: all upper case letters; plaque shall include copy reading, “ATLANTA PUBLIC SCHOOLS” and “BOARD OF EDUCATION MEMBERS”. In addition, plaque copy shall include: the name of the school, the name of each Board of Education member, the name of the architect, the name of the contractor and the date (year) of completion. Graphics and other design elements shall be as provided by Project Manager.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install identification devices using specified fasteners, level, plumb and true to line, in accord with manufacturer’s product data, at locations shown or directed by Project Manager.

B. Mounting locations and heights: As indicated on drawings and approved shop drawings.

C. Just prior to Date of Substantial Completion, clean and polish surfaces. Remove stains and repair or replace damaged work.

END OF SECTION 10 14 19

10 14 19 EXTERIOR SIGNAGE
EXHIBIT "A"

SPRINGDALE PARK ELEMENTARY SCHOOL

ATLANTA PUBLIC SCHOOLS
DR. BEVERLY HALL, SUPERINTENDENT

ATLANTA BOARD OF EDUCATION
LACHANDRA D. BUTLER-BURKS, PRESIDENT

MS.YOLANDA K. JOHNSON
MR. ERIC W. WILSON
MS. KATHLEEN B. PATTILLO
MR. EMMETT D. JOHNSON
MS. BRENDA J. MUHAMMAD
MS. CICILY HARSCH-KINNANE
MR. MARK B. RILEY
MR. KHAATIM S. EL

PERKINS AND WILL, ARCHITECTS
BARTON MALOW COMPANY, CONSTRUCTION MANAGER

AUGUST 2009

TYPICAL BUILDING PLAQUE

Mounting height: 6'-0" to top of Plaque (AFF)
Typical overall size: 22"H X 34" W

SECTION 10 14 23
INTERIOR UNFRAMED SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 – General Requirements and the Drawings are collectively applicable to this Section.

B. Section includes:

1. Unframed, chemically welded, square or radius corner signs, for interior applications.

2. ADA signage for interior applications

3. EVAC Maps

1.2 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.. Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

B. Source Limitations for Signs: Obtain all products in this section from one source from a single manufacturer.

C. Regulatory Requirements: Products shall meet requirements ADA-ABA Accessibilitu Guidelines: US Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines and local amendments and modifications.

1.3 SUBMITTALS

A. Submit in accordance with requirements of Section 01 33 00 – Submittals.

B. Product Data: Submit product data for specified products. Include material details for each sign specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, accessories, and installation details. Provide message list, typestyles, graphic elements; including tactile characters and Braille, and layout for each sign.

D. Samples for Initial Selection: Submit supplier's standard color chart for selection purposes, and selected colors for verification purposes.

E. Installation: Submit supplier's installation instructions.

F. Closeout Submittals:

1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.

2. Submit warranty documents specified within.

G. The Architect will provide a schedule of room names, room numbers, symbols and pictographs (male, female, stair, handicap, etc. and quantities for the project that will be verified by the APS Project Manager.. Schedule shall be compiled from the construction documents/drawings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 1.

1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact, only after the building is enclosed and designated areas are ready to receive work.

3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.

4. Handle products in accordance with manufacturer's instructions.

5. Cover or otherwise protect installed signage from damage or stains for remainder of work.

1.5 WARRANTY:

A. Project Warranty: Comply with requirements of Division 1.

B. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official, in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following

a. Deterioration of metal and polymer finishes beyond normal wear and tear.

b. Deterioration of graphic image and colors.

C. Warranty Period: One (1) year from project date of Substantial Completion.

PART 2 PRODUCTS

SIGNAGE SYSTEMS

A. Product:

Unframed square or radius-corner signage with Graphic insert. Manufacturer's proprietary software to be provided for use with existing APS Microsoft Word software for convenient revision of Signage inserts. Signs shall be fabricated from solid-color modified acrylic polymer. Raised letters and symbols recessed into sign face and chemically welded,

B ADA Compliant signage with text and standard pictograms.

C. Fabrication

1. Chemically welded in compliance with indicated materials, thickness, finish, colors, designs, shapes, sizes, and details. Subsurface graphics to comply with manufacturer's standard process for precisely formed, uniformly opaque graphics for indicated size, style, spacing, content, position, and colors.
2. Clear matte lens with paper insert (paper to be 24 lb. White, perforated to 4 5/8" H x 5 ½" W)
3. Panel Size: 6 3/8" high x 6 3/8" wide.
4. Panel Finish: Selected from one of the following colors:
    a. Navy Blue
    b. Forrest Green
    c. Burgundy
    d. Light Grey
5. Back Plate: 0.125 inch thick acrylic panel, clear, matte first surface.
6. Fastener: .030 inch thick double-face tape and/or concealed mechanical.

D. ADA Signage (standard header):

1. Size: 1-1/2" high x 6" wide, chemically welded
2. Text or graphic color(s): Black (confirm with Architect)
3. Letter style: Helvetica Regular Font, capitals, lower case, and numerals.
4. Letter size: 5/8" high, 3/8" spacing between lines of text
5. Text Schedule: Provided by architect; includes room names and numbers to be reviewed by APS Project Manager.
6. Tactile Graphics and Text: Provide tactile copy raised 1/32" minimum from plaque first surface by manufacturer's stratification process
7. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.

E. EVAC Maps

1. Evacuation Plan Signs Artwork to be provided by the Architect or Life Safety Engineer.
2. Designed for a Changeable Paper insert in a clear window
3. Subsurface painted border to receive an 8 ½" x 11" Evacuation Plan insert
4. Signage Contractor shall create appropriate quantity (consult Architect) with "you are here" noted for each Stair Sign. Print and install the initial insert

5. Install EVAC signs at entry door to each Stairwell on the adjacent hall wall or as determined by the Architect.

F. Signage: See “Exhibit A” attached.

1. Size: 6 3/8” x 6 3/8” overall with square or radius corners
2. Frame Color: (Selected from one of the following colors):
   a. Navy Blue
   b. Forrest Green
   c. Burgundy
   d. Light Grey
3. Paper Color: White
4. Text or graphic color: White (recessed text)
5. Letter style: Helvetica Regular Font, capitals, lower case, and numerals.
6. Letter size: 5/8” high
7. Lens panel: Clear Matte

2.2 SIGN MATERIALS

A. Mounting Panel: Acrylic

B. Face: Vacuum formed 1.5 mil, clear, scratch resistant PVC/vinyl acetate bonded to acrylic mounting panel.

2.3 FABRICATION OPTIONS

A. Tactile Graphics and Text:

1. Fabrication process: Provide tactile copy raised 1/32-inch minimum from plaque first surface by manufacturer’s vacuum formed embossing process.
2. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements.

B. Mounting Panel Options:

1. .125 inch thick matte finished black acrylic

C. Background Appearance Options:

1. Custom colors as selected by Owner.

D. Tactile Lettering and Graphics Color Options: White

E. Overall panel size 6 3/8” x 6 3/8”.

F. Shape: Standard with square corners

G. Letter style: Helvetica Regular Font, capitals, lower case, and numerals.

H. Letter size: 5/8” high

I. Text schedule: To be provided by Architect

J. Classrooms, offices and general rooms to be provided with Changeable Paper insert signs.

K. Janitorial, MEP, Data (IDF, MDF), toilets (Boys, Girls, Faculty), Stair, Stairwell and In Case of Fire signs are to be provided as Full Tactile Plate Signs

2.4 INSTALLATION METHOD

A. Vinyl tape, silicone adhesive or concealed mechanical anchoring to insure adhesion to either painted gypsum board, wall covering, or masonry surfaces.

2.5 FABRICATION – GENERAL

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

B. Pre-assemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and installation, in a location not exposed to view after final assembly.

C. Conceal fasteners, if possible; otherwise, locate fasteners to appear inconspicuous.

D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.

B. Installer proceeding with installation implies acceptance of substrate and conditions.

3.2 INSTALLATION

A. Install product in accordance with supplier's instructions/

B. Install product in locations indicated, using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated or directed by Project Manager.

D. Install product at heights to conform to Americans With Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

E. Seven days prior to date of Substantial Completion, clean and polish surfaces. Remove stains and repair or replace damaged work.

F. Quality to meet or exceed acceptable industry standards.

3.3 CLEANING, PROTECTION, AND REPAIR

A. Replace components where damage has occurred due to installation.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

3.4 SIGN SCHEDULE

A. The Architect will provide a schedule of room names and numbers to be used by the signage contractor.

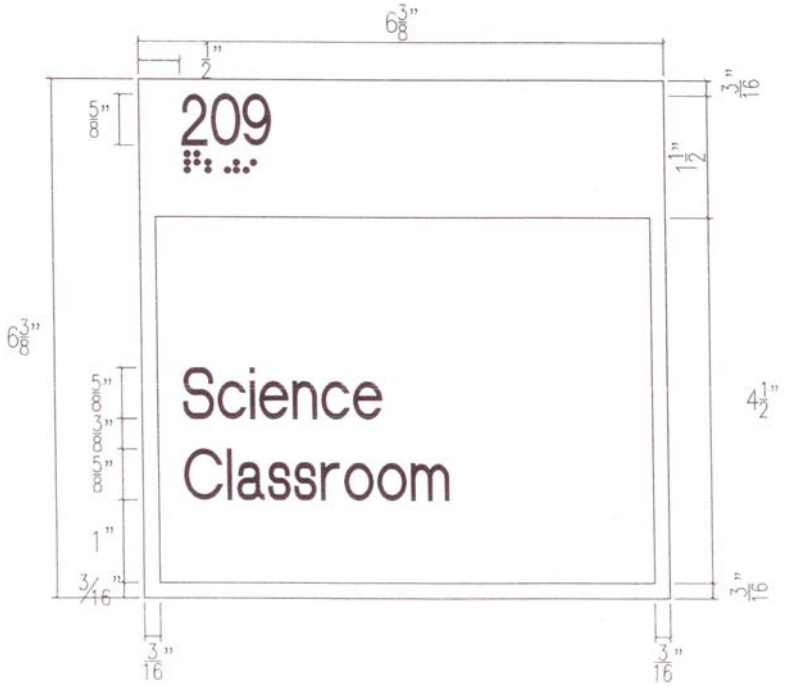
END OF SECTION 10 14 23

10 14 23 INTERIOR UNFRAMED SIGNAGE
EXHIBIT "A"

APS Interior Sign Specifications

Interior Room Window Signs: Provide smooth sign surfaces to remain flat under installed conditions within a tolerance of plus or minus 1/16" (1.5mm) measured diagonally from corner to corner, complying with the following requirements:

1. 6" x 6" 4-ply window sign comprised of 4 layers of .063"
   a. Top Layer: 6" x 6" x .063 solid core acrylic with 3.5" x 5" radius cut away to show window, with raised text and Braille in top portion
   b. Clear Layer: 6" x 6" x .063 Matte/Clear Acrylic
   c. Spacer Layer: 1.875" x 6" x .063 at top, .375 x 6" x .063" at bottom, solid core acrylic positioned to give a slide-in area 3.625" in height
   d. Backer Layer: 6" x 6" x .063" solid core acrylic with finger hole cut-away on either side to ease changing of client supplied 3.625"x 6" insert.
2. Edge Condition: Square or Radius
3. Corner Condition: Square or Radius
4. Letter Style: Helvetica Medium
5. Mounting: Unframed
6. Color: As selected by Architect from manufacturer's full range.
7. Tactile Characters: Characters and Grade 2 Braille raised 1/32" (.8mm) above surface with contrasting colors.
8. Layers shall be chemically welded



SECTION 10 14 63
LED EXTERIOR MONUMENT SIGN

The Exterior Monument/Marquee Sign shall be designed and installed in a strategic location that provides for maximum visibility and ease of operation for managing and changing the display. The final placement and design configuration shall be selected and approved by the APS Project Manager. . The LED Sign shall be the initial resource for disseminating information to the community and general public; and must be configured for remote monitoring and remote access.

PART 1 – GENERAL

1.1 SCOPE OF WORK

A .The Contractor must provide a single installation for a double-sided Exterior Monument Sign, 8 feet 4 inches wide (extended to 8‘ X 8” with decorative brick cap) X 7’-4” inches High X approximately 20” Deep. Brick monument sign constructed of brick to match new or existing brick and mortar on school building. Size of monument may vary per project.

1. The Design must be approved by the APS Construction Manager. The brick must be designed to surround signage face and provide solid brick finishing on edge fascia of signage. Two options should be provided to APS for final approval: with and without brick.

2. The Cast Aluminum Letters shall be manufactured and installed on the brick fascia with the school name and street number. **“An Atlanta Public School” wording shall also be installed on the brick fascia (size to be determined by architect)**. Letters must be Time Roman, Huxley Modern, or any other font designated by owner, with letters, if required, to match letters on building fascia.

3. School Location number must be 6” High Caps School Name must be in 6” High Caps (or a combination of 6” & 4” letter height)

4. Elementary/Middle/High must be 4” High Caps

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental General Conditions and Division 1 Specification, Sections, shall apply to this section.

1.3 **SUMMARY**: This technical scope of work includes the following types of signs:

A. Exterior cast aluminum letters

B. Exterior illuminated electronic LED message signage

1.4 SUBMITTALS

A. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles and finishes for each type of sign required.

B. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations and large-scale sections of typical members and other components. Show anchors, grounds, reinforcements, accessories, layout, and network connectivity details.

1. Provide large-scale details of wording and layout of lettering and graphics. Indicate sizes, colors, sign copy, finish and installation details.

2. For cast aluminum letters supported by or anchored to permanent construction, provide drawings, templates and directions for installation of concealed fasteners.

3. Show LAN connection, power requirements and connection locations for electronic LED message board.

4. Samples: Provide samples of each sign component for verification of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

1.5 QUALITY ASSURANCE

A. Single-source Responsibility: Vendor must provide sign, material and accessories from a single source manufacturer.

B. Design Criteria: Vendor must adhere to the drawing and specifications, size, profiles and dimensional requirements of sign.

C. All applicable signs shall meet ADA requirements

D. Cast aluminum letters must adhere to Aluminum Association (AA) standards.

1.6 DELIVERY, STORAGE AND HANDLING

A. The vendor shall deliver exterior material only after building and designated areas are ready to receive work, and confirmation and approval has been provided by the APS Construction Project Manager. This must be confirmed by site superintendent.

B. Each component must be properly packed and crated to insure safe delivery to the site. Upon receipt of shipment, an APS representative shall inventory and confirm components and software.

C. It is the vendor's responsibility to insure that all materials are stored in a secure area and out of weather that insures protection from work of other trades; and must cover or otherwise protect installed signage from damage or stains for remainder of work. Software must NOT be left in the MDF/IDF.

1.7 WARRANTY:

A. The Vendor must provide a written warranty that covers the physical sign and all encasing; and a separate warranty for all electronic components and software. The details of the warranty must include a call-out procedure that is seamless to the end-user and must provide a single source solution for ALL material, hardware, and software during the two (2) year warranty period.

1. Vendor must provide manufacturer's standard one (1) year limited warranty covering manufacturing defects for cast aluminum letters.

2. Vendor must provide manufacturer's standard two (2) year warranty covering all electronics, and lifetime warranty against defects in workmanship, operability and materials.

3. Vendor must provide a call-out procedure separate and apart from the manufacturer's warranty that clearly identifies the procedure for software related problems and/or outages. The information must contain the following:

a) Confirm 4-hour response time for normal hours of operation

b) Emergency response time for after-hours

c) Requirements of APS Network Control Center

d) Ticket close-out procedure

e) Out of warranty procedures.(provide a call-out procedure and hourly rate and response time for responding to out of warranty issues.)

Troubleshooting: The vendor must provide a written procedure that defines roles and responsibilities for troubleshooting failures. The document must include a step-by-step process flow that clearly states desired outcomes; and next steps if the desired outcome is obtained. It is the vendor's responsibility to insure 100% functionality of the system during the 24 month warranty period with a 4-hour minimum response time.

1.8 DELIVERABLES

A. MESSAGE BOARD: Vendor must provide two (2), LED Message Boards with a minimum 230 pixels per sq. ft. and installed with four (4) lines of Amber Display of 20 mm with a 16x16 pixel configuration (with 64 shades of Amber for Graphics), to measure 6' 9" W X 2'9" H X 8" D per side, installed back to back on a 4" D steel post with a protective Lexan Vandal Cover to mount over each LED face.

B. SOFTWARE: LED Sign must be supplied with the appropriate software and controller; and must be network capable with TCP/IP Ethernet connection capabilities including modem cable and signal converter in order to network with APS LED network and software. The Software must have the following capabilities:

1. Traveling text with full editing capabilities in True-Type Fonts

2. Remote and on-site programming capability.

3. Windows environment for menu guided software controls; and must allow for pre-programming and separate messages for two-sided sign unless otherwise directed.

C. HARDWARE: The Atlanta Public Schools shall provide the following:

1. PC with Windows 98 or higher to be provided by each school

2. Pentium II 233 or higher

3. 32 MB RAM

4. 20 MB disk space

5. Current year's version of Microsoft Internet Explorer 4.01 with latest Service Pack or higher

6. Supported communication device (serial port, modem or Ethernet network)

7. CD ROM drive

D. TRAINING: Vendor must provide at least two (two-hour) training sessions for school personnel and one (two-hour) session for the designated APS Technology Account Manager. All training must be scheduled through and confirmed by the APS Construction Project Manager.

E. INTEGRATION: The Vendor must coordinate installation, integration and programming of the system through the APS Construction Project Manager; shall work with the APS Department of Technology for testing and final integration with APS Network and shall demonstrate functionality prior to scheduling training.

F. CABLE: The APS Project Manager will coordinate the installation of all cable with Department of Technology.. The installation of Fiber Optic Data Cable and Fiber Optic

Signal Converter will be the responsibility of cabling vendor; and shall insure all infrastructure and connectivity requirements are in place prior at the time of sign installation. Cable must be terminated and connected at the sign and at the network box inside the school's MDF or IDF. Twenty-Five feet (25') of cable must be available at each termination end

G. CLOSEOUT: The Vendor must not commence work at the site without prior approval from the APS Construction Project Manager; and shall not deliver hardware or software to the school's Administrative Office without prior permission from the Project Manager.

1. In the delivery of this service to the Atlanta Public Schools, the Vendor is required to provide a fully operational system that includes the sign and all associated programming.

2. The system must be tested and confirmed to be online, integrated into the LAN, and accessible by the designated point of contact in the school prior to acceptance and signoff.

1.9 PRODUCT

A. CAST ALUMINUM LETTERS & NUMBERS

1. Type: Cast

2. Metal: Aluminum alloy

3. Letter Height and Style: See Part 1 Section 1.1.1 thru 1.1.3.

4. Finishes: Aluminum Class II, clear anodic or baked enamel, as selected by the APS Project Manager.

1.10 INSTALLATION

A. Type: 6'-9" X 2' 9" high LED pre-finished aluminum message board sign cabinet, double- faced (as determined by the APS Project Manager), with LED illumination providing four (4) lines of message board on each side. Vendor must install vandal cover with recessed locks. Cabinet & Sign Face must be installed in accordance with the following:

B. Extruded aluminum cabinets to have reinforced mitered and wire welded corners.

C. Cabinets to be painted with Aliphatic urethane powder coating with graffiti-resistant finish.

D. All faces to be pan-formed solar grade polycarbonate/ 3M Scotchcal translucent vinyl film on the 2nd surface.

E. Locate signage and accessories as indicated on drawings, using mounting methods of the type described and in compliance with the manufacturer's instruction.

Sign location must be confirmed and approved by APS Project Manger prior to installation.

F. Install signs level, plumb and at the height indicated above finish grade and in accordance with ADA requirements, and with sign surfaces free from distortion or other defects in appearance.

G. Attach cast aluminum letters to wall surface with concealed mounting consisting of threaded studs mounted on back of letters, fitted into cement/adhesive-filled holes in masonry surface.

H. LED Display Module

1. Double sided signs to be master-master configurations

2. Message center must be able to be controlled by direct serial connection with RS232 connection.

3. LED (light emitting diode) Made in America, Hewlett-Packard HLMP amber, ultra-bright (can be seen in direct sunlight), Life expectancy of 100,000 hours.

4. Pixel Size: 1 LED per pixel (high definition) (high resolution)

5. Operating Conditions: From -40 to + 150 degrees Fahrenheit.

6. Viewing Angle: 90 degrees from center. Viewing Cone: 140 degrees.

7. Serviceable cabinet

8. LED Module

1.11 ELECTRICAL

A. Primary electrical cabling will be provided to the sign by the APS Construction Manager. (Vendor shall price with and without electrical material and labor; inclusive of trenching and moderate landscape.) The CM's electrician will lay one (1) 1" conduit, which slopes 90 degrees at all turns, from the sign into the school's MDF or IDF room for the fiber optic connection. The cable vendor shall pull fiber optic cable through the conduit from the sign to the MDF or IDF room; and shall insure proper testing, termination and coordination with the sign vendor/manufacturer. . The Electrical contractor will coordinate termination and connectivity with the sign vendor. Additional electrical requirements as follows:

1. Power: 120 volts per side on 20 AMP Dedicated circuit

2. Two circuits for the LED cabinet; one per side: Dedicated separate circuits required.

3. Power Cabling: Electrician will provide and run #10 wire in a 1" conduit from building power source to sign site and provide additional 25' of data wire at both

sign site and MDF or IDF room for use by LED engineer for final connection. Electrician will provide a 12" X 12" X 6" or larger junction box at sign site for electrical and data, cabling storage prior to connectivity by LED engineer.

1.12 PROJECT COMPLETION: All aspects of the installation must be in place and the LED Sign demonstrated and approved prior to signoff.

A. The Sign will not be considered to be complete if any point of connectivity is missing:

1. Fiber Connectivity from the sign to the facility. Any medium other than fiber must be approved by the Construction Project Manager in conjunction with the APS Department of Technology. The final sign-off and approval shall be provided by a designated APS representative.

2. Fiber must be properly run through fiber

3. LED Sign must be properly installed and enclosed

4. Software must be configured, tested, and demonstrated

5. Training manuals and manufacturer specifications

6. Training must be conducted for the end-user.

7. Warranty must be provided with call-out procedure

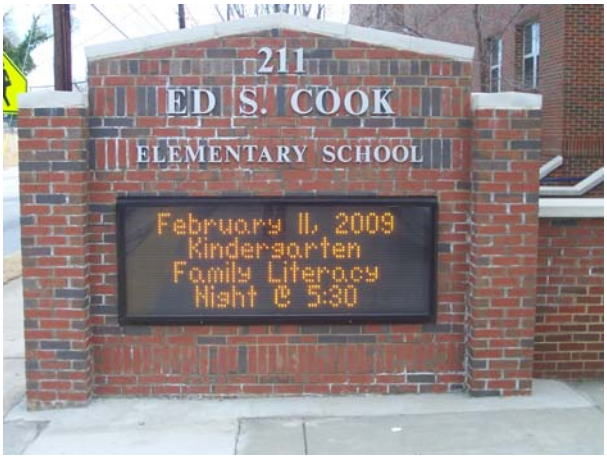
B. Network Connectivity: It is the vendor's responsibility to deliver a completely operational LED sign. This shall include the coordination of network connectivity and quality assurance. The option for wireless connectivity is to be addressed and approved by the APS Project manager in conjunction with the APS NOC. Prior to completing the installation, a designated APS Department of Technology staff representative will assign an IP address, coordinate loading software onto the school's PC, and coordinate testing, Vendor must contact the APS Project Manager to schedule an appointment with the APS NOC.

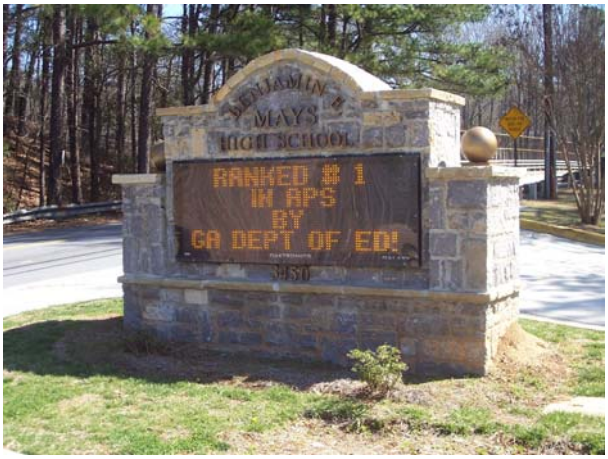
C. The Vendor is responsible for final handoff of software, documentation, manuals and controllers to the APS Project Manager. A signature is required.

D. Cleaning & Protection: At completion of the installation, vendor must clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until Final Acceptance by APS and seven (7) days prior to Date of Acceptance, clean and polish surfaces.

END OF SECTION

TYPICAL LED MONUMENT SIGNAGE
EXHIBIT A





SECTION 10 51 13
METAL LOCKERS

PART 1 GENERAL

1.1 SCOPE OF WORK- INSTALLATION OF FULLY WELDED LOCKERS:

Description: Furnish and install factory-assembled Heavy-Duty All-Welded Metal Lockers, complete, as shown and specified per contract documents.

1.2 QUALITY ASSURANCE

A. Manufacturing Standard: Provide metal lockers that are standard products of a single manufacturer, with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.

B. Fabricator Qualifications: Firm experience minimum 10 (ten) years in successfully producing the type of metal lockers indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.

C. Installer Qualifications: Engage an experienced minimum 5 (five) years installer who has successfully completed installation of the type of metal lockers and extent to that indicated for this project.

1.3 SUBMITTALS

A. Shop Drawings: Submit drawings showing locker types, sizes, quantities, including all necessary details relating to anchoring, trim installation and relationship to adjacent surfaces.

B. COLOR CHARTS: Provide color charts showing manufacturer's available colors (minimum 24). Provide metal samples if requested.

C. NUMBERING: Locker numbering sequence will be provided by the approving authority and noted on approved shop drawings returned to the locker contractor.

1.4 PRODUCT HANDLING

A. GENERAL: All work shall be fabricated in ample time so as to not delay construction process.

B. DELIVERY: All materials shall be delivered to the site at such a time as required for proper coordination of the work. Materials are to be received in the manufacturer's original, unopened packages and shall bear the manufacturer's label.

C. STORAGE: Store all materials in a dry and well-ventilated place adequately protected from the elements.

1.5 WARRANTY

A. Manufacturers must cover all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction, and vandalism under this

section for the lifetime of the facility. Provide manufacturer written warranty with bid.

PART 2 PRODUCTS

2.1 MATERIALS

A. Available Manufacturers: Subject to compliance with the design, material, method of fabrication warranty, and installation as required in this specification section or modified as shown on drawings. The following manufacturers offering products meeting or exceeding these specifications are considered approved:

1. Art Metal Products Model: Champ Elite
2. DeBourgh Manufacturing, Inc Model: Sentry Series with Stiffener
3. List Industries All Welded Bulldog Series
4. Interior/MedART Corporation Legacy Series
5. Lyon Metal Products, Inc. All Welded Series
6. Penco Products All Welded Series with Classic 3 Handle
7. Republic Storage Systems, LLC

B. Steel:

1. Steel Sheet: All sheet steel used in fabrication shall be prime grade free from scale and imperfections and capable of taking a heavy coat of high gloss baked enamel.

C. Fasteners:

1. General: Cadmium, zinc or nickel plated steel; bolt heads, slotless type; self locking nuts or lock washers.

D. Equipment:

1. Hardware: Hooks and hang rods of cadmium plated or zinc plated steel or cast aluminum.
2. Number Plates: To be polished aluminum with not less that 3/8" high etched numbers attached to door with two aluminum rivets.

2.2 FABRICATION

A. General: All lockers shall be factory-assembled, of all MIG welded construction, in multiple column units to meet job conditions. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable. Grind exposed welds and metal edges flush and make safe to touch.

B. Finishing: All locker parts to be cleaned and coated after fabrication with a seven stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade enamel electrostatically sprayed and baked at 325 degrees Fahrenheit for a minimum of 30 minutes to provide a tough durable finish. Color to be selected from manufacturer's standard list of colors.

C. Locker Types and Ventilation Schedule:

1. General: Lockers shall be ALL-WELDED LOCKERS.
2. Student Corridor Lockers:
   a. Type: 2 Tier
   b. Size: 15" wide x 16" deep x 72" high
   c. Ventilation:
      1) Doors:Louvered
      2) Backs, Sides, Tops, bottoms and Hat Shelves: Solid
   d. Color Selections:
      1) Two-Tone Color Combination: Shall be at no additional cost with the locker body, frame, and trim one color; and the doors may be a second color chosen from manufacturers standard selection.

3. Athletic Dressing Room lockers (Visitor locker room)

   a. Type: 2 tier
   b. Size: 18” wide x 18” deep X 72” high
   c. Ventilation:
      a. Doors and sides to be punched diamond perforated
      b. Backs, tops, bottoms, and tier dividers to be solid
      c. Two –Tone Color Combination: Shall be at no additional cost with the locker body, frame, and trim one color; and the doors may be a second color chosen from the manufacturers standard selection.

4. Athletic Dressing Room Lockers (Basketball typical lockers)

   a. Type: 2 tier
   b. 15” wide x 16” deep x 72” high
   c. Ventilation:
      a. Doors to be punched diamond perforated and sides
      b. Backs, tops, bottoms and tier dividers to be solid
      c. Two –Tone Color Combination: Shall be at no additional cost with the locker body, frame, and trim one color; and the doors may be a second color chosen from the manufacturers standard selection.

5. Football Locker Room

   a. Type: Prep Sport Fully Welded open locker
   b. Size: 24” wide x 22” deep x 72” high
   c. Ventilation:

a. Sides to be ventilated

b. Backs, tops, bottom, and tier dividers to be solid

d. Add footlocker, stainless hanging rod, and 12” wide security box

a. Two –Tone Color Combination: Shall be at no additional cost with the locker body, frame, and trim one color; and the doors may be a second color chosen from the manufacturers standard selection.

6. Physical Education (PE) Lockers

a. Type: 6:1 ratio

b. Size: 15” wide x 15” deep x72” high

c. Each overnight locker to measure 15” wide x 72”high

d. Ventilation:

a. Doors and sides to be punched diamond perforated

b. Backs, tops, bottoms, and tier dividers to be solid

e. Type: 1 tier

f. Size: 9” wide x 16” deep x 48” high

g. Ventilation:

a. Doors and sides to be punched diamond perforated

b. Backs, tops, bottoms, shelves and tier dividers to be solid.

D. Wardrobe Doors: Outer door to be fabricated from single sheet prime 14-gauge with 7/8" bends at top and bottom and 3/4" double bends at the sides and include a 3" wide 18-gauge full height channel door stiffener that is MIG welded to the inside of door face at the hinge side as well as being welded to the top and bottom return bends of the door. See ventilation schedule above. Fabricate to swing 180 degrees.

E. Door Recessed Locker Handle: All locker doors shall have a deep-drawn recessed seamless extruded stainless steel cup and handle shaped *to receive a padlock or built-in combination lock*. The recess pan shall be deep enough to have the lock be flush with the outer door face. The pull handle shall be embossed in the side of the recess pan for easy opening of the locker door. Seam cut and bent type pans are not acceptable.

F. Latch Assembly: Shall be finger lift control type constructed of a minimum 14-gauge steel with nylon cover that has a generous finger pull. Spring activated nylon slide latched shall be completely enclosed in the lock channel allowing doors to close in the locked position. Latch hooks must be a minimum of 12-gauge steel and shall be MIG welded to the vertical frame member

G. Door Hinges: Shall not be less than 16-gauge continuous piano type, securely riveted to frame and welded to the door. Doors are to be secured to frame by

means of riveting. To avoid pinch and twisting hazards, *5 or 7 knuckle hinges are not acceptable*.

H. Twin Frame / Vertical Side Panels: Shall be of integral frame and sidewall construction manufactured from solid 16-gauge sheet steel. The one-piece side/frames shall be formed to provide a continuous door strike on the hinge side. An additional continuous vertical door strike shall be at the latch side by MIG welding a 16-gauge full height channel frame member to the integral locker side producing a rigid torque free welded locker body. See ventilation schedule above.

I. Tops: In projects involving no soffit above the lockers exists, provide integral slope tops, integrated slope tope ends, and metal fillers. Separate riveted, screwed, or other means of manually attaching pieces of slope tops are not desired. Provide flush hairline joints against adjacent surfaces. Where soffit above conditions exist, use top and side recessed trim pieces. All tops must be a single piece of 16-gauge cold rolled sheet steel and shall be an integral part and be MIG welded to each vertical side panel member and be continuous to cover the full width of a multiple locker unit.

J. Hat and Intermediate Shelves: Shall be 16-gauge sheet steel, have double bends at front and shall MIG welded to the sides and back.

K. Bottoms: Shall be constructed of 16-gauge continuous bottom with reinforcing channels welded to the underside at each side panel providing a rigid unit base.

L. Backs: Shall be 18-gauge cold rolled sheet steel, be continuous to cover a multiple
Column unit and be welded to each vertical side panel.

M. Exposed Side Panels: All exposed side panels shall be solid boxed end type and to have matched paint color of the locker bodies.

N. Locker Accessories:

1. Locks: Locks for entire project to be keyed to the same master key system. Locks are required and use the following types.

   a. Automatic built-in combination spring bolt lock with 5 master keys on all student lockers

2. Equipment: Furnish each locker with the following items, unless otherwise shown.

   a. Single tier lockers 60" high or 72" high only: One hat shelf, one double prong ceiling hook and not fewer than two single prong wall hooks.

   b. Single tier lockers 48" high & under: One gauge double prong ceiling hook and not fewer than two gauge single prong wall hooks.

   c. Double and triple tier lockers, one double prong ceiling hook and not fewer than two single prong wall hooks.

3. Fillers: Where required to cover all edge gaps 1/8” or larger provide not less than 16-gauge sheet steel, factory fabricated and finished to match lockers.

4. Provide 16-gauge slope tops 24” deep with 18-degree pitch in 72” lengths. Finish to match locker body color.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Installation shall be in strict conformance with referenced standards, the manufacturer's written directions, as shown on the drawings and as herein specified.

B. Placement: Units shall be set in place, plumb, level, rigid, flush and securely attached to the wall (or bolted together if back-to-back) and anchored to the floor or base according to manufacturer's specifications.

C. Anchorage: About 48" o.c., unless otherwise recommended by manufacturer, and apply where necessary to avoid metal distortion, using concealed fasteners.

D. Trim: Recess trim and metal fillers shall be installed using concealed fasteners. Provide flush, hairline joints against adjacent surfaces.

3.2 ADJUSTMENT

A. General: Upon completion of installation, inspect lockers and adjust as necessary for proper door operation. Touch-up scratches and abrasions to match original finish.

END OF SECTION 10 51 13

SECTION 10 56 13
METAL STORAGE SHELVING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Adjustable steel storage shelving.

1.2 SUBMITTALS

A. Product Data: Provide data on shelving type, sizes and finishes.

B. Shop Drawings: Indicate each type of shelving in layout plan.

PART 2 PRODUCTS

2.1 METAL STORAGE SHELVING

A. Acceptable Products:

1. Rigid Frame Shelving meeting or exceeding the design characteristics listed below will be acceptable.

B. Design Characteristics:

1. All units shall be free standing requiring 4 upright posts. Posts in common are *not* acceptable. Upright angle posts shall be 14-gauge.
2. Shelving units shall be constructed so that individual units can be moved.
3. Top and bottom shelves to be 18 gauge prime steel, triple bent on all 4 sides, 2" face, ½ inch return and ½ inch return again.
4. Each top and bottom shelf shall have 16 bolting points for attachment to upright posts. Clipping system on top and bottom shelves is *not acceptable.*
5. Intermediate shelves shall be 18-gauge prime steel, triple bent front and rear, 1-1/4 inch face and ½ inch returns.
6. Shelf clips on intermediate shelves shall be compression type and adjustable without the use of tools.
7. Shelf unit shall be rigid type so that the use of cross bracing is not required.
8. Finish shall be iron-phosphated, electrostatically painted and baked to full cure (with the exception of the nuts, bolts and clips).
9. Color shall be available in at least 5 standard selections at no additional cost.

C. Standard Shelving unit sizes:

1. Type A: 87”H x 36”W x 12”D
2. Type B: 87”H x 48”W x 12” D
3. Type C: 87”H x 36”W x 18” D
4. Type D: 87”H x 48”W x 18” D
5. Type E: 87” H x 36”W x 24” D
6. Type F: 87”H x 48”W x 24”D
7. All units to have top and bottom shelf and 5 intermediate shelves.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas where shelving is to be installed and confirm completion of all adjacent finish work.

3.2 INSTALLATION

A. Assemble shelving in accordance with manufacturers instructions.

B. Secure shelving with anchor devices to suit substrate materials.

C. Bolt adjoining shelving units together to provide rigid installation.

END OF SECTION 10 56 13

SECTION 11 40 00
FOOD SERVICE EQUIPMENT SCHEDULE (Revised 10/1/08)

ITEM #	LOCATION	ITEM DESCRIPTION	SPECIFICATIONS	PREFERRED MANUFACTOR	Elementary	Middle	High
	SERVING LINE AREA						
1		Hot and Cold Pass-Thru, stainless steel w/ locking casters	Each Line (hot and cold units)	1. **Traulsen (H) RHF132WP-FHS (C) RHT132WPUT-FHS** 2. Norlake	2	2	2 to 4
2		Cashier Cart (point of sales) w/ solid V tray rail on both sides	Each line, cable ready, drawer w/lock. Elementary tray rails at 27 inches Middle & High tray rails at 35 inches	1. Shellyglas **KCS-30** 2. Color Point 3. Randall	2	2	0
3		Media Cart	Metal w/ locking casters	1. Apollo			2 to 4
4		Point of Sales		1. HP & Elo Touch 2. Dell & Elo Touch	As needed	As needed	As needed
5		Stools	adjustable legs		As needed	As needed	As needed
6		Milk Cooler w/ locking casters	All stainless steel 12 case/ 600 capacity	1. **True TMC-49-S-SS** 2. Norlake 3. Beverage - Aire	2	2	2 to 4
7		Heated Buffet Table w/ sneeze guards and drain, solid V- tray rail, w/ locking casters	5 wells unit. Elementary tray rails at 27 inches Middle & High tray rails at 35 inches	1. Shellyglas **KH5-NUH** 2. Color Point 3. Randall	2	2	2 to 4
8		Refrigerated Buffet Table w/ sneeze guards and drain, solid V- tray rail, w/	w/ slotted wells, Elementary tray rails at 27 inches Middle & High tray	1. Shellyglas **KCFT-50H** 2. Color Point 3. Randall	2	2	2 to 4

		locking casters	rails at 35 inches				
9		One-side self serve salad bar w/ single buffet shield and drain, solid V- tray rail, w/ locking casters	Elementary tray rails at 27 inches Middle & High tray rails at 35 inches	1. Shellyglas 2. Color Point 3. Randall	2	2	2 to 4
10		Dispenser and Tray Cart		1. Color Point	2	2	2 to 4
11		Pizza Oven			0	0	1
12		Deep Fryer		1. **Frymaster FPGL330** 2. Pitco- Frialator 3. Keating	0	0	2
13		Grill			0	0	1
14		Exhaust Vent Hood	To cover all cooking equipment	1.	0	0	1
15		Safety floor Mat		1. Rubber Maid	8	8	10
16		Hand sink w/foot pedal and wall mounted Paper towel dispenser	Stainless steel Z-fold (serving Line)		1	1	1
17		Crowd Control Device	Movable w/ metal base, w/ schools name and color	1. Lawrence Metal 889 Tensabarrier			40
	Dish/Tray Washing Area						
18		Pot Scrubber Dish Machine	One person operated	1. **Hobart** UW-50	1	1	1

19		Water Booster Heater	For Pot scrubber machine	1. **Hatco**	1	1	2

20		Table, Solid Dish w/ over head pre-rinse unit	Stainless steel		1	1	1
21		Table, clean dish	Stainless steel		1	1	1
22		Hand Sink w/foot pedal & mounted Paper towel dispenser	Stainless steel Z-fold (Kitchen)		1	1	1
	Cooking Area						
23		Range, 6 Burners w/ Oven / No casters		1. **South Bend P32D-BBB** 2. U S Range 3. Vulcan - Hart	1	1	1
24		Skillet, Tilt w/ water and drain (Floor Trough)	40 gallons	1. **Cleveland SEL-40-T1** 2. Blodgett	1	1	1 to 2
25		Kettle, Gas, Floor mounted w/ water, lid, stirring paddle & Floor trough	Elementary: 20 gals. Middle & High: 40 gals.	1. **Cleveland KET-12-T** 2. Southbend 3. Blodgett	1	1	2
26		Steamer, convection w/ drain line		1. **Cleveland 21CGA5** 2. Blodgett	1	1	2
27		Stand for Steamer	Stainless steel	1.**Cleveland Unistand 34** 2. Blodgett	1	1	2
28		Hand Sink w/foot Pedal & mounted Paper towel dispenser	Stainless steel Z-fold (Kitchen)		1	1	1

29		Veg. / Fruit Sink	2 compartment w/ drain		1	1	1
30		Garbage Disposal		1. **In-Sink Erator SS20-29 AS101** 2. Salvajor	1	1	1

31		Meat Sink	2 compartment w/ drain		1	1	1
32		Ice Maker w/ storage bin	300 lb. capacity	1. 1. **Scotsman C0330** 2. Ice-O-Matic 3. Manitowac	1	1	1
	Baking Area						
33		Exhaust Vent Hood	Utility distribution system		1	1	1
34		Combi-Oven	Gas Steam-on- Demand	1. **Blodgett BCX-14G**	1	1	1
35		Oven, Convection double stacked	Gas w/ electric ignition	1. **Blodgett DFG-100** 2. Garland	2	2	2
36		60 qt. Mixer	w/ bowl (SS) and attachments, bowl truck	1. **Hobart HL600** 2. Welbuilt	1	1	1
37		Vertical cutter/mixer w/ water supply	with attachments	1. Hobart UW-50	1	1	1
38		Deep Fryer w/ oil filter, baskets and cover for wells		1. **Frymaster FPGL330** 2. Pitco- Frialator 3. Keating	0	2	3 to 4
39		Bakers Table w/3 drawer storage, back splash, over head shelf w/ drip gutter	Stainless steel		1	1	1
40		Upright Warmer (insulated mobile	w/ drain & locking casters	1. Crescor **H-137-UA-12C**	2	2	3

		food warmer)					
41		Work Table, stainless steel w/ Pot Rack	w/ hooks & drawers		1	1 to 2	1 to 2
42		Work Table, stainless steel	w/ drawer shelf below		3	3	4 to 5

43		Shelf Utility Cart, Super Erecta, chrome wire	300 lb. capacity, w/ casters	1. Metro 3SP SERIES	4	4	6
44		Utility Cart/ heavy duty, stainless steel	400lb. capacity, w/ casters	1. Wilder	2	2	2
45		Universal Angle Utility Rack		1. Crescor 207 - UA - 13	1	1	1
46		Steam Table Pan Rack		1. Crescor	1	1	1
47		Work Table w/ drawer	Stainless steel		1	1	1
48		Industrial Can Opener, table mounted	w/ gear and knife		1	1	1
49	**Kitchen Area**						
50		Walk-in Freezer and Cooler w/ separate entrance doors w/ duel compressor units	w/ 12 frost rack shelving, (SS) quarry tile floor, perferred	1. **Koplak** 2. Norlake	1	1	1
51		Install Cool / Freezer Monitoring System	Mounted on outside wall units near ceiling	1. Lenel	1	1	1
52		Upright Refrigerator, 2	w/ locking casters	1. **True TM-52** 2. Victory	1	1	1

		doors					
53		Food Processor	w/ attachments	1. **Robot Coupe R6VN** 2. Hobart 3. Dean	1	1	1
54		Meat Slicer		1. Hobart 2712	1	1	1
55		Meat Cutter Automatic, on mobile stand	w/ pan storage (Buffalo Chopper)	**1.Hobart 84186**	1	1	
56		Fruit Sectionizer	Sectionizer w/ 4 wedge and single blade cutters	1. Sunkist S-101 S-35	1	1	
57		Hand Sink, stainless steel	w/ paper towel dispenser Z-fold (Kitchen)		1	1	1
58		Four Compartment Sink, stainless steel	w/ water agitator in first compartment /w drain, Spray hose and 2 HP Pump	1. Aqua Scrubber	1	1	1
	Pantry Area						
59		Open Wire Shelving, SS w/ microban antimicrobial protection	800 lbs. shelf capacity	1. Metro Seal 3	As needed	As needed	As needed
60		Can Storage Rack		1. Metro	1	2	2
61		Dunnage Racks	12 inch, 2100 lb. capacity w/ locking caster	1. Metro	3	3	3 to 4
62		Step Ladder	4 ft. Min. w/ 300 lbs capacity		1	1	1
63		Hand Truck	Convertible, light aluminum (alloid)	1. Magliner	1	1	1
64		Ingredient Bins w/ casters	Under counter w/ casters		4	4	4
65							
66		Sheet Pan Rack		1. Crescor	As needed	As	As

		(cooking)				needed	needed
67		Pot Rack Shelf		1. Metro	1	1	1
	Sanitation						
68		Waste container w/ Lid on casters	30 Gallons		6	6	6
69		Mop Bucket and Wringer w/locking casters	Plastic product	1. Rubbermaid products	2	2	2
70		Dust Pan w/ handle			2	2	4
71		Commercial Mop	16 oz. Wet Mop head	1. Cotton/Synthetic	2	2	2
		Commercial Mop Handle	Quick change	1. Unisan	2	2	2
72		Commercial Broom	Plastic bristles	1. Unisan	2	2	2
	Mop Closet						
		Chemical Shelf					
73		Mop Hanger/Mop Sink			1	1	1
74		Industrial Wall Mounted Pressure Washer	2.2 GPM 1100-psi Food Service Package	1. Spray Master Technologies	1	1	1
75		Fly Fan	Over exterior door		1	1	1
	Security						
76		Security System and Key Pad	Install near managers office or inside entrance wall				
77		I-Phone	I-Phone w/ door bell system, install in manager office				
	Manager Office						
78		Desk	w/ drawers		1	1	1
79		Desk Chair	w/ casters		1	1	1
80		Book Shelf			1	1	1
81		Filing Cabinet			1	1	1

82		Chair			3	3	3
83		Phone			1	1	1
84		Computer		1. Hp 2. Dell	1	1	1
85		Printer		1. HP 2. Dell	1	1	1
86		Fax			1	1	1

SECTION 11 66 23
GYMNASIUM EQUIPMENT

PART I GENERAL

1.1 This section shall include the furnishing of all equipment and labor necessary to complete basketball backstops and volleyball equipment shown on the drawing(s) and/or herein specified. All equipment specified shall be supplied by one manufacturer.

