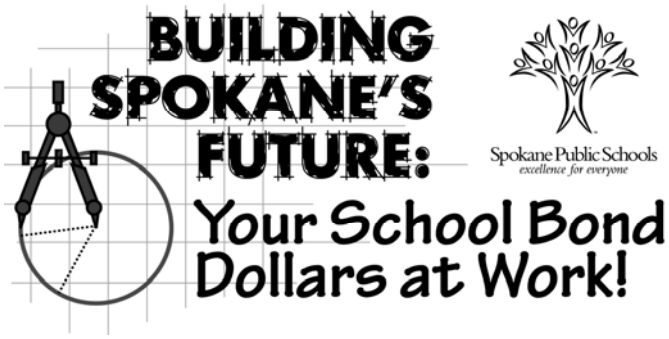

BEST PRACTICES MANUAL

SPOKANE PUBLIC SCHOOLS
2015

Spokane Public Schools
Capital Projects and Planning
2815 East Garland Avenue
Spokane, WA 99207

SPS Drawing Standards

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DRAWING STANDARDS

A. SHEET NUMBERING

1. Follow AIA standards:

    0- General (symbols, legend, notes, etc)
    1- Plans (horizontal views, including ceiling plans)
    2- Elevations (exterior)
    3- Sections
    4- Large-Scale Views (plans, interior elevations, stair sections, or sections that are not details)
    5- Details
    6- Schedules and Diagrams
    7- User Defined
    8- User Defined
    9- 3D Representations (isometrics, perspectives, photographs)

2. Sheet numbers can be either 1.xx or 10x, but make sure that numbers are consistent across all disciplines. For example, if sheet A1.10 is the first floor plan, then sheets M1.10, E1.10, etc. should also be the first floor plans.

B. SHEET NAMING

1. For sheet naming, be as specific as possible, i.e. “Roof Details” not just “Details,” or “First Floor Plan- Hydronics” not just “First Floor Plan- Mechanical,” etc.

C. TITLE BLOCK

1. Title block shall have sheet number in the lower right hand corner, with sheet name immediately adjacent.

D. FILE NAMING

1. All drawing file types that are sent to the school district (autocad, pdf, etc) should be labeled with both sheet number and sheet name, i.e. “A110- First Floor Plan.”

END OF SECTION

SECTION 02 41 00 - DEMOLITION

A. SCOPE

1. Building and Site Demolition (separate section for Building and Site Demolition encouraged on larger projects):
   a. Demolition of building structures.
   b. Demolition of site improvements including paving, curbing, site walls, and utility structures.
   c. Demolition of below-grade foundations and site improvements to depth to avoid conflict with new construction or site work.
   d. Removal of hollow items or items which could collapse.
   e. Protection of site work and adjacent structures.
   f. Disconnection, capping, and removal of utilities.
   g. Pollution control during building demolition.
   h. Removal and legal disposal of materials.

2. Selective Demolition (separate section for Selective Demolition encouraged on larger projects):
   a. Selective demolition of interior partitions, systems, and building components designated to be removed.
   b. Selective demolition of exterior facade, structures, and components designated to be removed.
   c. Protection of portions of building adjacent to or affected by selective demolition.
   d. Removal of abandoned utilities and wiring systems.
   e. Notification to Owner of schedule of shut-off of utilities which serve occupied spaces. (Carefully coordinate with owner, especially on projects where owner operations remain active.)
   f. Removal and legal disposal of materials.
   g. Stipulate that shoring is contractor's "means and methods" responsibility unless indicated otherwise.
   h. Protection of landscaping, trees, shrubs and turf. (See tree-protection specifications, Section 31 10 00)

3. Hazardous materials (HAZMAT) and other contaminants. Carefully coordinate with owner's specialty consultant the following:
   a. Removal of asbestos or asbestos containing materials (ACM).
   b. Removal of other hazardous materials.
   c. Removal of underground oil tanks.

B. SCHEDULE

1. Items for protection during demolition and construction: carefully coordinate with owner.
2. Items to be salvaged for reinstallation: carefully coordinate with owner.
3. Items to be salvaged for delivery to Owner: carefully coordinate with owner.
4. Items to be salvaged directly by Owner.
5. Utilities requiring interruption, capping, or removal: carefully coordinate with owner.