1.2 RELATED SECTIONS

A. Cast in Place Concrete - Div. 03 00 00

B. Metals - Steel Joist Framing - Div. 05 21 00

C. Finishes - Flooring - Div. 09 60 00

D. Masonry - Div. 04 00 00

E. Finishes - Painting - Div. 09 90 00

F. Electrical - Div. 16 00 00

1.3 REFERENCES

A. Equipment specified shall conform to the latest rules and regulations of the NationaL Federation of State High School Association (NFSHSA) (P.O. Box 690- Indianapolis, IN 46206-0690. Telephone: (317-972-6900)

1.4 SUBMITTALS

A. Submit shop drawing under this specification. Show location and detail of attachment to building structure.

B. Submit color samples for wall padding, divider curtains, equipment protective padding or mat mover sling.

C. Indicate each item being furnished including materials, quantities, locations, connections and fasteners. Include dimensioned layout of equipment locations.

D. Submit copy of manufacturers Certificate of Insurance.

E. Submit static loads and point reactions complete with calculations for each backstop in compliance with paragraph 1.5 Engineering Data.

F. Submit test data requested. Same shall be from a licensed independent testing company and shall be data on parts specifically requested.

G. Submit copy of additional guarantee/warranty information for indicated items with shop drawing submittals.

1.5 ENGINEERING DATA

A. The overhead attachments of the basketball backstops have been located in keeping with static equivalent loading and point reactions furnished by the prime specified manufacturer. Should a manufacturer, other than the prime specified be selected, that manufacturer must submit static loads and point reactions for each basketball backstop.

B. All calculations must be submitted complete for each backstop showing hanger and hoist pulley points. General load charts or generic product laboratory test data will not be considered sufficient data for approval.

1.6 WARRANTY

A. Provide applicable warranties as described in the following specifications. Provide a one year warranty on all other items where not described specifically in the specifications.

1.7 QUALITY ASSURANCE

A. While it is not the intent to limit competitive bidding, the manufacturer and equipment specified is listed as a standard of quality, durability and performance. Items furnished shall be of the same manufacturer to assure similar operation, safety, routine maintenance and service.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The following manufacturers, who meet or exceed the following specifications, are considered equal or any other manufacturer meeting or exceeding the following specifications with 10 days prior approval by APS:

1. BPI Products 800-435-DUNK
2. Porter Athletics 770-205-8312
3. Bison Sports 800-247-7668
4. BSN Equipment 800-292-7772

B. Manufacturer's products shall be standard cataloged items and shall be a consistently offered line of equipment. Manufacturer's published literature must clearly show that the products being furnished are in compliance with these specifications. Otherwise, a detail listing of differences is required prior to bid.

C. Manufacturer's in order to be considered must have at least ten (10) years of experience producing equipment of the type and design specified. Manufacturer must be able to furnish a reference list of recent projects (within 25 mile radius of this project site) with similar products in compliance with these specifications.

2.2 BASKETBALL EQUIPMENT MATERIALS

A. Provide where indicated on drawings, the following basketball backstop support structure and related equipment:

1. Structure:

a. Provide overhead-supported backstop incorporating a fully welded vertical front frame assembly consisting of a main center mast of 6-5/8" O.D. heavy wall structural steel tube with diagonal side sway braces of 2-1/2" rectangular steel tube. Ends of diagonal brace tubes and internal web bracing shall be precision machine cut to provide maximum weld surface contact to form a unitized, back-to-back triangular type structural design to provide superior lateral stability. Top horizontal mast hinge spreader shall be a heavy 4" structural channel. Backstop shall be supported from 3-1/2"O.D. pipe anchored to overhead framing members by means of heavy formed steel support fittings which must be capable of supporting a load exceeding 10,000 pounds with sufficient attachment points and meeting a safety factor of 60 to 1. Certified test results shall be furnished with submittals. Bolt together masts are not acceptable.

b. All goals shall mount directly through backboard and into a heavy structural steel weldment center-strut, which shall be clamped to the vertical 6-5/8" O.D. center support to eliminate any strain on backboard should a player hang on the front mounted goal and to be in compliance with NCAA and NFSHSA requirements. All fittings shall be attached to the 6-5/8" O.D. vertical drop tube by heavy ¼" thick precision saddle die-cut formed steel fittings secured in place by 5/8" diameter "U"-bolt type hardware. The upper backboard extension assembly shall provide the official NCAA and NFSHSA regulation 6" from the front of the center-strut to the face of the backboard. Rear Bracing to be supported and fixed in playing position with 1-7/8" diagonal rear brace. Goals not incorporating center strut design will not be approved.

2. Backboard Selection: Provide each court backstop with rectangular backboard 1/2" thick 72" x 42" tempered plate glass cushioned in a fully unitized steel tubing frame with glare free aluminum perimeter. Standard white borders and target area shall be fired-into glass permanently. Provide Limited Lifetime Warranty against breakage.

3. Backboard Padding: Provide for each rectangular glass backboard bolt-on

positive attachment backboard pad along bottom of backboard and up 15" on each side meeting NCAA/NFSHSA rules. Pads shall be 2" thick molded form 9 lb. density polyurethane foam with integral skin. Provide 8 standard colors. Provide 8-year warranty.

4. Goal Selection: Provide for each glass backboard a torq flex goal incorporating a shock absorption feature by a special torq rod arrangement designed to return to playing position when load is released. Goal shall be fabricated from 5/8" diameter cold drawn alloy steel. Provide a cover to conceal mounting bolts and entire shock absorption mechanism of goal, and also protect against finger entrapment. Goal shall be rigidly braced by means of special, formed die cut steel braces on underside for maximum support. Entire goal shall be finished in a durable official orange powder coat finish. Provide anti-whip white net. Provide limited 5-year warranty.

5. Folding Operation: Provide ½-hp Electric Winch with key switch for attachment heights lower than 28 feet. Attachment points greater than 28 feet shall require a ¾ hp winch for durability. Worm and gear set must be oil bathed within main shaft for durability.

2.3 VOLLEYBALL EQUIPMENT

A. Provide and install after the installation of the flooring and where indicated on drawings, the following volleyball equipment. Provide 8" Brass Cover plates and 3 ½" Sleeves. Provide two extruded fully ribbed aluminum volleyball standards, one judge's stand, and one kevlar cabled competition volleyball Net. For player safety provide complete padding for standards and judges stand.

2.4 SCOREBOARD

A. Furnish and install complete, where indicated on the architectural drawings, Daktronics Model BB-2107 or equal scoreboard. Boards shall measure 6' High, 10' Long, and 6" Deep. Provide one wireless controller for this project. Equipment must be UL approved and meet CSA Certification.

2.5 WALL PADDING

A. Furnish and install complete where shown on the drawings, 2'X 6' wall padding or equal. Padding shall measure 2' X 6' and 2" Thick. Panels shall be manufactured with 3/8" Thick high density oriented fiver board, 2" thick padding, and covered with 14 ounce non-tear vinyl laminated material. Covering must meet UL-214 and NFPA-701 standards.

2.6 DIVIDER CURTAIN

A. Furnish and install where shown on the architectural drawings, one center roll curtain. For maximum overhead clearance, the gym divider curtain shall be center roll up type that will store no more than a height of 14" below the structural support. For maintenance and ease of use, curtains shall not use hoist cables and belts. Lower half of curtain shall be solid vinyl, polyester reinforced 19 oz vinyl coated

fabric containing antibacterial, fungi-resistant and flame retardant chemicals. Vinyl shall meet NFPA 701 large scale, and ULC S-109 large and small scale. Upper half of curtain to be fleximesh designed for air circulation.

B. Top and bottom of curtain shall be fabricated with a pocket to conceal continuous 1 5/16" od tubes extending the full length of the fabric to ensure proper support. Upper and lower sections shall roll flat and compact to the overhead storage position by means of a tubular type motor that shall be 110 volt 3.8 amp single phase.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine work in place on which specified work is in any way dependent to ensure that conditions are satisfactory for installation of specified work. Report in writing to the Construction Manager and the Owner any defects that may influence completion of specified work. Absence of such notification will be construed as acceptance of work in place. Do not attempt installations until correct conditions are present or you have a written order to do so.

3.2 INSTALLATION

A. Equipment herein before specified shall be installed by factory trained craftsmen skilled in their trade. Be responsible for accurate fit of specified work.

B. Install and assemble all equipment furnished in accordance with manufacturer's instructions and approved shop drawings. This contractor shall adjust backstops, backboards and goals for plumb and level.

C. Installer to removal all trash and debris resulting from this scope of work upon the completion of this work.

END OF SECTION 11 66 23

SECTION 11 66 43
MULTISPORT SCOREBOARD

PART I GENERAL

1.01 SECTION INCLUDES

A. Single-sided LED multisport scoreboard

1.02 REFERENCES

A. Standard for Electric Signs, UL-48, 13th Edition

B. Standard for Control Centers for Changing Message Type Signs, UL-1433, 1st Edition

C. Standard for CAN/CSA C22.2

D. Federal Communications Commission Regulation Part 15

E. National Electric Code

1.03 SUBMITTALS

A. Product data: Submit manufacturer's product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.

B. Shop drawings: Submit mechanical and electrical drawings.

C. Maintenance data: Submit manufacturer's installation, operation, and maintenance manuals.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Product delivered on site.

B. Scoreboard and equipment to be housed in a clean, dry environment.

1.05 PROJECT CONDITIONS

A. Environmental limitations: Do not install scoreboard equipment until mounting structure is secure and concrete has ample time to cure.

B. Field measurements: Verify position and elevation of structure and its layout for scoreboard equipment. Verify dimensions by field measurements.

C. Verify mounting structure is capable of supporting the scoreboard's weight and windload in addition to the auxiliary equipment.

D. Installation may proceed within acceptable weather conditions.

1.06 QUALITY ASSURANCE

A. For indoor/outdoor use

B. Source Limitations: Obtain each type of scoring or related equipment through one source from a single manufacturer

C. ETL listed to UL Standards 48 and 1433

D. NEC compliant

E. FCC compliant

F. ETLC listed to CAN/CSA 22.2

1.07 WARRANTY

A. Provide 5 years of parts coverage

B. Provide toll-free service coordination

C. Provide technical phone support during business hours

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Daktronics, Inc., or equal.

2.02 PRODUCT

A. Daktronics MS-2016-11/21 single-sided multisport scoreboard can score basketball, field hockey, football, lacrosse, soccer, volleyball and wrestling. It scores HOME and GUEST to 99, PERIOD to nine, time to 99:59 and during the last minute of the period, displays time to 1/10 of a second and includes an audible horn.

2.03 SCOREBOARD

A. General information
   a. Dimensions: 2'11" (889 mm) high, 9'-0" (2743 mm) wide, 0'-7" (178 mm)

deep
b. Weight: 70 lb (32 kg)
c. Power requirement: 300 watts
d. Color: more than 150 colors to choose from

B. Construction
a. Alcoa aluminum alloy 5052 construction
b. Scoreboard face and perimeter: 0.063" thick
c. Scoreboard back: 0.050" thick
d. Digit faceplates: 0.063" thick

C. Digits
a. Seven bar segments per digit
b. PanaView® LED technology
c. All digits: 10" (254 mm) high
d. Red or amber LEDs
e. TS AlInGaP light emitting diodes (LEDs)
f. Individual digit panels are fastened with a maximum of three screws for easy access and quick removal. Rivets are not an acceptable fastening method.

D. Captions
a. HOME and GUEST captions: 5" (127 mm) high
B. PERIOD caption: 4" (102 mm) high
c. All captions: white vinyl applied directly to scoreboard face

E. Logo/Sponsor Panels
There is space for one 13" (330 mm) high, 36" (914 mm) wide logo/sponsor panels in the top corners of the scoreboard.

F. Optional Equipment
a. Vinyl team logo/sponsor graphics
b. Scoreboard striping
c. Vinyl team name caption in place of the home caption
d. Programmable message centers
e. Protective screen for LED digits

2.04 SCORING CONSOLE

A. Console is an All Sport® All Sport 5010 controller.

B. Capable of scoring basketball, lacrosse, soccer, volleyball and wrestling through the use of keyboard inserts

C. Capable of controlling other All Sport controlled scoreboards

D. Console has a maximum power requirement of 6 watts

E. Console recalls clock, score, and period information if power is lost

F. Console includes:
   a. A rugged aluminum enclosure to house electronics
   b. A sealed membrane water-resistant keyboard
   c. A 32-character liquid crystal prompting display to verify entries and recall information currently displayed
   d. A 6' (1829 mm) power cord to plug into a standard grounded 120 V AC outlet
   e. A 20' (6096 mm) control cable to connect to the control receptacle junction box
   f. A practice timer mode
      1. Can sound the horn at the end of each segment
      2. Has 99 programmable segments
      3. Displays the segment number and segment length
      4. Has a programmable interval time

G. Optional Equipment
   a. Carrying case for console
   b. 2.4 GHz spread spectrum radio for scoreboard control
   c. Battery pack

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting structure is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings. Verify concrete has cured adequately according to specifications.

3.02 INSTALLATION

A. All power and control cables to scoreboards and displays are routed in conduit, power to the scoreboards/displays as well as raceways shown on electrical plans by the Electrical Contractor. Scoreboard control wiring including conduit are the responsibility of the contractor assigned the scoreboard equipment.

B. Install scoreboards and exterior displays to beams in location detailed and in accordance with manufacturer's instructions. Verify unit is plumb and level.

3.03 INSTALLATION – CONTROL CENTER

A. Provide boxes; cover plates and jacks in locations per plans.

B. Test connect control unit to all jacks and check for proper operation of control unit, scoreboard and all features. Leave control unit in carrying case and other loose accessories with owner's designated representative.

C. Verify earth ground does not exceed 15 ohms.

END OF SECTION

SECTION 11 66 48
BASKETBALL SCOREBOARD

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Single-sided LED basketball scoreboard

1.02 REFERENCES
A. Standard for Electric Signs, UL-48, 13th Edition
B. Standard for Control Centers for Changing Message Type Signs, UL-1433, 1st Edition
C. Standard for CAN/CSA C22.2 No. 207-M89 for indoor use
D. Federal Communications Commission Regulation Part 15
E. National Electric Code

1.03 SUBMITTALS
A. Product data: Submit manufacturer's product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.
B. Shop drawings: Submit mechanical and electrical product specification drawings.
C. Maintenance data: Submit manufacturer's installation, operation, and maintenance manuals.

1.04 DELIVERY, STORAGE, AND HANDLING
A. Product delivered on site.
B. Scoreboard and equipment to be housed in a clean, dry environment.

1.05 PROJECT CONDITIONS
A. Environmental Limitations: Do not install scoring equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.
B. Field Measurements: Coordinate scoreboard location and height with the customer. Verify dimensions by field measurements.
C. Supply weight and mounting method for owner to verify that building structure is capable of supporting the scoreboard's weight in addition to the auxiliary equipment.

1.06 QUALITY ASSURANCE
A. For indoor use only
B. Source Limitations: Obtain each type of scoring equipment and electronic displays through one source from a single manufacturer.
C. ETL listed to UL Standards 48 and 1433
D. NEC compliant
E. FCC compliant
F. ETLC listed to CAN/CSA 22.2

1.07 WARRANTY

A. Provide 5 years of parts coverage
B. Provide toll-free service coordination
C. Provide technical phone support during Daktronics business hours

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Daktronics, Inc., 201 Daktronics Drive, P.O. Box 5128, Brookings, South Dakota 57006-5128

2.02 PRODUCT

A. **Daktronics BB-3107-19** single-sided basketball scoreboard can also score volleyball and wrestling. It scores HOME and GUEST to 199, PERIOD to 9, team FOULS to 19, PLAYER number to 99, player FOUL to 9, T.O.L (time outs left) to 9, indicates possession and bonus, displays period time to 99:59 and during the last minute of the period, it displays time to 1/10 of a second. The HOME and GUEST scores can illuminate green to indicate which team is ahead, red to indicate which team is behind, and amber when both scores are tied. The clock can illuminate red when stopped, green when running, and amber when under a minute. In wrestling mode, the HOME score displays green and the GUEST score displays red.

2.03 SCOREBOARD

A. General information
    1. Dimensions: 6'-0" (1829 mm) high, 10'-0" (3048 mm) wide, 0'-6" (152 mm) deep
    2. Weight: 225 lb (102 kg)
    3. Power requirement: 200 W
    4. Color: over 150 colors to choose from
B. Construction
    1. All-aluminum construction
    2. Scoreboard face and perimeter: 0.063" thick
    3. Scoreboard back: 0.050" thick
    4. Digit faceplates: 0.090" thick
    5. Cabinet withstands high-velocity impact from indoor sports balls without the need for protective screens.
C. Digits
    1. LED digit technology: A diffusant over the LEDs blends the light achieving a uniform look with 140 degree wide viewing angle.
    2. Clock and score digits: 13" (330 mm) high
    3. PERIOD, FOULS, PLAYER/FOUL, and T.O.L. digits: 10" (254 mm) high
    4. Clock, colon, and score digits: amber, green, or red LEDs
    5. PERIOD, PLAYER/FOUL, and T.O.L. digits and bonus indicators: amber LEDs
    6. FOULS digits and possession indicators: red LEDs

D. Captions
   1. HOME and GUEST captions: 6" (152 mm) high
   2. PERIOD, FOULS/SCORE, PLAYER/FOUL/MATCH, and T.O.L. captions: 4" (102 mm) high
   3. All captions: white vinyl applied directly to scoreboard face

E. Logo/Sponsor Panels
   1. There is space for two 17" (432 mm) high, 21" (533 mm) wide logo/sponsor panels on the top corners of the scoreboards.

F. Horn
   1. Vibrating horn: mounts behind scoreboard face
   2. Sounds automatically when period clock counts down to zero
   3. Sounds manually as directed by operator

G. Power Cord
   1. Cord is 11' (3353 mm) long
   2. Cord plugs into a standard grounded 120 V AC outlet

H. Optional Equipment
   1. Double bonus indicators
   2. Vinyl team logo/sponsor graphics
   3. Scoreboard striping
   4. Vinyl team name caption in place of the HOME caption
   5. Programmable Team Name Message Centers (TNMCs)
   6. Protective screen
   7. Hardware for suspension installation
   8. Corner mounting kit
   9. Protective screen
   10. 12V DC horn
   11. Advantage time option for wrestling

2.04 SCORING CONSOLE

A. Console is an All Sport® 5000 controller

B. Capable of scoring basketball, volleyball, and wrestling through the use of keyboard inserts

C. Capable of controlling other ColorSmart® compatible scoreboards

D. Console has a maximum power requirement of 5 watts

E. Console recalls clock, score, and period information if power is lost

F. Console includes:
   1. A rugged aluminum enclosure to house electronics
   2. A sealed membrane water-resistant keyboard
   3. A 32-character liquid crystal prompting display to verify entries and recall information currently displayed
   4. A 6' (1829 mm) power cord to plug into a standard grounded 120 V AC outlet
   5. A 20' (6096 mm) control cable to connect to the control receptacle junction box
   6. A practice timer mode
      a. Can sound the horn at the end of each segment
      b. Has 99 programmable segments

c. Displays the segment number and segment length
d. Has a programmable interval time

G. Optional Equipment
1. Carrying case for console
2. 2.4 GHz spread spectrum radio for scoreboard control
3. Battery pack

PART 3 EXECUTION

3.01 EXAMINATION

Verify that surfaces scoreboard will be mounted on are ready to receive work.

A. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings.

3.02 INSTALLATION

A. Power conduit, cable and outlet boxes to be provided and installed by the electrical contractor. Signal raceways, conduit and boxes to be provided by the electrical contractor. Electrical contractor is responsible for pulling signal wire and terminators between each scoreboard and control location. Scoreboard vendor to terminate signal wire of controller and conduit scoreboard.
B. Mount scoreboards and interior displays to wall in location designated by the customer and in accordance with manufacturer's instructions. Unit is plumb and level.

3.03 INSTALLATION – CONTROL CENTER

A. Provide boxes, cover plates and jacks as required to meet control specification requirements. Control cables to control panels shall be concealed.
B. Test the operation of the scoreboard, controller and all control jacks, leave control unit in carrying case and other loose items with owner's designated representative.
C. Conduct operator training on the scoreboard/controller operation.

END OF SECTION

SECTION 12 66 13
TELESCOPIC FOLDING BLEACHERS

PART 1 GENERAL

1.1 WORK:

A. Telescoping gymnasium bleachers.

1.2 RELATED WORK:

A. Electrical

B. Gymnasium flooring

1.3 REFERENCES:

A. Applicable building codes NFPA 101 Edition Year 2000

1.4 DESCRIPTION OF THE SYSTEM:

A. The bleacher system shall be comprised of multiple tiered, closed deck seating rows operating in a telescopic manner, incorporating the most economical quantity of sections while still complying with all loading requirements.

B. The first moving row shall be secured with friction or mechanical locks. Other rows shall be mechanically locked, operable only upon unlocking and cycling the first row to be determined by manufacturer engineering.

C. Each bleacher row shall be comprised of risers, seat and deck components, and a complete set of supportive columns and braces.

D. The telescopic bleacher shall incorporate a locking system permitting the use of one, several, or all rows, each locked in the extended position.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturing: Manufacturer shall be regularly engaged in the design and manufacturing of telescopic seating for not less than ten years.

2. Engineering: It will be mandatory that each bidder submit with their bid an affidavit signed by a Registered Professional Engineer stating that the product to be supplied has been tested by an independent testing facility and meets all applicable code requirements.

B. Deviations: It will be the responsibility of the bidder to furnish with their bid, a list clarifying any deviations from the specifications, written or implied. Those bidders not submitting a list of deviations will be presumed to have bid as specified.

C. Guarantees:

1. Two (2) Year Guarantee: The manufacturer shall guarantee all work performed under these specifications to be free from defects for a period of two years.

D. Product Improvements: Seating provided shall incorporate manufacturer's design improvements and materials current at time of shipment.

1.6 SUBMITTALS:

A. Submit manufacturer's installation instructions and descriptive literature in accordance with Section 01 33 00.

B. Manufacturer's operating and maintenance manuals in accordance with Section 01 70 00.

1.7 DESIGN CRITERIA:

A. Telescopic bleacher design and fabrication shall conform to NFPA 2000 requirements.

B. Telescopic gymnasium seating will be designed to support a vertical live load of 100 PSF, but not less than 120 PLF on both seat boards and foot boards. Seating shall also be designed to carry a horizontal sway force of 24 PLF parallel to the seating and 10 PLF perpendicular to the seating.

C. Steel components shall be cold-formed from appropriate width strip stock conforming to ASTM A570 - Grade C 30KSI, ASTM A653- Grade 33 and 50, ASTM A500 - Grade B 46 KSI as applicable.

D. Lumber components are kiln dried, finger jointed, edge glued southern pine of grade "B & B Finish" manufactured to the current SPIB glued-laminated standards for southern pine.

E. Architect to supply all of the necessary information for the design of the folding bleachers in the contract documents.

PART 2 MANUFACTURERS

2.1 GENERAL:

A. The purpose of these specifications is to establish minimum requirements for this gymnasium bleacher needs in order to provide a durable and functional installation of quality equipment. Subject to compliance with these specifications, provide one of the following manufacturers or approved equal:

1. Sheridan Bleacher Company

2. Paddock Bleacher Company

3. Interkal Bleacher Company, basis of design.

4. Hussey Seating Company

B. Deck: Closed Deck

C. Type: Wall attached

D. Quantity:

1. Provide the number of banks, length, and rows high per the architectural drawings and contractor/manufacturer verified field dimensions.

E. ADA

1. Notchouts: Provide a one-row deep 36” wide wheel chair space as shown on the plans and as required to meet local code jurisdiction compliance with ADA specifications.

F. Dimensions:

1. Rise per row – Minimum 10 -1/4”

2. Row to row spacing 24”

G. Propulsion - For all bleacher systems over 5 rows.

Friction Power- Furnish friction power, integral automatic electro-mechanical propulsion system to open and close telescopic seating system. Operation shall assure full visual control of the seating bank. The propulsion system must incorporate two friction drive roller assemblies as an integral part of both first row vertical column assemblies. Each section of bleacher shall have a power system that shall consist of two vertical column roller assemblies which shall include two 6” diameter by 2 ½” wide cast drive wheels for a minimum of four friction roller contact points per section of bleacher. Each roller shall have a specially formulated 45 durometer rubber covering to grip the floor as the units roll in and out. The two friction drive roller assemblies shall be installed a minimum of 7-

feet apart per section. The two friction roller assemblies are linked together by a continuous drive shaft driven by a 1/2 H.P. 208V, 3-phase motor that shall enable the rollers to work simultaneously, resulting in a more efficient operation with allowance for minor variations in the floor surface. *The entire power system shall be U.L. Recognized*. A 208/220 volt 3-phase power source, including conduit, wiring, and safety disconnect must be provided by others. The electrical contractor shall perform the connections to the seating equipment at the safety disconnect. Motors, housing, and wiring shall be installed by certified personnel. *Coordinate the location of the wall mounted key switch for operation with the Architect.* Bleachers sections with less than 6 rows shall be manually operated.

2.2 ACCESSORIES

A. Foot Level Aisles: Provide footrest level aisles at locations and sizes as shown on plans and approved shop drawings.

1. Center Aisle: Provide a permanently attached self storing aisle rail which is designed to eliminate all labor associated with the setup and storage of the aisle rail.

2. Intermediate Steps: Provide manufacturers standard intermediate step as necessary per applicable code.

B. Wheelchair Seating:

1. Notchouts: Provide manufactures standard permanent handicap notchout (36”) located as shown on architectural plans. Notchouts must be located at section joints only to avoid interference with understructure. Fascia panels shall have manufacturer’s standard polydeck finish to match deck board surface.

C. End and Aisle Railing:

1. Self-Storing End Rails: Provide steel self-storing 42” high self-storing end guardrails with tubular supports and vertical intermediate members to comply with all code requirements. Rails shall be fitted to each exposed bank end from third row and above with all steel-to-steel connections. Finish shall be a polyester powder coat.

2. Self-Storing Aisle Rails: Aisle Rails must store into the bleacher system without the use of labor and be attached to the bleachers as to provide closing without adjusting or moving the rails.

2.3 FABRICATION

A. Continuous Wheel Channel: Wheel channels shall consist of a one piece formed steel channel welded to the base of a vertical column. Every row of each section shall be fitted with not less than eight (8) wheels under each moving row for rows 1 to 10, ten (10) wheels under each moving row for rows 11-15, and twelve (12) wheels starting with row 16.

B. Wheels: 3-1/2" diameter with 1-1/8" non-marring soft rubber face with rounded edges designed to protect wood or synthetic floor. Provide I/2" diameter axle for all wheels

C. Columns: Electrically welded closed rectangular steel tube, 2" x 3" minimum size, 14 gauge steel fitted with a rear welded gusset at the wheel channel.

D. Row Interlocks: Join each row structure front to rear by means of two (2) interacting steel connections, plus automatic gravity row locks where Engineering determines they are required.

1. Lower: Lower track guides shall be an external superslide rod to guarantee positive engagement of vertical supports without binding and assures smooth operation over uneven floor conditions.

2. Upper: Upper track guides shall completely interlock adjacent understructure support. A welded stop to ensure correct extension of bleacher unit on deck support. Use of bolt and nut stops is not acceptable, due to risk of loosening.

E. Diagonal Braces: Structural formed steel truss fitted to rows 3 and beyond. Bracing shall be attached to the rear riser at optimum locations to insure structural integrity. Bracing will be designed and shaped to support a minimum load of 1000(lbs) of both compression and tension forces created when the bleacher is loaded.

F. Deck Supports: Shall be of structural steel, 11 gauge spaced not greater than 60" on center for maximum deck stiffness.

1. Rollers: There shall be a minimum of (5) integral nylon rollers on deck supports, per section, per row.

G. Decking: All deck boards shall consist of 19/32" nominal Douglas Fir BC grade plywood with exterior glue and solid cross bands. An extruded aluminum "H" connector shall be placed between plywood panels. Exposed wear surfaces shall be finished with a layer of high Density polyethylene plastic .025 - .030 thick in either a Dark Brown or Light Gray color complimentary to the seat option. Deck finishes, such as clear coat, requiring more than simple touch up to restore it to a new appearance after wear occurs is unacceptable.

H. Welds: All welds shall be made at the factory by welders that are AWS certified on the equipment and process used.

I. Nose Beam: Shall be one piece 13-gauge galvanized steel.

1. 13-gauge steel is utilized for the necessary structural integrity to accommodate section lengths up to 26'

J. Rear Riser: Shall be one piece formed 14-gauge, grade 50, galvanized steel, with a continuous access joint to fully encapsulate footrest panel for ease of

cleaning and additional structural support. 14-gauge roll formed steel is utilized for the necessary structural integrity to accommodate section lengths up to 26'.

K. Splice Plates: (For Friction or Non-Friction power only) Each section joint shall be tied together with two structural steel members per row, employing a minimum of four steel to steel through bolt connections at the nose beam and a minimum of eight steel to steel through bolt connections at the lower steel rear riser. Gauge of splice plates to match the gauge of the nose beam and rear riser. Splice plates employing steel to plywood deck board attachments will not be acceptable. Gauge of splice plates to match the gauge of the nose beam and rear riser. In order to minimize deflections and keep rows in alignment during operation, splice connections shall transfer both axial loads (tension/compression) and bending.

L. Fasteners: All structural connections shall be made with S.A.E. grade 5 or better stress rated bolts. The use of self-tapping bolts is not acceptable.

M. Finish:

1. Steel Understructure abraded, cleaned and finished with russet brown water base acrylic paint. Steel risers and nose beams finished with corrosion resistant silver gray matte finish with galvanized alloy plating.

2.4 SEAT MATERIAL

A. Sculpture Seat Modules:

1. 18-inch wide one-piece individual seating modules shall be constructed of high-density polyethylene.

2. Each module shall have two longitudinal and five transverse internal ribs to provide additional structural integrity and resistance to impact.

3. Each module shall have a full ½" interlock to the adjacent module both around the perimeter and along the internal ribs to eliminate pinching hazards and insures proper alignment.

4. A steel-to-steel attachment of each module to a minimum 14 gauge galvanized steel nosebeam shall be provided for maximum rigidity. All such mounting hardware shall be concealed.

5. End caps shall be provided at the ends of each bank (section, if manual) of seating as well as at each aisle.

6. Each module shall have a recessed area for optional seat numbering.

7. Select from manufacturer's 12 standard solid colors.

PART 3 EXECUTION

3.1 INSPECTION:

A. Verify that areas to receive telescopic bleachers are free from impediments interfering with installation.

B. Do not begin work until building conditions are satisfactory and product and features approved by the Architect.

3.2 INSTALLATION:

A. Install telescopic bleachers in accordance with manufacturer's instructions and approved submittal drawings.

B. Adjust bleachers for smooth and proper operation.

C. Installer to clean bleachers and remove all debris from gymnasium resulting from installation.

END OF SECTION 12 66 13

ATLANTA PUBLIC SCHOOLS

Department of Technology
130 Trinity Avenue
Atlanta, Georgia 30303
(404) 802-2100

27 00 00 - Technology Systems Specifications

for

- **Network Cable**
- **TV Distribution**

Distributed by:

The Atlanta Public Schools
Department of Facilities & Construction
1631 LaFrance Street NE
Atlanta, Georgia 30316

Date: January 21, 2011

PART 1 – Network Infrastructure

PART I: SCOPE OF WORK:

The intent of this specification calls for the design, installation and delivery of a fully operational Network Infrastructure that insures optimum performance for all network connectivity in the classrooms for instructional purposes and student learning; delivery of high-speed connectivity and efficiency for all administrative areas and facilities throughout the district; and create a means for network connectivity for building systems automation, life-safety and other specialty systems as approved by the APS Department of Technology. This requirement shall address requirements for conduit, boxes, pathways and Communication Outlets; and the means by which the cable type and brands must be installed in the Communication Outlets; connectivity between closets (MDF/IDF); and the final coordination of service delivery from the Local Exchange Company (ATT/BellSouth) to the facility.

1. **STANDARD CLASSROOM DESIGN**: To insure maximum use of technology in each instructional area, the Atlanta Public Schools has adopted a standard configuration that shall be incorporated.

   1.1 **Internet Access**: Each classroom shall be equipped with Communication Outlets (CO) for student and teacher access. The Communication Outlet for the student workstation shall be centered along the corridor wall and shall provide access to **five** student workstations; **connected via a client-provided eight-port switch**. One additional CO shall be placed at the front of the classroom for use by the teacher. This **single data outlet** shall be positioned at 18" AFF to the **left** of the marker board next to the TV Distribution outlet.

   1.2 **TV Distribution**: One TV Outlet shall be installed in all instructional areas. The outlet shall be placed at **18"AFF**, and next to the Teacher Communication Outlet.

   1.3 **Marker Boards**: **Three (3)** white marker boards shall be installed by the Contractor, and centered at the front of the classroom. **Center board will be removed for placement of promethean board in designated classrooms.**

   1.4 **Promethean Board**: **Each designated classroom will receive a newer version of the promethean board with an attached projector and this technology eliminates the need for an electrical outlet and conduit for the projector.** The electronic, networkable board **and the attached projector** shall be purchased and installed by the APS Department of Technology at the **Elementary, Middle and High School level**. The final placement shall be determined by APS Technology and does not require any involvement from the General Contractor. In those instances where a classroom is identified to receive the Promethean Board, the white marker board can be divided for installation at each end of the Promethean, with prior approval from APS Technology.

   1.5 **Electrical Outlets**: The Contractor must place at least one quad outlet within six feet of each communication device.

   1.5.1 Student Workstations – Five (5) Outlets

1.5.2 Teacher Workstation – One (1) outlet
1.5.3 TV Outlet –One (1) Outlet
1.5.4 Promethean Board – One Outlet

2. **COMMUNICATION OUTLETS**: All standard classrooms or instructional areas at the elementary, middle and high schools shall be designed for two Communication Outlets. One Communication Outlet must be centered on the corridor wall and the second shall be placed at the front of the classroom to the left of the marker board, at 18" AFF. Conduit must be stubbed out to the hallway in all areas. A quad electrical outlet must be placed within six (6) feet of each Communication Outlet. Each Outlet must have a **two-position faceplate** for each box. Additional Communication Outlets are required for specialty labs and Media Center:

2.1 **Instructional Classrooms** shall include ALL areas where teaching and learning is conducted. Each Instructional area shall receive the two Communication Outlets as outlined in each area of the drawing as marked for classrooms, Band, Chorus, Practice Room, Art or other specialty classrooms.

2.2 **Media Center**: Positioning of the Communication Outlet is driven by the layout of the Media Center furniture. The typical arrangement calls for four (4) or more computers to be placed on a desk or table in small cluster areas. A Communication Outlet must be positioned for the cable to **feed** through a raceway and terminated into an 8-port switch provided by the APS Department of Technology. Each workstation will be connected to the switch via individual client-provided CAT-6 patch cables. **Power poles shall not be used**. Appropriate power must be pulled to and terminated in the Media Center workstations. Final placement must be coordinated with the APS Department of Technology

2.3 **Commons & Shared Areas**: Communication Outlets must be strategically positioned in all areas that are designed for students to assemble. The placement of the outlet shall be driven by the space requirement; and final placement shall be coordinated with the APS Department of Technology

2.3.1 Gymnasium: Outlets should be placed within five feet of the scoreboard and **one outlet must be placed on one of the perimeter** wall 72" AFF. **Each of the other (3) communication outlets on the remaining perimeter walls will be located at 18" AFF.**.

2.3.2 Cafeteria: One outlet must be placed on **one of the** perimeter wall at 72" AFF. **Each of the other (3) communication outlets on the remaining perimeter walls will be located at 18" AFF.** Additional drops must be positioned **directly below the stage** and **behind the stage curtain to the left and right of the stage** in those areas where the cafeteria serves as an auditorium.

2.3.3 Auditorium: One outlet must be placed on **one of the** perimeter wall at 72" AFF. **Each of the other (3) communication outlets on the remaining perimeter walls will be located at 18" AFF.** Additional drops must be positioned directly below the stage; to the left and right of the stage and in the communication control room

2.4 **Family & Consumer Science Lab**: The FCS Lab is designed to equip students with the basic fundamentals to move from school to the work force; and has instructional

areas for food preparation, basic home economics, interior decorating, child care and family management. Communication Outlets should be positioned in each instructional environment within the lab. Final placement shall be coordinated with the APS Department of Technology.

2.5 **Music and Keyboard Labs**. This lab is a multi-purpose music lab for students to write and develop music. The environment has connections for headphones, headset microphones, synthesizers, keyboards, and a Teacher-Controller Console. Each Lab should be properly equipped with Communication Outlets around the perimeter of the room.

2.6 **Specialty Labs**: The Exploratory Lab, Communication Lab, Foreign Language, etc., are uniquely designed based on the physical layout and size of the Classroom. Each should be equipped with four (4) Communication Outlets; to include one outlet on each wall.

2.7 **Science & Chemistry Labs**: Careful consideration should be given to the design and placement of lab furniture in Science and Chemistry Labs. Most instructional programs require students to use computers to connect to the Internet. All labs should be properly equipped for workstations and/or laptops.

2.7.1 Option #1: When overhead cabinets are placed around the entire perimeter of the classroom, and there are **NO sinks, the communication outlet should be centered between the bottom of the cabinet and the top of the counter**. The Communication Outlet should be placed at six-foot intervals on each wall to include, corridor, back, and side. A single Communication Outlet should be placed in a **similar fashion at the front of the classroom for the Teacher station.**

2.7.2 Option #2 If the cabinetry is placed with each counter butting up to a wall and facing the front of the classroom, **one communication outlet should be placed at the end of each counter (providing there are not sinks)**; and a single Communication Outlet will be positioned at the front for the Teacher Workstation.

2.7.3 Option #3: Island Tables/cabinets: In an environment where sinks are placed around the perimeter of the classroom **and Island Tables are used**, **one Communication Outlet should be placed in the floor underneath each island;** and one additional Communication Outlet will be positioned at the front for the Teacher Workstation.

2.8 **Technology Labs:** The Computer, Technology or Interactive Learning Lab must be adequately equipped with Communication Outlets for a minimum of **28 workstations** and **two (2) printers**. The design calls for **two (2) Communication Outlets at the front of the room and four (4) additional Communication Outlets** strategically positioned to meet the requirements and placements of the furniture. Provisions must be made for each workstation to be connected to a switch via CAT-6 patch cord (each to be provided by the APS Department of Technology) that runs thru a 4" cable track located 18" AFF. **The objective is to insure that all cable is completely enclosed. For security purposes, Technology Labs should not be placed at ground level; or near windows; and lighting should be designed with motion sensors for automatic activation.**

2.8.1 Furniture: The Communication outlets must be placed to accommodate layout of the furniture. Each lab should be equipped to accommodate computer tables around the walls enabling **two** workstations to be placed on each **table**. The corridor wall, back wall, and sidewall (where appropriate) must be utilized.

2.8.2 A quad power receptacle must be within six feet of each Communication outlet to eliminate the use of extension cords and extension communication cables. If computers are clustered, multiple receptacles must be provided in order to have a one to one correlation with the workstation.

2.9 **Administrative, Miscellaneous & Multi-Use Communication Outlets**: Each must receive **two (2) single** communication outlets; unless otherwise identified on the drawing with the exception of the offices for Principal and Vice Principal which shall receive **two (2) combination outlets each**. The **dual outlet** should be positioned on the opposite wall from the door and sized to accommodate one data/voice combination. The **second CO** in the Principal's or **Assistant Principal's** office should be dictated based on the positioning of furniture. Conduit must be stubbed out to the hallway in all areas. A quad electrical outlet must be placed within six (6) feet of each Communication Outlet.

2.8.3 **Administrative**: This category includes, but is not limited to, the Principals, Receptionist, Cafeteria Manager's Office, Media Center Office, Cafeteria, Stage, Clinic, Conference Room, Parent Centers, Work Rooms, Teacher Planning, Lounges, Counselor, Teacher/Director Office, Site Mechanics, Coach/PE, etc.

2.8.4 **Life Safety and Special Systems**: The contractor must provide the necessary conduit and box for life–safety and specialty systems as designated. **Each trade is responsible for pulling the wires and cables** unless otherwise designated by the Contractor.

2.8.4.1 Fire Alarm System
2.8.4.2 Burglar Alarm System
2.8.4.3 Elevators
2.8.4.4 Energy Management System (HVAC)
2.8.4.5 Freezer/Cooler Monitor
2.8.4.6 Keyless Access (Lenel Control Panel)
2.8.4.7 Scoreboard

3. **CABLE REQUIREMENTS**: The wiring systems specified in these guidelines are based upon requirements and recommendations of the IEEE, ANSI, EIA\TIA 568\569 and TSB 36 & 40, and BICSI for horizontal premise wiring. All products used shall be UL listed and meet applicable local and state codes.

3.1 **Fiber Optic Cable**: Fiber optic cable is the designated media cabling for APS school backbone inter-building and intra-building wiring. This includes all MDF to IDF or

IDF to IDF and vertical riser applications. **All fiber optic cabling used must be multi-mode 62.5 micron core diameter and 125 micron cladding diameter.**

3.1.1 The multi-mode fiber used in the cable must meet EIA\TIA 492 AAAA standard.

3.1.2 As a minimum, backbone and vertical riser cables must contain **6-strand fibers and must terminate all 6-strands in the MDF.** This allows the client **to set up counter rotating rings if desired**, and allows maximum flexibility for future growth and configuration changes.

3.1.3 All fibers in each cable must be usable and capable of 1000 Mbps data rates or greater.

3.1.4 Inter-building fiber optic cable used in buried or aerial installations must be a **loose tube, gel-filled design**, composed of all dielectric materials and rated for outdoor use.

3.1.5 Intra-building fiber optic cabling used to interconnect MDFs and\or IDFs must **be a tight buffered, non-gel-filled design** composed of all dielectric materials and installed in flexible conduit and must be plenum rated and meet NFPA 262 and UL-910 standards. The cable must be marked UL to qualify.

3.1.6 Fiber optic cabling is also the method of connection for multiple story riser applications. To connect communications closets in multi-level buildings or riser, **plenum rated cable must be installed**. The cable must be marked UL and meets the UL-1666 flame test to qualify.

3.1.7 All cables must be **permanently labeled at both ends** indicating the originating and terminating location of each end. Markers may not be used.

3.2 **Copper Cable**: Unshielded Twisted Pair (UTP) with a 24 AWG cabling must be used for the horizontal wiring from the MDF, IDF, or **CP** to the individual communications outlets.

3.2.1 The four pair UTP cables can be provided as one cable or provided as individual four pair cables that are bundled into one cable.

3.2.2 The UTP cable used must be capable of operation at **1000 Mbps data speeds** and be certified to UL Level V or EIA\TIA Category-6 and EI

3.2.3 A\TIA TSB-36. The UTP cable must meet NFPA 262 and UL-910 standards and be marked type CMP, MPP or Plenum (UL).

3.2.4 **Each cable must be permanently labeled at both ends indicating the originating and terminating location**. Markers may not be used. *See example for numbering scheme on the drawing in Appendix D.*

4. MAIN DISTRIBUTION FRAME (MDF)

Only one Main Distribution Frame (MDF) is needed for a single facility or a multi-facility campus environment. In some cases more than one communication closet may be required per building. This room is the entry point for communications cables coming to the building and the origination point of all communications systems in the building or throughout the campus. This room must house the head-end equipment (i.e. routers, concentrators, Hubs, Switches, Telephone systems, video distribution, etc.) of the school's communications systems and must be connected via fiber cabling to

Intermediate Distribution Frame (IDF) for distribution to the client workstation areas where needed. **NOTE: The *MDF must be located in or near the Media Center unless otherwise approved by the APS Department of Technology and shall not have windows.***

The MDF also functions as the demarcation point for external systems such as the telephone company lines and smart jacks and/or the cable television system connections, life safety alarm panels, and will contain punch-down blocks or other terminations for these systems. It may also house file servers for the data systems or the point where servers would be connected to facility cabling. This room will also be the source for delivery of communications to other buildings.

4.1 When an MDF is constructed in an existing building, the **room cannot be co-located with any other operation such as a Storage Room or Janitorial Room**; **shall not contain water pipes, mop sinks, or windows; shall not be co-located with electrical panels, Boiler Rooms or Mechanical Rooms; and shall have a completely enclosed ceiling**. APS has adopted the practice of locating all school MDF's in or near the Media Center.

4.2 **MDF Physical Requirements & Trade Use**: The size of the main distribution frame is a function of the quantity and types of communications to be delivered to the Client Area (Classroom). Nominal size for a main distribution frame is ***18 Feet by 18 Feet with backboards on all four walls: Floor to Ceiling, corner to corner and wall to wall.***

- 4.2.1 Wall #1—Door Wall: Energy Management System Control Panel
- 4.2.2 Wall #2 --Data/Telco: Connected to Door Wall and shall be designated for ladder racks & LEC DEMARC
- 4.2.3 Wall #3 – Wall Opposite Door Wall:
- 4.2.4 Wall #4 directly opposite Data/Telco Wall shall be designated for Security Panels: Located directly across from Data/Telco Wall for positioning Radionics (Burg) Panel, Fire Alarm Panel & Lenel Access Control Panel

4.3. **MDF Room Finishes**: The floor of the MDF should be smooth and free of cracks, crevices and dust. If finished concrete is used, dust protection sealer should be applied. Distributed load capability must be at least 250 pounds per square foot. The walls must be concrete block, drywall or other suitable materials and receive a latex paint finish. All walls must have **3\4" plywood backboards** installed 4" above floor to 12" from ceiling. The Contractor must insure that the plywood is painted with a **gray flame retardant latex paint**. The room requires a finished ceiling.

- 4.3.1 New construction project must be **properly equipped with cable trays.** Cable trays must be mounted from the ceiling for distribution of cables to the various terminations on the equipment racks and\or the wall plywood.

- 4.3.2 MDF Entry Doors: A 42" inch wide by 84" height minimum door is required. A pair of doors equal to or greater than this opening may be provided. Doors must be metal or solid core wood with lockable

hardware. Door must swing outward. **MDF & IDF doors are to have a door closure keyless entry pad and no glass.**

4.3.3 Doors on floor consoles, communications cabinets, or wall mount cabinets used in lieu of MDFs must provide access to all internal equipment and cable terminations.

4.3.4 If door access is limited on the communications panels, then removable panels must be provided to provide access for operator and maintenance personnel.

4.4 MDF Lighting: Non-EMI generating lighting must be installed in the MDF. A minimum lighting level of 50-foot candles measured 3 feet above the finished floor must be provided. **The MDF must have an independent switch and should not be controlled by another area such as the Media Center**. Lighting should be designed with motion sensors for automatic activation.

4.5 MDF Electrical:

The Contractor is responsible for terminating power on the racks and a total of eleven (11) receptacles in designated areas for rack termination.

(1) Quad receptacle will be located at the top of each rack for rack power of switches and/or other devices. (5) Quad Receptacles in all. Install a minimum of one additional receptacle on each wall. Add (1) Quad Receptacle located high (approximately 72") and (1) low (approximately 18") on wall behind equipment racks where ladder racks are attached to same wall. (2) Quad receptacle in all.

Add one **(1)** single NEMA L5-30R, AMP twist lock, 208 Volts and one **(1)** single NEMA 30R, straight blade, 208 Volts **on the adjacent wall near the 1st rack as to not cause a tripping hazard; if wall is less than two (2) feet and behind Rack#@ 18" AFF if more than two (2) feet away** to power the MDF **UPS Units and** test equipment. **Add one (1) Quad receptacle for each video cabinet a total of two (2).**

Power Strips must be mounted to each rack and plugged into the power receptacles at the top of each rack.

All receptacles must be wired (line, neutral, ground) to the power distribution panel. Each receptacles must be on its own circuit breaker from the primary power source and positioned behind the rack or cabinet as indicated below

4.5.1 Cabinet #1: Video 20 AMP, 120 Volts Breaker - Dedicated circuit

4.5.2 Rack #1: Telco, 30 AMP, 120 Volts Breaker – Dedicated circuit

4.5.3 Rack #2: Data, 30 AMP, 120 Volts Breaker – Dedicated circuit

4.5.4 Rack #2: Data, NEMA L5-30R, AMP twist lock, 208 Volts –dedicated circuit

4.5.5 Rack #2: Data, NEMA 20R, straight blade, 208 Volts –dedicated circuit

4.5.6 Rack #3: Data, 30 AMP, 120 Volts Breaker – Dedicated circuit

4.5.7 Rack #3: Data, NEMA L5-30R, AMP twist lock, 208 Volts –dedicated

circuit

4.5.8 Rack #4: Server/Security 20 AMP, 120 Volts Breaker – Dedicated circuit

4.5.9 Cabinet #2: Video 20 AMP, 120 Volts Breaker - Dedicated circuit

4.5.10 **Back wall behind equipment racks 72" AFF,**: 20 AMP, 120 Volts Breaker - Dedicated circuit

4.5.11 **Back wall behind equipment racks 18" AFF,**: 20 AMP, 120 Volts Breaker - Dedicated circuit

4.5.12 If metal cover plate is used ground pole to be positioned in the up position (NEC Code)

4.5.13 Leviton Receptacle #1636~-IG or EQUAL (Color Orange)

4.5.14 Position server rack to allow **48"** clear service area at front & rear of server

4.5.15 Label Breaker and Receptacle cover plate.

4.6 **MDF Grounding**: A ½ inch trade-size conduit must be provided from the MDF to the main distribution panel ground. A ground bus sized for #6 AWG ground conductors must be installed. A #6 AWG solid copper insulated grounding wire must be provided from the ground bus to the building main electrical service entrance disconnect enclosure. **Separate solid #6 AWG insulated grounding wires must also be connected between the ground bus and the building grounding system.**

4.7 **MDF/IDF Room Temperature and Humidity**: Dedicated Cooling required. The room ambient temperature must be maintained such that the temperature in the MDF is maintained between 40°F and 78°F. Relative humidity must not exceed 60%. Any required cooling must accommodate an internal 50 watt per square foot heat load generated within the MDF when the MDF contains active equipment. The control unit shall not be placed directly above the racks.

4.8 **MDF Auxiliary Fire Extinguisher**: *(Electrician shall provide)* A portable fire extinguisher must be provided and maintained within the MDF as close as practical to the entry or exit. A carbon dioxide fire extinguisher must be used. If local code requirements are more stringent than this they must be complied with.

4.9 **Rack Requirement**: **The Cable Installer is responsible for equipment racks and/or communications cabinets.** The racks must be installed in the MDF to support communications systems equipment and the communications distribution system. Communications distribution cables must be terminated in jack-fields and punch-down blocks mounted in the equipment racks or communications cabinets. Each rack must be positioned approximately 6" apart to accommodate a vertical cable management system. All equipment racks and communications cabinets used must be installed to provide a **4 foot clearance on all working sides, on front and back to provide access for maintenance and operation.** The Racks must be properly centered on the Data/Telco Wall.

4.9.1 Telco Rack #1, #2, and #3 shall house network equipment

4.9.1 Rack #4 is designed for client-provided rack-mounted keyboard, mouse, monitor, and KVM Switch

4.9.2 Rack #5 is designed for client-provided security equipment
4.9.3 The Video Cabinet shall store all head-end equipment for TV Distribution.

4.10 Contractor Telephony Requirements

4.10.1 There shall be a **4' X 8' area reserved on the backboard immediately behind the telephony rack,** for any telephony terminals and/or equipment.

4.10.2 The LEC's incoming C.O. services should be terminated and grounded in this reserved space. The C.O. terminal shall be no less than a **25-Pair terminal.**

4.10.3 There will be a 25-pair feeder from the backboard to the telephony rack. The backboard side will be terminated on 110-punch block and the telephony rack side will be terminated to RJ45 patch panel with two pair per port. The patch panel configuration must be at **least 48 ports**.

4.10.4 The GIG-E (NMLI) fiber feed should be brought in to the first rack (designated as the data rack) in the MDF. The Electrical contractor must also provide **one** (**1) open 4" conduit into the MDF** room for the fiber feed; with **two (2)** addition 4" conduits as required **in which one of the 4" conduits will be used exclusively for a fiber feed from the outside Demarc point into the MDF and must not be used for any other cable. The other 4" conduit may be used for other trades and intra and inter-building connectivity**

4.11 **MDF Heat Load Capacity**: The Contractor is responsible for the efficient cooling of the MDF; and must insure adequate and continuous performance based on the following factors:

4.11.1 Elementary School: Total BTU/HR = 13,351
4.11.2 Middle School: Total BTU/HR = 14,686
4.11.3 High School Total BTU/HR = 14,831

4.12 **MDF Circuit Delivery**: The delivery of service by the Local Exchange Company (ATT/BellSouth) must be facilitated by the Contractor. Because of the lead time for service delivery, the coordination should commence with the execution of a contract with the Atlanta Public Schools.

4.12.1 12 months prior to service delivery or as soon as a contract has been executed, the Contractor should coordinate a site visit by ATT/BellSouth to determine engineering requirements.

4.12.2 The Contractor must facilitate the receipt of the final design and engineering requirements from ATT/BellSouth and shall comply with all requirements for service delivery. **A copy of the final design requirements and any associated costs must be shared with the APS Construction PM and the Department of Technology.**

4.12.3 The Contractor must identify any up-front costs that must be paid by the district at least **9 months** prior to service delivery. **The APS Construction**

Project Manager will deliver the LEC's Manager's bill (if applicable) to the APS Finance Department for processing if applicable.

4.12.4 **6 Months** prior to service delivery, and upon receipt of payment to the LEC, the Contractor must contact the BIC Engineer to perform a **final inspection for delivery of service.** Prior to that time, the **MDF must be complete and must have met the following requirements:**

4.12.4.1 Power outlets installed and active
4.12.4.2 Ground-bar installed and connected
4.12.4.3 Conduit to point designated by BellSouth with pull string
4.12.4.4 Power on the Racks
4.12.4.5 Door with locking hardware installed
4.12.4.6 Air Conditioning installed and operational
4.12.4.7 Closet must be clean and dust free
4.12.4.8 Racks and Ladder racks properly installed and bolted

5. INTERMEDIATE DISTRIBUTION FRAME (IDF)

The Contractor shall insure proper pathways and connectivity from the MDF to each IDF. The intermediate distribution frame is an interconnection point on the communications backbone and serves as the distribution point for horizontal cable to the communications outlets or lab switches within a building. The IDF functions as a secondary Communications Equipment Room to concentrate wiring from client areas and distribute signals to the head-end or MDF. When applicable the IDF shall contain the communications equipment, local area network equipment and other termination equipment; and must not contain any unrelated equipment.

5.1. When an IDF is constructed in an existing building, the closet must not serve as a storage or janitorial room**. In addition, the location of the IDF should not coexist with water pipes and locations in Boiler Rooms or Mechanical Rooms. Convenient access must be provided in the IDF for performing system administration and maintenance.** The room must be secured by the Lenel Access Control System & should have special sensors for light activation.

5.2 **IDF Requirements**: There should be a minimum of **one IDF per floor as required by distance limitations.** Additional IDFs must be provided when the floor area to be served exceeds 10,000 square feet (approximately 360 communications outlets) or when the cable horizontal distribution distance to the communications outlet exceeds 290 feet (90 meters). Nominal sizes for the IDF relative to communication outlets are shown below. IDF Equipment Room Floor Space must be **a minimum 10' X 10'**; and shall be stacked in a multi-story environment.

5.3 **IDF Finishes**: If the floor of the IDF is concrete, a sealer must be applied then covered with vinyl tile or painted. Carpet is not acceptable.

Distributed load capability must be greater than 50 pounds per square foot. The walls can be concrete block or drywall. If plywood is used to mount communications panels, all walls must have ¾ inch plywood backboards installed from corner to corner and wall to wall near floor to near ceiling with a minimum plywood height of 6 feet. The plywood must be painted with a gray flame retardant, latex paint. Where the IDF is constructed in an existing area devoted to other uses, such as a classroom, then at least two walls of the closet must be supplied with the ¾ inch plywood. This will provide for adequate equipment and cabling terminations on the plywood and still provide for access to the installed equipment.

5.4 **Contractor is responsible for cable trays**. Each must be mounted from the ceiling for distribution of cables to the various terminations on the equipment racks and\or the wall plywood**. If space limitations impede the installation of cable trays, the Contractor must provide multi-tiered J-hooks with special markings for each trade.**

5.5 **IDF Entry Doors**: A 30 inch wide by 6 foot 8 inch minimum door must be installed and should swing out from the room; and shall be equipped with an electronic door reader.

5.6 **IDF Lighting: Non-EMI** generating lighting must be installed in the IDF. A minimum lighting level of 50-foot candles measured 3 feet above the finished floor must be provided.

5.7 **IDF Electrical**: **Power must be terminated on the Racks. Install Seven (7) receptacles in each IDF.**
Install one (1) quad receptacle at the top of each rack for rack power of switches and/or other devices. (3) Quad Receptacles in all. Add (1) Quad Receptacle located (approximately 72") high and (1) low (approximately 18") low on wall behind equipment racks where ladder racks are attached to same wall. (2) Quad receptacles in all.
Install Single receptacle, NEMA L5-30R, AMP twist lock, 208 Volts, and NEMA L5-30R, AMP twist lock, 208 Volts **on the adjacent wall near the 1st rack as to not cause a tripping hazard** to power the MDF **UPS Units and** test equipment.
Power Strips must be mounted to each rack and plugged into the power receptacles at the top of each rack. All receptacles must be wired (line, neutral, ground) to the power distribution panel. Each of the double duplex receptacles must be on its own circuit breaker from the primary power source.

5.7.1. Rack #1: Data, NEMA L5-30R, AMP twist lock, 208 Volts – dedicated circuit
5.7.2 Rack #1: Data, 20 AMP, 120 Volts Breaker – Dedicated circuit
5.7.4 Rack #1 NEMA 20R, straight blade, 208 Volts –dedicated circuit

5.7.4 Rack #1: Data, NEMA, 208 Volts –dedicated circuit
5.7.5 Rack #2: Server, 20 AMP, 120 Volts Breaker –Dedicated circuit
5.7.6 **Back wall behind equipment racks 72" AFF,** 20 AMP, 120 Volts Breaker –Dedicated circuit
5.7.7 **Back wall behind equipment racks 18" AFF,** 20 AMP, 120 Volts Breaker –Dedicated circuit

5.8 **IDF Grounding**: A ½ **inch trade-size conduit must be provided from the IDF to the building grounding electrode.** A ground bus sized for #6 AWG ground conductors must be installed. A #6 AWG solid copper insulated grounding wire must be provided from the ground bus to the building main electrical service entrance disconnect enclosure**. Separate solid #6 AWG insulated grounding wires must also be connected between the ground bus and the building grounding system.** Communications cable shields, if used, must be connected to the equipment frame which must be connected to the grounding system.

5.9 **IDF Room Temperature and Humidity**: The room ambient temperature must be maintained such that the temperature in the IDF is maintained between 40°F and 78°F. Relative humidity must not exceed 60%. Any required cooling must accommodate an internal 50 watt per square foot heat load generated within the IDF if the IDF contains active equipment.

5.10. **IDF Auxiliary Fire Extinguisher**: A portable fire extinguisher must be provided and maintained within the IDF as close as practical to the entry or exit. A carbon dioxide fire extinguisher must be used. If local code requirements are more stringent than this they must be complied with.

5.11 **Rack requirement: Contractor is responsible for acquisition and installation of racks in each IDF.** Communication distribution cables must be terminated in jack-fields and patch panels mounted in the equipment racks, communications cabinets or on plywood. Distribution cables will be routed from the IDF via cable trays or conduit. If plenum cabling is used the cables may be routed directly from the equipment racks, cabinets, or backboards to the client outlets. **Note: The Contractor is responsible for insuring that power is provided.**
5.11.1 Rack #1 shall be used for Telecommunication
5.11.2 Rack #2 is designed for a client-provided server with a KVM Switch
5.11.3 Rack #3 is designed to be used for Life Safety & Security Equipment.
5.11.4 Each rack must be positioned approximately 6" apart in order to accommodate a vertical cable management system.

5.12 **Location:** The IDF must be located such that a communications station cable run to the client area communications outlet equipment **must not exceed 290 feet**. IDF shall not be located any closer than 48" from Electrical closets or Electrical rooms and shall NOT have windows.

5.12.1 **If floor-standing consoles or wall mount cabinets are used in lieu of the IDF, then all equipment mounting and cable terminations must be accomplished within the cabinet**.

5.12.2 When the IDF and MDF are located on the same floor, they must be interconnected with ladder type cable trays or a minimum of 3-inch conduit or equivalent, unless otherwise authorized.

5.12.3 If the IDF is to be interconnected to other IDFs or MDFs located on other floors, a minimum of **one 3-inch conduit** or equivalent must be provided for each introduced interconnect. *(Note: When pulling cable between floors, there must be an accessible, useable space above or below that is allowable for this purpose.)*

5.12.4 When plenum cabling is used, the IDFs can be interconnected without cable trays or conduit provided the cabling is appropriately bundled and care is exercised in placing so as not to cut the cables on sharp structure objects, exceed the maximum pulling tension or exceed the minimum bend radius as defined. **Fill ratios in conduits should not exceed 50%.**

5.13 **IDF Telephony Requirements**

5.13.1. Contractor must terminate all Voice Jacks RJ45 patch panels.

5.13.2. Contractor must provide **a 50-pair feeder tie to the MDF**. Both ends must be terminated on RJ45 patch panels with two pair per port. The patch panel configuration **must be at least 24 ports**.

5.14 **Communications Panel**: If the area to be served from the IDF is small and floor space is not available to construct an IDF, a communications panel (CP) consisting of a floor standing console or wall mount cabinet may be used as the IDF provided they are enclosed, access to all of the interior can be provided and the installation can be secured. All equipment mounting and cable terminations must be accomplished within the cabinet. Doors must provide access to all internal equipment and cable terminations.

5.15 **IDF Heat Load Capacity**: The Contractor is responsible for the efficient cooling of the IDF; and must insure adequate and continuous performance based on the following factors: Technology and Security must provide any upgrades to equipment.

5.15.1 Elementary School: Total BTU/HR = 3,494

5.15.2 Middle School: Total BTU/HR = 3,494

5.15.3 High School Total BTU/HR = 3,494

6. WIRING DISTRIBUTION SYSTEMS

Wiring distribution systems (cableways) are facilities for housing the wire and cables placed between the MDF, IDFs, CPs, and the communications outlet locations. The design and capacity of the wiring distribution system have built in flexibility and the design should anticipate future movement and growth of the communications systems and classroom\office rearrangements.

6.1 Wiring distribution systems fall into three main categories identified as Underfloor, Ceiling and Miscellaneous. Within these main categories are various wiring delivery systems a building or group of buildings (campus) may use only one type or a combination of types.

6.2 A Conduit Distribution System must be used in grade or below grade level concrete slabs for interbuilding distribution. A conduit distribution system must be used between MDFs, IDFs, and CPs when a classroom\office area is not available. A ceiling **Raceway Distribution System is preferred for use between MDFs, IDFs, and CPs and client communications outlets where a suspended ceiling is available.** In many suspended ceiling applications plenum rated cabling is used without any cableway facilities. A requirement for all cableways, including the Conduit Distribution System, is the accommodation of advanced technology cable requirements such as the minimum bending radius for fiber optic cable which also **requires a draw string\wire be maintained in any conduit used.**

6.2.1 **Under-floor Distribution System**:

6.2.1.1 Under-floor Distribution Systems may be encountered in existing facilities and used in new or retrofitted communication systems. If this system is not adequate it may be necessary to supplement this system with other systems such as Ceiling Systems or Miscellaneous Systems.

6.1.2.2 Under-floor Duct Raceway - Single level and two level under-floor duct raceways are placed in the slab with a header duct from an MDF\IDF feeding the distribution ducts. The distribution ducts shall have floor communication outlets at set intervals.

6.1.2.3 Cellular Steel Floors - Cellular steel floors enable the placement of communications anywhere, anytime, without costly alterations. Every cell is prepared at the time of original installation to be a potential duct for the placement of communications facilities. When the header duct is installed, service extensions or relocation can be made easily. This arrangement also permits the placement of the communication boxes within the floor rather than atop the finished floor.

6.2.1.4 Conduit System - The conduit system refers to an encased conduit usually laid in the grade or below grade level slab when the concrete is poured. The conduit system must be extended from the MDF or IDF to the client communications outlet equipment. This system provides

for direct routing to the point of termination. This system is used where a ceiling distribution system cannot be used.

6.3 NOTE: Intrabuilding conduit is required to connect standalone buildings from the IDF to the MDF. Each building requires **two (2) 4" conduits** to be used exclusively for Data/Voice/Video and must not be used for any other cable.

6.4. **Ceiling Distribution System**:

6.4.1 Communications wiring distribution can be made through various ceiling distribution systems, especially where suspended ceilings are used. If the ceiling distribution system is adequate for the intended installation it may be used. However, it may be necessary to supplement this system with additional ceiling or miscellaneous installations.

6.5 **Conduit System** - In this installation each communications outlet is connected to a **1-inch conduit which is home-run to terminate in either the MDF, IDF CP. Home-run refers to the most direct point to point path** from the communications outlet to the terminating MDF, IDF or CP.

6.5.1 Power wiring is accomplished in a similar manner whereby the power receptacle is connected to conduit routed back to the power distribution panel. Several power outlets may share a common conduit.

6.5.2 Zoned Conduit System - The zoned conduit system provides one 2-inch conduit for each 500 square feet of client area. Five 1-inch conduits are then provided for each 2-inch conduit provided to the communication outlets within the client zone.

6.5.3 All 2-inch zoned conduits must be run from the MDF, IDF, to the zone where the conduit is terminated in a pull box. The 1-inch conduits must also be terminated in the pull box. Each conduit must be stubbed into the hallway above the drop ceiling.

6.6 **Ceiling Raceway System** - This system provides a network of cable trays or runways to support the communication in the suspended ceiling spaces between the MDF and the IDF or between IDFs, and from the MDF, IDFs and to the vicinity of the communications outlet equipment.

6.6.1 The cable tray to a closet must have a **minimum width of 12 inches with 3-inch cable fence inserts.** The cable tray to the vicinity of the stubbed wall conduit connected to the outlet boxes must have a width of 6 inches with 4 inch cable fence inserts.

6.6.2 Cable suspension utilizing J-hooks or other approved devices is allowed providing cable is supported every 4 to 5 feet and is plenum rated. At no time may cable be allowed to rest on suspended ceiling.

6.7 **Miscellaneous Distribution Systems**:

6.7.1 The type of building and the type of construction will assist in determining which of the miscellaneous distribution systems may be used. Often these systems become necessary in renovations\additions after the original construction of the building has been completed.

6.7.2 **Perimeter Distribution** - An enclosed raceway system may be used for perimeter distribution to communication outlet boxes. The raceway system can be surface mounted or recessed into the wall and will include the communications outlet as part of the system. **The raceway can be mounted at desk height, at the standard outlet height above the floor similar to power receptacles or at the base of the wall to form a baseboard.** The practical capacity for communication wiring in perimeter raceways ranges from 30 to 60% fill depending on the cable bending radius limitations.

6.7.2.1 Power wiring may also be performed in a similar raceway system. **The power wiring must not share the same raceway as communications wiring, unless the raceway is designed for this function with separate compartments and is properly grounded in accordance with the National Electrical Code.**

6.7.2.2 A perimeter raceway system must use vertical elements for interconnection to the horizontal raceway system that is routed back to the MDF or IDF.

6.7.2.3 Open Wiring - **Open wiring may be used in wood frame construction in walls, ceilings, and floor cavities. This is especially useful in retrofit wiring applications; however, wiring used must be rated for Plenum use**. The preferred installation in walls would be to use conduit from the communication outlet and stub the conduit into the ceiling area. In the ceiling area, the communications wiring would be routed to the equipment closet with cabling support provided by the structure. Care should be exercised to avoid cutting the communication cabling during installation on sharp structure objects.

7. CONDUIT INSTALLATION PARAMETERS

Conduit used in the installation of communications systems **must not be longer than 100 feet, contain more than two 90° bends or exceed the minimum bend radius of the fiber optic cable in a specific run.** If the total required conduit run is longer than 100 feet or more than two 90° bends are required, pull boxes must be used. Conduit bend radius must be as specified in the current edition of the National Electrical Code for conductors without lead sheath. Either field or machine bend radius is acceptable. **A pull wire\string must be provided in each piece of conduit**. Junction\pull boxes must not be mounted more than 10 feet above the floor. ***All conduits must be stubbed out to the hallway*.**

7.1. **Inter-building Conduit**:

7.1.1. Inter-building conduit must be an approved metallic, fiberglass, epoxy or plastic (PVC or high density polyethylene). Grounding systems are required where metallic conduits and\or conductors are used. Interbuilding conduit must include an innerduct system to segregate

different communication systems such as voice\data, instructional television, intercom systems, security systems, etc.

7.1.2. A conduit must be provided for cabling entering a building and a separate conduit provided for cable leaving a building. **Conduit entering and leaving a building and conduit entering and leaving a pull box must have an additional conduit of the same size to serve as a spare.** An innerduct facility may be used in a conduit in lieu of a separate spare conduit, however, the separate building entrance and exit conduits must be maintained. Pull wires\strings must be installed in each conduit or innerduct chamber.

7.1.3. **A conduit run of more than 100 feet or containing more than two 90° bends must have pull boxes, handholes or manholes installed.** The distance between pull boxes and buildings must satisfy the requirements for cable pulling tension listed by the cable manufacturer.

7.1.4. The **minimum conduit size must be 4 inches**. The installation of innerduct facilities is recommended within the conduit. Conduit must be buried at a depth to meet local electrical codes.

7.1.5. Separate conduit must be used for communications cable and power cable. The communications conduit must be separated from the power conduit by a minimum of 3 inches of concrete or 12 inches of compacted earth.

7.2. **Bend Radius**: The bend radius of the conduit must accommodate the requirements of the fiber optic cable and be such that the sidewall pressure of any cable, when pulled, does not exceed the manufacturer's recommendations for the cable used. Sweeps of large bend radius are, therefore, recommended to change angular direction. This is especially important for conduit that will carry fiber optics. At no time must the bend radius be less than 10 times the internal diameter of the conduit.

8. COMMUNICATION OUTLET BOXES AND POWER RECEPTACLES

8.1. The communications outlet is the point of the connection between the horizontal cable and workstations or hubs in the client areas. Similarly, the power receptacle is the connection point between the client devices and the power circuits. Connection points consist of jacks\ports in the case of the communications outlets and plugs in the case of the power receptacles with the associated outlet faceplates.

8.2. Each workstation in the client area must have a communications outlet\port and power receptacle within six feet of the workstation. **Communication extension cables or power extension cords must not be used.**

8.3. When a specific area such as a long section of wall is designated as a workstation area, communications outlets and power receptacles must be provided along the designated section of wall at **six foot intervals**. If a corner of a classroom is

designated as a workstation area, outlets must be provided at six foot intervals to include the total corner area between the outermost workstation. If the workstation area is designated as a bench area, the total bench area where workstations will be installed must include a communications outlet and power receptacle at six foot intervals. **(NOTE: The Corridor Wall is the designated workstation area in Classrooms. The designated areas should be located away from markerboards, windows, pipes, and sinks)**

8.4. Each Classroom must be designed to receive **two (2)** Communication Outlets, and at least **two (2)** CO in each Administrative Officer Area. The numbers may be greater in those areas that are designated as work-rooms or multi-use. There should be a minimum of one power receptacle for each Communication Outlet. Client areas do not include Storage Rooms (unless there is a possibility that the space will be used as an office), Janitorial Closets, Bathrooms, Hallways, etc. If an area is likely to have a future requirement or if considerable difficulty would be encountered in adding additional outlets, a minimum of two communications outlets and power receptacles must be provided (NOTE: This includes non-traditional areas such as Cafeterias, Auditoriums, and Conference Rooms). This shall also include viewing rooms, practice rooms, or any other co-located room adjoining an instructional area. When determining the location of outlets, alternate room arrangements that would meet instructional needs should also be considered for installation.

9. COMMUNICATIONS OUTLETS

The Communications Outlet must consist of modularized interchangeable jack assemblies that must snap into a faceplate assembly and mate with a contained connector to which the Category 6 UTP cable is permanently connected. The Contractor must certify that the jack assemblies will perform to or exceed Category 6 standards per EIA\TIA TSB-36 and TSB-40. **The faceplate must include four 8-position non-keyed (EIA\TIA 568b) jacks.**

9.1. In **the networking scheme data and voice signals will travel over the same cable.** The application of a jack is universal and is determined by the connection made at the MDF, IDF, or CP (i.e. data, voice, or video). **The data taps must be color coded blue.**

10. POWER RECEPTACLES

Power receptacles must be provided at all locations where a communications outlet is provided. Power receptacles must be provided in designated workstation areas at six-foot intervals. This requirement is inclusive of modular furniture and calls for the complete connectivity and termination at each station.

10.1 Each power receptacle must be a NEMA 5-20 R receptacle and must be wired (line, neutral, ground) to the power distribution panel. The power receptacle must be rated for a minimum of 125 VAC and 20 amperes. The ground connection from the outlets to the distribution panel must be insulated wire. **A maximum of three power receptacles must share the same branch circuit feed from the power distribution panel through a 20 ampere circuit breaker so that a tripped breaker will only impact a maximum of six workstations. This is based on an allocation of 3 1/3 amperes maximum per workstation and one duplex receptacle feeding a maximum of two workstations.** Surface mounted power receptacles may be used if they meet these requirements. Power\surge strips may be used as a convenience to connect from the workstation to the power receptacle.

10.2 **The workstation power receptacle must be color coded to designate their use for communications equipment only**. These power receptacles must not be used for powering non-communications equipment.

10.3 Lightning\surge protection devices must be installed in the power distribution panel supplying power to the workstation receptacles.

10.4 Uninterruptable power supplies and isolation transformers are items that may be required for specific workstations\file servers running critical applications or critical source equipment.

11. CABLE MANAGEMENT & TERMINATION

The optimum hub arrangement calls for a rack to be mounted in front of the plywood with at least **three** feet of clearance between the wall and back of the rack. An additional six feet of clearance is required in front of the rack. A six-foot ladder kit with the associated hardware is required and is to be mounted on top of the rack and span the distance from the rack to the wall. **The rack must be bolted to the floor and the ladder must be bolted to the wall. The ladder must be secured to the rack and the rack must be grounded.**

11.1. CAT-6 Data Termination: From the backboard, the data cables must be neatly bundled and placed in a horizontal ladder rack that has been secured to the backboard; and the bundle shall be placed across the ladder and terminated into an RJ45 (568-B) patch panel. The patch panel should be adequately sized to accommodate each drop.

11.2. Voice Termination: The voice cable plant is engineered to meet EIA/TIA 568 (B) standards and shall be terminated on an RJ45 patch panel for voice over IP. The Contractor is not responsible for electronics or telephony equipment.

11.3. **6-strand fiber** ties the MDF to the IDF in an LIU (Light Interface Unit) or other fiber distribution box. The LIU is securely attached at the top of the rack above the RJ45 Patch panel.

11.3.1. "SC" Type connectors will be used for terminations
11.3.2. Contractor must provide two SC to SC Patch Cables per tie.
11.3.3. Each connector must be polished to meet minimum standards
11.3.4. Cable must have an end-to-end test for db loss and must be certified
11.3.5. There must be a minimum of **three (3) feet of slack coiled and mounted at the backboard.**

12. PROVISIONS FOR PORTABLE CLASSROOMS

Wiring of portable or modular classrooms should be done only if it is anticipated that the classroom will remain in place for an extended period of time. The Contractor is responsible to insure the proper installation and connectivity from the portables to the MDF or nearest IDF; **and shall insure that the units will provide the same functionality as the classrooms located in the main building.**

12.1. Inter-building wiring distribution must be similar to standard buildings. CAT-6 Data cable must be used, unless distance limitations have been exceeded. In the case that distances have been exceeded then Fiber Cabling will be utilized and APS Technology must be notified immediately. Lightning protection devices are required at each end of the cable if copper cabling is used.

12.2. **A communications panel must be installed in the interior of the Classroom or equivalent to function as the IDF.**

i. 12.3. Power wiring for the workstations must be accomplished as described previously in this specification, including surge suppressors at the power distribution panels and insulated power receptacles grounding to the power distribution panel.

13. DELIVERABLES

As part of the wiring system installation, **the Contractor must provide two (2) detailed shop drawings and a cable routing inventory per closet within two weeks of contract award. One copy must be provided for the APS Department of Technology** and a **second to the APS Construction Project Manager.**

13.1 **Contractor must provide total cables pulled to each closet broken down by classroom and administration *within two weeks* of contract award.**

13.2 Upon completion of the wiring system installation, and prior to demonstrating connectivity, **the Contractor must provide detailed documentation** of the distribution system to facilitate system administration, system maintenance, and future system changes.

13.3 A clear and consistent nomenclature scheme has been developed by APS and must be utilized by the Contractor for cable labeling which facilitates locating and identifying each cable. **A working copy of the floor plans with identification of**

room numbers cross referenced to jack in closet must be left in ALL closets at completion of installation.

13.4. System verification and acceptance documentation signed and dated by the Contractor and the design professional must also be provided. This documentation must include test measurements and system calibrations performed for the entire system. Sample system operations must also be performed with actual hardware or using the Contractor's test equipment and documented to verify that the system is operational, meets or exceeds industry standards specified, and is ready for acceptance. **This must also establish the baseline performance of the system. All documentation must be presented for electronic utilization within two weeks after site walk-thru with an APS Representative.**

13.4.1. Red-line drawings

13.4.2. Cross Reference

13.4.3. Test Data

13.4.4. Official Certificate of Warranty assigned to the Atlanta Public Schools

13.4.5. **As part of the system verification and acceptance, the Contractor's vendor must be available and accessible for up to five days after system delivery, to insure complete connectivity during electronic equipment integration. <u>This specifically calls for 40 hours of field support to be provided at no additional cost to the district.</u>**

14. <u>RESPONSIBILITIES AND REGULATIONS</u>

14.1. NEC, NESC, and Local Code Compliance: The latest version of the Underwriters Laboratories, Inc., National Electric Code, and the National Electric Safety Code must be followed. If local regulations or codes are more stringent, then those stipulations must govern and Contractor must advise Atlanta Public Schools of the applicable code.

14.2 Laws, Rules, and Regulations: The Contractor must give notices to authorities and must comply with all federal, state, local laws, ordinances, rules regulations and orders of any public authority bearing on the performance of the work. Where such laws, ordinances, rules and orders are in conflict, the more stringent standards must apply. The Contractor must also obtain all permits and licenses required for the performance of work under this Contract, including but not by way of limitation, inspection fees, or any certificate of occupancy required by code, ordinance, or government regulation. The Contractor must perform all work in accordance with applicable permits and licenses.

15. <u>BUSINESS TERMS AND CONDITIONS</u>:

15.1 The APS Construction Management Team Representative shall act as the liaison representative to interpret, verify and insure proper delivery of services as outlined

herein; and shall work with the Contractor to facilitate the timely delivery of services for building commissioning and occupancy.

15.2 The Construction Team Representative shall work closely with the Contractor to insure proper installation, inspection, and final service delivery; and shall facilitate the relationship with the Contractor to insure that all schedules are met on time and in accordance with the technical guidelines.

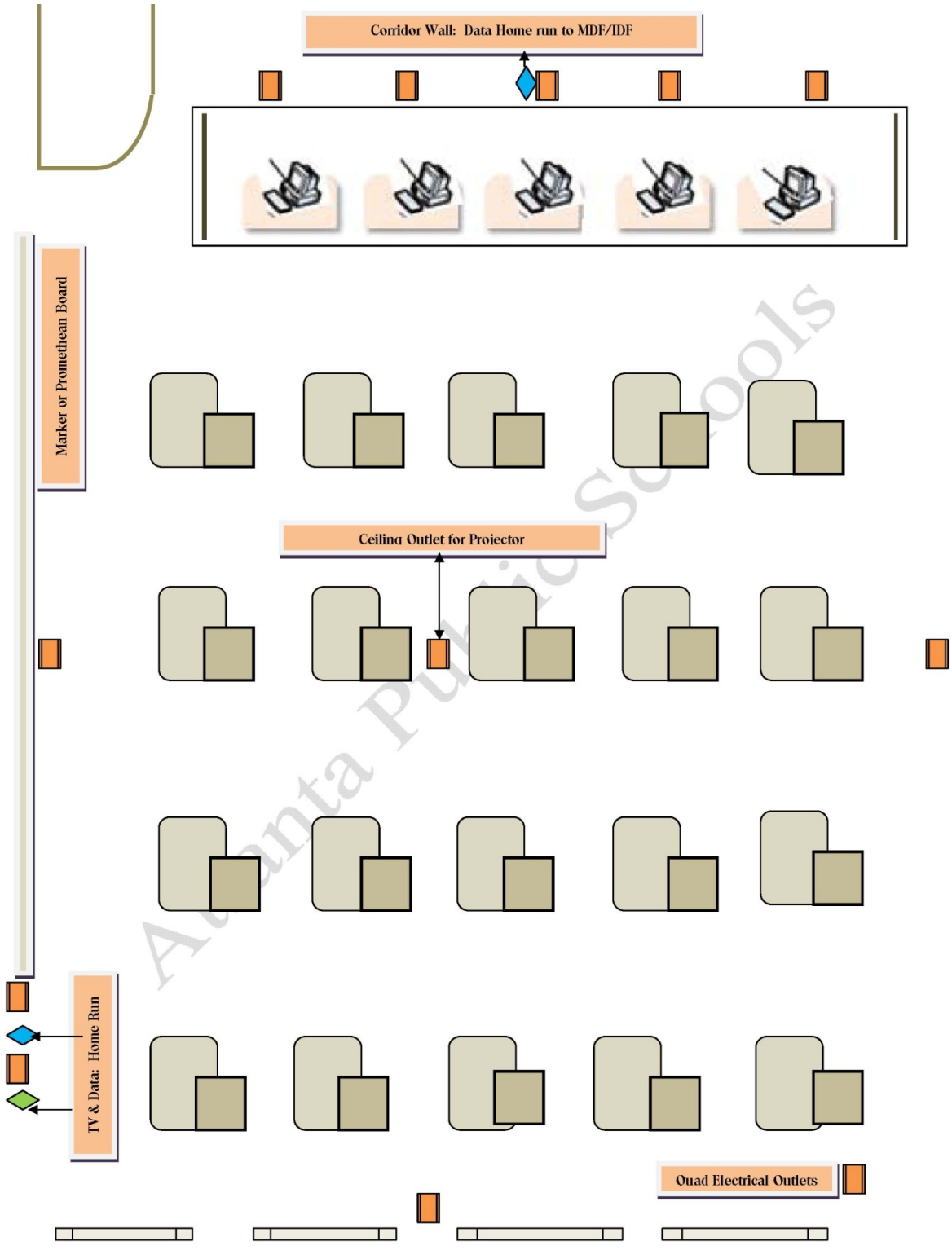
15.3. Contractor shall perform all work as an independent contractor and shall be responsible for all tax payments, withholdings, benefits and other matters for its personnel under this Contract award.

15.4. Contract Assignment: **The contract shall not be assigned without Atlanta Public School's prior written consent.**

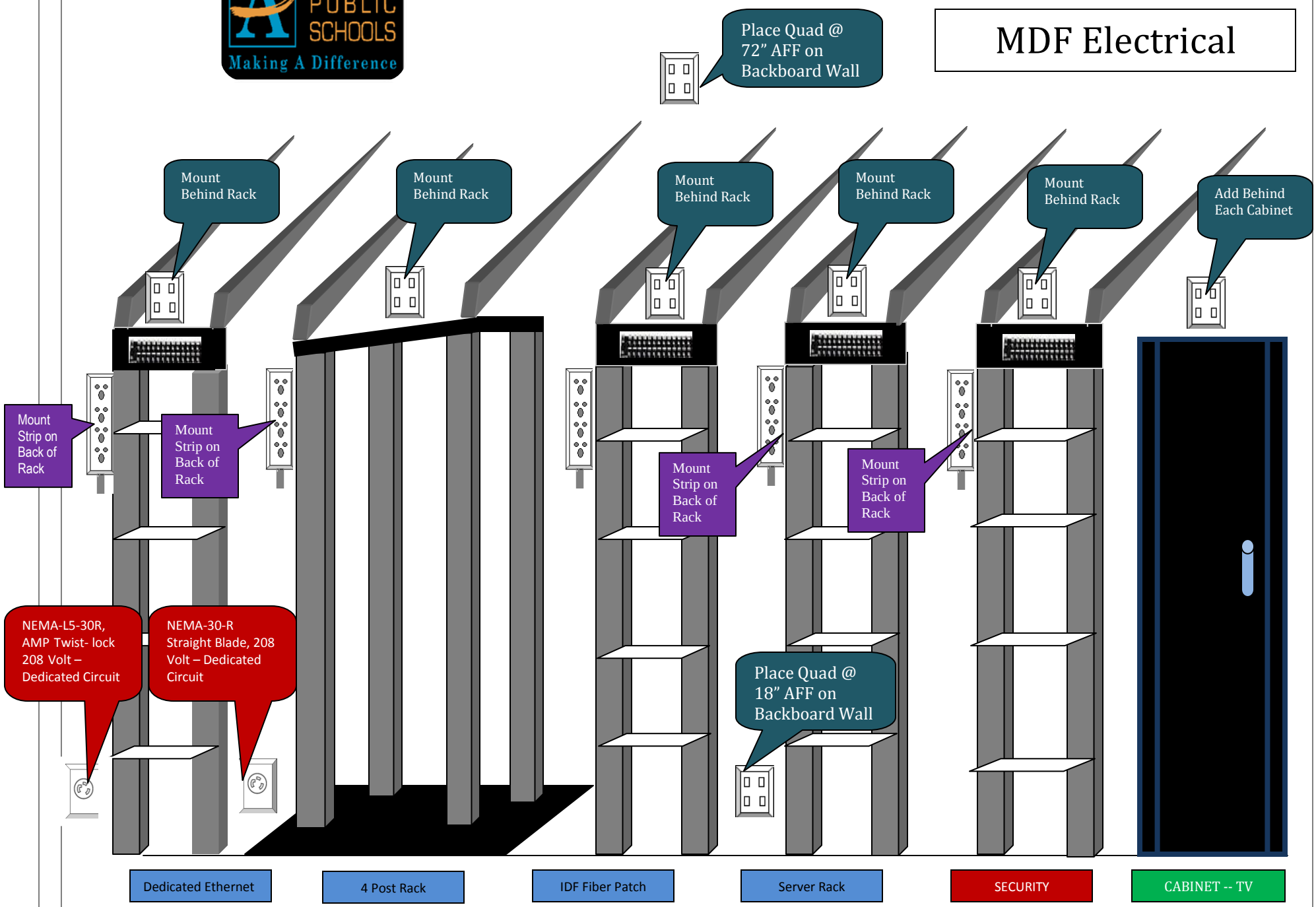
15.5 Workmanship: All work shall be done in a thorough and conscientious manner according to the highest standards of care within the industry and shall be subject to inspection and final acceptance by the APS Construction Management Team, its agents, consultants and/or the General Contractor.

END

Appendix “A”



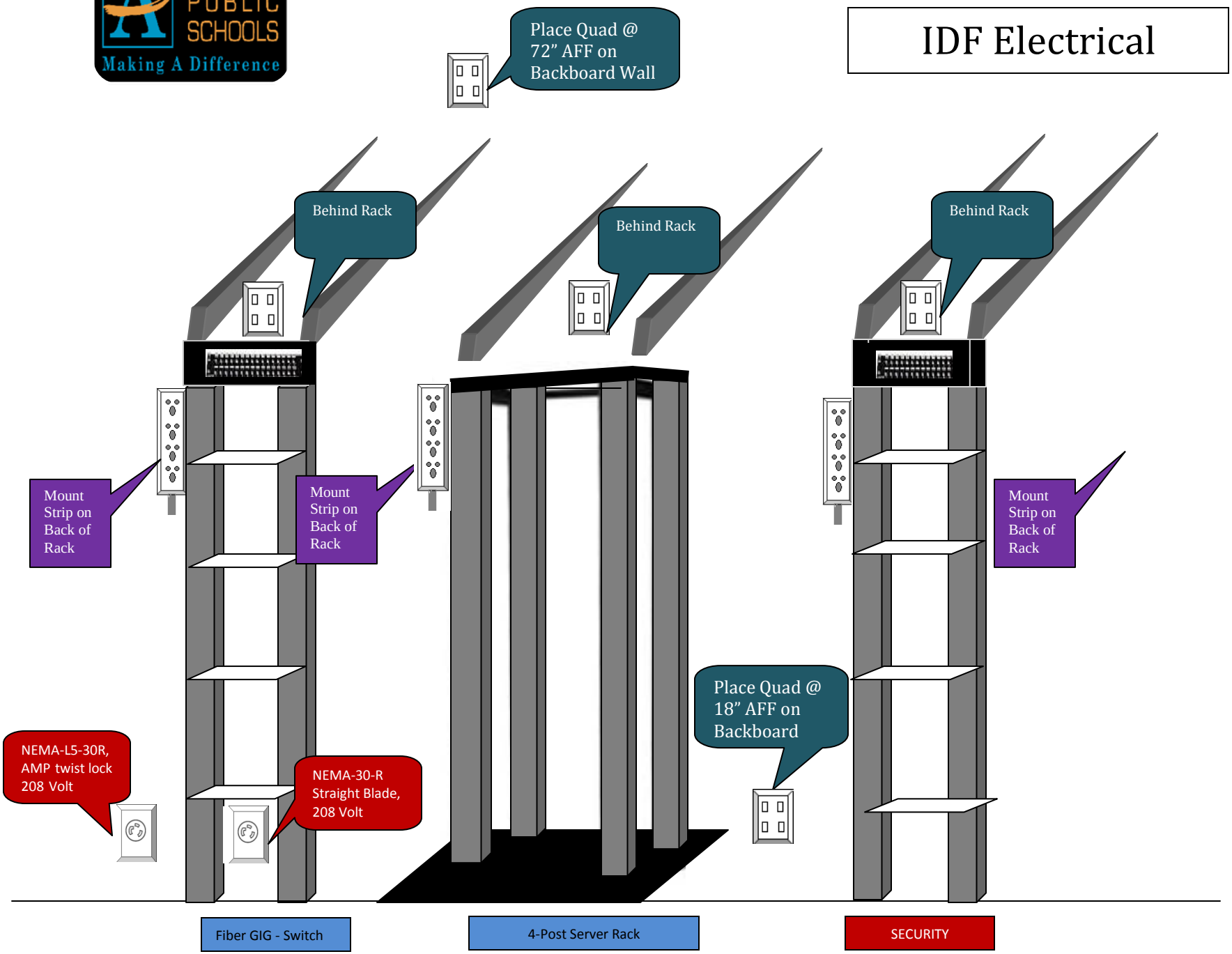
MDF Electrical



02-08-11

NOTE: ***Each receptacle must be on its own circuit breaker from the primary power source!***

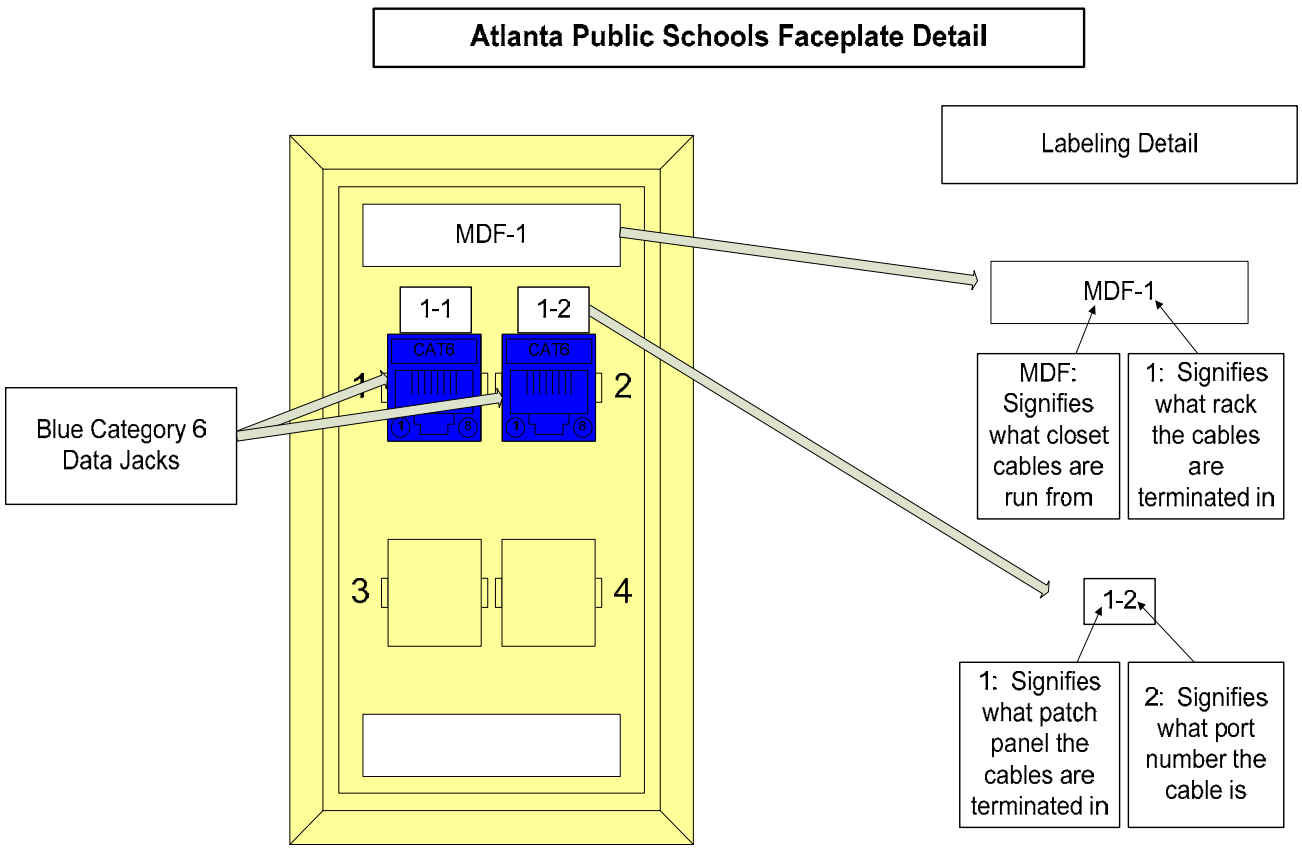
IDF Electrical



02-08-11

NOTE: ***Each receptacle must be on its own circuit breaker from the primary power source!***

APPENDIX D


Atlanta Public Schools Faceplate Detail
Labeling Detail
MDF-1
1-1
1-2
CAT6
CAT6
1
2
3
4
Blue Category 6 Data Jacks
MDF-1
MDF: Signifies what closet cables are run from
1: Signifies what rack the cables are terminated in
1-2
1: Signifies what patch panel the cables are terminated in
2: Signifies what port number the cable is

TV DISTRIBUTION
AND CABLE TELEVISION SIGNAL SYSTEM

PART 1 - GENERAL

A. Furnish and install a complete bi-directional Television Distribution system. The system shall be comprised of the following scopes of work:

1. A Bi-directional multi-trunked System Design
2. Head-End Electronic Components and Hardware
3. Remote Classroom Electronic Components and Hardware
4. A multi-trunk Coaxial Cable Based bi-directional Distribution Plant
5. Interfacing of Head-End and Cable Plant
6. System Installation Testing, Certifications and Documentation
7. An auto CAD and one hard copy line drawing of the complete "as built" system design
8. An APS OT&T full system technical demonstration and acceptance will be required prior to vendor operational demonstrations to school staff.

SPECIAL NOTE: One or more sections of the scope of work may be specified as a separate document within the APS Master Construction specifications, with allocations, as directed by the Assistant Superintendent of Informational Services.

Provide a complete and operating bi-directional trunk system for the reception, interfacing, amplification and reproduction of all current available Comcast Cable Television Channels, owner specified satellite system signals, video and "RF" signals. The System design shall include provisions for the distribution of "in-house" television on "RF" channels 2, 3, 4, 5 and 6, as specified by the OWNER (APS), by switching from cable system low band to Broadcast TV "in-house" by an A/B switch mounted on the front outside panel of the distribution cabinet clearly and permanently labeled. The switch shall select either all cable channels OR in-house channels 2,3,4,5 and 6 and all cable channels 7 and above, by using an "A/B" coaxial switch. When in the "in-house" position of the switch, incoming cable drop channels 2,3,4,5 and 6 shall be filtered, as specified, to prevent interference with "in-house" channels 2,3,4,5, and 6, but shall pass all other cable channels with little or no attenuation. Channel 6 will be designated and designed as the bi-directional video channel. The Head-End system output signal will be designed for signal inputs to both the Head-End TV AND at least one of the owner provided VCR/s as well as the school cable plant.

B. The system shall be designed for a 45 Db signal-to-noise ratio and shall provide a signal level with a minimum of +6 dbmv and a maximum of +20 dbmv at each OWNER (APS) designated outlet. The OWNER specified Head-End location shall be prepared, if not previously installed, with a 4x8 foot ¾" horizontal mounted backboard for supporting connections and hardware as may be specified. The backboard shall be painted gray and shall include one ground bar, meeting or exceeding City of Atlanta Electrical and Low Voltage Code/s.

C. **TWO SETS** of a **ONE LINE DRAWINGS**, provided by the vendor, of the entire **SYSTEM DESIGN** shall be included in the submittal. The document shall indicate **SIGNAL LEVELS OF DBMV** at the input and at the output at each device location, at the head-end location, at all splitters, amplifiers and room/location outlets. The document will also indicate and list

type/s of coaxial cable to be used, model numbers, cable tested certification documents and manufactures of all equipment. Submittal not having the above and as indicated and specified one-line drawings shall be rejected without further review. The following and or authorized APS OWNER representatives will distribute the documents for review that will require pre-approval: 1) APS Department of Technology Video Designee, 2) Technology Representative.

D. The CONTRACTOR shall be an authorized distributor for the equipment supplied under this contract. The contractor shall maintain their own maintenance and service organization which shall be under the direct control of the contractor, capable of furnishing warranty service to the owner and providing the out of warranty service and/or replacement as may be required or specified herein. The TV Contractor must have been incorporated in the State of Georgia for a minimum of ten (10) years.

E. The equipment herein specified is based on equipment manufactured by Blonder-Tongue and must meet or exceed the manufacturer's specifications as provided by the TV Contractor.

PART 2 - CENTRAL TELEVISION / VIDEO DISTRIBUTION HEAD-END ELECTRONIC HARDWARE PRODUCTS AND COMPONENT DESIGN SPECIFICATIONS

A. Amplifier: The broadband amplifier shall be of the push-pull type. Output capability shall be at least +44 dBmv with adjustable gain control range of 15db. The gain and slope controls shall be located on the front of the panel of the amplifier for easy set-up and adjustments. Test ports of minus 30db shall be back matched (Input and Output) and shall be located on the front panel for testing without interruption of distribution signal. The amplifier shall be rack mountable and all front panel connections shall be "F" type coax. The amplifier shall operate from 117VAC, + / - 10%, 60 Hz.

Blonder-Tongue Model RMDA 550-50: Provide as required and with return capability as required

B. Modulator: Audio/video rack mountable modulators shall be frequency selectable as specified by the OWNER for channels 2, 3, 4, 5 and 6 with an output of +42/+60 Db with 54-860 Mhz frequency and broadband noise performance of -74 dB. The video and audio inputs will be front panel accessible with RCA phono inputs. Each video and audio input will be mounted on the front panel below the Identified channel specified modulator and shall be permanently and clearly marked indicating in-house RF distribution channel setting.

SPECIAL NOTE: Modulators and sub-channel converters will be assigned to one or more of the following units provided by the owner: Satellite Receivers (Analog and Digital), VCR's, Laser Disc Players, ITFS wireless receivers and /or character generators.

Blonder-Tongue Model AM60 860 Series
Provide Four - One each for Channels 2, 3, 4 and 5
Provide One - One for Channel 6 if no remote classroom system is specified within the specifications documents

C. Television System Monitor: The television system monitor shall be 125 channel cable ready 13" color VCR combination set with remote and on screen programming. The television set,

on a shelf, shall be specified herein AND will have the Head-End system signal output attenuated as its input.
Panasonic Model PV-M1368 (or upgraded equivalent)
Provide: One

D. Television Rack Mount Shelf:
Lowell Model L15714
Provide: One

E. Sub-channel VHF Converter – Unit shall be of solid state having 75 ohms coaxial inputs and outputs. The local oscillator shall be crystal controlled. Conversion shall be from sub-channel to VHF channel respectively with an output of +42 dB. The unit shall comply with all FCC RF radiation regulations.

Blonder-Tongue Model AM60-860 series Agile Heterodyne Processor T-9 Sub-carrier Modulator
Provide: One

F. Rack Mountable Black Utility Shelves:
Lowell L-15-314
Provide: Five

G. Locking Heavy Duty Swivel Casters:
Lowell L192
Provide: Four

H. Vent Panels 1¾" 19" Rack Mountable:
Lowell L5-191-L
Provide: Ten

I. 1¾" 19" Rack Mountable Louvered Panels:
Lowell L4-191-L
Provide: Two

J. AC Electric Power Strip with a 12 foot electrical power cord:
Lowell L-180-20A
Provide: One

K. Surge Protector/Suppressor:
Graybar MAX6-6
Provide: Two

L. A/B switch plate (L) as specified by Owner as follows: Furnish and install an A/B panel (as described in L above) complete with all lettering engraved in white back filled characters to indicate function of devices on panel. Devices mounted on panel shall include: DSV, MLHF's, CRT and one A/B switch ("A" labeled Cable), and ("B" labeled In-House/Cable) respectively, one "F" connector labeled "Cable Out/Record," one "F" Connector labeled "Portable In-House" "IN" and one "F" connector labeled "Out To TV." The A/B switch shall be mounted on the front panel and all coax cables shall access the switch through rubber grommet filled holes. The panel shall be 19 inches wide and seven inches high designed for standard industry rack mounting. See attached line drawing specifications.

Provide: One

M. DSV Band Separator 5-30MHz:
Blonder-Tongue DSV
Provide: One

N. Coax Lightning Protector:
Nortec TCSCP-1 - NO SUBSTITUTE
Provide: One for each coax cable to any exterior building

O. Microwave Band Separator:
Microwave, Inc., Model 3329-88/102- NO SUBSTITUTE
Provide: Two

P. Equipment Cabinet: A standard 19" rack type cabinet 77 1/8 inches of vertical panel space in height and 27 inches deep with an overall height of 88 1/8 inches constructed of at least 16 gauge cold-rolled heavily reinforced steel to provide for maximum floor-standing strength and durability. The cabinet shall have front mounting rails tapped 10/32 on universal EIA hole spacing and two integrally welded vertical bars in the rear for cable lacing or secure mounting of AC power. Side panels are equipped with internal louvers for maximum heat dissipation. A space-saver fan assembly shall be required for additional heat removal and airflow. Integral slotted air intakes shall be above and below the front door to provide supplemental equipment ventilation pathways. The cabinet shall be constructed and furnished with an internal switched top rear mounted magnetic based work light. The cabinet shall be furnished with front and rear removal doors and door locks (keyed alike). The cabinet unit shall be furnished with one 12 port electrical power strip (herein specified) mounted on left rear side of the cabinet. Two separate surge protector-suppressor (herein specified) shall be furnished with the cabinet. There shall be one 12 foot (herein specified) AC power cable exiting from the rear of the cabinet and one coax cable exiting from the rear of the cabinet for interfacing to the MDF backboard distribution devices interconnecting to the Building video cable distribution system. This cabinet shall be pre-assembled and tested with all electronics herein specified and accepted by APS Department of Technology prior to delivering cabinet to job-site.
Lowell Model L-262-77/MB227 with items installed/wired as herein specified for a complete system.
Provide: One Cabinet System (See attached line drawing riser diagram)

Q. Complete Cabinet Unit and Electronic Hardware Component Assembly, Delivery, Installation, Testing And documentation as required prior to acceptance by OWNER.

R. Covered Storage Drawer:
Lowell 18-195
Provide: One

S. RCA "Phono" 6 foot Cable (attached one set each to Channel 2, 3, 4, and 5 modulator):
Provide: Four

T. RCA to "F" Connector Adapter (attached one each to Channel 2, 3, 4, and 5 modulator):
Provide: Four

PART 3 - REMOTE CLASSROOM ELECTRONIC PRODUCTS, HARDWARE AND COMPONENT DESIGN SPECIFICATIONS

A. Modulators: Video and audio rack mountable modulator shall be selected for Channel 6. Output of +6Dbmv with 50-550 MHz frequency range broadband noise performance ratio of –74 dB. The video and audio inputs will be front mounted panel accessible with RCA phono input jacks. Each video and audio input/output will be mounted on the front panel above the identified channel and shall be permanently and clearly marked as will all external unit connecting cables.

Blonder-Tongue Video / Audio AM60-860 series Agile Heterodyne Processor T-9 Sub-carrier Modulator
AP60-550B with Option 17 Agile Heterodyne Processor T-9 sub-carrier to Channel 6 Modulator:
(To be installed at the Head-End with this option)
Provide: One Each

B. DCE Desk - Top 19" Rack Mountable Black Cabinet:
HOME DCE1225
Provide: One

C. Louvered 19" Rack Mountable 1 ¾" Black Pan:
Lowell L4-191-L
Provide: One

D. DSV Band Separator 5-30 Mhz & 5:
Blonder-Tongue DSV
Provide: One

E. Six Input Stereo Portable Rack Mountable Audio Mixer w/Limiter:
Shure Model M367
Provide: One

F. Rack Mount Panel for M367 Audio Mixer:
Shure A367R
Provide: One

G. Light weight Dual Muff Mono Headphone Set:
Telex PH36
Provide: One

H. Rack Mountable 19" Microphone Plate:
Pro-Sound RAAM6901-1
Provide: One

I. NTSC Digital camcorder with accessories package that includes an (AC V-316) AC Power Adapter/Battery Charger, a (NPFM-50) Re-chargeable info-Lithium-ion Battery, a (RMT-808) wireless camera remote control unit, A/V cables, camera strap and Sony support accessories that include:

Sony DCR-TV11 NTSC (or of equivalent up graded model)

Provide: One and accessories as a Package
Provide: One Sony Soft Camera carry case LCS4G1
Provide: One 5-Pack Sony DVM60EX mimi DV digital video cassette tapes

J. Sony DCR-TV8 Digital Camera Tripod with handle remote operation:
Sony VCT-570RM
Provide: One

K. Dynamic Cardioid Microphone:
Shure Professional Microphone with switch Model SM-58S
Provide: Two

L. Floor Microphone Stand:
Atlas MS-10C
Provide: Two

M. Desk Microphone Stands:
Atlas DS-7
Provide: Two

N. XLR Microphone 25 foot cables:
Shure C-25J 3-pin XLR Audio Connectors
Provide: Four

O. Wireless Lapel Microphone System:
Telex FMR70L
Provide: One System

P. Rack Mount Standard 19" Plate for Wireless Microphone System:
Telex RM-S Rack Mount Plate
Provide: One

Q. Electrical Quad Power Outlet:

Standard RA3AC
Provide: One

R. Portable Equipment Cart:
PIXMOBILE AV2-34E
Provide: One

S. Assembly, Delivery, Installation, Testing and Documentation Package

PART 4 - COAXIAL CABLE DISTRIBUTION

The coaxial cable plant will be of trunk line design for distribution from the Head-End as specified on line drawings markups as provided by APS (The OWNER) to classroom/building as in designated locations as follows:

A. Coaxial Cable: Shall be quad shielded. The cable shall be 75 ohms nominal impedance and shall be marked with manufacturer's name. All coaxial cable shall be sweep tested by the

maker before shipping and be certified by the tester with documentation provided by the TV CONTRACTOR at the time of the official demonstration performance. No discontinuities shall exist from 5 MHz to 1000 MHz on the cable and shall have a return loss of 20 dB minimum. All cable shall be quad shielded insulated type with both a foil aluminum shield and a braided aluminum shield 80 dB of shielding. The outer jacket shall be a color specified by the owner and a non-contaminating type. The cable will be UL listed. No Cable, that shows bruises and or shipping damages, shall be installed in the conduit system. There will be NO 90° cable turns without right angle adapters as indicated in the APS approved final design.

Model RG-6 and RG-11 as required by City of Atlanta Electrical and Low Voltage Code/s
Provide: Quantity as system required as indicated by survey and line drawings provided by the OWNER.

B. Splitters/Combiners: Bi-directional, hybrid type, having essentially flat response across the Frequencies utilized on the entire system design. All devices shall be housed in environment proof and Radiation proof housing. All devices shall have "F" type fittings / connectors.
Blonder-Tongue Models SCVS, SCW, SRT and SXRS series
Provide: Quantity as required and as indicated on line drawings.

C. Tv Tap-off: Bi-directional coupler type mounted in trunk-line in a least 10x10x6 junction boxes in the ceiling and hallways. Feeder lines shall run from the taps through the conduit to outlets in all of the room locations as specified by the OWNER and indicated on the one-line drawing. The tap-offs shall be available in ten (10) tap values as required and shall have "F" type connectors.
Blonder-Tongue Model SRT, ZDC Series
Provide Quantity as indicated on line drawings

D. TV Outlet: Bi-directional, all channel feed through the cable distribution plant / system for connecting the television (RF) signal to the owner television set. The unit shall have an "F" connector, which shall accept RG-6 cable and mounted in 4x4x4 wall or surface box (as specified by the OWNER). The outlet shall be furnished with an ivory plastic saddle adaptable for a standard duplex or quad cover plate as may be specified elsewhere in this section.
Blonder-Tongue Single Outlet V-1GF-FT and Dual Outlet SCW-4 where indicated on drawings
Provide: Quantity as required and as indicated on line drawing

E. Terminators: Terminating resistors shall be required at the ends of all branches of the system and shall be devices that are specifically designed for the purpose of terminating coaxial cable lines. They shall be products of the manufacturer of the amplifier and / or tap-off units used in this system design and shall be approved by the manufacturer for use in the 5 MHz to 1000 MHz range with a return loss of 30 dB minimum.
Blonder-Tongue Model FBT Series
Provide: Quantity as required and as indicated on line drawings

PART 5 - TELEVISION SET SELECTION (OPTIONAL ALTERNATE)

A. The Chief Information Officer and the Director of Operational Technology reserve the right to specify this scope of work as a separate document within the construction design documents. Optional section as may be specified.

PART 6 - CONTRACTOR CERTIFICATION REQUIREMENTS

A. All Atlanta Public Schools contractors and sub-contractors providing telecommunications equipment, cable, system parts and installations will be required to hold a valid State of Georgia Low Voltage Certificate at the time of BID submission as well as a time period exceeding the proposed duration of the scope of work to be performed. A Low Voltage Certificate installer, with valid Certificate will be required on site during all installations. Proposed low voltage site designs will require the stamp of a State of Georgia Communications Distribution Designer. The CONTRACTOR shall document, in writing, upon completion and demonstration of operating video distribution system, that FCC Radiated Emission Limits, if any, are acceptable under the Code of Federal Regulations.

B. A review of all construction drawings and/or written specifications will include the following:
   1. Head-end Cabinet Riser Platform and layout design
   2. The remote classroom origination cabinet platform design
   3. Typical classroom design and TV / Electrical outlet locations and heights AFF
   4. Typical one-line drawing showing trunk and tap-off cable routing design
   5. Television Combination "F" connector low voltage and high voltage outlet design
   6. Typical MDF

PART 7 - PRODUCT MANUFACTURERS, MINIMUM SPECIFICATIONS

A. Low voltage electronic video, audio and cable distribution products and devices specified here-with-in are based on specifications of listed manufactured products. Vendors may bid and propose other products, however, proposed products not listed must meet or exceed specifications of those products listed.

B. Products proposed by vendors, other than those specified, must provide advanced written proof of specifications and provide written performance data for review to obtain a required written approval for bid inclusion prior to sealed bid opening.

C. Product manufacturers are specified as to one the following - NO EXCEPTIONS.
   1. HEAD-END EQUIPMENT – Blonder-Tongue, Scientific Atlanta, Jerold
   2. CABINETS AND ACCESSORIES - Atlas / Soundolier, Lowell, Fin and Home
   3. CABLE - West Penn and Belden
   4. TELEVISIONS - Phillips, Magnavox, Sharpe, GE, Panasonic, Sony and RCA
   5. DEVICES and ACCESSORIES - Shure, Rauland, Bi-amp, Altec, Pix-mobile, Panasonic, Sony, Bogen, Microwave, Snap-and Seal
   6. CAMERAS and ACCESSORIES - Sony. Panasonic, Sharpe, RCA

PART 9 - EXECUTION

A. Upon completion of the equipment installation, it shall be the responsibility of the TV Contractor to perform all necessary mixing, marking and balancing of all signals for a properly operating system as described here-with-in.

B. A system quality demonstration shall be performed in the presence of or an authorized Representative of :
   1. The Owner
   2. The Architect, General Contractor and or Electrical Contractor

3. The Assistant Superintendent of Informational Services
4. The Director of Operational Technology
5. The TV Contractor
6. The APS site construction manager

C. A written notice of the system performance demonstration time and date must be received by each of the certification representatives with a minimum of seven working days. The TV contractor will be responsible for the performance demonstration notification.

D. The TV Contractor shall forward a letter to each of the authorized performance representatives stating that a performance test has been successfully demonstrated and naming the representatives in attendance accepting the specifications of the demonstration. Documentation signatures will be required for a final job performance and acceptability.

E. One hard copy final "as installed" set of line drawings AND one AUTO CAD disc copy of final "as installed" line drawings shall be provided to the owners representative in Operational Technology Department of the Atlanta Public Schools. The final "as installed" documents shall indicate location of all TV outlets, layout design of all tap-off lines, location of all tap-off devices and trunk lines. The documents shall be delivered within ten (10) days of the final system sign-off to:

Atlanta Public Schools
Operational Technology and Telecommunications
130 Trinity Avenue
Atlanta, Georgia 30303

F. The final documentation and acceptance is subject to review by the APS Oversight Committee at the written request of any authorized performance test representative.

END OF SECTION

PROJECTOR INFRASTRUCTURE

PART 1 – Statement of Work:

1. **Each designated classroom will receive a newer version of the promethean board with an attached projector and this technology eliminates the need for an electrical outlet and conduit for the projector.**

   Instructional areas shall include: Classrooms, all Labs, Media Center, Academies, and auditoriums. Projector screens ARE NOT INCLUDED.

   1.1. **The following items are NOT included** in the construction project
   1.1.1 Projector* **With the exception of the Auditorium**
   1.1.2 Projector Screen* **With the exception of the Auditorium**
   1.1.3 Speakers* **With the exception of the Auditorium**
   1.1.4 VCR

   1.2 The following items are included and must be provided by the Electrical contractor:
   1.2.1 Electrical Outlet next to communication outlet

PART 2 –Installation

2.1 **Promethean board placement must be coordinated with location of typical items such as thermostats and fire strobes especially in Science Labs and/or other specialty rooms**.

2.2 APS Department of Technology is responsible for the Teacher **work** station and **projector/** Promethean Board, and shall coordinate the final delivery and acceptance of the system.

PART—3 DELIVERABLES

3. **The APS Department of Technology and** the Department of Instructional Technology shall secure the A/V vendor for installation and training on the projector/ **promethean board** and all connectivity associated with the Teacher work station. Close coordination is required to insure adequate installation.

Training and demonstration of the projector/promethean board shall be managed by APS Department of Technology and Instructional Technology. The electrical contractor is responsible for the efficient delivery of the infrastructure as outlined in this specification. The **A/V** vendor is responsible for installation, connectivity, and a one time training session for the projector /promethean board or any associated peripherals.

END OF PROJECTOR

WIRELESS

1. Scope of Work: The Atlanta Public Schools Department of Technology **shall assume shared responsibility for implementation of the Wireless Communication System. The on-site Cabling vendor will be responsible for the cabling requirements and APS Department of Technology and its approved vendor will be responsible for the installation and testing of the Wireless Communication devices.**
    a. **The cabling for the wireless access points must be installed immediately prior to the completion of the ceiling grids and ceiling tile.**
    b. **The current version of the Wireless Communication devices do NOT require any power outlets in the ceiling to support installation.**
    c. **The installation of the wireless access points can then be installed immediately after or be delayed until construction is complete and the facility has received a Certificate of Occupancy.**

2. General Responsibilities: The Department of Technology and its approved vendor shall assume full responsibility for the design**/layout** and implementation of the **Wireless Communication System with the exception of the cabling requirements.**
    a. The APS Department of Technology and its approved vendor shall assume responsibility for all installation and delivery of final as-built and documentation.
    b. **For each school designated to receive the Wireless Communication System and a wireless survey of the facility is required prior** to the conclusion of construction, its representative shall coordinate the site visit with the APS Project Manager and the APS Construction Project Manager.
    c. **The APS Department of Technology shall work with the APS Construction Project Manager and its approved vendor to perform the wireless survey prior to the completion of the ceiling grids throughout the construction site.**
    d. **After the wireless survey is completed the wireless plan/layout will be submitted to the APS Construction Project Manager and the General Contractor in order to complete the cabling requirements for each of the wireless access points per the Wireless Communication Plan.**
    e. **The required cabling for the Wireless Communication Systems must be pulled to the appropriate wiring closets MDF or IDFs terminated and labeled properly. The Department of Technology and its approved vendor will start the installation; configuration and testing of the wireless access points after the cabling requirements are completed by the Cabling contractor and will not commence work until permission is granted by the APS Construction Project Manager and the General Contractor.**

END

WIRELESS

1. Scope of Work: The Atlanta Public Schools Department of Technology **shall assume shared responsibility for implementation of the Wireless Communication System. The on-site Cabling vendor will be responsible for the cabling requirements and APS Department of Technology and its approved vendor will be responsible for the installation and testing of the Wireless Communication devices.**
    a. **The cabling for the wireless access points must be installed immediately prior to the completion of the ceiling grids and ceiling tile.**
    b. **The current version of the Wireless Communication devices do NOT require any power outlets in the ceiling to support installation.**
    c. **The installation of the wireless access points can then be installed immediately after or be delayed until construction is complete and the facility has received a Certificate of Occupancy.**

2. General Responsibilities: The Department of Technology and its approved vendor shall assume full responsibility for the design**/layout** and implementation of the **Wireless Communication System with the exception of the cabling requirements.**
    a. The APS Department of Technology and its approved vendor shall assume responsibility for all installation and delivery of final as-built and documentation.
    b. **For each school designated to receive the Wireless Communication System and a wireless survey of the facility is required prior** to the conclusion of construction, its representative shall coordinate the site visit with the APS Project Manager and the APS Construction Project Manager.
    c. **The APS Department of Technology shall work with the APS Construction Project Manager and its approved vendor to perform the wireless survey prior to the completion of the ceiling grids throughout the construction site.**
    d. **After the wireless survey is completed the wireless plan/layout will be submitted to the APS Construction Project Manager and the General Contractor in order to complete the cabling requirements for each of the wireless access points per the Wireless Communication Plan.**
    e. **The required cabling for the Wireless Communication Systems must be pulled to the appropriate wiring closets MDF or IDFs terminated and labeled properly. The Department of Technology and its approved vendor will start the installation; configuration and testing of the wireless access points after the cabling requirements are completed by the Cabling contractor and will not commence work until permission is granted by the APS Construction Project Manager and the General Contractor.**

END

Facilities and Construction
1631 La France Street NE
Atlanta, Georgia 30309
(404) 802 3700

Intercommunications Specifications

February 4, 2011

APPROVED BY:
Marquenta Sands, Director of Security

INTEGRATED INTERCOMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK: The Atlanta Public Schools has begun to integrate all low voltage and life safety systems into one seamless platform. The Intercommunications system is considered a vital part of life safety. This specification requires an Intercommunication system capable of seamless integration with IP technology and other life safety systems which include CCTV, Fire, Burg, and Keyless.

A. This specification establishes a minimum level of quality, features, and performance for individual components as well as the integrated system and will be enforced by APS. It is the responsibility of the contractor to insure that the proposed product meets or exceeds every standard set forth in these specifications.

B. The functions and features specified are vital to the operation of this facility, and therefore, the acceptance of alternate manufacturers does not release contractor from strict compliance with the requirements of this specification.

C. The Contractor for this work shall be held to have read all of the Bidding Requirements, the General Requirements of Division 1, and Contract Proposal Forms; and in the execution of this work, he will be bound by all of the conditions and requirements therein.

D. The contractor shall be responsible for providing a complete functional system including all necessary components whether included in this specification or not.

E. In preparing the bid, the contractor should consider that no claim will be made against APS for any costs incurred by the contractor for any equipment demonstrations which the owner requests:

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Requirements of the following Division 16 Sections apply to this Section:

1. Basic Electrical Requirements.
2. Basic Electrical Materials and Methods.

1.3 SUMMARY

a. This Section includes Integrated Telecommunications/Intercom System. It includes requirements for Integrated Electronic Communications Network system components including, but not limited to, the following:

1. Administrative Telephones with LCD Display
2. Attendant Console(s) with LCD Display
3. Ceiling/Wall Mounted Speaker Assemblies
4. Bell/Class Change Signaling System
5. Public Address/Intercom System
6. Controls, Amplifiers, and Terminal Equipment
7. Power Supplies
8. Wiring
9. Master Clock
10. Secondary Clocks
11. Program Sources – AM/FM Tuner, CD Player
12. VoIP Intercom Controller

B. Related Sections: The following Division 16 Sections contain requirements that relate to this Section:

1. "Raceways," for raceways used for Integrated Electronic Communications Network systems cables.

2. "Electrical Boxes and Fittings," for boxes, cabinets and fittings used with communications systems.

3. Data Network.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections:

1. Submit equipment prints, inter-panel and intra-panel, full electronic wiring diagrams and specification sheets for each item specified herein. Provide a tabulation of the specification clearly comparing the submitted item with the specified item, being able to refer to all written expressed functions and capabilities. Specification Sheets shall be submitted on all items including cable types.

2. Shop drawings, detailing Integrated Electronic Communications Network system including, but not limited to, the following:

a. Built-in station arrangement.
b. Equipment cabinet arrangement.
c. One line diagram of Gateway(s) and typical classroom

3. Wiring diagrams that detail wiring for power, signal, and control, differentiating clearly between manufacturer -installed wiring and field-installed wiring. Identify terminals to facilitate installation, operation and maintenance.

4. Submit wiring diagrams showing typical connections for all equipment.

5. Provide a riser diagram for the system showing in technically accurate detail all connections, interconnections, and all provisions available and made for adaptability of all specified future functions. In addition, riser diagram must include all calculations, charts, and test data necessary to demonstrate that all systems and system components deliver the specified signals, grades, and levels at all required points and locations.

6. Submit a certificate of completion of installation and service training.

1.5 QUALITY ASSURANCE

A. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The contractor shall be an established communications and electronics contractor. The contractor shall utilize a duly authorized distributor of the equipment supplied for this project location with full manufacturer's warranty privileges.

C. The contractor shall show satisfactory evidence, upon request, that the supplier maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The supplier shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

D. Electrical Component Standard: Provide work complying with applicable requirements of NFPA 70 "National Electrical Code" including, but not limited to:

1. Article 250, Grounding.
2. Article 300, Part A. Wiring Method.
3. Article 310, Conductors for General Wiring.
4. Article 725, Remote Control, Signaling Circuits.
5. Article 800, Communication Systems.

E. EIA Compliance: Comply with the following Electronics Industries Association Standards:

1. Sound Systems, EIA-160.
2. Loudspeakers, Dynamic Magnetic Structures, and Impedance, EIA-299-A.
3. Racks, Panels, and Associated Equipment, EIA-310-A.
4. Amplifiers for Sound Equipment, SE-101-A.
5. Speakers for Sound Equipment, SE-103.

F. Installation and start up of all systems shall be under the direct supervision of a local agency regularly engaged in installation, repair, and maintenance of such systems. The supplier shall be accredited by the proposed equipment manufacturers and be prepared to service the system for the completion of the guarantee period and provide the names, locations, and size of six (6) recent successful installations in the area.

G. The agency providing equipment shall be responsible for providing all specified equipment and mentioned services for all equipment as specified herein. The agency must be a local authorized distributor of all specified equipment for single source of responsibility and shall provide documents proving such. The agency must provide proof that the agency is adequately staffed with factory-trained technicians for all of the specified equipment. The agency must have established business for and currently be providing all services.

H. The contractor shall guarantee availability of local service by factory-trained personnel of all specified equipment from an authorized distributor of all equipment specified under this section. On-the-premise maintenance shall be provided at no cost to the APS for a period of one (1) year (parts and labor) from date of acceptance unless damage or failure is caused by misuse, abuse, neglect, or accident. Additionally, all manufacturer supplied products must be covered by a five (5) year (parts only) limited warranty from the date of acceptance. The warranty period shall begin on the date of acceptance by the owner/engineer.

I. The supplier shall visit the sites and familiarize himself with the existing conditions and field requirements prior to submitting a proposal.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in factory containers. Store in clean, dry space in original containers. Protect products from fumes and construction traffic. Handle carefully to avoid damage.

1.7 IN-SERVICE TRAINING

A. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments that will

facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training.

1.8 WARRANTY

A. Provide five-year warranty of the Intercom System against defects in material and workmanship. If any defects are found within the warranty period, the defective equipment shall be replaced at no cost; a one year warranty shall be provided for labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The equipment specified is based on equipment that will allow for future seamless integration with APS Life Safety Systems which include Radionics (Burg), Notifier/Edwards (Fire), Lenel (Keyless), and Bosch (CCTV).

2.2 SYSTEM REQUIREMENTS

A. Provide complete and satisfactorily operating Integrated Communications/Intercom System as described herein, using materials and equipment of types, sizes, ratings, and performances as indicated. Use materials and equipment so they form and integrated system, with components and interconnections matched for optimum performance of specified functions.

B. The system shall provide the state of the art in technology for internal telephone and intercommunications, emergency call-in notification, life safety paging and evacuation tones, secondary clock corrections, and class change tones with schedules. The system shall be easy to learn and operate. All standard system programming shall be user friendly to allow the system administrator the ability to easily program system features. The system shall be capable of being integrated to the Cisco VOIP Telephone system.

C. The system shall be a single electronic system consisting of classroom call buttons, administrative telephones, attendant console(s), amplified intercom channels, (classroom) speakers, corridor speakers, inside and outside horns, call-in switches and master clock.

D. Features offered by this system shall be implemented and controlled by a single software program that can be changed and expanded as APS needs evolve.

E. The system shall lend itself to expansion by simple addition of hardware modules.

F. The system shall allow system monitoring and administration from a local Windows PC, networked Windows PC over the LAN, or remote Windows PC via a modem.

G. The system shall provide the ability to initiate life-safety paging announcements, evacuation tones and take cover tones from any telephone within the facility or outside the facility to any other location within the facility.

H. The system shall provide the ability to selectively communicate or monitor individual classrooms in emergency situations from any telephone within the facility or outside the facility to any other location within the facility; all communication within the classroom shall be hands free and will not require any interaction by the end-user to answer.

I. Room speakers, call switches, and telephone extension numbers shall be programmable and may be assigned any two, three, four or five digit number. Any extension may be reassigned at any time, and it shall not be dependent on wiring or circuit numbers. Speakers and associated classroom station will be able to be reached by the same extension.

J. The system shall provide the ability for amplified two-way voice communication any dialing telephone in the system, through any speaker in the system. This shall allow hands-free communication to any classroom or any individual loudspeaker unit. A programmable pre-announce tone shall sound immediately before the intercom path is opened and a supervisory tone shall continue to sound at regular intervals when speaker monitoring is active, complying fully with all privacy legislation.

K. The attendant console(s) and administrative phones shall be located where indicated on the plans, and these instruments shall be used for inter-school communication.

L. Integrated Master Clock:16 schedules,1000 events and automatic Daylight Savings time correct.

M. The system supplier shall provide a tie line between the Cisco Telephone system and the Intercommunication System.

The purpose of the Integrated Communications System (PBX) is to enhance communication in the school environment. The PBX provides PBX service {communications, telephone, and wireless handsets} to school personnel and students at any point on school grounds. This system must provide an optimized solution with a combination of safety enhancements, long-term stability, low total costs, and ease-of-use specifically for the K-12 environment. All purposed systems must be compatible with existing technology to insure wire area network ability for future integration. Basis of design is the Cisco VoIP System.

The system as described consists of a Communications System telephone switch integrated with existing systems or new that adhere to the following specifications, classroom communications system, providing feature set and programming designed specifically to facilitate safe and efficient communications in the K-12 school environment. As system requirements vary any proposals must match in detail equipment listing in these specifications.

Failure to provide a fully-integrated network communications system functionally equivalent or superior to these specifications will disqualify a proposal. In the event a system is installed that fails to adhere to these specifications, the system will be replaced at the contractors expense.

1. Attendant Console(s) with LCD Display
2. Ceiling/Wall Mounted Speaker Assemblies
3. Normal Call-In Switches
4. Bell/Class Change Signaling System
5. Public Address/Intercom System
6. Controls, Amplifiers, and Terminal Equipment
7. Power Supplies
8. Wiring
9. Atomic Clock/Server Synchronization module
10. Master Clock
11. Secondary Clocks Program Sources
12. Tuner, Cassette, CD Auxiliary Input
13. Remote Network Access Controller
14. UPS Power Supplies - 1 per gateway/call manager

N. Low voltage communication contractor is responsible to provide all necessary hardware if applicable to coordinate with the owner or owner's audio video contractor with the integration of muting the classroom sound systems.

2.3 EQUIPMENT AND MATERIALS

A. General
The system provided shall be a completely integrated communications system. Providing a separate intercom system, and stand alone master clock may be considered, but shall meet fully the intent of this specification, and shall be demonstrated to the buyer or their agent for prior approval.

B. VoIP Based Intercom Controller (Gateway) (Qty 2) (High and Middle Schools). The Integrated Electronic Communications Network shall at a minimum, have the following features and capabilities:

1. The ability to network multiple controllers together to provide a single interconnected system within the facility. The networking capability must provide for total transparency between controllers and in turn operate as a single system. The system must be

capable of all of the following multiple network transmission types: fiber, twisted pair, Ethernet, Voice over IP.

2. An Ethernet port for the connection of on-site or off-site diagnostics by distributor or factory-trained personnel. The controllers have the option to tie directly into the facility's Ethernet LAN/WAN (depending on firewall access) or to interconnect over their own Ethernet network (recommended).

3. System can connect to CISCO Telephone VoIP System via an analog Central Office trunk, or T-1/PRI lines.

4. The Operating System and system programming database shall be stored in non-volatile flash memory. The Operating System can be easily upgraded through a configuration program without requiring replacement of any chips. The system programming database can be easily archived.

5. Support a flexible numbering plan allowing two, three, four, or five digit extensions. The two, three, four, and/or five digit extensions can be intermixed within the same facility. Each extension can include leading or trailing alpha digits to match a facility's room numbering scheme.

6. The ability for centralized attendant answering/call routing or optional automated attendant answering/call routing.

7. Personal Identification Numbers (PINs) for select administrators. By dialing their PIN at any system telephone, the administrator shall have access to the same capabilities assigned to their office telephone or admin handset, regardless of the restrictions on the phone they are currently using.

8. Reports on feature usage, system activity, etc. upon request either on site or remotely. The system shall also provide standard SMDR reports including: date, time, duration of call, extension number, and number dialed. The system shall allow for easy import of SMDR reports into spreadsheet format or other analysis software package.

9. Direct Dialing, two-way amplified voice intercom between any telephone and staff speaker without the use of a press-to-talk or talk-listen switch.

10. Administrative Telephone Call Waiting feature that notifies the telephone user, who is already on their extension, that another telephone call is trying to contact their extension. The user has the option to answer the call before it is forwarded to another extension.

11. “Executive override” feature permitting an assigned telephone to "override" and break into ongoing telephone or intercom conversation(s) in the system.

12. DID: Direct Inward Dialing. The system can be configured with DID trunk(s) from the central office. The central office passes the last two to four digits of the listed directory number to the system which the system uses to direct the phone call directly to an extension (bypassing an attendant).

13. DIL: Direct Inward Line. The system can be configured with standard DIL, bi-directional CO trunks. The DIL always rings a specific extension of hunt group within the system.

14. DISA: Direct Inward System Access. The system can be configured to allow access to all system features/functions (paging, intercom, evacuation tones, toll access, class tone schedule selection, etc.) from any offsite DTMF dialing telephone via an incoming trunk line. Only authorized individuals may use this feature by dialing into the system through a dedicated trunk number, with or without a pass code, and then dialing a system function.

15. Direct Outward Dialing: An extension user can make external calls with attendant assistance.

16. Ground Start/Loop Start Trunks: system is able to interface with either type of subscriber trunk lines.

17. Pooled Lines: Administrative and Staff Users can seize one of multiple outside trunk lines by pressing a single key.

18. Ability to place two levels of call-in from any staff location. Call-ins may originate from either a separate call switch or via the “*” button on the Staff Phone.

19. The ability to answer intercom call-ins registered at any administrative telephone by merely pressing a single response button.

20. Facilities for multiple telephone conversations to take place without preventing intercom, announcements, educational, or music programs from being distributed to other areas of the building.

21. The ability to automatically reroute incoming calls and call-ins to an alternate telephone or group of telephones if they remain unanswered for a predetermined amount of time.

22. Universal wiring for all data network, telephones, intercom speakers, and call switches using category 5, 5E and 6 cables. Systems requiring a custom cable plant will not be acceptable.

23. The ability to remotely locate Intercom Controller(s) (Gateways and or Mini Gateways) among MDF and IDF equipment closets to allow the most economical wiring of the system based on facility layout.

24. The option to automatically ring the staff telephone if the intercom path to the associated intercom speaker is unavailable.

25. The ability to initiate Class of Service changes either manually or automatically on a per station basis based on time of day, day of the week, and calendar.

26. A minimum of sixty four (64) unique Classes of Service shall be available.

27. Two-way communication capability from any telephone to any other classroom on the system.

28. "Student Phone" operation for selected telephone extensions. The “student phone” extension(s) will only allow outbound dialing during

29. Desired time periods, restrict outbound dialing to local, non-toll calls and do not allow repeat dialing of the same number or prolonged conversations. “Student phone” extension(s) can be controlled manually from select administrative telephones and/or automatically based on time, day, and date.

30. Ability to alert designated attendant(s) with a special tone and visual indication of the location of any 911 call placed from classroom or administrative phone.

31. Ability to perform any system feature or function from the administrative telephone

2.4 INTERCOM/PAGING/TONES/CLOCK CORRECTION MODULE

A. Provide an integrated intercom module for individual room intercommunications, all page and zone page, evacuation tones, multilevel call-in, secondary clock correction, and class change tones.

1. Two-way communication between any telephone and any room speaker.

2. Preannounce tone prior to connecting any intercom conversation to alert the user to the call and prevent unauthorized monitoring. A tone shall be automatically repeated at regular intervals for the duration of the intercom call if the voice circuit is not activated.

3. Audio paging access from any telephone to any single intercom speaker, zone (group) of intercom/paging speakers, or all speakers/paging horns throughout the entire facility.

4. Single button access from any telephone on the system to distribute emergency announcements within the facility to all or select locations equipped with speakers. Emergency announcements originating from any assigned administrative telephone shall have priority over all regular system functions.

5. Single button access from any telephone on the system to initiate alarm signals within the facility to all or select locations equipped with speakers. Up to nine (9) separate distinct alarm signals shall be provided. Alarm signals originating from any assigned administrative telephone shall have priority over all regular system functions.

6. The system can automatically broadcast (with preprogrammed messages) page emergency instructions throughout an entire school when an alarm is tripped.

7. Multilevel call-ins can be placed from either a classroom call-in switch. The call-ins route to select or all administrative telephones and can only be cleared from the system once answered from an administrative telephone. If a call-in is not answered within a preprogrammed time the call-in may reroute to other administrative telephone(s) and/or announce over intercom/paging speakers.

8. An option for Privacy call-in switches. When the Privacy switch is activated it prevents administrative or classroom telephones from monitoring the specific classroom/location intercom speaker.

9. An option for Call Assurance call-in switches. When the normal or emergency button is pressed, an LED lights up to visually confirm that a call-in has been placed.

10. The system can automatically alter a call switch's class of service by time of day and date.

11. The capability to assign speaker locations to any one or more of the sixteen (16) zones for zone paging, program/music distribution, or class change tone reception; this assignment is a programmable function.

12. Automatic class change tones sent through all or selected intercom/paging speakers and/or horns. Any combination of up to nine (9) tones can be sounded to indicate different events. Up to eight (8) different class change schedules can be stored in the system and selected manually from an administrative telephone or selected automatically based on time, day of the week, and date. Tone type and duration are selectable for each class change event. A total of one thousand (1000) class change events can be stored on the system.

13. Programmable "Music-on-Class-Change." A program source can be automatically routed to select zones of paging speakers or all speakers within the facility during each class change period.

14. The system shall provide facilities to distribute program material (i.e. cassette tape, CD, radio broadcasts) in the following manner:
    a. The user shall cue remotely located music source or select radio station.
    b. From an Administrative Telephone the user can select the room(s) or areas to distribute program.
    c. Automated distribution based on event schedule.

15. The module provides for secondary clock correction with the following features and functions:
    a. User programmable Automatic Daylight Savings Time Change.
    b. Latched operation of zone outputs to control lighting or other devices.
    c. Interface with most types of secondary slave clocks whether synchronous wired or electronic.
    d. User-programmable custom slave clock correction. Output relays rated at 5 amperes shall be provided on all zone circuits as necessary.
    e. Lithium battery will provide not less than 5 years battery back-up for timekeeping function.

16. System has the ability to sync system time to the Atomic Clock Signal or to the school's or districts Network Time Server.

17. The module provides for classroom security and call switch supervision with the following features and functions:
    a. All field wiring to call switches connected to the system can be individually supervised for opens or shorts.
    b. Security alarms may be programmed to automatically trigger pre-recorded emergency announcements and/or emergency tones to sound in select areas or through the facility when an alarm is activated.

c. Multiple alarm inputs shall be provided to the main security and/or fire alarm system. Emergency tones and/or announcements can be triggered, via the primary security and/or fire alarm system, to provide redundant annunciation using the classroom and corridor speakers.

18. Intercom and paging speakers/horns can be assigned to any one or more of the sixteen (16) zones for zone paging, up to sixteen (16) zones for program distribution, and sixteen (16) zones for class change tones. All of these zones may be configured to be independent of the other zones and in any combination. Initially, paging zones shall be provided for the following:

    a. Multi-School (High and Middle Schools) intercommunications shall accommodate more than one zone of operation and allow for multi-site, intercom functionality. Provide two channels of intercom capabilities. Failure to provide this functionality will result in the removal of the equipment at the contactor expense.

B. Administrative Telephone – Administrative Telephones shall provide the following functions and features:

1. Digital LCD Display.

2. Optional three (3) line by twenty (20) character Alphanumeric Display: the display will indicate calling phone number, called number, caller ID, trunk ID, type of telephone call, type of call-in, calling phone/room's alpha description, and other characteristics of the call

3. Standard twelve (12) key dial pad and hook switch.

4. Four (4) predefined soft keys: Release, Speaker, Transfer and Hold.

    a. Release – allows a user to release an extension, internal or external, that is being transferred.
    b. Transfer – initiate a transfer of the current telephone call to another telephone extension.
    c. Speaker – initiates hands free speakerphone operation with answerback.
    d. Hold – places a call or extension on hold

5. Five (5) facility-wide programmable keys and ten (10) or twenty-five (25) individually programmable feature keys. The following programmable functions can be selectively programmed at each administrative telephone:

a. Speed Dial – one touch dialing of any local or long distance number.
b. DSS (Direct Station Select) – one touch dialing of any internal station (within the same facility) and indication of station status (in-use, on hold, available)
c. Last Number Redial – one button speed dial calling of the last number dialed from that administrative telephone.
d. Night Mode – place the system in and out of night answer mode.
e. Call-in Answer – one touch answering of any call-in queued to the administrative telephone.
f. Group Pickup – one touch answering of any telephone call routed to any of the available eight (8) calling groups.
g. System Configuration Select – manually select among one (1) to four (4) available system configurations. The feature button will indicate which configuration is active. If the active system configuration changes automatically, the feature buttons will automatically update to reflect the change.
h. Class Tone Schedule Select - manually select among one (1) to sixteen (16) available class change tone schedules. The feature button will indicate which configuration is active. If the active class tone schedule changes automatically, the feature buttons will reflect the change.
i. Evacuation Tones – initiate evacuation tones to selected areas within the facility or throughout the entire facility. While tones are sounding it is possible to make a voice page on top of the tones.
j. Zone Page – initiate pages to any combination of one (1) to sixteen (16) paging zones and the ability to combine these zones into user defined paging groups using speed dial buttons.
k. Voicemail message notification and one-touch retrieval – the feature key will flash to indicate that one or more messages are waiting. Pressing the voicemail feature key will automatically connect the user with the voicemail box for that extension. Multiple feature keys can be configured to access different voicemail boxes from the same administrative telephone.
l. DND Call Forwarding – one touch activation of Do Not Disturb call forwarding. The feature key will light to indicate that call forwarding is active.
m. Busy Call Forwarding – one touch activation of Busy call forwarding. The feature key will light to indicate that call forwarding is active.
n. Away Call Forwarding key – one touch activation of Away call forwarding. The feature key will light to indicate that call forwarding is active.

o. In-Class Forwarding – one touch activation of In-Class call forwarding. The feature key will light to indicate that call forwarding is active.
p. Mute - one touch ability to mute audio to distant party
q. Missed Call Review – review, dial and delete Caller ID information for outgoing, incoming and missed calls.
r. Conference – allows a user to conference up to five (5) other extensions into one group for a total of six (6) telephone extensions in the conference
s. Page – all page over all intercom/paging speakers and administrative telephones within the facility.
t. Volume Up/Down – while the telephone is ringing the volume up and volume down keys change the level of the ring volume. During a conversation the volume up and volume down keys change the level of the listen back audio.
u. Leave a Voice Mail Message – ability to reach a user's voice mail box without ringing their extension. Internal users can leave messages directly or transfer external users directly to voice mail boxes.
v. Speed Dial Set up – this puts the phone in speed dial set up mode allowing users to set speed dial buttons unique to their phone.
w. System Set-up – this allows users to access system and phone set-up information, including firmware version, MAC address, IP address, speed dial set up and other functions.

6. Telephone calls and call-ins will queue on the display based on type of call/call-in and time of call.

7. Each administrative telephone in the system shall be assigned, through software, the following individually programmable (allowed or restricted) features/options using the class of service attribute:
   a. Access to C.O. or external system trunks
   b. Access to specific area codes and/or prefixes
   c. Initiating zone page announcements
   d. Initiating emergency all page with override
   e. Initiating all page announcements
   f. Initiating emergency/evacuation tones
   g. Executive Override
   h. Initiating class change tones
   i. Receipt of class change tones and/or zone pages
   j. Call Forward – No Answer
   k. Call Forward – Busy
   l. Call Forward – In Class
   m. Call Forward – Always
   n. Door access control during intercom conversation

8. Complete station software assignment including class of service, call group, hunting assignment, extension number, and any other features via system configuration software. User programmable features such as speed dial buttons can also be programmed using the system configuration software.

9. Ability to make a “911” call from any administrative phone

10. “911” calls made from any phone in system will display as highest priority call to all administrative phones at location. Display will show “911” along with extension information. “911” call can only be cleared from display using a PIN code.

C. Attendant Console - Multi-School (Qty per school/academy) (High and Middle Schools) Attendant Console(s) indicated on the drawings shall provide all the features of an Administrative Telephone plus:

1. Sixty four (64) programmable speed dial/DSS buttons per sidecar.

2. Up to three (3 sidecars can be associated with an administrative telephone for a total of one hundred and ninety two (192) additional speed dial/DSS buttons.

D. Staff Telephone - Staff Telephones indicated on the drawings shall provide the following functions and features:

1. Standard 48 volt analog single-line telephone.

2. Standard twelve (12) key dial pad and hook switch.

3. Ten (10) programmable speed-dial keys. Speed dial keys shall be programmable to include one or more "Pauses" in the dial stream.

4. Last number redial key.

5. Call transfer “flash” key to permit call to be transferred smoothly and efficiently without the need to use the hook switch.

6. Ability to place a “911” call from any staff phones

7. “Message waiting” lamp

8. Facilities for desk or wall mount without special adapters.

9. Instrument shall include "Transfer" key

10. Programming keys are concealed to prevent unauthorized alterations of speed dial numbers.

11. Speed dial programming shall be retained even when the telephone is disconnected from the line.

12. Each staff telephone in the system may be assigned, through software, the following individually programmable (allowed or restricted) features/options using the class of service attribute:
    a. Access to C.O. or external system trunks
    b. Access to specific area codes and/or prefixes
    c. Initiating zone page announcements
    d. Initiating emergency all page with override
    e. Initiating all page announcements
    f. Initiating emergency/evacuation tones
    g. Initiating class change tones
    h. Receipt of class change tones and/or zone pages
    i. Automatic Call-Back-Busy
    j. Call Forward – No Answer
    k. Call Forward – Busy
    l. Call Forward – In Class
    m. Call Forward – Always
    n. Door access control during intercom conversation
    o. Set the priority level and target administrative telephone group for "normal" calls
    p. Set the priority level and target administrative telephone group for "emergency" calls
    q. Assignment of associated speaker to paging zone

E. Caller ID Staff Telephone - Caller ID Staff Telephones shall be indicated on the drawings and shall provide all of the features of the Staff Telephone plus the following functions and features:

1. 2-way speakerphone mode with microphone mute.

2. Twenty (20) speed dial locations with ten (10) keys.

3. Adjustable display indicating:
    a. Caller ID Information – for both internal and outside callers
    b. Sixty (60) name and number call log information
    c. Elapsed call timer

F. Accessories

1. Equipment Cabinet – Middle Atlantic Model DWR-35-22 (Main Gateway - Model DWR-21-22.(Remote Gatway) EIA Compliant 19” wall mount rack shall be Middle Atlantic Products model # DWR-21-22 . Weight capacity shall be 250 lbs. Tool-Free Quick-Mount system enables one-person installation. Useable depth shall be 20” (refer to chart) and shall extend into the back pan 3.5”. Center section and back pan shall be 16-gauge steel,

phosphate pre-treated and finished in a black or granite gray textured powder coat. Rackrail shall be constructed of 11-gauge steel with tapped 10-32 mounting holes in universal EIA spacing with black e-coat finish and marked rack spaces. Rack shall be constructed to swing open for component cabling access, center section shall pivot for either left or right opening. Back pan includes raised mounting embosses to mount power products and other accessories. Rack shall have a rear knockout panel with 1/2", 3/4", 1", 1-1/2", 2" and 3" electrical knockouts installed in base, and a rear knockout panel with 1/2", 3/4", 1", 1-1/2", 2" and 3" electrical knockouts, four Decoraa cutouts, and BNC knockouts for UHF,VHF antennas installed in top. Large laser knockout on back pan shall have a 12-1/2" X 12-1/2" cutout for electrical cutout pull-box. Fan knockouts on top and bottom shall allow for installation of up to four 4-1/2" fans. Rack shall have 2" knockouts, 4" knockouts for Wiremold 4000 Series raceways, and knockouts for UPC Series universal connector panels on the side. Top, bottom, and sides shall feature vertical vent pattern. Rack shall be UL Listed in the US and Canada. Rack shall be warranted to be free from defects in materials or workmanship under normal use and conditions for the lifetime of the rack.

2. Remote Program & Microphone Interface – Power requirements 12v DC @40ma, Backbox requires standard 21/2" deep 2 gang box and maximum distance from controller is 1000ft.

3. VoIP-Based 24,36,48, & 60 Port Remote Intercom Gateway – Data Communication VoIP over Ethernet (10/100BaseT Ethernet), Inter-Chassis One (1) 100 Mb Ethernet connection, two twisted pairs one with overall shield. Port capacity 24, 36, 48 & 60 phones call switchers and speakers. Rack unit space 4RU. Zone relay output (3). Secondary clock corrections ports 1 – requires relay.

4. Atomic to Master Clock Synchronization Module – Shall be design for synchronizes of American Time & Signal clocks. or universal equivalent. Daily Atomic Clock synchronization via an internet connection over ALN or a local network time server (NTP). Automatic Daylight Savings Time corrections for all locations.

5. Speaker Paging/Intercom Priority Module - Mutes Classroom Sound Reinforcement during Intercom System activity (paging, tones, or intercom).

6. AM/FM CD Player - An auxiliary input jack should be provided in the main office of schools and academies (one in every multi school main office), to allow for universal connection of an external AM/FM CD source (i.e. portable radio, ipod, etc.).

7. Power Amplifier - Shall be capable of delivering a minimum audio output of 325 watts RMS per channel into 4 ohms or 650 watts into 8 ohms. Frequency response shall be plus/minus .5 dB, 20-20,000Hz. The amplifier shall operate continuously from 120VAC. The amplifier shall include fused outputs protective circuit to safeguard against damage from prolonged overloads and from extreme overloads, such as shorted output line. Controls shall be provided for level control. An LED pilot indicator shall be incorporated. The amplifier shall be capable of delivering full rated power to 25V or 70V constant voltage lines VIA a companion transformer. Provide (2).

8. Microphone - Desk type public address or paging type with base constructed of die-cast zinc alloy with durable molded cycolac body in matching black. Dynamic moving coil incorporates a special diaphragm of mylar, resulting in excellent sensitivity and smooth wide-range peak-free response of 50-12,000 Hz. Shall have press-to-talk and lock-to-talk switching, complete with 7'cord, concealed Hi-Lo switch, non-skid molded feet. Height 9 3/8", width 4 3/4", depth 5 7/8".

9. High Security Call Station - Two-way communications shall be accomplished by the built-in speaker-microphone. A call-in momentary pushbutton switch shall be provided. The complete unit shall be vandal-proof in design and construction, protected externally by an 11 gauge stainless steel plate with brushed finish. Actuators shall be flush with face plate and completely isolated from the push-button, and movement shall be coupled through a coil spring to prevent damage. Speaker-microphone shall be protected against tampering as well as by flame or liquids. Unit shall mount in a standard three-gang electrical box. Surface mount requires ACC1119 Back Box.

10. Digital Secondary Clocks (High Schools Only) – American Time & Signal or universal equivalent – The Secondary Clock shall operate from 24vac, controlled from the Master Clock at the Central Cabinet. Furnish single face and double face digital clocks as shown on drawings. Furnish a clear heavy duty guard for the gymnasium. Single dial clocks shall be flush mounted. Double dial clocks shall be wall mounted. The display shall be 4 characters; seven segment red LEDs 2.5” high. Provide 5 gang (non-gangable box) for single faced and single gang for double faced. Clocks shall be installed in common areas which include:
    a. Hallways
    b. Main Office
    c. Cafeteria
    d. Gymnasiums
    e. Auditoriums

11. Outdoor Weatherproof Speakers - Lowell Model 8C10MR-T25. The weatherproof speaker shall have the following features: Moisture-Resistant 8" 8-ohm, 5oz. magnet, 25V/70V multi-tap transformer. Refer or the plans for quantities and locations of speakers. (Lowell Equal)

12. Tamperproof Speaker Grille -The speaker grille shall be tamperproof and shall have the following features: Square two-piece aluminum alloy construction, heavy-gauge steel back-up screen, tamper-proof mounting hardware and textured white baked enamel finish. Refer to the plans for quantities and locations. (Lowell Equal)

13. Ceiling Speaker Assembly – The speaker shall be an 8-inch speaker with a 25 volt transformer. The speaker shall be rated at 8 Watts RMS and have a Frequency Response of 65 to 17Khz. The speaker baffle shall have dimensions of 23 ¾" Width, 11 ¾" Length and 3 3/8" Depth. The total weight of the speaker shall be 4 lbs. 14 oz. Refer to the plans for quantities and locations of speakers. (Lowell Equal) *Provide volume controls in ceiling speaker assemblies for administration area.*

14. Speakers – Speakers shall be an 8" permanent magnet cone type having viscous-damped cone and a ceramic magnet weighing 5 oz. It shall have a frequency response of at least 65-17,000Hz, 8 watt program power- handling capacity and an axial sensitivity of at least 96db at 4 feet with a 1 watt input. Voice coil shall be 3/4" diameter with 8 ohm impedance. Flux density shall be 10,000 gauss. The speaker shall be equipped with a multi- tap transformer 1/2, 1, and 2 watts, 25V. (Lowell Equal)

15. Flush Ceiling Grille - Constructed of steel and have a white baked epoxy finish. It shall include matched hardware for mounting a standard 8" speaker. Its overall diameter shall be 12 7/8" with center preforation of 7 5/8". (Lowell Equal)

16. Ceiling Speaker Backbox – Shall be a round one- piece backbox for flush mounting a standard 8 inch speaker. The enclosure shall be of painted, one-piece 22 gauge drawn steel and shall have applied in its interior a fire retardant resonance damping material. It shall have four perforated steel mounting brackets and four knockouts for conduit. Dimensions, 9 3/4" diameter with flange diameter of 12 2/16", mounting centers 11 1/4", depth 4 1/16". (Lowell Equal)

17. Speaker Support Bridge - Shall be a single piece unit constructed of 24 gauge galvanized rust- resistant cold rolled steel, 23 3/4" long and 14 1/2" wide. The unit is designed for firm support of

ceiling speaker, grille, and backbox (if included). (Lowell Equal)

18. Flush Wall Speaker Baffle - Constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the ACC1105 backbox. Its dimensions are11 1/2" square by 3/16". (Lowell Equal)

19. Surface Wall Speaker Baffle - Shall be of durable wood construction with modern decorator styling and have excellent acoustic quality, finished in natural blond. It shall have a full grille front and be at least 10 1/2" high, 10 1/2" wide and 6 3/16" deep with a volume of 475 cubic inches. Speaker mounting screws and wall mounting bracket shall be included. (Lowell Equal)

20. Surface Mounted Ceiling Baffle – Shall be constructed of heavy gauge CRS and shall have a white epoxy finish. It shall have a square grille opening with a separate subplate for mounting speaker baffle to the surface backbox. Backbox shall be 12 1/2" square by 4" deep with white epoxy finish. (Lowell Equal)

21. Equipment racks shall be located in a climate controlled MDF and IDF area/rooms as shown on drawings. Equipment racks shall be:

    a. Distributed among one or several equipment closets/rooms
    b. Self-contained, specifically engineered racks with provisions for all present and future components as described and recommended by the manufacturer within this specification.
    c. Racks shall be accessible from front and rear.
    d. All program, zone, and time circuitry, data, linkage, power, telecommunications components, and circuitry to be located in racks configured as approved by the Engineer.
    e. Optionally, the equipment may be desk or wall-mounted.
    f. Provide (1) Uninterrupted Power Supply per Gateway.

G. Low Voltage Surge Suppression

1. Low voltage surge suppression shall be installed on all runs between buildings. Surge suppressors shall operate at 27 volts and shall be manufactured by Ditek. (no exceptions)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the Integrated Electronic Communications Network system work.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General

1. Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

2. Cable

a. Speaker cable with call-in: CAT 6 only
b. Speaker cable without call-in: 25292B
c. Microphone cable: CAT 6 only
d. Administrative Telephone cable: CAT6 only
e. Clocks cable: WP25226B
f. Remote Gateway to Main gateway cable: 6-Strand Multimode Fiber / 1 CAT 6 / 1-25292BBLUE

3. Provide cables as indicated above. All cables shall be plenum rated. Manufacturers: West Penn, as indicated.

4. The system contractor shall be responsible for the termination of the Administrative Telephones.

B. Wiring Method

1. Install wiring in raceway except within consoles, desks, and counters, and except in accessible ceiling spaces, and in gypsum board partitions, where cable wiring method may be used. Use UL listed plenum cable in environmental air spaces including plenum ceilings. Conceal wiring except in unfinished spaces. Ceiling trays are preferred for larger buildings. J-Hooks can be used in smaller installs.

C. Impedance and Level Matching

1. Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching networks where required.

D. Control Circuit Wiring

1. Install control circuits in accordance with NFPA 70 and as indicated.

2. Provide number of conductors as recommended by system manufacturer to provide control functions indicated or specified.

system manufacturer to provide control functions indicated or specified.

3. The contractor shall mount a main distribution frame behind the Integrated Electronic Communications Network console. All wires shall be laid down on terminal punch blocks and identified by the actual room location it serves. All the communications points shall be wired into this main distribution frame, laid down in sequence, and identified by which line it is on and the point position it serves.

4. All housings are to be located as specified and shown on drawings.

5. Make installation in strict accordance with approved manufacturer's drawings and instructions.

6. The contractor shall provide necessary transient protection on the AC power feed, all station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.

7. All cable shall be plenum rated. All cable ties shall be plenum rated.

E. Wiring Within Enclosures

1. Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.

2. Provide physical isolation from each other for speaker-microphone, line-level, speaker-level, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12 inch minimum separation between conductors to speaker-microphones and adjacent parallel power and telephone wiring. Provide physical separation as recommended by equipment manufacturer for other Integrated Electronic Communications Network system conductors.

F. Splices, Taps, and Terminations

1. Make splices, taps and terminations on numbered terminal punch blocks in junction, pull, and outlet boxes, terminal cabinets and equipment enclosures.

G. Identification of Conductors and Cables

1. Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams.

H. Weatherproofing

1. Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

I. Repairs

1. Wherever walls, ceilings, floors, or other building finishes are cut for installation, repair, restore, and refinish to original appearance.

3.3 GROUNDING

A. Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.

B. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

C. The contractor shall provide all necessary transient protection on the AC power feed and on all station lines leaving or entering the building.

D. The contractor shall note in his system drawings, the type and location of these protection devices as well as all wiring information.

E. The contractor shall furnish and install a dedicated, isolated earth ground from the central equipment rack and bond to the incoming electrical service ground buss bar.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services

1. Provide services of a duly factory authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection

1. Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.

C. Testing

1. Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

3.5 COMMISSIONING

A. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Provide a minimum of (8) hours training. Operators Manuals and Users Guides shall be provided at the time of this training.

B. Schedule training with Owner through the Architect, with at least seven days advance notice.

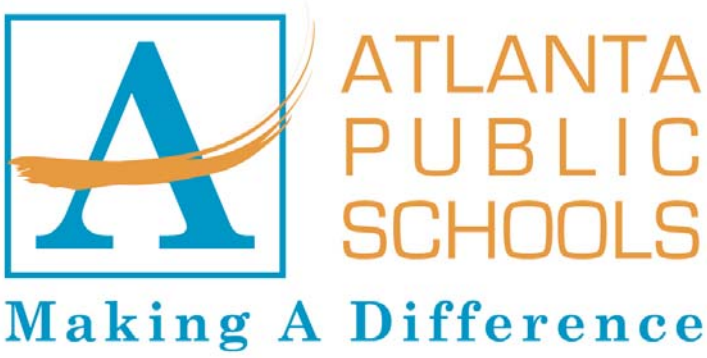
3.6 OCCUPANCY ADJUSTMENTS

A. When requested by the Architect within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, resetting matching transformer taps, and adjusting controls to suit actual occupied conditions. Provide up to three (3) visits to the site for this purpose.

3.7 CLEANING AND PROTECTION

A. Prior to final acceptance, clean system components and protect from damage and deterioration.

END OF SECTION



Facilities and Construction

1631 La France Street NE
Atlanta, Georgia 30309
(404) 802-3700

Keyless Access Control Specifications

February 4, 2011

Reviewed By:

_____ _____

Charles Johnson, APS Building Systems Programmer Date

Approved By:

_____ _____

Marquenta Sands, Director of Security Date

ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK: The vendor and its designated licensed and certified personnel is responsible for the purchase and installation of all hardware, software, licenses, peripherals, accessories, and materials as outlined in these specifications.

A. Description of Access Control System operation: The Access Control Panel (ACP) will be connected to the designated doors using the following hardware setup: Refer to attached drawings 1 thru 6 for diagrams of most common hardware configurations. This unit will be connected to the host database utilizing the APS internal network.

1. The Proximity Card Reader is connected to the ACP and is mounted on the entry side of the door 18" from the frame (where applicable) and 48" AFF. The proximity card reader is mounted to a single gang box fed by a concealed conduit (or for renovation work, an exposed conduit or metal wire molding on the secure side of the wall. Either must be secured to the wall using screws. Tape of any kind is unacceptable.

2. The Electric Strike is connected directly to the ACP that controls access by unlatching the electric strike upon valid card read. The electric strike is 24VDC power that is directly provided by the lock hardware power supply. If the ACP panel is an excessive distance from the Electric Strike a supplementary power supply powered by a 120 volt power source may be required. The wiring for the electric strike shall be concealed in conduit to the door frame.

3. The door exit hardware will operate normally to provide unencumbered exiting from the building. A motion detector connected to the ACP will be provided above each doorway on the secure side of the opening to provide a "Request to Exit" signal back to the ACP. This will prevent an alarm condition upon opening the door from the inside of the building without a card key request for access.

4. The main entrance "handicap accessible door" shall have an automated door opener installed that works in conjunction with both keyless access and remote entry phone systems. The placement of the handicap reader and remote entry phone shall be in a location that will not conflict with the operation of the door and any handicap equipment that may be in use. When the door is under the control of the keyless access system, the handicap button shall be disabled. Once a valid card read or signal is sent by the remote entry

phone, the button will be activated allowing the person to press and activate the automatic opener.

5. A door position sensor shall be mounted in the door header of each door located within the same frame and will signal a door (open/closed) position back to the ACP panel. If a door is opened without a card reader signal or a "request to exit" signal, an alarm condition will occur. If the ACP has received a valid card read or request to exit and the door is held open longer than the programmed time period, an alarm condition will occur.

6. A 105 db piezo sounder will be placed at each door having keyless entry. This sounder will work in conjunction with bullet #5 whereas during the alarm condition, this sounder will be active. Once the door is closed, the sounder will reset.

B. Card Reader Locations
1. All External Entry Doors
2. Loading Docks
3. Courtyards
4. Playground
5. Kitchen Entrance
6. MDF/IDF Closets
7. Computer Labs
8. Standalone Buildings in Campus Environment
9. Detached Gym
10. Internal Access to Multi-School Environments
11. Secured Access Leading to Tenant Leased Space

C. Description of AIPHONE operation
1. The AIPHONE color tilt video entry system consists of a door station, monitor station and transformer.

2. A call from the door station is received at the monitoring station where the monitor has video and audio communication with the door station to verify the identity of the caller. The monitor pushes a door release button on the AIPHONE monitor station that connects to the ACP causing the electric strike at the entry door to be activated.

3. One AIPHONE is designated for buildings that are physically divided on a campus. Each AIPHONE should be placed in the main office that has been designated as the visitor entrance.

1.2 QUALITY ASSURANCE:

A. Installation of the access control shall be under the direct supervision of an APS representative who is Lenel factory certified and have at least two years related experience installing security or door access systems.

B. Work shall not commence until the selected vendor's Lenel installer has coordinated a walkthrough with the. APS Building Systems Integrator. Installers of the system must be Lenel certified and must work directly for the award recipient. Work under this agreement cannot be reassigned nor subcontracted to a third party vendor under ANY circumstances.

C. A final walk thru, with the Vendor will be performed by the APS Building Systems Integrator prior to billing. In addition to contract deliverables, the vendor is responsible for cleanup, proper cable management and dressing, structural repairs that occurred due to negligence; paint touch-ups, and all deficiencies caused during installation; and the items identified below
    1. As-built electronic CAD drawing of door names, numbers, and zones
    2. Licenses as determined by the APS Facilities Engineer
    3. 200 blank Badges (vendor must contact APS for number sequence)
    4. Loading Schedule (must be sent electronically)

1.3 WARRANTY: 2 years for Parts and Labor

PART 2 – PRODUCTS

2.1 ACCESS CONTROL: The Contractor shall provide Lenel software reader licensing for doors required to integrate the system to the parent server. The number of Lenel software reader licenses shall be provided by the owner on an as needed basis. The number of licenses needed will be provided in writing during pre-bid meetings and prior to bid submission. All software, equipment, controls and devices shall work directly with the existing operating systems.

A. Burglar and Fire Integration – the Contractor shall provide licensing to integrate the connection of the FireLite Notifier fire alarm systems and Radionics D9412V2 burglar alarm systems (Part No. SWG1250). Integration of these systems shall be done down to component level detail.

B. Access Control Cards - The Contractor shall provide HID Model 1386 cards based on recommendations by the owner. This information will be provided in writing during pre-bid meetings and prior to bid submission.

C. The Reader Access Control Panel shall have the following features:
    1. The system shall process valid card entries, and unlock the doors within 1.5 seconds when all locations are attempted simultaneously.

2. ACP shall include a microprocessor controlled solid-state electronic device, incorporating a real time clock/calendar on board. ACP shall be compliant with U1294, U11950 and UL1076. A set of the AC's database sufficient to support access and alarm functions for its designated readers and points shall be stored at the ACP.

3. In event of communication loss, the ACP shall continue to function without a degradation of operation and will provide storage of at least 1000 (expandable) transactions. These stored events will be uploaded to the CPU automatically upon restoration of the communication.

4. ACP shall include, as standard, at least 8 hours of battery backup for the ACP. The ACP shall include internal battery backup to maintain controller database, program, time and date during power loss.

5. The ACP shall allow (through software download) the user to choose whether the alarms are supervised or non-supervised.

6. All field wire terminations shall be on removable terminal strips.

7. ACP shall have direct-connect, on-board, built-in RS232 programming port. No external interface module will be required. RS232 connection to the panel will be through removal terminal strip.

8. The ACP shall be: Model LNL-2000, LNL-2220, or the LNL-3300; manufactured by LENEL Systems International.

D. Panel must have the ability to add the following boards to the system:
   1. Alarm Expander Board: additional inputs shall be available through the use of expansion boards mounted in the ACP enclosure. Each expansion board shall have a minimum of 16 supervised inputs. Up to 3 expansion boards shall be available for ACP. The alarm expander board shall be Model LNL-1100.

   2. Relay Expander Board: additional outputs shall be available through the use of expansion boards mounted in the ACP enclosure. Each expansion board shall have a minimum of 16 form "C" relay outputs Up to 3 expansion boards shall be available for the LNL-2000 The relay expander board shall be model LNL-1200.

   3. Memory Expansion Board: An additional memory board (1MB) shall be available. The memory board shall be model LNL-1001MK.

E. RS232 to LAN Interface:
   1. A Micro Serial Server unit shall be provided for ACP network connectivity. One unit is required for each LNL-2000, 2220, or 3300.

2. Manufacture: LENEL LNL-ETHLAN
3. Must utilize manufacturer supplied RS-232 to Ethernet cable. Custom made cables will not be approved.

F. Proximity Readers:
   1. Product: OmniProx; Model: OMNI-90; Manufactured by: Northern Computers Inc.
   2. Description: vandal resistant, metallic with hidden mounting screws. 4.5”x3.15”x.59” –
   3. The material shall be composed of a stainless steel.
   4. The reader shall omit an ADA compliant audio tone as well as have an LED indicator.

G. Door Contact:
   1. Manufacturer: Sentrol Model 1078-C
   2. The Contact shall be of rugged construction a 1” diameter and specifically designed for use in steel doors.
   3. The Contact shall feature wire leads, self-locking mounting and be designed for recessed installation.

H. Sounder: The sounder should connect in conjunction with the door to sound if the door is held open or forced open. The sounder should sound until the door is closed back to the closed position.
   1. The Sounder shall fit in a single gang box and produce a steady piezo tone.
   2. The Sounder shall produce 105dB at 24VDC.

I. Manufacturer: ATW Security Model SGST-W.

J. Locking Hardware:
   1. The locking hardware will be 24VDC Fail Secure Strikes.
   2. Strikes will be the only device permitted on the exterior of the building. No exceptions will be made.
   3. Magnetic locks may be used on a per incident basis and must be approved in writing by an APS representative. If used, there MUST be a time delay push button release that removes power to the lock locally to release the door in the event of a system failure. If code states a connection to the fire alarm system is necessary, it is the Contractors responsibility to insure that this takes place. APS will assist in any way possible. This type lock shall be 24VDC as well.

K. Aiphone:
   1. Manufacturer: Aiphone: KCS-1ARD. This is a package containing:
      KC-DAR color video door station – ¼” CCD
      KC-1MRD color inside monitor station – 4” TTF Display
      PS-2410A 24VDC power supply

2. Protective housing:

   Aiphone KA-DGR Stainless Steel surface mounted box and cover for the KC-DAR for Retrofit applications. Use Model KA-FSH Stainless Steel housing for flush mounting in new construction applications.

L. Plenum 485 Cable:
   1. The cable must be rated for plenum return ceilings. Multi-conductor, 4 conductors, 18 AWG, stranded (7x16) BC – Bare Copper conductors, FA – Flamarrest insulation, Unshielded, FA – Flamarrest jacket. Applicable Specifications: UL Type CMP, CEC type CMP. Flame Resistant: UL910 Steiner Tunnel, New Generation, Unshielded Plenum Multi-Conductor. Two pair, each pair shielded.
   2. Manufacturer: Belden #82723

M. Plenum 18-6 Reader Cable:
   1. The cable must be rated for plenum return ceilings. The cable shall be multi-conductor, 6 conductors, 18 AWG, stranded (7x26) BC – Bare Copper conductors, FA – Flamarrest insulation, polypropylene separator tape, Aluminum Foil-Polyester Tape (BeldFoil) shield (foil side out) with a 20 AWG drain wire, 100% shield coverage, FA – Flamarrest jacket. Applicable Specifications: UL CMP, CSA C (UL) CMP. Flame Resistant: UL 910 Steiner Tunnel, CSA FT6. New Generation. Overall Shielded Plenum Multi-Conductor. Manufacturer: Belden #6304FE or Equivalent.

N. Plenum 18-4 Lock / Sounder:
   1. The cable must be rated for plenum return ceilings. Multi-conductor, 4 conductors, 18 AWG, stranded (7x26) BC – Bare Copper conductors, FA – Flamarrest insulation, Unshielded, FA – Flamarrest Jacket. Applicable Specification: UL Type CMP, C (UL) CMP. Flame Resistance: UL 910 Steiner Tunnel. New Generation. Commercial audio cables. Unshielded plenum multi-conductor. Manufacturer: Belden #6302UE or Equivalent.

O. Plenum 22-4 Motion Cable:
   1. The cable must be rated for plenum return ceilings. Multi-Conductor, 4 conductors, 22 AWG, stranded (7x24) BC – Bare Copper conductors, FA – Flamarrest insulation, Unshielded, FA – Flamarrest jacket. Applicable Specifications: UL Type CMP, CEC Type CMP. Flame Resistance: UL 910 Steiner Tunnel. Net Generation. Unshielded Plenum Multi-Conductor.
   2. Manufacture: Belden #6302UE or Equivalent.

P. Plenum 20-2 Contact Cable:
   1. The cable must be rated for plenum return ceilings. 2 conductors, 20 AWG, stranded (7x28) BC – Bare Copper conductors, FA – Flamarrest insulation, Unshielded, FA – Flamarrest jacket. Applicable Specifications: UL Type

CMP, CEC Type CMP. Flame Resistance: UL 910 Steiner Tunnel. Net Generation. Unshielded Plenum Multi-Conductor.

2. Manufacture: Belden #6400UE or Equivalent.

Q. Category 5 4-Pair Plenum Cable:

1. The cable must be rated for plenum return ceilings. The cable shall be paired, 4 pairs, 24 AWG, Solid BC – bare copper conductors, FEP – Flourinated Ethylene Propylene insulation, unshielded, flexible Flamarrest jacket with nylon ripcord. The jacket should be sequentially marked at two-foot intervals. The cable shall have a flame rating and test: UL CMP, UL 910, C (UL) CMP, CSA FT6. The cable shall be UTP (unshielded twisted pair).
2. Manufacturer: Belden # 1585A or Equivalent.

2.2 POWER SUPPLY EQUIPMENT: Mounted in a NEMA 1 hinged enclosure with power indicator integral with door.

A. Rated at 1.2 times the current draw for devices served. Coordinate with the Division 8 Contractor for electrical power requirements.

B. Individually fused outputs to each locking device.

C. Input for connection to UL listed fire alarm panel output, which upon initiation shall disconnect power to the lock outputs.

D. Sufficient battery back-up to power devices connected for 30 minutes in the event of primary power failure.

E. UL Class 2 rated outputs.

F. Manufacturer:

1. Securitron BPS 24-6: For locking hardware and sounders
2. Altronix AL400ULXB: For Lenel head end, Readers and REX motions

G. Battery Back-up: Standby batteries with charger shall power microprocessor-based units, controllers, and control panels and detectors in the event of a primary power failure. Batteries shall be sized to provide 105% capacity for the same time interval as the batteries in the security control Console. Standby batteries shall be sealed lead-calcium, lead-acid, or nickel cadmium. Power supplies shall be solid state. Controls shall be designed to maintain full battery charge when primary power is available. Batteries shall be recharged to 85% of capacity within 24 hours from battery use. Microprocessor – based units, controllers, and control panels and detector circuits shall be automatically transferred to battery power upon loss of primary power and returned to primary power upon restoration. Alarms shall not be initiated during switchover. An alarm shall be initiated upon failure of battery and /or primary power.

2.3 MISCELLANEOUS EQUIPMENT:

A. Custom control panels: Aluminum-backed plastic laminate engraving stock, engraved and filled anodized plates, or anodized photo-sensitized aluminum plates. Minimum plate thickness shall be 0.125".

B. Lock and Key-lock switches: Locks and key-lock operated switches shall be UL listed, round key type with 3 dual, 1 mushroom, and 3 plain tumblers, or have a pick resistance equal to a lock having a combination of 5 cylinders pins and 5 point3-position side bars in the same lock.

C. Relays: light duty relays and switching devices shall be solid state type or hermetically sealed electro-mechanical type.

D. Time delay relays: release type with minimum adjustable range of 2 to 120 seconds.

E. Annunciator lamps / LED: visual annunciators shall be electric lamps or light emitting diodes (LEDs), unless otherwise specified herein.

F. Fire/Life safety interface for perimeter locks, stair tower locks, and locks which are installed on required exit doors which empty into exit corridors, vestibules, stairwells, or building exits:

G. Locks shall be power, dual fail-safe type, and state fire martial approved.

PART 3 – EXECUTION

3.1 GENERAL

A. Installation:

1. ACP shall be mounted on a ¾" painted plywood backboard.
2. ACP must be mounted inside an APS MDF or IDF on the wall across from the server rack.
3. ACP and associated components shall be mounted in a Hoffman or West Penn enclosure only.
4. ACP boards will not be mounted to the door of the enclosure under any circumstances. Provide a second enclosure if needed.
5. Piggy backing of ACP boards is unacceptable. (i.e. No more than one board per stand-off)
6. Wire all devices following manufactures specifications. No wires shall be visible below the ceiling or next floor up if room is unfinished. Free run at deck level is acceptable but must be properly secured and neat.
7. Wire management devices, such as Panduit finger type duct or equivalent, must be used within the enclosure to provide a neat and presentable installation.
8. All wires will be labeled identifying the location of the device in plain English.
9. Documentation shall be placed in each enclosure showing placement and identification of each field device.

10. Burden the responsibility for the delivery of a turnkey system that may require coordination with door hardware contractors to achieve a functional system.

B. Programming:
   1. Provide a completed loading schedule to APS keeping in mind that there is a three (3) day turn around for completion of programming. Failure to complete the loading schedule properly will delay the programming, the testing, and signoff of the project.

   2. APS will program all points as stated in the loading schedule.
   3. Upon completion of programming, a date will be scheduled for APS to meet the vendor on site and perform a signoff walk-thru.

C. Graphics:
   1. Develop graphic maps that detail the facility and email said map to APS for import into Lenel. At this point, APS will place the necessary icons on the map as needed.
   2. Utilize AutoCAD architectural floor plans that show walls, doors, windows, room names, and room numbers.

3.2 KEYS: Permanently identify all equipment keys with metal tags. Turn over keys, along with manufacturer's certificate stating the quantity of each key made, to the Owner and obtain a signed receipt acknowledging receipt of same.

3.3 MISCELLANEOUS EQUIPMENT:

A. Aiphone:
   1. Install per manufactures instructions to avoid noise, interference, and malfunction. Connect master station to door station using solid wire 18/2 vinyl jacketed PE insulated cable. Connect master station, door release signal wire, back to Access Control Panel to signal electric strike/hardware operation.
   2. Install Door Station in Stainless Steel security housing. Locate single gage box for door station installation. Mount door station, centered 4'3" AFF in a location adjacent to entry door set to provide a clear unobstructed view of the caller. Maximum wire distance between master station and door station is 330 feet.
   3. Provide 120 VAC duplex plug power for power supply.
   4. Provide AIPHONE MCWS desk stand for master stations being placed on a desk rather than on a wall.

B. Fire/Life Safety Interface:
   1. Any locking device installed that is required to fail safe to an open unlocked position upon receipt of a building alarm shall be connected to the building fire alarm system.

2. Emergency exits connected to the building fire alarm system shall unlock on loss of primary power to the building fire alarm system. The use of battery or emergency power shall not be used to keep emergency exits locked.

C. Alarm Bypass switches: Configure (wire and program) those key switches designated as alarm bypass switches such that when the key-switch is turned to the access position, it will engage a set of momentary contacts which will signal the access control system to shunt the alarm at the adjacent door. The key-switch can then be released such that it returns to its neutral position, from which the key can be removed. The alarm shall remain shunted until the access control system receives a door closed indication from the magnetic contacts or position switch at the door. Provide a second set of magnetic contacts at the door if necessary to accomplish this control sequence. Once the door closed indication is received, the alarm shunt shall be discontinued.

D. Freezer/Cooler Temperature Probe – EnviroAlert EA200-24; each installation must be installed on the exterior wall adjacent to the entry door of the cooler with one probe designated for the cooler and the other for the freezer. Alert sensors must be programmed according to the requirements of the designated APS Nutrition Representative or APS Security Engineer. All work must be installed according to manufacturer's specifications.

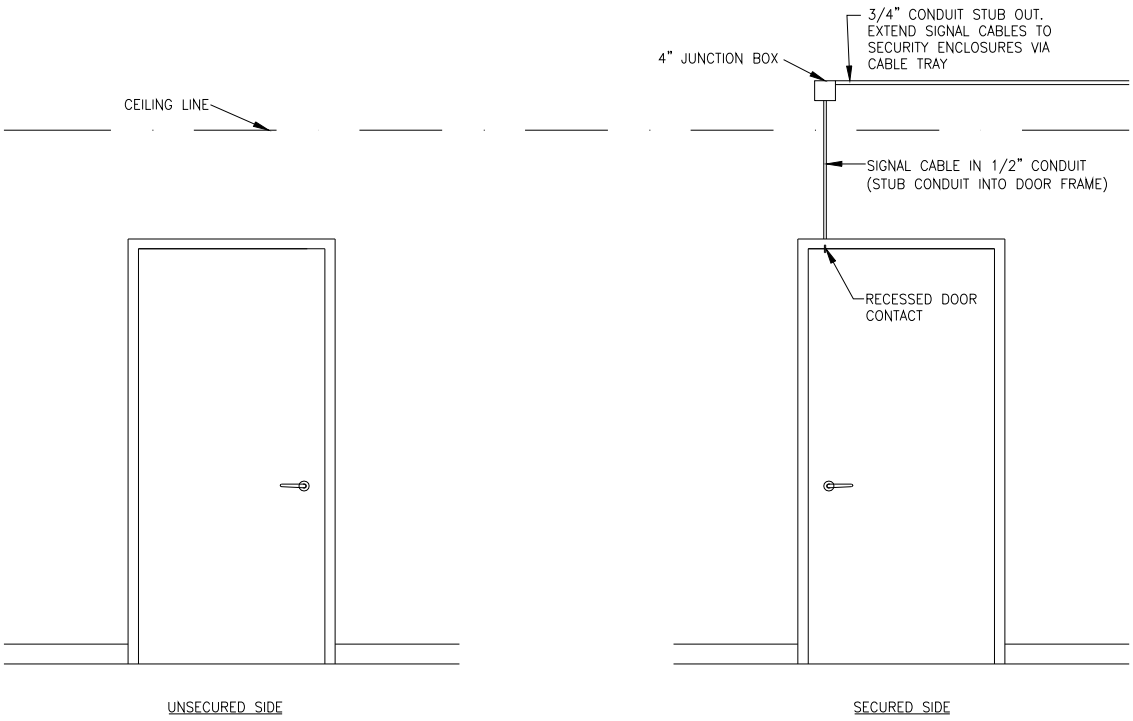
3.4 POWER SUPPLY EQUIPMENT:

A. Components specified below shall be provided with battery back-up or connected to the UPS.
   1. Motion Detection Devices
   2. Security devices located in the central control equipment rack.
   3. Card access readers, reader interface devices, electric door hardware (and their power supplies) and controllers.

3.5 CABLES:

A. Size power conductors as required ensuring voltage drop does not exceed 10% of the source voltage of the load.

B. Data cables shall be as recommended by the manufacturer.



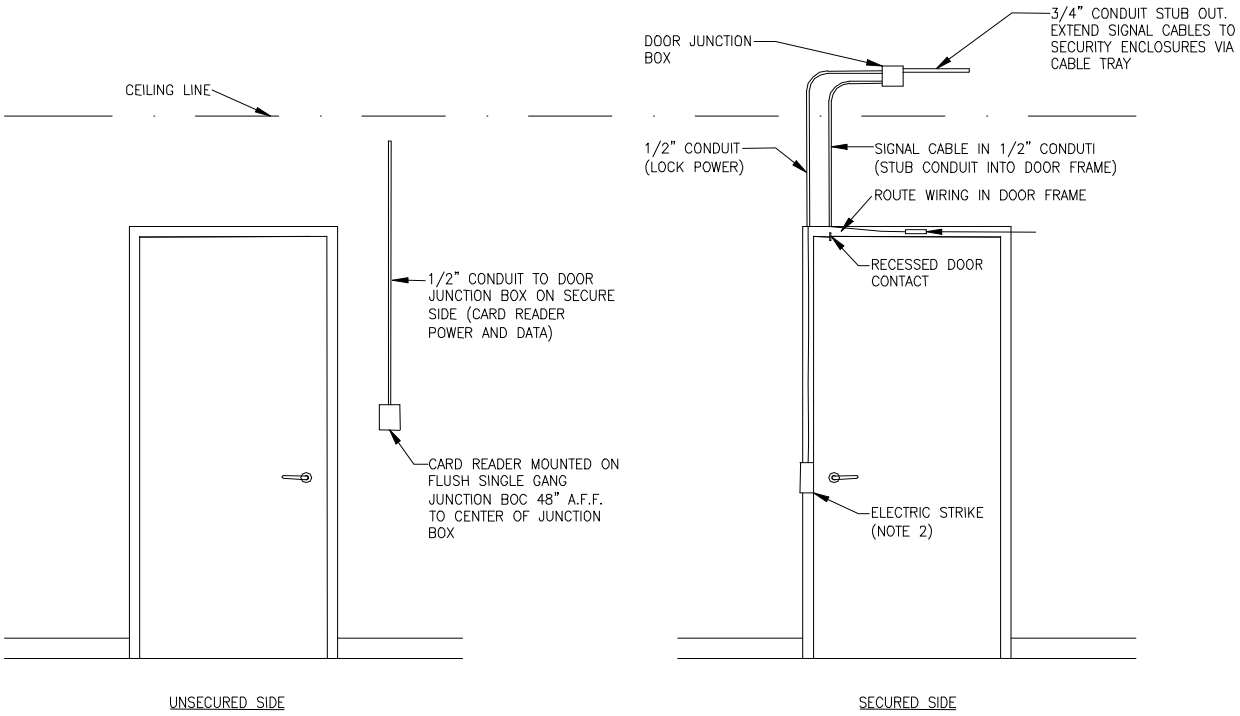
NOTES:

1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #01	
	DRAWING TITLE: TYPICAL SINGLE DOOR CONTACT	SCALE: NTS



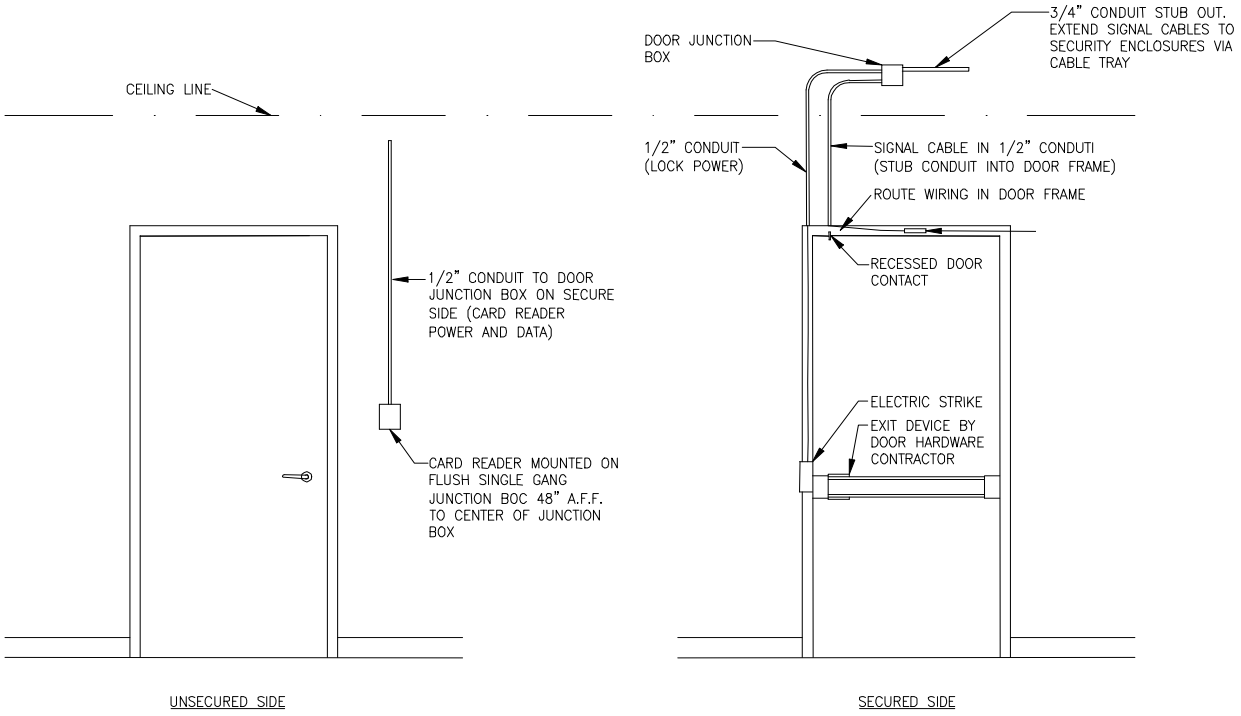
NOTES:

1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #02	
	DRAWING TITLE: TYP. ACCESS CONTROLLED SINGLE DOOR WITH ELECTRIC STRIKE	SCALE: NTS



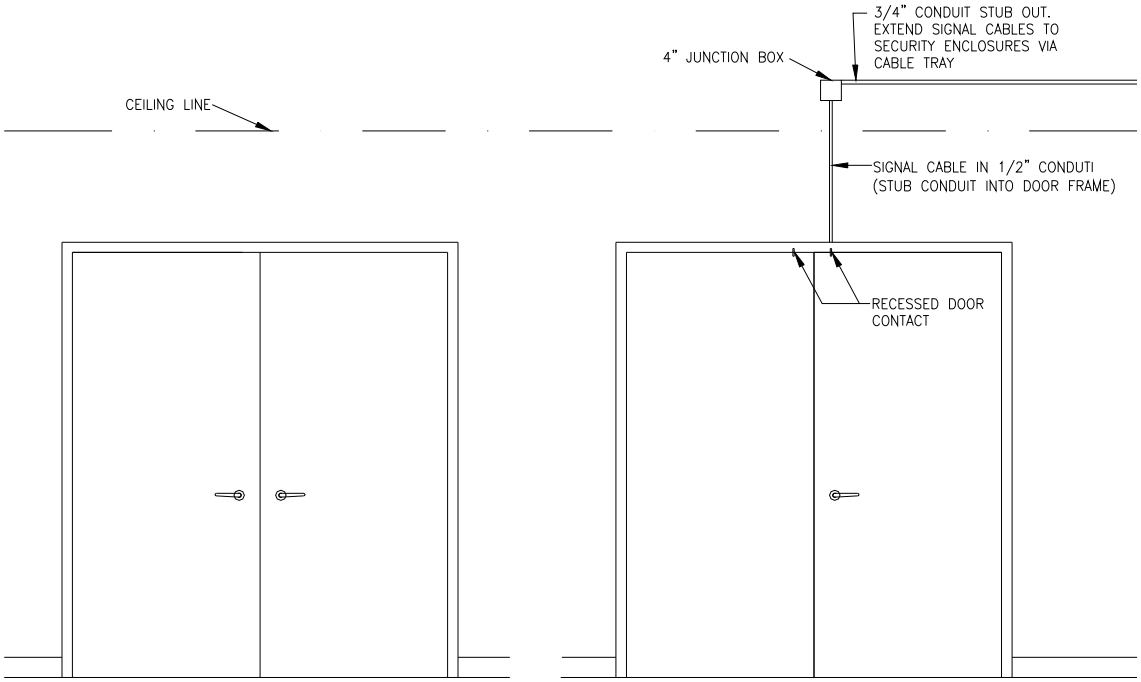
NOTES:

1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #03	
	DRAWING TITLE: TYP. SINGLE DOOR WITH ELECTRIC STRIKE & EXIT DEVICE	SCALE: NTS



NOTES:

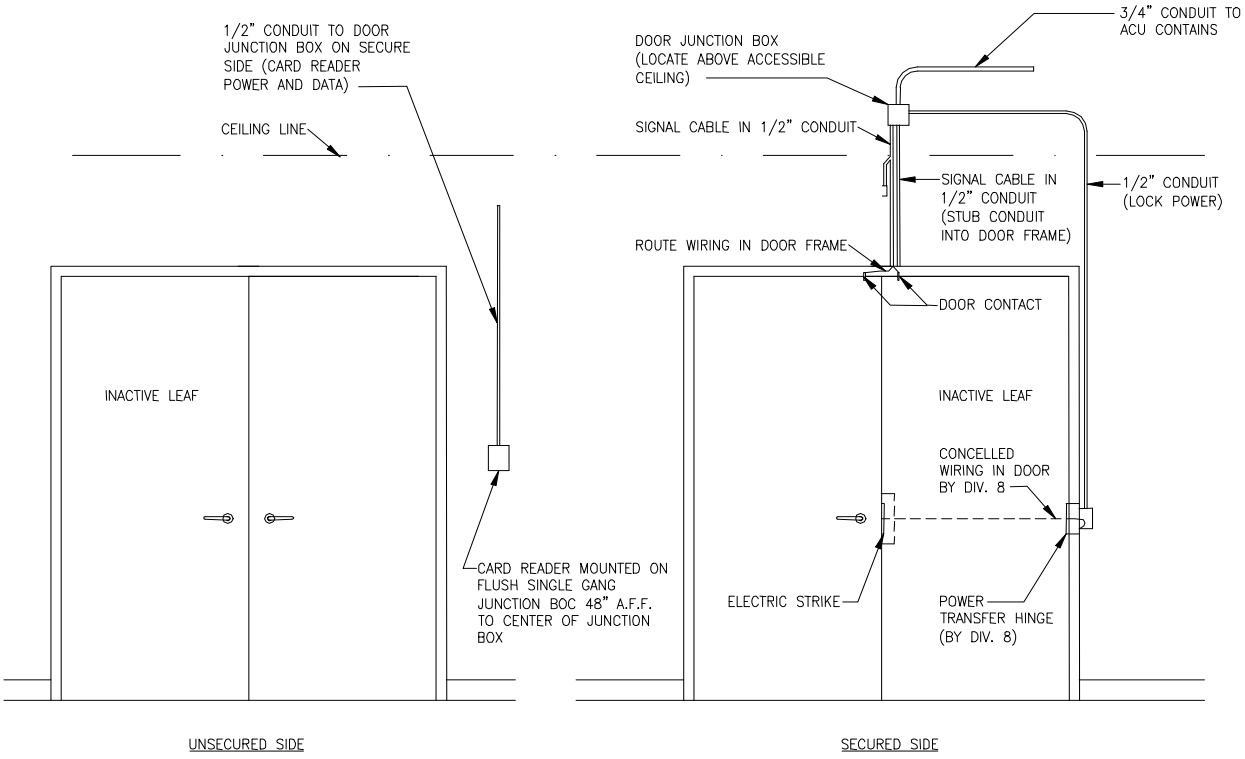
1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #04	
	DRAWING TITLE: TYPICAL DOUBLE DOOR CONTACT	SCALE: 3/8"=1'-0"

00
NS



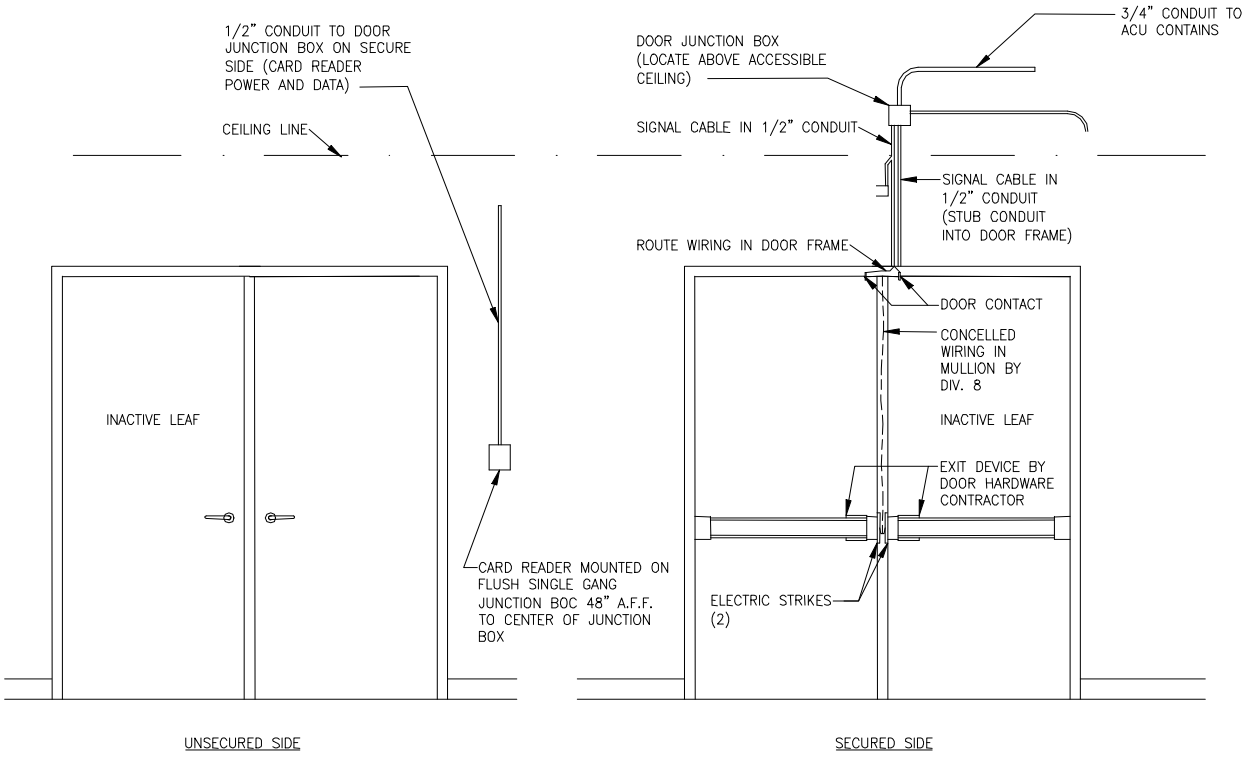
NOTES:

1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #05	
	DRAWING TITLE: TYPICAL DOUBLE DOORS WITH ELECTRIC STRIKE	SCALE: NTS



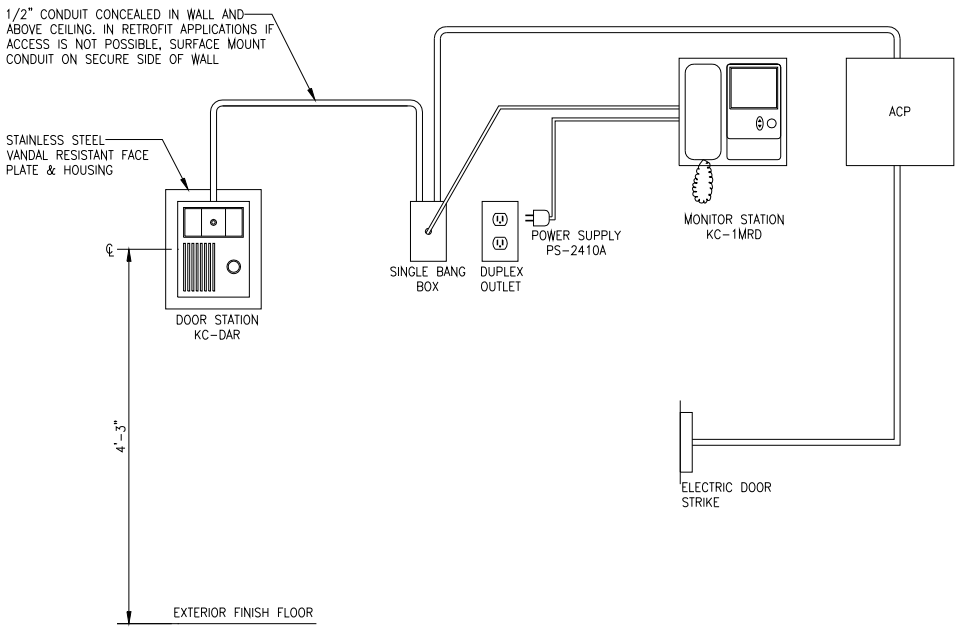
NOTES:

1. RACEWAYS SHALL BE CONCEALED IN WALLS OR CEILING, UNLESS OTHERWISE NOTED.

2. LOCKING HARDWARE PROVIDED AND INSTALLED BY DIVISION B CONTRACTOR. SECURITY CONTRACTOR TO PROVIDE CABLING TO ACCESS CONTROL SYSTEM AND CONNECT.

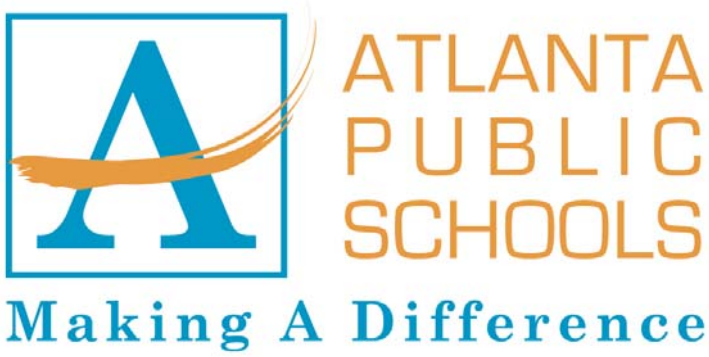
3. COORDINATE EXACT REQUIREMENTS WITH DOOR HARDWARE SCHEDULE.

ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #06	
	DRAWING TITLE: TYPICAL DOUBLE DOORS WITH ELECTRIC STRIKE & EXIT DEVICES	SCALE: NTS



ATLANTA PUBLIC SCHOOL SPECIFICATIONS SECTION 16970 – ACCESS SECURITY SYSTEM	DRAWING #07	
	DRAWING TITLE: AIPHONE COLOR TILT VIDEO ENTRY SYSTEM	SCALE: NTS

END OF SECTION



Facilities and Construction
1631 La France Street NE
Atlanta, Georgia 30309
(404) 802-3700

Burglar Alarm Specifications

February 4, 2010

APPROVED BY:

_____

Marquenta A. Sands, Director of Security

Atlanta Public Schools – Facilities and Construction
Burglar Alarm System Bulletin

ADDENDUM 1

Please be advised that the following revisions were made to the latest bulletin distributed prior to July 15, 2008.

1.1 Changed “Burgler Alarm” to “Bosch D9412GV2”.
2.11 Added tamper proof siren in computer labs.
2.12 Added weather proof blue strobes visible to the street on exterior of buildings.
3.18. Added installation instructions for sirens to be mounted in computer labs.
3.19. Added installation instructions for blue strobes on exterior of building.
3.20. Changed “APS Engineer” to “APS Project Manager, the Department of Safety and Security (DSS) Rep, or the APS Building Systems Programmer”.
3.21. Changed APS Engineer to “Department of Safety and Security (DSS) rep or the APS Building Systems Programmer”.

Burglar Alarm System

The specifications contained herein are designed as a blueprint by which minimum acceptable performance will be governed and assessed. When responding to the Request for pricing, it is incumbent on the Responder to review requirements for installations and deliverables. Because the Atlanta Public Schools Instructional requirements have changed with this specification, each Respondent must take the time to fully understand the objective and functionality for the facility.

1. SCOPE OF WORK:
   - 1.1. The work provided within this specification includes a complete zoned Bosch D9412GV2 Burglar Alarm System; the details of which are the guidelines for new construction, renovation, modifications and upgrades to existing facilities. The system must be zoned and configured for single or multiple keypads to insure sufficient activation and deactivation based on the number of academies within the building throughout the campus. The vendor must deliver a fully functioning system that conforms with the APS guidelines for traditional and non-traditional schools. Work shall be performed in accordance with all local codes and regulations and installation guidelines as set forth in this specification.
     - 1.1.1. Traditional School Environment: Most current school facilities are designed with a single integrated system that connects all buildings and additions in a single school environment; regardless of the grade level or square footage. If the requirement calls for adding new classrooms or renovating the existing facility, the contractor is required to seamlessly match any proposed system with what is in current operation; and must further insure complete connectivity and integration to the existing system in those instances where an addition or upgrade is warranted.
     - 1.1.2. Non-traditional Transformational School Environment: The Atlanta Public School System has established a new concept for smaller learning environments that create multiple schools under one roof or in a multi-facility campus environment. Regardless of the physical layout and design, these non-traditional settings will be designed for each building to operate as an independent entity; with individual Principals and staff; and isolated access for each building. The vendor must seamlessly install a single system that allows isolated and independent, zoned access for each building. The activation or deactivation of a single building shall not impact the others.

2. MANUFACTURERS
   - 2.1. The security control panel for new projects and some existing sites is Bosch D9412GV2
   - 2.2. The keypad is being standardized as a Bosch D1260 only.
   - 2.3. The bi-directional network interface module, PC9133TTL-E, is required at each control panel.
   - 2.4. If required, the eight zone expander will be a Radionics/Bosch D8128D Octopopit or the D9127T popit module can be used in conjunction with a D8125 module.
   - 2.5. Power supply shall be an Altronix SMP5 with an Altronix T2885 open face transformer.
   - 2.6. The proposed motion detectors shall be dual technology or tri-tech technology only and are the approved detection devices are as follows:
     - 2.6.1. Intellisense DT435T
     - 2.6.2. Intellisense DT901
     - 2.6.3. Intellisense DT907
     - 2.6.4. Bosch DS720

2.6.5. Bosch DS9360
2.6.6. Bosch DS950
2.6.7. Bosch DS970
2.6.8. Bosch ZX970

2.7. The door contact shall be a GRI4532 metal contact or Sentrol 1078 ¾" recessed door contact.
2.8. Batteries for control and power supplies shall be 12 volt 7 amp hour batteries. Manufacturer of battery is left to the discretion of the proposer.
2.9. The only approved equipment "CAN" is Bosch which shall include a connected tamper switch.
2.10. All wire must be Genesis cable of a plenum rated type. All wire used should be at least 22 gauge and stranded. No solid type wire will be permitted.\
2.11. Siren/s shall be Revere RV-R2200SSDP or greater equivalent 120dB minimum dual tone
2.12. Strobe light shall be a weather proof AMSECO AS-SL5A or greater equivalent. Strobe light shall be blue in color.

3. INSTALLATION REQUIREMENTS

3.1. All control equipment shall be mounted in either an MDF/IDF room.
3.2. All control equipment (panel, expanders, and power supplies) will be mounted inside the appropriate Bosch can or cans.
3.3. Control cans are to be mounted at a height of 5 feet measured from floor to bottom of can.
3.4. All wiring to control equipment will be placed in EMT conduit of appropriate size. Wiring is only required to be in conduit in the room where control equipment is located. For example, if room has a drop ceiling, conduit will be required to extend only 5 inches above ceiling grid. If room has no drop ceiling, then conduit must be extended into next room or hallway with drop ceiling.
3.5. Wiring between control cans, located in same room, shall be in conduit of appropriate size. No exposed wiring will be permitted at control equipment.
3.6. The wiring inside of the control equipment cans will be well routed and neatly terminated. Each wire inside of control equipment shall be labeled with a legible marking that identifies origination and destination. This includes the single Ethernet cable for network communication. A P-touch label maker is recommended. To ensure a neat job, wire guides and tie wraps will be permitted.
3.7. All Bosch control cans are to be mounted with a minimum of four number 10 screws. Appropriate wall anchors are also required if can is not mounted to wood or metal surface. A plastic ¾ inch long by ¼ inch diameter anchor is recommended for number 10 screws.
3.8. All power supply and control transformers shall be placed inside of above mentioned control cans. This means that an electrical receptacle will need to be placed inside of can. Arrangements need to be made with electrical contractor.
3.9. The Intellisense DT435T, Bosch DS950, Bosch DS970, and Bosch ZX970 motion detectors will be mounted at a height of 7 feet 6 inches measured from floor to bottom of detector. The Intellisense DT901, Intellisense DT907, and Bosch DS720i motion detectors will be mounted at 8 feet measured from floor to bottom of detector's mounting base. These mounting heights follow manufacturer's recommendations and are not to be altered or modified. The Bosch DS9360 will always be mounted to ceiling tile and no higher than 12 feet measured from floor.
3.10. The Intellisense DT435T, Bosch DS950, Bosch DS970, and Bosch ZX970 will always be corner mounted as indicated on architectural drawings. This detector should always face away from outside windows. These detectors will be mounted with at least two number 6 screws at least ¾ inches in length with wall anchors measuring ¾ inches long by 3/16 inches in diameter.
3.11. The Intellisense DT901, Intellisense DT907, and Bosch DS720i will be mounted in accordance with architectural drawing placement. These detectors will be mounted with at least four number 10 screws at least 1 inch long with wall anchors measuring 1 inch in length by ¼ inches in diameter.

3.12. All wiring below ceiling level to detector will be installed with either 200 or 500 series wire mold and appropriate mounting hardware. Wire mold shall extend from detector to at least 5 inches into drop tile ceiling. The wire mold will only be necessary if no inner wall conduit is run. No stick on molding will be accepted.

3.13. Motion detectors will be mounted so that the field of view is not directed toward outside windows.

3.14. Detector placement will be in every ground level room with outside windows or doors that are accessible from ground. If window or door is lower than 12 feet in height from ground, then a detector or contact is required.

3.15. External door contacts are to be installed on all exterior doors.

3.16. Door contacts must be installed in such a way that the wiring is not exposed. The contact's metal-jacketed cable must be run into a shallow wire mold box and wire mold should be extended from box into ceiling. Wire mold should be of same specification as listed above in motion detector specification.

3.17. Each alarm device must be placed on a separate zone. Each zone must be clearly identified and color-coded on the As-built drawing.

3.18. E120dB siren shall be mounted in a tamper proof box in computer labs only. The siren shall be partitioned to alarm only if the dedicated computer lab motion is faulted. The sirens are to be mounted adjacent to the exterior window.

3.19. The AS-SL5A shall be mounted on an exterior corner/s visible to the street. Final placement shall be determined by the assigned APS Department of Safety & Security (DSS) representative.

3.20. Exact detector and door contact placement will be reviewed and finalized on shop drawings by APS Project Manager, the Department of Safety and Security (DSS) Rep, or the APS Building Systems Programmer. It is the sole responsibility of the vendor to coordinate review prior to final placement. All liability for misplacement will reside with the vendor.

3.21. Keypads must be installed at the main entrance, administration area for each academy, near the outside exit door of the kitchen and gym. Sometimes it shall be required, depending on the needs of the school, to add additional keypads. Prior to commencing work, the vendor must coordinate placement of keypads with the designated Department of Safety and Security (DSS) rep or the APS Building Systems Programmer.

3.22. Keypads shall be mounted with screws provided by manufacturer. The screws should be run into a ¾ inch long by 3/16-inch diameter plastic anchor.

3.23. Keypads shall be mounted at a height of 60-inches measured from floor to bottom of keypad.

3.24. Wire mold or inside wall conduit shall be used to run wire from keypad to at least 5 inches above ceiling tile grid.

3.25. All wire between alarm devices (motion detectors, door contacts) and control equipment must be 22-gauge 4-conductor stranded copper cable or better depending on current consumption and length of wire run.

3.26. All output terminals of transformers to device it is powering (control panel or power supply) must be 18-gauge 2-conductor stranded copper cable.

3.27. Wiring must be run neatly above ceiling. This means tie wrap wiring bundles as high above ceiling as possible and keep away from moving motors and high voltage electrical conduit.

3.28. Excess wiring must be removed from above ceiling.

3.29. Exposed wiring will not be accepted.

3.30. Solid copper wiring will not be accepted.

3.31. Terminate all transformer connections with spade type connectors of appropriate size. Vendor shall NOT wrap wire around screw terminals.

3.32. Two dedicated phone lines and one network drop must be installed as homerun from telephone punch down to alarm panel. Phone line must be terminated into an RJ31X telephone jack. The

phone line must be labeled "Burglar Alarm Phone Line." Network drop shall also be labeled in accordance with above. It is the responsibility of the vendor to ensure that the burg panel line is terminated. APS is responsible for the delivery of phone service.

3.33. All zones must be programmed to confirm proper working order. Vendor is required to walk test each detection device with the APS Building Systems Programmer and the DSS Rep to insure working order. Adjust microwave sensitivity down as far as it will go while still maintaining proper space coverage.

4. INTEGRATION: Vendor must work with the APS Building Systems Programmer to obtain IP address for the network interface module program and shall test and troubleshoot the module for communication prior to turnover and training. Vendor must verify that 3 outputs from the fire alarm panel (trouble, alarm, and supervisory) are connected and programmed to the burg panel. Vendor must set aside four hours to insure compliance; and shall be prepared for the time allocation to occur in one (1) hour intervals.

5. DELIVERABLES: A final closeout and walk-thru with the Department of Safety and Security (DSS) rep or the APS Building Systems Programmer is required. At the time of walk-thru, the vendor must provide all documentation and training manuals.

5.1. Vendor must provide As-built drawings; color-coded to identify all system devices. APS Building Systems Programmer will be responsible for programming.

5.2. Vendor must provide a minimum of one (1) hour of training for school personnel for each school and/or academy. Individual training sessions shall be coordinated with the APS Project Manager, the Building Systems Programmer, or DSS Rep.

5.3. Vendor must verify all point assignments are correct. An accurate point assignments list consisting of detailed placements, such as room number, corridor and stairwell indicators, and any site specific area will be required at time of completion and delivered to Atlanta Public Schools.

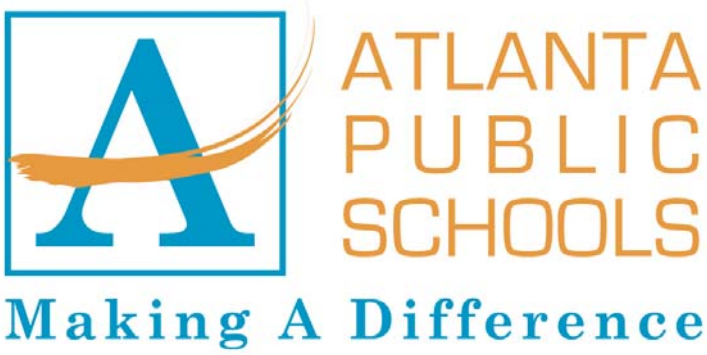
6. WARRANTY & MAINTENANCE: Vendor must provide a two (2) year warranty (or longer if provided by manufacturer) on all parts, material, devices, and labor. Warranty shall commence ONLY after the entire system has been accepted and is deemed 100% fully-operational and approved by an APS Field Engineer.

6.1. Vendor must respond to all calls for maintenance within four (4) hours.

6.2. Vendor must provide a written escalation plan with Help-Desk support, after-hour, and holiday contact information.

6.3. Vendor is required to conduct a preventative maintenance inspection, and complete all needed repairs in six month intervals during the 24-month warranty period; with an inspection at 6-months, 12-months, and one month prior to system expiration.

END OF SECTION



Facilities and Construction

1631 La France Street NE
Atlanta, Georgia 30309
(404) 802-3700

CCTV Specifications

November 20, 2009

APPROVED BY:

_____

Marquenta Sands, Director of Security

Atlanta Public Schools – Facilities and Construction
CCTV Specifications

ADDENDUM 1

Please be advised that the following revisions were made to the latest bulletin distributed prior to July 10, 2009. Approved November 20, 2009 and issued December 1, 2009

1.4. Standardized on a maximum camera count of 32, 64, and 96 cameras on an elementary, middle, and high school respectively. Added verbiage to specify that Field of Vision (FOV) calculator be used to help determine camera count.

1.5.B Requires that cameras be installed at entrances and exits with badge readers. Allows for PTZ to be used as an option in courtyards, parking lots, playgrounds, and on multistory buildings.

1.5.I. Added requirement for vendor to provide excel documentation with camera information.

2.1.A.3 Addition: Bosch IP Cameras ONLY. Added Tatung analog cameras

2.1.B.3. Addition: Bosch IP Cameras ONLY. Added Tatung analog cameras

2.1.C.3. Addition: Bosch IP Cameras ONLY. Added Tatung analog cameras

2.2 . Requires Red Cat 6 cabling.

2.2.A. Requires Red Cat 6 cabling.

2.3.B.1 Changed Flat Monitor from 21" to 27"
Added Field of View example and camera spreadsheet example.

WEB-BASED CCTV SECURITY SYSTEM
PART I - GENERAL

1.1 SCOPE OF WORK: The Atlanta Public Schools has begun to transition from an analog environment to a digital system with the implementation of IP based cameras. The selected vendor shall have the responsibility for the purchase and installation of all cameras and cable infrastructure; and shall purchase and deliver video monitors, monitor servers, video cards and associated operating system software to the APS Facilities Security Engineering Manager. The APS Facilities Security Engineering Manager shall program and configure monitor servers. Upon completion of the full configuration of ALL server hardware, the vendor shall coordinate pickup, installation, and testing at the appropriate school location.

A. The work includes the provisioning and installation of an IP based closed circuit television (CCTV) security equipment including all cables, electronic hardware and necessary connections for a complete system. Delivery and installation of hardware and material and all such activities required to meet the scope of work, must be performed solely and exclusively by the award recipient. No part shall be subcontracted to a third-party vendor without prior approval to Atlanta Public Schools.
B. Multi-School or Academy Environment: In an effort to create small learning environments for high schools, each facility will be transformed to accommodate multiple schools under a single roof or a campus-like setting. The positioning of the cameras MUST allow for each "school" to operate independent of the others. Each school must have access for viewing "only" those cameras placed in their school. The vendor is responsible for installing one integrated system.
C. Vendor is responsible for providing descriptions to uniquely identify the cameras and the delivery of final closeout documentation to the APS Project Manager and the Department of Safety & Security (DSS) Representative. The documentation shall include the following:
    1. Placement of camera icons with descriptions and/or identifiers on CAD drawings.
    2. Correlate camera identifiers to a legend that describes location of camera
    3. MDF/IDF location with camera identifiers and IP Addresses
    4. Detailed summary of IP Addresses correlated to camera identifier
    5. All information must be submitted in an electronic format
    6. Cat-6 Test Data
D. The vendor is responsible for installation and demonstrated operability of all cameras, cable, monitors, closet termination, UPS, and connectivity. The final coordination for placement and testing must be coordinated with an APS representative, Facilities Building Systems Integrator, DSS Representative, Operational Technology (OTT) Representative, or designated facilities technician.
E. APS shall purchase Recording Server Hardware, DVR or NVR; and shall purchase and configure all licenses and software for the operational performance required to

capture and store images on the recording devices and monitor servers. All commissioning of the system shall be completed prior to approval and acceptance by the Atlanta Public Schools. The vendor is responsible for all internal and external cameras, lenses, monitors, monitor servers, and infrastructure cable and also associated material.

1. Within 14 days of contract award, vendor must provide shop drawings to reflect cable routing to each MDF/IDF and a closet specific breakdown of the number of ports required for each. The shop drawings will be required for an official kick-off meeting with an.APS Project Manager/ team, DSS Representative, and OTT Representative.

1.2 SUBMITTALS

A. The vendor is to submit data information sheets for all items listed below.

B. Provide three copies of the Operations manual for this equipment, modified as necessary for this particular system, for the Owner's use. Provide a site specific electronic schematic design of building with camera placement. Electronic As-built deliverables are as follows and must be available at time of final walkthrough and acceptance.
   1. Cameras must be labeled with location and descriptions
   2. Placements must be identified by building, hall, corridor, and/or room # to include the direction the camera is facing.
   3. Vendor must identify cable routing from camera to MDF/IDF

C. Provide three copies of the Owners Manual, containing information of each piece of equipment, which shows operation, proper maintenance, and possible purchases that may be required for replacement parts beyond the two-year warranty period.

1.3 WARRANTY: The warranty shall not commence until the system has been demonstrated; the positioning of cameras is validated and all documentation has been delivered in the format required.

The warranty period for the operational system shall commence after the acceptance of the entire building warranty or the acceptance of the CCTV system warranty, whichever is later; and shall be enforced up to two years. However, in the event of a continuous failure in any area of the hardware, APS has the right to defer the warranty until the vendor has completely eliminated the problem and restored the system to optimum performance; at which time the warranty period shall resume.

1.4 GENERAL DESCRIPTION OF THE SYSTEM

This document shall be used by the architect/engineer as a guideline master specification for the purpose of developing individual project specifications for a CCTV surveillance

system. As a standard, interior and exterior camera coverage shall not exceed **32** cameras in an elementary school, **64** in a middle school, and **96** in a high school. Adequate camera coverage can be determined using any standard Field of View Calculator

A. The components specified herein provide for PoE IP cameras, sending video signals via appropriately specified cabling to a network switch.

B. The recording server provides for access to the files, storage of the files, and allows for remote access by theDSS Representative and Building Systems Programmer.

C. Atlanta Public Schools is responsible for the review and coordination of the following:

1. The appropriate camera and lenses selection, specification of appropriate housing and mounting; and will identify at least three (3) camera models. The appropriate camera location and security plan.
2. The correct use and specification of cabling and connectors.
3. The correct grouping and specification of video server/station.
4. The system backup power specification
5. The testing and commissioning of the operational system from point at the cameras.
6. The specification of the recording server and it's back up power supply.
7. Other special requirements, which may be required by the APS project.
8. Providing adequate lighting for the cameras field of view.
9. Coordination of the entire system with the APS Project Manager and the General Contractor.

D. APS will assign a Low Voltage Tech and OTT Representative to oversee installation, port assignment, and MDF/IDF closet access. Further assistance shall include supervision of cable connections between the IP camera patch panel and the switch, the connections between the recording server and the network, and final commissioning of the entire system.

1.5 GENERAL REQUIREMENTS OF THE VENDOR

A. The chosen vendor shall purchase and install all hardware for the CCTV system and ensure proper operation for a period of two years from the final acceptance of the operational system by the Owner. Individual pieces of equipment may carry a longer warranty than two years.

B. The vendor shall refer to the electrical drawings and/or the security drawings for the exact camera location, server, UPS, and the conduit location from each individual IP camera to a dedicated CCTV Patch Panel. Coverage must be assured for the following key areas:
   1. Building Entrance & Exits with badge readers

2. Adequate coverage for all Hallways
3. Front Office & Administrative Area
4. Adequate coverage for Stairwell Entrances and Exits
5. Adequate coverage for Parking Lots (PTZ or High Resolution may be used)
6. Adequate coverage for multi-story building (PTZ or High Resolution may be used)
7. Bus Pickup
8. Cafeteria & Loading Dock
9. Gym and all "Commons" areas
10. Media Centers
11. Breezeways
12. Portables
13. Courtyards (PTZ or High Resolution may be used)
14. Playgrounds (PTZ or High Resolution may be used)
15. Computer Labs
16. MDF/IDF Closets

C. This system shall utilize a minimum standard of CAT-6 cable routed between the camera locations and the MDF/IDF room housing the video system components; and shall meet the distance limitations as required for Cat-6 cable. The cable is to be terminated to a CCTV specific Patch Panel. The Patch Panel is to be labeled with individual camera identifiers. Cables routed between the CCTV patch panel and the network switch should be a color accepted by the Technology Department.

1. A minimum of Cat-6 cable shall be utilized for all cameras. Vendor is liable for camera failures that are caused by inferior cable practices up to twenty-four months on installation; and is responsible to provide authenticated cable test before warranty starts.

2. This standard shall have a NEMA 3 approved junction box for mounting the converters, transformers, and other electrical gear where mounted in an exterior or high humidity (such as a gymnasium) setting.

D. The vendor shall install the camera and housing units as per the manufacturer recommendations. Mount housings in secure, vandal resistant manner. All exposed cabling must be protected in metallic conduit.

E. The digital camera signal shall be carried through CAT-6 wiring terminating at a designated patch panel in the nearest MDF/IDF. The cable will be labeled within one foot of the terminating RJ-45 connector with the camera identifier and location. The patch panel must also be labeled with the camera identifier. This label must be printed clearly and not handwritten. The IP cameras will receive power from the nearest PoE switch. Coordinate this location with the APS Project Manager.

G. The vendor shall install new rack mounted patch panels and UPS in the designated CCTV rack or equipment cabinet in the Owner's MDF/IDF room. Note: The rack and/or cabinet is not the obligation of the vendor.

H. The vendor must provide at least one monitoring station for up to 32 cameras. Any addition of cameras in any denomination over 32 requires an additional monitor and server (1 per 32 cameras). If the building calls for multiple schools or academies, the vendor must provide at least one monitor and server for each location; and shall also comply with the 1:32 camera allowance. The monitor shall be a 22" LCD monitor.

I. The vendor shall configure the cameras and provide documentation in excel format that includes Camera Model, address, description, port location, and numbering scheme. This includes configuring IP cameras with the IP addresses provided by the APS Building Systems Programmer and/or Project Manager.

PART II - EQUIPMENT

2.1 COLOR CAMERA

A. Fixed high resolution or PTZ outdoor camera, mounted on Main Building, Cat-6: weather and vandal-resistant enclosure, color CCTV camera and varifocal lens with the following minimum features:

1. Resolution: 1.3 megapixel /520 TVL (minimum).

2. Minimum illumination: 0.075 lux at f/1.4.

3. Manufacturer: IP: Bosch brand **ONLY** Analog: Bosch, Tatung, Axis, Honeywell, Panasonic, Pelco, Sony (or greater equivalent).

B. Fixed high resolution or PTZ outdoor cameras, pole mounted with Fiber or Cat-6 cable. Cameras and cable must be weather and vandal-resistant enclosures and lens with the following minimum features:

1. Resolution: 1.3 megapixel /520 TVL (minimum).

2. Minimum illumination: 0.075 lux at f/1.4.

3. Manufacturer: IP: Bosch brand **ONLY**. No Analog PTZ will be accepted..

C. Fixed indoor camera: impact-resistant enclosure, color CCTV camera, and lens with the following minimum features:

1. Resolution: 1.3 megapixel /520 TVL (minimum).

2. Minimum illumination: 0.075 lux at f/1.4.

3. Manufacturer: IP: Bosch brand **ONLY** Analog: Bosch, Tatung, Axis, Honeywell, Panasonic, Pelco, Sony (or greater equivalent).

D. Lens: For all cameras, provide the appropriate lens for the field of view required as specified by the APS Department of Safety & Security Representative. The vendor shall provide alternate size lens at no additional charge to the Owner on cameras, which does not provide the correct optimum field of view. The preferred lens type is the automatic iris varifocal lens.

2.2 CABLES

Red Cat-6 cable shall be considered as the system standard unless the cable will be exposed to exterior conditions or conditions which are electronically "noisy" or to other environmental failures. Outdoor cables must be routed through conduit with compression connectors and weather resistant pull boxes. Absolutely no indoor rated 4 square boxes will be allowed outdoors. Vendor shall be liable for all equipment and system malfunctions due to their failure to use the proper cable where warranted; and must provide test data to authenticate cable prior to start of warranty.

A. Category 6 4-Pair Plenum Cable: The cable must be rated for plenum return ceilings. The cable shall be paired, 4 pairs, 24 AWG, Solid BC - bare copper conductors, FEP Fluorinated Ethylene Propylene insulation, unshielded, flexible Flam arrest jacket with nylon ripcord. The jacket should be sequentially marked at two-foot intervals. The cable shall be red in color. The cable shall have a flame rating and test: UL CMP, JL910, C (UL) CMP, DSAFT6. This cable will be used, only, in those instances where a video server/station is located away from an IDF/MDF and with written permission of APS and for patch cables.

B. Fiber Optic Transmission Equipment

1. All fiber optic transmission equipment shall be as manufactured by Fiber Options, Inc. or International Fiber Systems, Inc.

2. All fiber optic cable shall be 62.5 micron, multi-mode type fiber, using "ST" type connectors. Fiber jacketing shall be selected dependant upon application: aerial, burial, armored, plenum. Provide the type recommended by manufacturer for specific installation and environmental condition.

3. Provide Category 6 4-Pair Plenum Cable red in color with crimped RJ-45 connectors between the camera and the fiber optic video transmitter.

4. The vendor shall provide Fiber Options 110V-T video transmitter or equal IFS product at the camera location. The vendor shall provide Fiber Options 112V-R video receiver or equal IFS product at the IDF/MDF Closet location. The 110 V-T video transmitter must be environmentalized with its 610p (plug in power supply). Where multiple cameras are mounted in close proximity, the vendor must provide a two channel transmitter and receivers (use with two multi-mode fibers). Coordination of the exact specification should be done with the APS Project Manager.

5. Whenever the unit is mounted outdoors, a NEMA 3 box or Hoffman type box must be supplied.

6. Provide each camera housing with the required 80-100va, 24vac transformer as recommended by the camera manufacturer.

7. All power cable is provided as part of Section 16 Electrical.

D. Control cables: multiconductor, color-coded type, minimum #22 AWG, stranded tinned-copper for energy limited control circuits conforming to NFPA 70-1999, and minimum #14 AWG size, stranded tinned-copper for others. Insulation and jacket may be vinyl, pvc, cross-linked polyethylene. Voltage rating shall be 200, ac or dc, minimum except where cable is pulled in same raceway with non-energy limited systems, insulations shall be rated 600V minimum.

2.3 MISCELLANEOUS EQUIPMENT:

A. DVR: Bosch Dibos DB24C4100R2, 24 analog, 32 IP Channel with 1-TB Hard drive. There is a 32 camera maximum per DVR, which requires the use of Bosch IP cameras. APS shall purchase the DVR(s) associated with each site.

B. External Monitor(s), PC Monitor Server(s) with AGP Video Card(s). Install monitor(s) at a location specified by Principal or APS Security Field Engineer. The vendor shall furnish and install the PC Monitor Server(s) with an AGP Video Card(s)
   1. Provide and install one 22” Flat Panel Color CCTV Monitor and wall mount per 32 cameras.
   2. Provide Monitoring Server to Building Systems Programmer for configuration for each Monitor.
   3. Install RG59 or RG6 cable w/BNC, CAT6, or VGA cable, whichever is appropriate for the installed CCTV system; from Principals/APS Field Engineers specified location to nearest MDF/IDF closet.

PART III - INSTALLATION

3.1 INSTALLATION

A. It is the General Contractors responsibility to insure that all conduit has been planed and located to create a neat workmanlike appearance. Conduits shall be tight to corners and plumb.

B. Vendor must insure that the correct camera mounts are selected based on surface requirements, and care must be taken to neatly provide holes for conduit, and locate electrical service in a logical and orderly manner.

C. The final installation of closet equipment shall not commence in the MDF/IDF Closet until the CCTV system is completely constructed and approved by the APS Security Field Engineer.

D. The Contractor shall coordinate final completion and coordination of the CCTV work with APS Security Field Engineer. When finished, the Field Engineer and vendor must conduct a preliminary test to verify proper operation of all equipment.

E. Through the installation, the vendor must provide a detailed cross-reference with locations/descriptions of cameras along with port numbers and locations.

3.2 TESTING

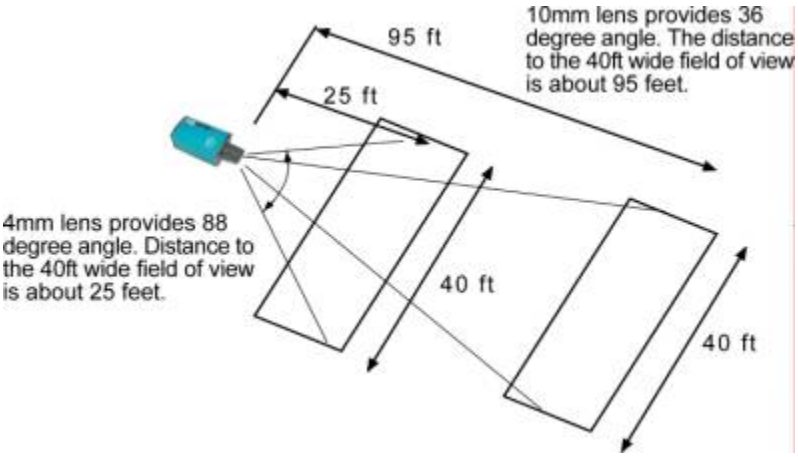
A. Vendor shall demonstrate to Owner the proper operation of the entire CCTV system from the MDF/IDF Closet. The contractor shall demonstrate operation of the system and provide two 4-hour training sessions for the Building Administrator and designees..

CALCULATING FIELD OF VIEW

How wide an area should be covered with the camera?

The field of view determines how wide an area can be seen by each camera. Is it necessary to view people or objects in a room or in a parking lot? Is it necessary to see a person's face or just know that they are there?

Suppose we have a camera with a resolution of 2048 x 1536, then we divide the horizontal pixels available by the minimum number of pixels/ft to get the total horizontal field of view. In this example 2048/50 = 40 ft. So 40 ft is the maximum field of view required to allow us to identify a person's face. If we just want to see how many people are in the view, the field of view can be over twice as large.



Lens Selection

The lens determines what you will see in the video display. You can select a wide angle lens to view objects that are close to the camera, or select a telephoto lens to see objects further away.

If we use a high resolution camera you should select a high resolution or Mega-pixel lens that will maintain the high resolution. We can use an automatic zoom lens or use digital zoom to look at a portion of a wider scene. A mechanical zoom lens can provide 25X or more of zoom. Digital zoom capability depends on the resolution of the camera. For example a camera with 2048 x 1536 of resolution can be zoomed about 16X before the image becomes too pixilated to make out the picture.

Selecting the Lens

Select the lens based on how far away the 40 ft field of view is from the camera. The closer to the camera the wider angle (or smaller mm) lens we require, the further away the narrower the angle and the larger the mm of the lens. In our example, a 4mm lens will allow us to view a person's face up to 25 feet away from the camera. A 10mm lens will move the field of view 95 feet from the camera. A lens calculator can help you calculate the distance to the object, width of the field of the view and lens.

Conclusion

The resolution of the camera and the lens determine what we will see. A higher resolution camera provides better detail. The lens determines the field of view. Both factors work together to provide the view we need for the application.

SCHOOL IP ADDRESS	TYPE OF CAMERA	MAC ADDRESS	SERVER IP ADDRESS	SERVER INSTALLATION (CLOSET LOCATION & DESCRIPTION)	NUMBERING SCHEME FOR DATA CABLE	PATCH CORDS (COLOR PREFERENCE)

END OF SECTION

Facilities and Construction
1631 La France Street NE
Atlanta, Georgia 30309
(404) 802-3700

Fire Alarm Specifications

February 4, 2011

APPROVED BY:

Marquenta Sands, Director of Security

FIRE ALARM SPECIFICATIONS

The technical specifications contained in this document are designed to be used as a guide for maintaining current Fire Alarm equipment with the Atlanta Public Schools. The document identifies minimum accepted standards by which all manufacturers equipment must be maintained. All new construction projects will be competitively bid in accordance with the minimum specifications outlined below; and will be rewritten specifically to meet the requirements of the specific school.

PART 1 – GENERAL

1. SCOPE: Respondent is responsible for the delivery and installation of all material, equipment and labor to maintain a completely operational Fire Alarm System and also associated components thereof.
   - 1.1. Fire Alarm System includes Control Panel(s), Initiating Devices, Notification Appliances, auxiliary control and monitor devices, annunciators, power supplies, and wiring.
   - 1.2. Duct mounted smoke detectors installed by Division 15; furnish and connect to fire alarm system by Division 16. Provide manufacturer mounting instructions to Division 15.
   - 1.3. Fire protection water valve and flow devices provided by Division 15; connect to devices requiring supervisory monitoring by fire alarm system.

2. STANDARDS: Current edition shall be enforced by local Authority with jurisdiction and/or as applicable to the following:
   - 2.1. ADA: Americans with Disabilities Act.
   - 2.2. ANSI/ASME A17.1: Safety Code for Elevators and Escalators.
   - 2.3. FM (Factory Mutual).
   - 2.4. NEMA “Guide for Proper Use of System Smoke Detectors”.
   - 2.5. NEMA “Guide for Proper Use of Smoke Detectors in Duct Applications”.
   - 2.6. NEMA SB 28-1997: Product Safety Guide for Developing Documentation for Fire Alarm Systems and Equipment.
   - 2.7. NFPA 13: Installation of Sprinkler Systems.
   - 2.8. NFPA 72: National Fire Alarm Code.
   - 2.9. NFPA 101: Life Safety Code.
   - 2.10. UL 13, 1996: Power-Limited Circuit Cables.
   - 2.11. UL 38, 1999: Manually Actuated Signaling Boxes for Use With Fire Protective Signaling Systems.
   - 2.12. UL 217, 1997: Single and Multiple Station Smoke Alarms.
   - 2.13. UL 268, 1996: Smoke Detectors for Fire Protective Signaling Systems.
   - 2.14. UL 268A, 1998: Smoke Detectors for Duct Application
   - 2.15. UL 497B, 1999 : Protectors for Data Communication and Fire Alarm Circuits
   - 2.16. UL 521, 1999 : Heat Detectors for Fire Protective Signaling Systems
   - 2.17. UL539, 1995: Single and Multiple Station Heat Detectors.
   - 2.18. UL 864, 1996: Control Units for Fire Protective Signaling Systems.
   - 2.19. UL 1424, 1996: Cables for Power-Limited Fire-Alarm Circuits.
   - 2.20. UL 1425, 1998: Cables for Non-Power-Limited Fire-Alarm Circuits.
   - 2.21. UL 1481, 1994: Power Supplies for Fire Protective Signaling Systems.
   - 2.22. UL 1638, 1995: Visual Signaling Appliances—Private Mode Emergency and General Utility Signaling.
   - 2.23. UL 1971, 1995: Signaling Devices for the Hearing Impaired.

3. SUBMITTALS : In the event a system is to be replaced, modified or upgraded, the following requirements shall apply and shall be submitted to the Atlanta Public Schools Fire Tech in a three-ring binder or some other form of bound set to include the following documents:
   - 3.1. Summary index page listing each component, manufacturer and catalog number.
   - 3.2. Manufacturer Data Sheet for each component, clearly marked to show specific item and catalog number, ratings, listings, input power, internal wiring and connection diagrams.
   - 3.3. Scaled Floor Plan prepared by manufacturer-authorized representative:
     - 3.3.1. AutoCAD format, minimum 1/8" = 1'-0".
     - 3.3.2. Legend, each equipment, device and device address.
     - 3.3.3. Point-to-point wiring and conduit layout with detailed description.
   - 3.4. System Operation description, detailed, clear and concise.
   - 3.5. Certification from major equipment manufacturer, showing proposed personnel as authorized representatives, factory-trained, NICET Level II or higher. Include names, addresses and certifications for:
     - 3.5.1. Supervisor of Installation.
     - 3.5.2. Installers.
     - 3.5.3. Testing personnel.
     - 3.5.4. Contract Maintenance personnel.
   - 3.6. Manufacturer Operation and Maintenance Manual for each system component. Submit simultaneously with all of the above items.

4. SOURCE
   - 4.1. All products described herein shall be supplied by Fire Alarm System manufacturer.
   - 4.2. Items shown on Drawings are minimum required. System designer shall verify and comply with all Owner requirements and include in the final Shop Drawing design.

5. OPERATION - GENERAL
   - 5.1. Separate and distinct alarm transmit for each zone or device supervisory and trouble signal to Main FACP. Simultaneous operation of all circuits and no signal loss or interference.
   - 5.2. Active/interrogative type system, including:
     - 5.2.1. Repetitive scan of each module and node.
     - 5.2.2. Signal to FACP indicating functional device and circuit wiring.
     - 5.2.3. Upon signal loss, indicate trouble status at FACP.
   - 5.3. Circuiting: Arrange IDCs to serve like categories (eg: manual, smoke). Mixed categories are not acceptable. Exception: SLCs connected to intelligent reporting devices.
   - 5.4. Malfunctions
     - 5.4.1. A single ground on any SLC, IDC or NAC shall not cause system malfunction, operating power loss, or alarm reporting ability.
     - 5.4.2. Alarm signals at FACP shall not be lost following power failure until signal is processed and recorded.

6. OPERATION - SPECIFIC
   - 6.1. FACP: When device alarms, the following occurs at FACP:
     - 6.1.1. "Alarm" LED flashes.
     - 6.1.2. Piezo-electric sounds.
     - 6.1.3. LCD display shows alarm information, including device type and location. Annunciators show same information.

6.1.4. History logs alarm information, time and date.
6.1.5. Outputs activate (Indicating Appliances, relays, etc.).

6.2. PERIPHERAL: When device alarms, the following occurs as programmed:
6.2.1. Actuate Notification Appliances until FACP is reset and enabled.
6.2.2. Release magnetic door holders and fire shutters.
6.2.3. Enable elevator control interface outputs.
6.2.4. Activate outputs interfacing with HVAC equipment, BAS, DDC and CASS.

6.3. CAMPUS FACP INTERFACE:
6.3.1. In the event there is more than one FACP, all other panels shall report all system alarms and trouble to the Main Campus FACP as "Building XX Alarm" or "Building XX Trouble".
6.3.2. Vendor must program the Main Campus FACP to monitor all other FACP system alarms and trouble as indicated above. Activation of any alarms or trouble to the other buildings FACP shall cause the local piezo-electric signal FACP to sound.
6.3.3. Actuation of any manual station, smoke detector, heat detector, fire protection supervisory device, etc. shall alarm only the affected building and report to the Main FACP as indicated above.
6.3.4. Each local control panel shall maintain its own area of protection, while reporting to the Main Campus FACP as indicated above.
6.3.5. Provide monitoring module to each FACP to monitor and report the alarms and trouble signal to the Main FACP.

7. HVAC EQUIPMENT CONTROL
7.1. When duct mount smoke detector alarms, shut down respective HVAC unit.
7.2. Provide I/O modules with contacts for control interfaces.
7.3. Upon "alarm", shut down exhaust ventilation fans.
7.4. HVAC units serving critical equipment shall not shut down until respective unit smoke detector alarms. Coordinate and verify with Division 15.

8. ELEVATOR CONTROL
8.1. Provide I/O module "alarm" interface with elevator controllers, programmed as follows:
8.1.1. Return to Main Floor.
8.1.2. Return to Alternate Floor.
8.2. Elevator Machine Rooms and Elevator Shafts: Provide smoke and heat detectors to shut down elevator power before sprinkler system activation. Heat detector shall have low response time index and lower temperature rating than sprinkler head temperature activation rating.
8.3. Elevator Lobbies: Provide smoke detector programmed to initiate recall functions.
8.4. Operating Sequence
8.4.1. When detector alarms in Elevator Equipment Room, recall elevator car to Primary Recall floor, with subsequent car operation by firefighters only.
8.4.2. When detector alarms in Elevator Lobby other than at assigned Primary Recall floor, recall elevator car to assigned Primary Recall floor with subsequent car operation by firefighters only.
8.4.3. When detector alarms in Elevator Lobby on assigned Primary Recall floor, recall elevator to assigned Alternate Recall floor.
8.4.4. Provide interface to shunt trip control elevator input power at power source.
8.5. INTERFACE WITH OTHER TRADES
8.6. Field coordinate interface and wiring of devices furnished and mounted by other Divisions

9. OPERATION AND MAINTENANCE MANUAL: When provided, each should contain the following:
   9.1. Manufacturer Warranty.
   9.2. Operating instructions, including complete programming procedures.
   9.3. Manufacturer recommended maintenance procedures.
   9.4. AutoCAD electronic "dwg" files of items indicated above in SUBMITTALS. Drawings shall reflect "As-Built" conditions, including raceway routing.

10. TRAINING: Required for New Installation or when an upgrade is warranted for an existing system.
   10.1. System vendor shall provide (8) eight hours on-site training for Owner personnel in operation, programming, and maintenance of FACP and system devices. Conduct training as scheduled by Owner.
   10.2. Provide "Hands-On" demonstration of entire system, including programming.
   10.3. Provide typewritten "Sequence of Operation" to Owner.

11. METHOD OF PROCEDURE (MOP): Install per Owner-approved MOP, manufacturer installation standards, Shop Drawings, and calculations. Where violations are unacceptable per Owner, modify at no extra cost or scheduling delay to Owner.

PART 2 – PRODUCT

12. MANUFACTURER: Atlanta Public School System has selected the manufacturer below or equivalent. The objective is to move toward a fully integrated web based security system that allows for remote monitoring through a single source. The equipment listed below shall be delivered and installed in a new construction or replacement environment:
   12.1. Notifier 640 Micro-Scan, Firelite or EST by GE Security.
   12.2. Smoke detectors, pull stations, notification appliances, etc. same manufacture and compatible with panel
   12.3. Where component is described by catalog number or model series, furnish complete with all standard features shown on manufacturer data sheet for that product.

13. CONDUCTORS, WIRING METHODS and ENCLOSURES
   13.1. Conduit: See Section 16110.
   13.2. Provide wiring recommended by Fire Alarm System manufacturer and as follows, unless otherwise noted herein:
      13.2.1. Completely supervised.
      13.2.2. Listed by NRTL for use with Protective Signaling System.
      13.2.3. IDCs and SLCs: #18 AWG (1.02 mm) minimum size.
      13.2.4. NACs: #16 AWG (1.32 mm) minimum size.
   13.3. Terminal Boxes and Cabinets
      13.3.1. NRTL Listed for intended purpose
      13.3.2. NEMA 12, hinged lockable door.
      13.3.3. Conductors terminated on barrier type terminal blocks.
      13.3.4. "Sta-Kon" type connectors. Exception: Box type/pressure plate terminals.
      13.3.5. Permanent number on each conductor and terminal.
      13.3.6. Permanent engraved nameplate on cabinet.

14. FIRE ALARM CONTROL PANEL
    - 14.1. CPU, microprocessor based, modular construction, to communicate with and control detectors, modules, annunciators, local and remote operator terminals, printers and other controlled devices.
    - 14.2. FUNCTIONS and FEATURES
        - 14.2.1. Supervise devices for normal, trouble, and alarm conditions.
        - 14.2.2. Supervise IDCs, SLCs and NACs.
        - 14.2.3. Detect and report activation and location of initiating devices.
        - 14.2.4. Operate Notification Appliances and auxiliary devices as programmed.
        - 14.2.5. Visually and audibly annunciate trouble, supervisory or alarm condition on operator's terminal, FACP display, and annunciators.
        - 14.2.6. Field-programmable without use of external equipment or EPROM change.
        - 14.2.7. Integral protection from line transients, voltage surges, RFI and EMI.
        - 14.2.8. Continuously scan each peripheral device for proper function. Provide reliable, error-free data transmission between CPU, transponders, and peripherals via dual transmission or equivalent error- check method. If any peripheral fails to respond to an interrogation, annunciate a trouble condition.
    - 14.3. CAPACITY AND GENERAL OPERATION
        - 14.3.1. Expansion capability.
        - 14.3.2. Operator interface control and annunciation.
        - 14.3.3. Program editing without special equipment and without interrupting alarm monitoring.
        - 14.3.4. Additional Features.
    - 14.4. ENCLOSURE
        - 14.4.1. Semi-flush mount, manufacturer standard finish.
        - 14.4.2. Backbox and door, minimum .060" steel, conduit provisions in sides and top.
        - 14.4.3. Key lock reversible hinged door, with transparent opening to view indicators.
        - 14.4.4. Modular structure for ease of installation, maintenance, and future expansion.

15. CPU FUNCTIONS
    - 15.1. Communicate with, monitor and control all other modules within FACP.
    - 15.2. Detect and report removal, disconnection or failure of any FACP module.
    - 15.3. Contain and execute control-by-event programs for action upon alarm.
    - 15.4. Provide real-time clock for time recording of system displays.
    - 15.5. Hold programs, time-of-day and date in non-volatile memory, not lost even upon primary and secondary power failure.

16. DISPLAY
    - 16.1. Backlit LCD, 80 character, with keypad customizable alphanumeric designations for detectors, modules and zones.
    - 16.2. Five (5) individual LEDs, color-coded, indicating status of AC Power, System Alarm, System Trouble, Display Trouble, and Signal Silence.

17. LOOP INTERFACE BOARD
    - 17.1. Monitor and control each SLC.

17.2. Monitor and process analog information from each detector or module to determine status (normal, trouble or alarm) and proper function.

18. SERIAL INTERFACE BOARD EIA-232: interface between FACP and multiple EDP peripherals.

19. SERIAL INTERFACE BOARD EIA-485:
    19.1. Shall provide port for the serial connection of the Annunciators and Control Subsystem components.
    19.2. Shall have LEDs which will show that it is in regular communication with the Annunciators or other EIA-485 connected peripheral device.

20. POWER SUPPLIES
    20.1. Main FACP: 120 VAC, 60 Hz, providing all power for FACP and Notification Appliances per Drawings, using switching 24 VDC regulator.
    20.2. Battery charger for 24 hours of standby power, using dual-rate-charging method for fast recharge.
    20.3. Meters indicating battery voltage and charging current.

21. SYSTEM CIRCUIT SUPERVISION
    21.1. Individually supervise for off-normal condition:
        21.1.1. Each fire protection water standpipe control valve.
        21.1.2. Each main gate valve.
        21.1.3. Each fire protection water flow switch.

22. OPERATOR CONTROL—Provide the following switches, functions and controls:
    22.1. ACKNOWLEDGE (ACK/STEP)
        22.1.1. In response to new alarm and/or trouble condition:
            22.1.1.1. Silence all panel and annunciator local piezo audibles.
            22.1.1.2. Change System Alarm or Trouble LED from flash mode to steady-ON mode.
        22.1.2. In response to subsequent new alarm and/or trouble conditions: Advance LCD display to next alarm and/or trouble condition.
    22.2. SIGNAL SILENCE: Cause user-selectable, field-programmed Alarm Audible Notification Appliances and relays to return to normal condition.
    22.3. SYSTEM RESET
        22.3.1. Cause electronically-latched initiating devices, appliances or software zones, and associated output devices and circuits, to return to normal condition.
        22.3.2. If alarm condition(s) still exist or reoccur after operation, resound alarms.
    22.4. SYSTEM TEST: Initiate automatic test of detectors:
        22.4.1. Simulate alarm condition at detector and transmit from detector to FACP, which interprets data from each detector.
        22.4.2. Display test results on LCD, CRTs and printers.
    22.5. LAMP TEST: Sequentially turn on LEDs, LCD and local piezo sounder, then automatically return FACP to previous condition.
    22.6. TOUCH KEYPAD, with two different access password levels, to command system functions, enter alphanumeric information, and field program.

23. FIELD PROGRAMMING

23.1. Programmable, configurable and expandable in the field without special tools, electronic equipment or field replacement of electronic integrated circuits.
23.2. Field-defined programs stored in non-volatile memory.
23.3. Password-Enabled
  23.3.1. Specifically defined at installation.
  23.3.2. Minimum Two Levels
    23.3.2.1. Status level changes, eg: zone disable or manual On/Off.
    23.3.2.2. Program Change.
23.4. Program any addressable input or initiating device to operate any single or group of addressable output devices or NACs. Inputs programmable to generate alarm, trouble, or no audible alarm.

24. SYSTEM OPERATIONS
  24.1. System Point Operations via Keypad
    24.1.1. Any device enabled or disabled.
    24.1.2. Any output point turned on or off.
  24.2. Point Read: Display point status diagnostic functions without peripheral equipment, each point annunciated with parameters listed:
    24.2.1. Device status.
    24.2.2. Device type.
    24.2.3. Custom device label.
    24.2.4. Software zone label.
    24.2.5. Device zone assignment.
    24.2.6. Program parameters.
  24.3. System History Buffer: FACP shall store system output, input and control events in non-volatile memory, with time and date stamp, to print or display, in total or one event at a time, by operator command.

25. MISCELLANEOUS
  25.1. PERIPHERAL DEVICES: All peripheral devices shall be intelligent, addressable type. Where surface mount, provide manufacturer standard surface mount box.

26. NOTIFICATION APPLIANCES
  26.1. White with red lettering.
  26.2. Visible Notification Appliance
    26.2.1. 24 VDC nominal.
    26.2.2. Per ADA and UL standard 1971, and as follows:
      26.2.2.1. Pulse Duration: 0.2 second maximum.
      26.2.2.2. Luminous Intensity: 75 candela, unless otherwise noted.
      26.2.2.3. Flash Rate: 1 Hz minimum, 3 Hz maximum.
    26.2.3. Flush cover plate where installed flush.
    26.2.4. Synchronized where more than one visible at same time.
  26.3. Combination Audible/Visible Notification Appliance
    26.3.1. Meet applicable audibility requirements.
    26.3.2. Meet Visible Notification Appliance requirements.
    26.3.3. Flush cover plate where installed flush.
    26.3.4. Speaker/Strobe: The fire alarm speaker shall be Gentex SPKE4-110 or Equivalent. The speaker shall be capable of producing alarm tones of voice on all 25 or 70 VRMs audio

systems. The speaker shall provide incremental tap settings of 1/8, ¼, ½, 1, 2 or 4 watts Minimum dB ratings at ¼ watt shall be 85 and at 4 watts 92dB. Tap settings shall be adjustable with field selectable jumper pins. The speaker shall also have an optional visual signal capability. The visual signal shall have a 1Hz flash rate regardless of input voltage. All field wiring connections shall be made via separate in-out terminal connections and the speaker or speaker strobe shall be UL, CSFM, BS&A and BFP-listed and comply with all local, state and federal fire alarm codes/standards. The speaker/strobe shall comply with ADA requirements of synchronization. Speaker/Strobe shall flush wall or ceiling mount to a standard 4" Square x 2-1/8" back box with a 1-1/2" extension ring. Provide quantity as shown on drawings. Provide Gentex SPKE4-110 Speaker Strobes or Equivalent.

26.4. Audible Notification Appliance
- 26.4.1. Meet applicable audibility requirements.
- 26.4.2. Flush cover plate where installed flush.
- 26.4.3. Shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tone (Temporal Patter) with an output sound level of at least 90 DBA measured at 10 feet from the device.

27. MANUAL STATION
- 27.1. Send status data to FACP.
- 27.2. Key operated test-reset lock, which, after emergency operation, cannot be restored to normal use except by use of key.
- 27.3. Positive visual indication of operation that cannot be reset without key.
- 27.4. Single action, cast metal or high impact Lexan.
- 27.5. Operating Instructions: Clearly visible on cover, with "FIRE" in raised letters, 1.75" high or larger.
- 27.6. Surface or semiflush mount.
- 27.7. Clear plastic keyed cover.

28. SMOKE AND HEAT DETECTORS

28.1. General
- 28.1.1. Connect to FACP SLC loop via 2-wires.
- 28.1.2. Ceiling mount with twist-lock base.
- 28.1.3. Test Means: Simulate alarm condition, either by magnetic switch on detector, simulated smoke, or remotely at FACP, and report alarm to FACP.
- 28.1.4. Address Setting Means: Rotary decimal switches or electronically through programming and internal identifying code by which FACP identifies detector type.
- 28.1.5. Visible Annunciation: LED, indicating conditions as follows:
  - 28.1.5.1. Normal: Flashing (operational and communicating with FACP), field-programmable.
  - 28.1.5.2. Alarm: Steady On (controlled by FACP)
- 28.1.6. Output Provision: Connection in base for external remote alarm LED.

28.2. Photoelectric Smoke Detector
- 28.2.1. Provide only photoelectric type detectors, unless otherwise noted.
- 28.2.2. Send status data to FACP, indicating analog level of smoke density.
- 28.2.3. Sensitivity
  - 28.2.3.1. Set via FACP, field-programmable.
  - 28.2.3.2. Automatic compensation for dust and other slow environmental changes.

28.2.3.3. UL Listed to meet calibrated sensitivity testing per NFPA 72.

28.3. In-Duct Smoke Detector, Housing and Remote Indicator
- 28.3.1. Continuous analog monitoring and alarm verification from FACP.
- 28.3.2. Upon alarm, FACP initiates appropriate action on air handling systems to help prevent smoke and toxic gas distribution via duct system.
- 28.3.3. Where detector is in above-ceiling space or other normally concealed or difficult to observe area, provide remote audio-LED visual indicator, one per each detector, visible from floor level in vicinity below detector. Before construction, verify exact location with Architect.

28.4. Heat Detector: Electronic type, sending status data to FACP, indicating analog level of thermal measurement.

29. MODULES

29.1. Monitor Module (Addressable Input Device)
- 29.1.1. Connects one IDC zone of conventional alarm initiating device(s) (any N.O. dry contact device) to one FACP SLC loop.
- 29.1.2. Mounting: In 4" square, 2.125" deep electrical box.
- 29.1.3. Visible Annunciation: Flashing LED indicating normal operation, communicating with FACP, field-programmable.

29.2. Control Module (Addressable Output Device)
- 29.2.1. Connects one conventional NAC, speaker or telephone circuit. For auxiliary control, can be set to operate as dry contact relay.
- 29.2.2. Mounting: In 4" square, 2.125" deep electrical box, or surface mount backbox, or directly in FACP.
- 29.2.3. Visible Annunciation: Flashing LED indicating normal operation, communicating with FACP, field-programmable.
- 29.2.4. Testing: Magnetic switch, without opening or shorting NAC wiring.

29.3. Isolator Module
- 29.3.1. Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor and SLC loop or protected zone of the building.
- 29.3.2. If a wire-to-wire short occurs, the Isolator Module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section of the SLC loop.
- 29.3.3. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its operation.
- 29.3.4. The Isolator Module shall mount in a standard 4-inch deep electrical box, in a surface mounted backbox, or in the Fire Alarm Control Panel. It shall provide a single LED which shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

30. REMOTE DISPLAY ANNUNCIATOR

30.1. Features

30.1.1. 80-character Liquid Crystal Display (LCD)
30.1.2. Control switches for Acknowledge, Silence, Reset
30.1.3. Time and Date field
30.1.4. Local piezo sounder with resound feature
30.1.5. Mimic FACP display panel

30.2. Mounting
Flush mount in finished areas.
30.2.1. Surface mounting in unfinished areas in suitable surface box.

30.3. Input Power
30.3.1. Provide power from main FACP.

31. Digital Communicator

31.1. The digital communicator shall transmit the fire alarm and supervisory signals to a central station. The central station service will be provided under a separate contract by the Owner. The digital communicator shall be UL or FM listed for reporting the fire to a central station and shall conform to the requirements of NFPA.

31.2. The control communicator shall supervise one telephone line, seize the phone line and send the alarm signal on one or both without the addition of any more equipment. It shall sound a local trouble signal if the telephone service is interrupted for longer than 45 seconds and shall transmit a signal that indicates the loss of phone line service to the central station over the remaining phone line. A signal shall also be transmitted indicating the restoration of the phone service. It both phone line fail a local signal shall sound. Termination and testing of the line is the responsibility of the vendor. The phone number will be provided by an APS Operational Technology Representative or the APS Project Manager.

31.3. The control/communicator shall have the ability to send a test signall to the central station every 24 hours.

31.4. Provide fire alarm monitoring into Radionics certified fire/burg panel, one for each FACP, with all operating, programming and maintenance software required and 3 Outputs to tie into the certified Radionics Burg System. The three outputs shall be for (1) Trouble, (2) Supervisory, and (3) Alarm.

32. VOICE EVACUATION PANEL

32.1. Provide an Evacuation Alarm Signal and Voice Transmission in assembly areas that hold over 300 people. All equipment shall be UL Listed. The System shall be a compatible Voice Evacuation Alarm system. Speaker lines shall be 25 or 70 VRMS, supervised for both open and short circuits. Speakers shall be UL Listed Life Safety rated with DC blocking capacitors. Amplifier, Signal Generator, power supply, output transformer and Speaker Lines shall be continuously supervised for normal operation, open or short circuits. Amplifier shall be capable of withstanding a continuous output short circuit while in Alarm without failure, fusing or shutdown. The system shall be capable of operating as a Non-fire or Emergency Public Address System without interfering with normal Alarm functions. Amplifier shall incorporate “Voice Band” filtering for increased speech intelligibility (400 – 4,000 Hz Bandwidth). Protection circuitry shall be incorporated to prevent failure due to output overload, overheating, output open/short circuits, over and under voltage conditions and input power polarity reversal. Automatic current limiting shall be provided to keep circuitry within safe operating limits without shutdown. System shall incorporate a built-in unitone generator (including ANSI/NFPA temporal pattern signal with general evacuation alert). Operation shall result in a “Slow Whoop” evacuation alert signal. Provide Digital Message Repeater instructions for occupants to evacuate the building. Live voice paging overrides and reset of the recording by keying the microphone. Message shall be Standard: Female voice, 15 seconds. “Attention please … Attention please”. The signal you

have just heard indicates a report of an emergency in this building. Walk to the nearest exit and leave the building. All handicapped occupants shall follow the building evacuation plan". Provide necessary amplifier power requirement and speaker zoning required for this project per ANSI/NFPA.

33. The Voice Evacuation Panel shall be mounted per factory recommendation.

34. BATTERY SYSTEM
    - 34.1. Type: 12 volt, gel cell, maintenance-free. No liquids, refilling, spills or leakage detection required.
    - 34.2. Backup Power Duration: Per applicable codes, minimum 24 hours.

PART 3 – EXECUTION

35. GENERAL
    - 35.1. Provide factory-trained, manufacturer-authorized personnel on site to supervise system tests and adjustments, demonstrate proper system operation to Owner representative, and program system per Owner requirements.
    - 35.2. Provide NFPA "Certificate of Completion and Certification" documents for complete system, indicating compliance with applicable requirements.

36. MATERIAL REQUIRED
    - 36.1. Provide Conductors required for furnished system, per drawings prepared by system manufacturer. Conductor quantity shown on Construction Documents is not intended to meet needs of all manufacturers.
    - 36.2. Device Quantities shown on Drawings represent general configuration and may not reflect actual quantity of devices and modules required. Provide components shown on Drawings and additional as required for system functions described herein.

37. INSTALLATION
    - 37.1. General
        - 37.1.1. Provide installation per standards indicated, local and state codes, Drawings, and manufacturer recommendation.
        - 37.1.2. Conduit shall enter equipment only at locations recommended by manufacturer.
        - 37.1.3. Fasten and support components securely. Do not support detectors solely from suspended ceiling tiles.
        - 37.1.4. In Finished Areas:
            - 37.1.4.1. Conceal conduits, hangers, J-boxes, etc.
            - 37.1.4.2. Flushmount or semi-flushmount devices, cabinets, backboxes, etc.
        - 37.1.5. In Unfinished Areas: Surfacemount installation is acceptable.
    - 37.2. Mounting Heights
        - 37.2.1. Manual Stations: 45"AFF.
        - 37.2.2. Notification Appliances:
            - 37.2.2.1. Combination Audible/Visible: 80"AFF, or top at 6" below ceiling, whichever is lower.
            - 37.2.2.2. Visible Only: Same as Combination Audible/Visible.
            - 37.2.2.3. Audible Only: 96"AFF.
    - 37.3. Locations – General

37.3.1. Locate area detectors to avoid supply air discharge; maintain 48" minimum separation and coordinate with Division 15.
37.3.2. Locate ductmount detectors per NFPA and coordinate with Division 15.
37.3.3. Locate modules in conspicuous places, as approved by Architect.

37.4. Conductors
37.4.1. Install in EMT conduit or other raceway type as allowed by Section 16110.
37.4.2. Separate from other system conductors per NEC 760-54.
37.4.3. Provide two dedicated telephone lines to each FACP, exact location. Permanently and clearly label "FIRE ALARM SYSTEM TELEPHONE LINE, 1 OF 2" and "FIRE ALARM SYSTEM TELEPHONE LINE, 2 OF 2".

37.5. Ductmount Detector and Remote Indicator
37.5.1. Settings: Set sensitivity for airflow encountered, as recommended by manufacturer.
37.5.2. Locate remote alarm indicator to be normally visible from floor level in vicinity below detector. Before construction, verify exact location with Architect.

37.6. Identification
37.6.1. Provide red band markers, pre-printed "FIRE ALARM", around conduits at 20' maximum spacings.
37.6.2. Paint J-boxes and covers red.
37.6.3. Paint exposed raceways to match adjacent finish surface color.
37.6.4. Engraved Plate for each:
37.6.4.1. FACP.
37.6.4.2. Transponder.
37.6.4.3. Module.

37.7. Smoke Detector Installation
37.7.1. Do not install before final construction cleanup of all trades is complete. Replace detectors installed before final cleanup and recertify system.
37.7.2. Do not install before system programming and test period.

38. TESTING

38.1. General
38.1.1. Before energizing conductors, verify correct connections, and perform short circuit, ground fault and continuity testing.
38.1.2. Using walk test, check installation, supervision, and operation of each detector.
38.1.3. Verify proper operation of program log, including HVAC and elevator interface.

38.2. Alarm Signals
38.2.1. Introduce each alarm condition.
38.2.2. Verify proper receipt and processing at FACP.
38.2.3. Verify each control point activation.

38.3. Verify Trouble Signal actuation on each circuit, under each condition:
38.3.1. IDC open.
38.3.2. SLC open.
38.3.3. NAC open and short.
38.3.4. IDC ground.
38.3.5. SLC ground.
38.3.6. NAC ground.

39. SYSTEM PROGRAMMING: Provide initial programming, incorporating Owner requirements, and as specified herein.
    39.1. Request program requirements from Owner, minimum one month before initial system startup. Assist Owner in determining and providing required information.
    39.2. Include alphanumeric descriptor for each input and output point.
    39.3. Program logic to perform HVAC, elevator, and door interfaces as applicable.

40. ADDITIONAL REQUIREMENTS: N/A

41. PREVENTATIVE MAINTENANCE
    41.1. The Contractor shall conduct preventive maintenance on all equipment installed under this contract twice per year for as long as the contract is in place. Maintenance shall include all of the manufacturers' suggested service, plus exercise each part of the system and control, and test each power supply and battery installed as part of this system. Written reports shall be submitted to the school system's Department of Facilities and Construction stating the results of the preventive maintenance, corrective measures taken of any defects found and list of items or components replaced.
    41.2. The Contractor shall be responsible for maintaining all systems in good, efficient operating condition and shall supply all labor and parts that are necessary to repair the system. An authorized representative of the school system will report equipment failure to the Contractor during the normal workday. The Contractor shall dispatch one or more qualified technicians to arrive at the equipment location before close of the business day, when notification is given before noon. When notification is given in the afternoon before the close of business, the service call shall be made on the next business day. The Contractor's personnel shall check in at the principal's office at each school before and after performing any work. The equipment shall be serviced and returned to full operation on the same day of the service call. In the event the equipment cannot be serviced in this time, the Contractor shall notify the school system's Facilities Security Tech Department. If the equipment remain out of service for longer than three business days, the Contractor shall be liable for all costs incurred by the school system to provide security lost due to the failure. This may include the installation of temporary equipment, hiring another Contractor to execute the work, or utilizing contract guard services. Each service call will be recorded, and a copy furnished to the school system for filing in a maintenance log.

42. SERVICE
    42.1. After normal working hours, the Contractor shall have service people available to dispatch to the job site. When this emergency service is required, the Contractor shall respond to the call for services within four (4) hours after the call is made.

43. PRODUCT SPECIFICATION: The following guidelines are applicable in a new construction environment or when a replacement or upgrade is warranted.
    43.1. In the technical section of these specifications, product name or number may identify certain products and equipment. This identification is to show the quality and standard of the equipment to be supplied.
    43.2. When only one manufacturer or model is referenced, the absence of anything to the contrary will be interpreted as a bid on the exact item specified.

43.3. Where several manufacturers of models are referenced as being equally acceptable and the bidder does not indicate what particular model or brand he is bidding on, the Contract Manager shall have the right to select the brand or model referenced.

43.4. The equipment specified above is the only equipment accepted due to the standardization of equipment within the school system.

44. CODES AND REGULATIONS

44.1. The fire alarm system as a whole shall comply with all applicable requirements of the current versions (at time of completion) of the National Electrical Code (NEC), the State of Georgia Building Code, all local fire, life safety codes, NFPA, BOCA, and local authorities having jurisdiction. The system shall be Underwriter's Laboratories (UL) listed for Fire Alarm controls. All components for which there is a relevant UL listing shall be listed for that purpose.

44.2. All Georgia Life Safety 101 regulations and ADA regulations must be adhered to and applied during the installation of the equipment. It is the sole responsibility of the contractor to research such regulations.

44.3. At the completion of work, adjust all systems for intended function, circuiting, voltage regulation, efficiency, and leave in perfect operating condition.

44.4. Test all work covered under this Contract and demonstrate to the Contract Manager or other designated School system representative that all requirements have been fulfilled. Program controls for configuration data, lock/unlock times, cardholders, etc. as required by the Owner.

44.5. Test all wiring and connections for continuity and ground prior to installing equipment.

44.6. Label all wiring runs in a permanent manner and documents such labeling on the "As-Built" drawings. Labeling shall include a numeric or alphanumeric identifier specific to each individual cable, and will be machine printed. Hand written labeling is specifically not acceptable.

44.7. The number of splices in any wire run shall be minimized. All splices shall be made with approved crimp connectors (using the appropriate crimp tool), terminal strip, or by soldering. No twisted connections shall be used. All splices will be located in a splice box or enclosure.

44.8. All components will be securely mounted. No contact, sensor, communicator, control, or similar component will be mounted using adhesive products. Screws, locking washers, and bolts will be used as appropriate for the surface involved. All components exposed to public view shall be flush mounted, unless specifically approved by the Contract Manager prior to installation.

44.9. Any surface mounted wiring shall be in EMT conduit or "Wiremold" type surface mount channel. "Wire-mold" type channel shall be used in all office type environments, and shall be color coordinated with the wall color. All wiring will be run concealed wherever possible. Specific approval from the Contract manager is required to surface run any wiring.

45. STRUCTURE

45.1. Contractor shall include cost for all cutting and patching of any or all of his/her work not so indicated as work by the Owner.

45.2. No cutting shall be done which will reduce the structural strength of the building. Cutting will be kept to a minimum, and appropriate methods will be used to prevent unnecessary damage to surrounding surfaces.

45.3. Wiring passing through a firewall shall do so only in conduit, which shall be filled to the exposed surfaces with a suitable sealant.

45.4. Wiring passing through a floor shall do so only in conduit, which shall be in sleeves sealed with Dow "RTV" or "Chase Foam". Sleeves shall extend 1" above the finished floor.

45.5. All holes in floors or solid walls will be core bored. Core boring shall be coordinated with structural members to avoid weakening the structure. Centerlines between adjacent holes shall not be less than three (3) times the diameter of the largest hole.

45.6. Patching, sealing and restorations of finished surfaces shall be performed only by workmen skilled in the trade necessary for restoration. The Contractor is responsible for all patching, sealing and restoration needed as a result of this work.

45.7. Any and all software, equipment, computer or lap top, diagnostic hardware and devices, connectors, patch cords and the like, that is needed to repair, diagnose, program or receive information history for print-out shall be furnished with the system upon completion. Atlanta Public School System will not accept the system until this requirement is met.

END OF SECTION

SECTION 32 18 13
ARTIFICIAL GRASS FIELD TURF

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, tools and equipment necessary to install all artificial grass field turf as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the manufacturer's installation instructions and in accordance with all approved shop drawings.

B. Perimeter edge details required for the system shall be as detailed and recommended by the Manufacturer, and as approved by the Owner. Supply and installation of these details will be under the scope of work of the base contractor (see Section 32 11 23 - Aggregate Base Course: Sub-base material), not that of the artificial grass field turf Installer.

1.2 REFERENCES

A. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition

B. ASTM Standard Test Methods:

1. D1577 - Standard Test Method for Linear Density of Textile Fiber
2. D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
3. D418 - Standard Test Method for Testing Pile Yarn Floor Covering Construction
4. D1338 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
5. D1682 - Standard Method of Test for Breaking Load and Elongation of Textile Fabrics
6. D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
7. F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces
8. D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
9. D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
10. F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surfaces.

10. F1936 - Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field

11. D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. 2001 NCAA Football Rules and Interpretations / National High School Federation Rules and Standards

1.3 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements for submittal procedures.

B. Prior to the Architect approval of a specified artificial turf system, the Manufacturer shall specify in writing that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.

C. Submit the following with the Bid/Proposal:

1. Submit two samples, 6x6 inch in size, illustrating details of finished product.

2. A letter and specification sheet certifying that the products of this section meet or exceed specified requirements.

3. Certified copies of independent (third-party) laboratory reports on ASTM tests as follows:

   a. Pile Height, Face Width & Total Fabric Weight, ASTM D418 or D5848

   b. Primary & Secondary Backing Weights, ASTM D418 or D5848

   c. Tuft Bind, ASTM D1335

   d. Grab Tear Strength, ASTM D1682 or D5034

   e. Pill Burn Test ASTM D2859

4. List of existing installations, including Owner representative and telephone number.

5. Lists providing specific contacts and telephone numbers of the following existing installations:

   a. A football field of 65,000 sq. ft or more of the exact specified material, including the infill material and fiber, in play for at least 5 years. These installations must have used the same manufacturer, product and company they are proposing for this field.

   b. A list of NCAA division 1 football fields in play for at least four seasons.

   c. A list of high school football and or soccer fields in play for at least four seasons

   d. A list of at least of 10 fields of 65,000 sq. ft or more in the United States in the past two years with the same manufacturer, product

and company, including the exact same infill system, fiber and fiber manufacturer being proposed for this field.

e. A sand/rubber infill field in play for at least 5 years in the United States. This installation must have used the same manufacturer, product and company being proposed for this field.

6. Resumé of Installation Supervisor who will be present on site during installation.

7. The Turf Contractor and the turf Manufacturer (if different from the company) shall provide a current audited company financial statement

8. *The Turf Contractor and turf Manufacturer (if different from the company) shall provide evidence that their turf system does not violate any other manufacturer's patents, patents allowed or patents pending.*

9. The Turf Contractor and the turf Manufacturer (if different from the company) shall provide a sample copy of insured, non-prorated warranty and insurance policy information.

D. Prior to ordering of materials:

1. The Contractor shall submit Shop Drawings indicating:

a. Field Layout to include school/district logo

b. Field Marking Plan and details for the specified sports;(i.e., NHF Football).

c. Roll/Seaming Layout

d. Methods of attachment, field openings and perimeter conditions.

2. The turf Manufacturer must submit the fiber manufacturer's name, type of fiber and composition of fiber.

E. Prior to Final Acceptance, the Contractor shall submit to the Owner:

1. Three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and markings.

2. Project Record Documents: Record actual locations of seams, drains or other pertinent information. Submit electronic documentation in latest AutoCad format.

3. Warranty: Submit Manufacturer Warranty and ensure that forms have been completed in Owner's name and registered with Manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section. The Turf Contractor and/or the turf Manufacturer:

1. Must be experienced in the manufacture and installation of this specific type of synthetic infill grass system for at least 5 years with the same manufacturer, product and company they are proposing for this field. This

includes the tuft fiber, the backing, the backing coating, and the installation method

2. Must have a NCAA division 1/high school football field in play for at least four seasons.
3. Must have a football field of 65,000 sq. ft or more of the exact specified material, including the infill material and fiber, in play for at least 5 years with the same manufacturer and company they are proposing for this field.
4. Must have a sand/rubber infill field in play for at least 5 years in the United States.
5. Must have installed a minimum of 10 fields of 65,000 sq. ft or more in the United States in the past two years with the same manufacturer, product and company, including the exact same infill system, fiber and fiber manufacturer that is being proposed for this field

B. Installer Qualifications: Company specializing in performing the work of this section.

1. The Turf Contractor must provide competent workmen skilled in this specific type of synthetic grass installation.
2. The designated Supervisory Personnel on the project must be certified, in writing by the turf Manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the infill mixture.
3. The Manufacturer shall have a representative on site to certify the installation and Warranty compliance.

C. Prior to the beginning of installation, the Installer of the synthetic turf shall inspect the sub-base and accept in writing the sub-base surface planarity and compaction. The Installer shall have the dimensions of the field and locations for markings measured by a registered surveyor to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.

D. The Turf Contractor shall provide the necessary testing data to the owner that the finished field meets the required shock attenuation, as per ASTM F1936.

1.5 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to project site in wrapped condition.

B. Store products under cover and elevated above grade.

1.7 WARRANTIES

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. The turf Manufacturer shall provide a Warranty to the owner that covers defects in materials and workmanship of the turf for a period of 8 years from the date of Substantial Completion. The turf manufacturer must verify that their onsite representative has inspected the installation and that the work conforms to the manufacturer's requirements.

C. The Manufacturer's Warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of God beyond the control of the owner or the manufacturer.

D. The turf Manufacturer's Warranty must be supported by an pre-paid in advance insurance policy for the full eight (8) year period.

E. The Turf Contractor shall provide a Warranty to the owner that covers defects in the installation workmanship, and further warrant that the installation was done in accordance with both the Manufacturer's recommendations and any written directives of the Manufacturer's onsite representative.

F. All turf warranties shall be non prorated, limited to repair or replacement of the affected areas, at the option of the Manufacturer, and shall include all necessary materials, labor, transportation costs, etc. to complete said repairs. All warranties are contingent on the full payment by the Owner of all pertinent invoices.

G. The artificial grass field turf must maintain an ASTM 355 G-max of between 125-200 for the life of the Warranty.

1.8 MAINTENANCE SERVICE

A. The Turf Contractor will train the Owner's facility maintenance staff in the use of the turf Manufacturer's recommended groomer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Approved manufacturers are as follows:

1. FieldTurf International Inc.; 5211 Mitchell Bridge Road; Dalton, GA 30721; USA; Tel: (800)724-2969

    a. Model: Field Turf Pro Series

2.2 MATERIALS

A. The component materials of the artificial grass field turf System consist of:

1. A Carpet made of polyethylene fibers tufted into a fibrous, non-perforated, porous backing.

2. An Infill that is a controlled mixture of graded sand and rubber crumb that partially covers the carpet.

3. Glue, thread, paint, seaming fabric and other materials used to install and mark the artificial grass field turf.

B. The installed artificial grass field turf shall have the following properties:

Standard	Property	Specification
ASTM D1577	Fiber Denier	8000 nominal
ASTM D418/D5848	Pile Height	2 1/2" nominal
ASTM D418/D5848	Pile Weight	33 oz./sq. yd.
ASTM D1335	Tuft Bind	7 lbs. (without infill)
ASTM D1335	Tuft Bind	12 lbs. (with infill)
ASTM D1682/D5034	Grab Tear (width)	207 lbs/force
ASTM D1682/D5034	Grab Tear (length)	297 lbs/force
ASTM F1015	Relative Abrasiveness Index	20.2
ASTM D4491	Carpet Permeability	>30 inches/hour
ASTM D2859	Flammability (Pill Burn)	Pass
ASTM F355/F1936	Impact Attenuation, Gmax	=<135 at installation
		=<200 over field life

C. The Carpet shall consist of fibers tufted into a primary backing with a secondary backing.

1. The Carpet shall be furnished in 15' wide rolls. Rolls shall be long enough to go from sideline to sideline without splicing. The perimeter white line shall be tufted into the individual sideline rolls. Head seams, other than at sidelines, will not be acceptable
2. The Carpet's primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors. The secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place. Perforated (with punched holes), backed carpet shall not be acceptable
3. The fiber shall be 8,000 denier, low friction, UV-resistant fiber measuring not less than 2 ½ inches high. The same fiber from the above listed projects (Section 1.04, art. C. 5) must be used on this project. Systems with less than a 2 ½ - inch fiber and/or shock pad enhancements will not be accepted as equivalent.
4. The fiber tufts shall be fanned or unfolded prior to installation, rolling or spiraling is not acceptable.

D. The Infill materials shall be approved by the Manufacturer. The Infill shall consist of a resilient layered granular system, comprising selected and graded dust-free silica sand and cryogenically hammer-milled SBR rubber crumb. Artificial Grass products without cryogenically processed rubber or a finish application of straight rubber cryogenically processed will not be acceptable. The sand component of the infill must represent a minimum of 51% or more of the total infill, by weight.

E. Non-tufted or inlaid lines and markings shall be in laid and must be approved by the synthetic turf Manufacturer.

F. Thread for sewing seams of turf shall be as recommended by the synthetic turf Manufacturer.

G. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic turf Manufacturer.

2.3 FIELD GROOMER

A. Supply a field groomer, which shall include a towing mechanism compatible with a field utility vehicle.

B. The field groomer shall be the FieldTurf RT Groomer (Phone 1-800-724-2969)

PART 3 EXECUTION

3.1 GENERAL

A. The installation shall be performed in full compliance with approved Shop Drawings.

B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, topdressing or brushing operations.

C. The designated Supervisory personnel on the project must be certified, in writing by the turf Manufacturer, as competent in the installation of this material, including sewing seams and proper installation of the Infill mixture.

D. All designs, markings, layouts, and materials shall conform to all currently applicable National High school federation rules and other standards that may apply to this type of synthetic grass installation.

3.2 EXAMINATION

A. Verify that all sub-base, drainage and leveling is complete prior to installation.

B. The surface to receive the synthetic turf shall be inspected by the Installer, and prior to the beginning of installation, the Installer must accept in writing the sub-base surface planarity and compaction. The surface must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

C. The compaction of the aggregate base shall be 95%, according to the Modified Proctor procedure (ASTM D1557), and the surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-½" from design grade.

3.3 INSTALLATION

A. Install in accordance with Manufacturer's instructions. The Turf Contractor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted in writing, by the Manufacturer’s onsite representative, and submitted to the Architect/Owner,

verifying that the changes do not in any way affect the warranty. Infill materials shall be approved by the Manufacturer and installed in accordance with the Manufacturer's standard procedures.

B. The carpet rolls are to be installed directly over the properly prepared aggregate base. Extreme care should be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity. It is suggested that a 2-5 ton static roller is on site and available to repair and properly compact any disturbed areas of the aggregate base.

C. The full width rolls shall be laid out across the field. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline. No head or cross seams will be allowed in the main playing area between the sidelines. Utilizing standard state of the art sewing procedures each roll shall be attached to the next. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf.

D. This is a 99% sewn installation. Gluing of rolls shall not be acceptable. Minimum gluing will only be permitted to repair problem areas, corner completions, and to cut in any logos or inlaid lines as required by the specifications. All seams shall be sewn using double bagger stitches and polyester thread or adhered using seaming tape and high grade adhesive (per the manufacturer's standard procedures). Seams shall be flat, tight, and permanent with no separation or fraying.

E. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth determined by the Manufacturer.

F. The Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The Infill installation consists of a base layer of sand followed by a homogenous mixture of the sand and the cryogenically processed rubber. A final application of specifically sized cryogenically processed rubber completes the system. The Infill shall be installed to the depth of 1 ¾". Infill density shall consist of no more than 7 pounds of sand and at least 3 pounds of rubber per square foot. The Infill shall be placed so that there is a void of ¾" to the top of the fibers.

G. Prior to the application of any line painting the turf shall be fibrillated by means of a nylon rotary brush to provide the look, feel, and safety of optimally maintained natural grass, including subtle undulations normally associated with natural grass athletic fields.

H. Non-tufted or inlaid lines and markings shall be painted according to the recommendations of the turf Manufacturer and of the paint manufacturer. Several applications may be required.

I. Synthetic turf shall be attached to the perimeter edge detail in accordance with the Manufacturer's standard procedures.

3.4 FIELD MARKINGS

A. The field will have the following lines tufted or inlaid according to NCAA standards:

1. Football: as shown on the contract drawings. Color shall be white, except where noted.
    a. Side lines
    b. End lines
    c. 5-yd lines
    d. Goal lines
    e. [Player's box]
    f. [Coach's box]

B. The field will have the following markings [inlaid] / [painted]:
1. Football: as shown on the contract drawings. Color shall be white, except where noted.
    a. 10 yard numbers and arrows
    b. 1-yd hash markings
    c. Inbound hash markings
    d. Extra point lines
    e. Kick off markings
    f. Limit lines

C. The end zone area will be [made from xxx-colored fiber] / [painted xxx], subject to availability of color

D. The center field logo will be [painted] / [inlaid] according to artwork submitted by the Owner or Architect to the turf Manufacturer or Turf Contractor, subject to the availability of colors.

E. The end-zone letters and logos will be [painted] / [inlaid] according to artwork and fonts submitted by the Owner or Architect to the turf Manufacturer or Turf Contractor, subject to the availability of colors.

F. Standards
1. Standards; all lines and markings shall be to NCAA Standards.
2. Team logo as shown on contract drawings.

3.5 CLEANING

A. Protect installed FieldTurf from subsequent construction operations.

B. Do not permit traffic over unprotected floor surface.

C. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.

D. All usable remnants of new material shall be come the property of the Owner.

E. The Contractor shall keep the area clean throughout the project and clear of debris.

F. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION 32 18 13

SECTION 32 18 16
PLAYGROUND PROTECTIVE SURFACING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of playground surface systems and accessories:

1. Non-loose fill systems (alternate)

2. Loose fill systems

3. Geosynthetics

1.3 DEFINITIONS

A. Critical Height: Standard measure of shock attenuation. According to CPSC No. 325, this means “the fall height below which a life-threatening head injury would not be expected to occur.”

B. Fall Height: According to ASTM F 1487, this means "the vertical distance between a designated play surface and the protective surfacing beneath it." The fall height of playground equipment should not exceed the Critical Height of the protective surfacing beneath it.

C. SBR: Styrene butadiene rubber.

D. Use Zone: According to ASTM F 1487, this means "the area beneath and immediately adjacent to a play structure that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment."

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, include material descriptions for each component of playground surface system.

B. Product Samples: For the following

1. Minimum 1-quart (0.95-L) loose fill sealed in a container.

2. 12-by12-inch (300-by-300-mm) minimum sample of geosynthetic fabric.

C. Color Samples for Initial Selection: Manufacturers' color charts of 6-inch (150-mm) squares of units showing the full range or colors and textures available for components with factory-applied color finishes.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

E. Product Certificates: Signed by manufacturers of playground surface systems certifying that protective surfacings furnished comply with requirements.

F. Product Test Reports: From a qualified testing agency indicating that playground surface system complies with requirements, based on comprehensive testing of current products.

G. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Engineered wood fibers.

H. Material Test Reports: From a qualified testing agency indicating material complies with requirements.

I. Maintenance Data: For playground surface system to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is specialized in installing work similar in material, design, and extent to that indicated for this project, and whose work has resulted in installations with a record of successful in-service performance.

1. Engage an installer who employs workers trained and approved by playground surface system manufacturer to install manufacturer's products.

B. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

C. Source Limitations: Provide secondary materials including adhesives, anchoring materials, filler/sealant material, geosynthetics, and repair materials of type and from source recommended by manufacturer of primary playground surface system materials.

D. Source Limitations: Obtain primary seamless playground surface system materials, including primers, binders, and rubber particles for cushion-base and wearing-surface layers, through one source from a single playground surface system manufacturer. Provide secondary materials including adhesives, primers, geosynthetics, and repair materials of type and from source recommended by manufacturer of primary playground surface system materials.

E. Standards and Guidelines: Provide playground surface systems complying with applicable provisions of the following, unless more stringent provisions are indicated:

1. CPSC No. 325, “Handbook for Public Playground Safety”; ASTM F 1292; and ASTM F 1487.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured materials in original packages with seals unbroken and bearing manufacturers’ labels indicating brand name and directions for storing.

B. Store manufactured materials in a clean, dry location, protected from the weather and deterioration, and complying with manufacturer's written instructions for minimum and maximum temperature requirements for storage.

C. Protect UV-light-sensitive materials from exposure to sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply playground surface system materials or components over wet, frozen, or excessively damp substrates if prohibited by manufacturer's written instructions or warranty requirements.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit playground surface system to be performed according to manufacturer’s written instructions or warranty requirements.

C. Field Measurements: Where playground surface system is indicated to fit to other construction, verify dimensions of other construction by field measurements.

D. Adhesively Applied Products: As follows

1. Apply adhesives only when temperature of surfaces to be adhered to and ambient air temperatures are within range permitted by manufacturer's written instructions.

2. Close area to traffic during surfacing installation and for time period after installation recommended in writing by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Seamless Surface System (Poured-in-Place):

a. Child Safe Products, Inc.

b. No Fault Industries, Inc.

c. Safe Guard Surfacing, Corp.

d. SpectraTurf, Inc.

e. SurfaceAmerica, Inc.

f. TerraSoft Poured-in-Place (Shaw)

2. Engineered Wood Fibers (Alternate):

a. Fibar, Inc.

b. New England Playground Surfacing.

c. Sof'Fall Inc.

d. Zeager Bros, Inc.

2.2 PLAYGROUND SURFACE SYSTEMS, GENERAL

A. Accessibility: Provide playground surface system determined to be accessible when tested according to ASTM PS 83 for system[s] designated.

2.3 NON-LOOSE FILL PLAYGROUND SURFACE SYSTEMS (ALTERNATE)

A. General: Provide protective surfacing designed to drain water freely when installed according to manufacturer's written instructions.

B. Seamless Surface Surfacing formulated for site mixing and application from rubber particles in a polyurethane binder, forming a water-permeable, UV-light-stable, impact-attenuating, seamless playground surface system with layered construction consisting of a lower-density formulation of recycled SBR particles and polyurethane forming a cushion-base layer bonded to higher-density formulation of EPDM rubber particles and polyurethane forming a top-layer wearing surface. Provide manufacturer's standard thickness for each layer as required for overall thickness indicated.

1. Binder: Weather resistant, UV stabilized, flexible, non-hardening, 100 percent solids polyurethane complying with requirements of authorities having jurisdiction for nontoxic and low VOC content.

2. Critical Height: 7 feet (2.1 m) for coordination with fall heights not exceeding Critical Height.

3. Overall Thickness: Not less than as required for Critical Height indicated.

4. Primer/Adhesive: Manufacturer's standard primer and weather-resistant, moisture-cured polyurethane adhesive suitable for unit, substrate, and location indicated.

5. Colors: As selected by Architect from manufacturer's full range.

6. Color Pattern: As indicated on Drawings.

C. Filler/Sealant: Where required by playground surface system manufacturer's written instructions, provide clear silicone or polyurethane filler/sealant suitable for exterior use and approved by playground surface system manufacturer.

2.4 PLAYGROUND SURFACE SYSTEMS

A. General: Provide playground surface system consisting of particulate loose fill materials indicated, free of deleterious materials.

B. Organic Wood-Based Materials: Consisting of the following:

1. Engineered Wood Fibers: Random-sized wood fibers, in manufacturer's standard fiber size approximately 10 times longer than wide; containing no bark, leaves, twigs, or foreign or toxic materials; graded according to manufacturer's standard specification for material consistency for playground surfaces. Provide the following minimum depth of material with Critical Height indicated for coordination with fall heights not exceeding Critical Height:

a. Compressed Material Depth: 12-inch (300-mm) depth with Critical Height of 12 feet (3.7 m).

2.5 LOOSE FILL ACCESSORIES

A. Edgings: Provide an anchored-in-place, weather-resistant, containment barrier designed to minimize sharp edges, protrusions, and tripping hazards; formed by interconnected, modular units; and fabricated from materials indicated for containing loose fill. Include manufacturer's standard corrosion-resistant-coated metal or noncurrodible anchor stakes, designed to be nonprotruding when installed, for connecting units and securing in-place.

1. Polyethylene Units: UV-light-stabilized, 100 percent recycled polyethylene, rotationally or compression double-wall molded, not less than 1/4-inch (6-mm) wall thickness; made into smooth-surfaced straight or curved units in radial conditions with radiused exposed edges and integral, molded-in color; in manufacturer's standard length, width, and height.

    a. Color: As selected from manufacturer's standard range

2.6 GEOSYNTHETICS (Alternate)

A. Drainage/Separation Fabric: Nonwoven needle-punched geotextile, specifically manufactured as a drainage geotextile; made from polyolefins or polyesters; complying with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Weight: 4 oz./sq. yd. (136 g/sq. m) according to ASTM D 5261.

2. Water Flow Rate: 100 gpm per sq. ft. (68 L/s per sq. m).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for subgrade and substrate conditions, for compliance with playground surface system manufacturer's requirements, and for other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of playground perimeter, playground equipment, use zones, and pathways. Clearly indicate locations of utilities, lawn sprinkler system, subgrade drainage systems, and underground structures.

B. General: Prepare substrates to receive surfacing products according to playground surface system manufacturer's written instructions. Verify that substrates are sound without high spots, ridges, holes, and depressions.

3.3 INSTALLATION, GENERAL

A. General: Comply with playground surface system manufacturer's written installation instructions. Install playground surface system over area and in

thickness indicated and as required to comply with specified requirements for impact-attenuation performance and, where indicated, for accessibility.

3.4 GEOSYNTHETIC INSTALLATION (Alternate)

A. General: Install geosynthetics according to playground surface system manufacturer's and geosynthetic manufacturer's most stringent written instructions, and as follows:

1. Geotextiles: Completely cover area indicated, overlapping lapping edges a minimum of 4 inches (100 mm) with manufacturer's standard treatment for seams.

2. Layer under and contain loose fill playground surface system.

3.5 INSTALLATION OF NON-LOOSE FILL PLAYGROUND SURFACE SYSTEMS

A. Seamless Surface: Mix and apply components of playground surface system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface and impact-attenuating system of total thickness indicated. Proportion each blend of resilient particulate material with binder, in ratio complying with manufacturer's written instructions. Mix components thoroughly to form a uniform dispersion. Coordinate application of components to provide optimum adhesion of playground surface system. Cure successive applications of components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

1. Substrate Primer: Apply according to manufacturer's written instructions over prepared substrate at manufacturer's standard spreading rate for type of substrate.

2. Intercoat Primer: Over cured base course, apply primer at manufacturer's standard spreading rate for maximum adherence of base course to surface course.

3. Surface Course: Spread evenly over primed base course to form a level layer of uniform density and consistency, applied at manufacturer's standard spreading rate in one continuous operation, and, except where color changes, with no cold joints. Finish surface to produce manufacturer's standard wearing-surface texture and allow to cure.

   a. Where colored pattern is indicated, place adjacent colored material as soon as placed colored material is sufficiently cured using primer or adhesive if required by manufacturer's written instructions.

4. Edge Treatment: As indicated on Drawings. Fully adhere edges to substrate with full coverage of substrate. Maintain fully cushioned

thickness required to comply with safety performance requirements within playground equipment use zones.

3.6 INSTALLATION OF LOOSE FILL PLAYGROUND SURFACE SYSTEMS

A. Loose Fill Edgings: Place in layout indicated on Drawings and permanently secure in place and attach to each other, according to edging manufacturer's written instructions, with top of edging at elevation indicated.

B. Loose Fill: Place playground surfacing materials in excavations promptly, including manufacturer's standard amount of excess material for compacting naturally with time to required elevations, but not before the following have occurred:

1. Completion of subgrade construction including drainage/separation geosynthetic layer.

2. Installation of containment edgings.

3. Removal of obstructions, trash, debris, and waste fill materials.

C. Finish Grading: Hand rake to a smooth finished surface and to required elevations with zero tolerance.

3.7 CLEANING AND PROTECTION

A. Non-Loose Fill Systems: Prevent traffic over system for not less than 48 hours after installation. Protect playground surface system from damage and wear during the remainder of construction period. Clean playground surface system after time period recommended in writing by playground surface system manufacturer but not more than four days before dates scheduled for inspections intended to establish date of Substantial Completion. Use cleaning materials and procedures recommended in writing by playground surface system manufacturer.

1. During installation of adhesively applied products, immediately remove visible adhesive from surfaces. Use cleaner recommended by playground surface system manufacturer.

B. Loose Fill Systems: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Replenish with matching material, repair, and reestablish densities and finish elevations where surfaces become eroded, rutted, or settled or where they lose compaction and depth, until date of Substantial Completion.

END OF SECTION 32 18 16

SECTION 32 18 23
SYNTHETIC TRACK SURFACING SYSTEM

PART 1 GENERAL

1.1 SCOPE

The synthetic surfacing contractor shall furnish all labor, materials, equipment, supervision, and services necessary for the proper completion of all synthetic track surfacing and related work indicated on the drawings and specified herein.

The synthetic surfacing contractor shall refer to the drawings for the required locations of synthetic track surfacing to be installed. All quantities and dimensions shall be field verified by the synthetic surfacing contractor.

1. 2 SPECIFIC SCOPE OF WORK

A. Install a porous latex and rubber synthetic track system comprised of a base layer of black latex bound SBR rubber granules topped with a colored EPDM and latex, UV resistant top coat.

B. Layout and paint all track lines and event markings as required and specified by appropriate governing body, IAAF, NCAA or NFHS.

1.3 COORDINATION

The synthetic surfacing contractor shall coordinate the work specified with an authorized and appointed representative of the owner so as to perform the work during a period and in a manner acceptable to the owner,

PART 2 CODES AND STANDARDS

2.1 Applicable Publications

Codes and standards follow the current guidelines set forth by International Amateur Athletic Federation, (IAAF), National Collegiate Athletic Association (NCAA), or the National Federation of State High School Association (NFHS), along with the current material testing guidelines as published by the American Society of Testing and Materials (ASTM).

2.2 Performance Standards

The new synthetic track surfacing system shall exhibit the following minimum performance standards (ASTM)

Thickness: (12-13mm) or as specified

Shore A Hardness: 45-60 (ASTM D-2240)

Elongation at Break: -75% (ASTM D-412)

Compression Set Recovery: 85%-90% over 24hr period (ASTM 395-89)

Abrasion Resistance: 0.25 grams loss after 1000 cycles (ASTM D-501)

Coefficient of Friction: Dry: 0.75-0.85, Wet: 0.70-0.75 (ASTM D-1984)

Resilience : 35%-41% (ASTM D-2632)

Tear Resistance: 45psi (ASTM D-624)

BASIS of DESIGN is Sport Track ST-55

PART 3 QUALITY ASSURANCE

3.1 Contractor Qualifications

A. The synthetic surfacing contractor must be in business for five years in the installation of elastomeric latex and rubber synthetic track surfacing.

B. The synthetic surfacing contractor must have installed a minimum of five outdoor track facilities using the specified system, within the last two years.

C. The synthetic surfacing contractor shall be a builder member of the American Sports Builders Association.

D. The synthetic surfacing contractor shall employ a Certified Track Builder (CTB) to oversee this project.

3.2 Submittals

The following submittals must be received with bid:

A. Standard printed specifications of the synthetic track surfacing system to be installed on this project.

B. An affidavit attesting that the synthetic track surfacing material to be installed meets the requirements defined by the manufacturers currently published specifications and nay modifications outlined in those technical specifications.

C. A synthetic track surfacing system sample, 4” x 4” in size, of the same synthetic surfacing system to be installed on this project.

D. An installation list of outdoor track facilities installed in the last two years using the exact synthetic track surfacing system specified herein.

PART 4: MATERIALS

4.1 Primers

Primers shall be water-based SBR latex, specifically formulated to be compatible with the paved asphalt/concrete base and track surfacing material.

4.2 Black SBR Granules

The rubber granules for the base course shall be recycled SBR rubber, processed and chopped to 1-5 mm size, midcourse 1-4mm in size, containing less than 4% dust.

4.3 Colored EPDM Granules

The rubber granules for the structural wearing coats shall be EPDM peroxide cured, synthetic rubber containing a minimum 20% EPDM resin (1-3mm) with a specific gravity of 1.50+/- 1 g/cubic centimeters. The EPDM rubber shall be the same color as chosen by the owner for the track surface.

4.4 Latex Binder

A minimum 50% solids SBR latex resin used for latex track construction.

4.5 Pigments

Shall be ultra violet stabilized water based pigments.

4.6 Line Marking Paint

All line and event markings shall be applied by experienced personnel utilizing an acrylic paint compatible with the synthetic track surfacing

PART 5 – INSTALLATION

5.1 Subbase

The synthetic track surfacing system shall be laid on an approved subbase. The general contractor shall provide compaction test results of 95% or greater for the installed subbase.

For NCAA and IAAF certification the following criteria must be followed. The track surface, i.e. Asphalt substrate, shall have a maximum lateral slope outside to inside of 1.0% and a maximum slope of 0.1% in the running direction. The finished asphalt shall not vary under a 10’ straight edge more than 1/8”.

It shall be the responsibility of the asphalt-paving contractor to flood the surface immediately after the asphalt is capable of handling traffic, but within 24 hours. If, after 20 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the architect, in conjunction with the surfacing contractor to determine the method of correction. No cold tar patching, skin patching or sand mix patching will be acceptable.

Any oil spills (hydraulic, diesel, motor oil, etc) must be completely removed either by chipping out or removing and replacing with new, keyed in asphalt. The minimum depth of any asphalt replacement shall be 1 inch. The curing time for the asphalt base is 28 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of latex and rubber surfacing system.

It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e. Cross slopes, planarity and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base before work can commence.

5.2 Thickness

The thickness of the Synthetic Track Surfacing System shall be 13mm, or as specified.

5.3 Equipment

The Synthetic Track Surfacing System components shall be processed and installed in specially designed machinery and equipment. An approved mixer tank with mechanical agitation and the capability to maintain the required pressure for spraying.

5.4 Installation (.92 gallons of undiluted latex, 8.5lbs SBR rubber and 6lbs EPDM colored rubber)

A. Prime coat of diluted latex applied at .07 gallons per square yard.

B. Base rubber applied and oversprayed with .15 gallons of latex per square yard

C. Mid course rubber applied and oversprayed with .15 gallons of latex per square yard

D. Mid Course rubber applied and oversprayed with .15 gallons of latex per square yard

E. EPDM rubber applied and oversprayed with .15 gallons of latex per square yard

F. EPDM rubber applied and oversprayed with .15 gallons of latex per square yard

G. Spray applied pigmented U.V. stabilized coat with .1 gallons of latex per square yard

5.5 Site Conditions

A. Installation shall not take place if adjacent or concurrent construction generates excessive dust, abrasives or any other by-product that, in the opinion of the installer, would be harmful to the track material, until completion of such works.

B. If, in the opinion of the installer of the synthetic material, the weather and/or climatic conditions are detrimental to the proper installation of the surfacing materials, work shall be delayed until conditions are acceptable. Preferred installation temperature is fifty degrees Fahrenheit and rising. Installation shall be executed only in dry conditions.

PART 6 – LINE STRIPING AND EVENT MARKINGS

6.1 Layout

Line striping and event markings shall be laid out in accordance with current IAAF, NCAA or NRHS rules

6.2 Certification

Upon completion of the installation, the owner shall be supplied with all necessary computations and drawings, as well as a letter of certification attesting to the accuracy of the markings.

PART 7 – GUARANTEE

Synthetic track surfacing system shall be fully guaranteed against faulty workmanship and material failure for a period of 3 years from the date of acceptance.

Synthetic surfacing material found to be defective as a result of faulty workmanship and/or material failure shall be replaced or repaired at not charge upon written notification within the guarantee period.

END OF SECTION 32 18 23

SECTION 32 31 19
DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplemental General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Pre-finished ornamental steel fencing and cantilever sliding gates fabricated from custom shapes.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 3 Section "Cast-In-Place Concrete" for concrete for post footings.

1.3 SUBMITTALS

A. Product data for each product used in ornamental fence work, including finishing materials and methods.

B. Shop drawings showing fabrication and installation of ornamental fence work including plans, elevations and details of components and attachments to other units of Work. Indicate materials, profiles of each ornamental fence work member and fitting, joinery, finishes, fasteners, anchorages and accessory items.

1. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as unit of Work of other sections.

C. Samples for selection purposes in form of manufacturer's color charts consisting of actual units or sections of units showing manufacturer’s standard range of colors and finishes available for each item indicated below.

1. Ornamental steel fences and gates with a high performance coating.

D. Samples of fittings and accessory items required for complete installation of fence work.

E. Qualification data for firms and persons specified "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, plus other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in successfully producing ornamental fence work similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Installer Qualifications: Arrange for installation of ornamental fence work specified in this section by same firm which fabricated them.

1.5 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of ornamental fence work. Do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle ornamental fence work on site to a minimum; exercise care to avoid damaging steel finishes.

1.7 WARRANTY

A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

B. Ornamental Steel Work Manufacturer's Warranty: Submit written agreement signed by manufacturer agreeing to repair or replace defective or premature failure of finish of ornamental steel fence work during following period of time after date of Final Acceptance:

1. Fabrication and Defects in Workmanship: Lifetime.

2. Paint Finish: Lifetime.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Industrial Grade Steel Ornamental Fences and Gates:

a. Ameristar, “Aegis”.

b. Boundary Fence and Railing Systems, Inc., “Regal Style”.

c. Builders Fence Company, Inc., “Aristocrat”.

d. Merchants Metals, “Welded Ornamental System”.

2.2 METALS

A. General: Provide metal free from pitting, stains, discolorations, and other imperfections where exposed to view on finished units.

B. The materials for fence framework (i.e., pickets, rails and posts) shall be manufactured from coil steel having minimum yield strength of 50,000 psi. The steel shall be galvanized to meet the requirements of ASTM A526 with a minimum zinc coating weight of .90 ounces per square foot (coating Designation G-90), hot-dip process.

C Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 GROUT

A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for exterior applications.

2.4 FABRICATION

A. Fences shall be both 6'-4" high nominal and 3'-0" high nominal (Alternate No. 15), and fabricated from galvanized steel with welded joints. After welding, welds shall be zinc metalized.

B. Stringers: (horizontal rails) shall be punched to allow pickets to pass through the top of the rail.

C. Pickets, rails, and posts shall be precut to specified lengths.

D. Stringers shall be welded to posts. Flat post caps shall be affixed to all posts.

E. Completed panels shall be capable of supporting a 600 lb. Load applied at mid-span without permanent deformation.

F. Finish exposed surfaces to smooth, sharp, well-defined lines and arises.

G. Pre-assemble items in shop to greatest extent possible to minimize splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

2.5 FENCE COMPONENTS

A. Fence Posts: 2.5" x 2.5" x 12 Ga. Minimum with acorn caps.

B. Horizontal Rails: 1.75" x 1.75" x 14 Ga. min., two top and one bottom.

C. Pickets: 1" x 1" x 16 Ga. minimum with integral spear point finials.

D. Picket Spacing: 3.75" to 5".

2.6 FINISHES

A. Fence and gates shall be pre-treated with a 175 to 250 mg primer coating of zinc phosphate chemicals using a five stage power washer. Finish coating shall be a thermosetting polyester powder applied by electrostatic spray and baked at 450 degree F to 500 degree F metal temperature. Finish metal shall withstand a minimum 500 hour salt spray test and a 500 hour humidity test. Manufacturer shall provide current testing results upon request.

B. 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 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.

C. Color as selected by Architect from manufacturer’s color chart.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages and setting drawings, diagrams, templates, instructions and directions for installation of items having integral anchors which are to be embedded in concrete. Coordinate delivery of such items to the project site.

3.2 INSTALLATION, GENERAL

A. Provide anchorage devices and fasteners where necessary for securing ornamental fence work items to in-place construction; including, threaded fasteners for concrete inserts, through-bolts, lag bolts, and other connectors as required.

B Perform cutting, drilling and fitting required for installation of ornamental fence work. Set products accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.

C. Fit exposed connections accurately together. Where cutting, welding and grinding are required for fitting and jointing of ornamental fence items, restore finishes to eliminate any evidence of such corrective work.

D. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.

E. Restore protective coverings which have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.

3.3 INSTALLATION OF FENCES

A. Adjust fence sections systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.

B. Concrete-Anchored Posts in Sleeves: Insert posts in preset sleeves cast into concrete and fill annular space between posts and sleeve solid with non-shrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

C. Concrete-Anchored Posts in Core-Drilled Holes: Core-drill concrete to produce holes with diameter at least 3/4 inch larger than outside dimensions of post and not less than 5 inch deep. Clean holes of all loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

1. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.

D. Anchor fence ends into concrete with fittings designed for this purpose.

3.4 ADJUSTING

A. Touch-Up Painting: Immediately after erection, clean field welds, and abraded areas of shop paint, and paint exposed areas with an acrylic enamel paint provided by the fence and gate manufacturer to match factory finish.

3.5 REPAIRS TO EXISTING ORNAMENTAL STEEL FENCES AND GATES NOTED TO REMAIN ON DRAWINGS

A. Repair and/or replace existing damaged fence components, including alignment, spacing and replacement sections to match existing. Repairs shall be level and plumb.

B. Re-weld existing fence components as necessary.

C. Remove all rust and corrosion, prime and prepare ornamental fencing for field finishing as specified in Division 9.

3.6 PROTECTION

A. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

END OF SECTION 32 31 19

SECTION 32 18 24
TRACK & FIELD INGROUND EQUIPMENT & LINE MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Full knowledge and understanding of all drawings, specifications, and general provisions of the bidding documents and related foundation and utilities work is required of the Synthetic Surfacing Contractor (SSC).

1. This section covers all labour and materials required to install a first-class, synthetic track and field surface.

2. The General Contractor (GC) is responsible for the installation, if any, of the track sub-base-works, drainage systems and asphalt base-works, designed by others, to corrected levels per IAAF/NCAA requirements as required or detailed in the project drawings and these specifications.

3. The SSC is responsible for installing all synthetic-surfacing materials as designated in the project drawings and these specifications.

4. The SSC is responsible for all line markings required for USATF, NCAA, scholastic or youth track and field events as directed by these specifications and the Owner.

5. The GC is responsible for the purchase and installation of all inground track and field equipment if required.

1.2 CODES AND STANDARDS

A. Codes and standards follow the current guidelines set forth by the International Association of Athletic Federations (IAAF) and the National Collegiate Athletic Association (NCAA). Where discrepancies are noted between these various governing bodies, the rules of the NCAA shall be enforced.

1.3 SUBMITTALS

A. The following information shall be submitted by the SSC with the bid documentation:

1. Standard printed specifications of the synthetic surfacing system that is being installed.

2. Installation process and requirements for the base, and any conditions that may limit the sports installation, or affect quality of installation.

3. Temperature / climatic conditions limiting quality of installation.

4. The SSC is required to provide documentation that shows the selected specified and installed product meets the IAAF Performance Specification for Synthetic Surfaced Athletics Tracks (Outdoor) and is certified in terms of the IAAF certification system as updated on April 1, 1999.

5. SSC to provide a list of completed facilities, minimum of 10, which are certified to meet IAAF/NCAA rules & regulations, utilizing the same product as specified.

B. The following information shall be submitted by the SSC as requested by the Owner prior to installation:

1. Provide a five- (5) year manufacturer's warranty against workmanship, installation and materials on the synthetic surface.

2. The SSC installing the material shall submit an affidavit attesting that the surfacing material to be installed meets the requirements defined in the manufacturers currently published specifications and any modifications outlined in these technical specifications prior to the commencement of any work.

3. A letter signed by an authorized representative of the SSC, that the track and field surfacing has no measurable traces of heavy metals, leachable mercury, and any other hazardous materials identified by the EPA. A 8" x 10" sample of the material to be installed, for testing by the owners independent laboratory to verify the above and establish parameters against which random spot tests by the owners agent during installation can be compared. This sample must be provided prior to installation.

4. A further product sample 8" x 10" in size, the same colour, texture, thickness, etc. as the type of surfacing to be installed for this project. This must be a representative sample of the product for comparison of color and texture during installation. This sample must be submitted and approved by the Owner prior to installation.

5. Upon completion of all line Markings, the SSC shall submit to the Owner a certification of accuracy submitted by a Registered Engineer or Surveyor. This document shall state that the track markings and layout meets the NCAA requirements and the requirements of these bid documents.

1.4 QUALITY ASSURANCE

A. Bids will only be accepted from those SSC that have completed at least 10 Track and Field facilities that have been properly certified to meet IAAF/NCAA specifications or rules. The SSC shall have installed a minimum of ten (10) tracks with a product that has been approved by the IAAF and meets all requirements of the IAAF Performance Specification for Synthetic Surfaced Athletics Tracks (Outdoor).

B. The synthetic track surface shall be installed by authorized applicators of the approved manufacturer, acceptable to the Owner. The Owner reserves the right of final acceptance with regards to any crewmembers of the SSC.

C. Each bidder shall be fully acquainted with the existing facility and utilities and shall fully understand the difficulties and restrictions attending the execution of the work under contract. All bidders shall advise the Owner before submitting bids of any restrictions or anticipated difficulty.

D. All material shall be guaranteed to the extent that the surfacing:

1. Has been manufactured and applied in accordance with these and the manufacturer's specifications.

2. Will hold fast and/or adhere to the asphalt, concrete, edging, filler and patches or overlay materials.

3. Will perform as specified in these specifications and the specifications of the product manufacturer in the current standard product information literature and specification sheets.

4. Is Ultra-Violet resistant and will not de-laminate, bubble, blister, fade, crack or wear excessively during the guarantee period.

E. All machinery and materials used must be only those approved by the Owner and the approved manufacturer of the selected synthetic surfacing material.

1.5 SPECIAL PROJECT CONDITIONS

A. Any required drainage and base works are the responsibility of the GC. The GC will provide a technician on-site during sub-contract installations through the completion of the contract.

B. The SSC will provide a technician who will review the asphalt specification as supplied by the GC and accepting that the specification is acceptable, verify the suitability of the HMAC after installation.

1.6 SPECIFIC SCOPE OF WORK

A. At the completion of the construction of the track and field base, the GC shall supply to the SSC a survey of the base, to confirm that the slopes and elevations meet IAAF requirements, to determine that there are no birdbaths in excess of the allowable limits as specified and to show that the track and field areas will meet the rules of the sport.

B. The SSC shall provide all labour, materials and equipment to perform the following work:

1. Review Bidding documents and specifications; verify suitability of installation of, by GC's sub-contractors, the base to corrected levels and the in-ground track and field equipment.

2. Sufficiently clean down all areas to be surfaced and protect all areas not to receive synthetic surface.

3. Install approved synthetic surfacing material on all areas as defined by the Bidding documents.

4. Install removable synthetic surfacing (rubber or full pour polyurethane) plugs and handles in all throwing circles within synthetic aprons, pole vault boxes, and long/triple jump boards and, if included, apply synthetic surfacing to the sand pit covers and the steeplechase water jump pit cover.

5. Stripe all lane lines, start-finish lines, event markings, 3 sets of lane numbers (one colour) and runway borders according to NCAA standards per the listing hereafter and any other details outlined by the Owner.

C. 400m track markings (NCAA based)

1. Official NCAA Events:

a. 100 meters - One direction on home straight-away

b. 100 meter hurdles - One directions on home straight-a-way

c. 110 meter hurdles - One directions on home straight-a-way

d. 200 meters - All in lanes, one turns

e. 400 meters - All in lanes

f. 400 meter hurdles - All in lanes

g. 800 meters - Water fall start and 1-turn stagger

h. 1500 meters - Water fall start

i. 3000 meters - Water fall start

j. 3000 meter steeplechase - Water fall start

k. 5000 meters - Water fall start

l. 10,000 meters - Water fall start

m. 400 meter relay (4 x 100 meters) - All in lanes

n. 1600 meter relay (4 x 400 meters) - Three Turn Stagger

o. Shot Put, Discus, and Hammer events - paint dividing lines;

p. Shot Put, Discus, Hammer, and Javelin - paint sector lines (not in circle or on runway)

q. Javelin - paint foul line

r. Pole vault, long jump, triple jump, and javelin - paint runway lines

s. Common Finish Line - paint to NCAA rule book, alternating solid black square with open square

t. Lane Numbers - paint prior to common finish line, facing timing camera (disregard NCAA recommendation

u. International Zones, as per the NCAA rule book.

v. All starting lines to have the event name painted on the synthetic surface.

2. Other NCAA Relays:

a. 800 meter relay (4 x 200 meters) All in lanes

b. Sprint Medley Relay (200, 200, 400, 800 meters) - 2 turn stagger

c. Distance Medley Relay (1200, 400, 800, 1600 meters)

d. 3200 meter relay (4 x 800 meters)

e. 6000 meter relay (4 x 1500 meters)

3. Other College Events:

a. 1-mile run

b. Common finish line paint lean lines at 1 meter intervals, total 5 meters.

4. High School Events: (These events to be verified w/Owner prior to installation)

a. 300 meter hurdles

b. 1600 meters

c. 3200 meters

d. 1500 or 2000 meter steeplechase

5. Paint:

   a. All lane lines, start and finish lines to receive 2 coats

   b. Numbers are to be 36" high; three (3) sets of numbers are required, location verified by Owner prior to installation.

PART 2 PRODUCTS

2.1 TRACK AND FIELD SURFACING

A. Refer to Section 32 18 23 Synthetic Track Surfacing System for specifications.

2.2 MINIMUM SURFACE THICKNESS, COLOR AND SHORE HARDNESS `A' MEASUREMENTS

A. NOTE: These parameters apply to all surfaces being offered for installation. Please note that this is a two colour surface installation.

B. Minimum thickness – 13 mm

C. Shore hardness A - top layer 50; bottom layer 40

2.3. SURFACING MATERIAL

A. Minimum thickness: As specified in 2.2 above.

B. Colors: As specified in 2.2 above. All components shall match identically. The surface shall conform to all slopes and tolerances of the rules of the sport with no deviation in excess of 6mm under a 4m straightedge.

C. The finished surface shall have a flat matte finish.

D. Synthetic surfacing: Refer to specifications in Section 32 18 24

E. Synthetic surfacing material shall exhibit a high resistance to track shoe spike traffic, cigarette burns and chemical agents.

2.4 CRACK FILLER & PATCHING MATERIAL

A. Material for all cracks and patching shall be an approved material compatible with the specified surfacing. Specified material shall be per the manufacturer's specification.

2.5 INGROUND TRACK AND FIELD EQUIPMENT

A. The GC is responsible to provide and install all permanent, in-ground track and field event equipment as may be required and shown on the project drawings.

B. Equipment is available from the following contractors:

1. UCS, Inc., Mr. Jeffery Schwartz, One Olympic Drive, Orangeburg, NY 10962, Tel: 1-800 526 4856

2. New Nevada Plastics, Mr. Stephen Chappell, 1601 Fairview Drive, Carson City, NV 89701, Tel: 1-800 537 7117

3. M-F Athletic Company, Mr. Mark Strawderman, P.O.Box 8090, Cranston, RI 02920-0090, Tel: 1-800 556 7464

C. The following inground equipment is required [*model # is UCS equivalent*]:

1. Pole Vault boxes: Provide [*4 #711-1100*] cast aluminium vault boxes. The SSC shall provide synthetic surfacing material plugs, which are to be, installed level to the surfacing of the respective runway and be of similar texture as the surrounding synthetic surfacing.

2. Take-Off Boards: Provide [*12 #519-2100*] take-off board systems.

3. Shot Put Toe Boards: Provide [*2 #716-1630*] shot put toe boards.

4. Shot Put Rings: Provide [*6 # 725-2540*] shot put circle rings.

5. Discus Rings: Provide [*1 # 725-2530*] discus circle rings.

6. Combination Hammer / Discus Cage: Provide [*1 # 570-4100*] hammer / discus cage with ground sleeves. Cage must meet IAAF rules.

7. Hammer/Discus Conversion Ring: Provide [*1 # 725-2535*] hammer/discus conversion ring.

8. Water Jump Hurdle: Provide [*1 # 506-5408*] adjustable water jump hurdle with sleeves.

9. Water Jump Cover: Provide [*1 # 505-5420*] aluminium water jump cover. SSC is to install track surfacing onto the cover. The cover, when installed with synthetic surfacing on it shall be flush with the surrounding area. GC to contact inground equipment manufacturer prior to constructing steeplechase water jump, for proper building instructions for water pit & construction of cover.

10. Removable Track Curbing: Removable track curbing [*# 792-9410*] shall consist of extruded anodized gold aluminium section constructed to allow portable installation. The curb shall meet the requirements of the IAAF. The curb will run the length of the 400m track **(with a section to run alongside the water jump inside of lane one on the second bend. The*

sections indicated on the drawings shall be removable when the curb is fully installed to allow passage of athletes.)

D. Sand: All sand for the long/triple jumps sand pits shall be clean, washed, white sand, containing not more than five percent (5%) clay and shall be free of trash, organic matter, and rock. Installed sand to meet all specifications of the IAAF - washed river sand, 0 to 2mm graining, no organic components, max 5% of weight up to 0.2mm. Prior to installation the GC shall provide the Owner with a one- (1) gallon sample for approval.

E. Line Markings: Shall be a paint approved by the track and field surfacing manufacturer and guaranteed to last a minimum of one year.

PART 3 EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. The GC is to purchase and install all fixtures and structures, and all inground track & field equipment.

B. The SSC is to purchase and install all synthetic surfacing, including plugs for any pole vault boxes, throwing circles and take-off boards; surfacing on all junction boxes.

C. The following installation requirements must be met by the SSC:

1. The SSC is required to follow the operations listed under Section: Specific Scope of Work.

2. Installation by approved technicians. Local laborers may be hired for non-technical work, only.

3. Technical representative from the approved manufacturer of the synthetic surfacing must verify suitability of the installation of the asphalt base for the track and field surface.

3.2 TIMING, LIMITATIONS, AND CONDITIONS AFFECTING INSTALLATION

A. Weather and Climate: If in the opinion of the synthetic track surfacing manufacturer or the Owner, weather and climatic conditions are having or will have an adverse effect on installation; work shall be delayed until the adverse condition has passed.

B. Adjacent and Concurrent Construction: Installation shall not take place until the completion of adjacent or concurrent construction operations which generate dust, airborne abrasives, or any other by-product that, in the opinion of the Owner or synthetic track surfacing manufacturer, would be harmful to the track material.

3.3 LINE MARKINGS

A. General line markings of the track and field events, shall be spray applied, using only paint, primers and finishes supplied and guaranteed by the approved manufacturer and/or supplier.

B. All markings shall be spray applied under the direction of a qualified line marker, having marked a minimum of 20 track and field facilities, which meet the IAAF or NCAA rules and regulations. The line marker shall be approved by SSC and experienced in the layout of track and field markings.

C. All markings shall be in accordance with the rules of the NCAA and shall be certified for accuracy.

D. The SSC shall submit a certification of accuracy prepared by the registered Engineer or Surveyor. The Engineer or Surveyor shall certify the actual line markings on the facility, not the line markers drawings or computations The track markings and layout must meet NCAA requirements and the requirements of the drawings and specifications.

3.4 INSTALLATION OF IN-GROUND TRACK AND FIELD EQUIPMENT

A. The installation of any throw circles, pole vault boxes, long jump/triple jump take-off boards, is the responsibility of the GC.

B. It shall be the GC's responsibility to see that each field event item is supplied and installed as per the manufacturer's specifications and NCAA rules. The items where synthetic surfacing material must be installed up to or on top of must be installed prior to the installation of the synthetic surfacing material. The pole-vault boxes, pit covers and take-off boards if any shall receive track and field surfacing.

END OF SECTION 32 18 24