END OF SECTION

SECTION 02 82 00 – ASBESTOS REMEDIATION

A. SCOPE

1. Asbestos abatement, removal and disposal of asbestos containing materials.

B. PROJECT CLOSEOUT

1. For renovation projects, contractor is to provide proof of abatement in closeout documents.

2. For both renovation and new construction projects, the architect and contractor are each to provide a letter certifying that no Asbestos Containing Building Material (ACBM) was specified or used in the construction of the project. See sample letter following.

END OF SECTION

Sample Exclusion Letter

Date:

Project Name:

Project Number:

Project Address:

Following the requirements of 40 CFR 763.99 (a) (7): An asbestos inspection is not required for new school buildings built after October 12, 1998.

As the architect (or contractor or AHERA Building Inspector) responsible for the construction of the above referenced project, no Asbestos Containing Building Material (ACBM) was specified as a building material in any construction document for this building. Review of labels and MSDS for products used during this project confirms that no asbestos materials were used.

Spokane Public Schools will forward a copy of this signed statement to the EPA Regional Office and ensure this statement is included in the AHERA management plan for the above referenced project.

Signature: _____

Typed name: _____

State/License number for architect (or contractor): _____

Company: _____

If this letter is written by an AHERA inspector:

State of accreditation: _____

Accreditation number: _____

Note: Please attach a copy of the licensing document for the architect or contractor, or for the AHERA inspector, a copy of the inspector's accreditation certificate.

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

A. SCOPE

1. Plant-Mixed Cast-In-Place Concrete:
   a. Footings, foundations, and basement walls.
   b. Slabs, columns, beams, and decks.

B. QUALITY ASSURANCE

1. Standards: ACI 318, Building Code Requirements for Reinforced Concrete, and CRSI Manual of Standard Practice.

2. Testing: Independent testing laboratory.

3. Floor flatness and levelness tolerances:
   a. Subfloors under materials such as concrete toppings, ceramic tile, and sand bed terrazzo: ASTM E 1155, floor flatness (Ff) of 15, floor levelness (Fl) of 13.
   b. Subfloors under materials such as vinyl tile, epoxy toppings, paint, and carpet: ASTM E 1155, floor flatness (Ff) of 20, floor levelness (Fl) of 17.
   c. Subfloors under wood gym flooring: ensure slabs meet levelness requirements of gym flooring manufacturer.

4. Moisture curing of slabs: Direct contractor to assume full responsibility to ensure that concrete slabs are sufficiently dry to the criteria of floor covering manufacturer requirements. Require management of the concrete floor slab installation and post-installation curing, protection from re-saturation, and augmented efforts if necessary (such as mechanical dehumidification).

5. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only). NOTE: this criterion is applied at owner discretion, only to gravity loads.

C. PRODUCTS

1. Concrete design mixes, ASTM C 94, 28 day compressive strength:
   a. Columns, beams, walls, foundations, and footings: 3000 psi minimum. (Verify with owner if special circumstances suggest lower psi to avoid special inspections and testing.)
   b. Slabs on grade: 3000 psi minimum.
   c. Exterior site concrete and pads exposed to weather: 4000 psi minimum.

2. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.

3. Reinforcing materials:
   a. Reinforcing bars: ASTM A 615, Grade 60, deformed.
   b. Steel wire: ASTM A 82.
   c. Fiberglass or welded wire fabric, verify with Owner.

4. Concrete materials: ASTM C 150, Type I, Portland cement; ASTM C 33 normal weight aggregates; potable water.
   a. ASTM C 33, normal weight aggregates.
   b. ASTM C 330, light weight aggregates.

5. Concrete admixtures: Containing less than 0.1 percent chloride ions.

a. Air-entraining admixture: ASTM C 260, for exterior exposed concrete and foundations exposed to freeze-thaw.
b. High-range water-reducing admixture, super plasticizer: ASTM C 494, Type F or G for placement and workability.

6. Concrete finishes for formed surfaces:
   a. Surfaces not exposed to view: As-cast form finish.
   b. Surfaces exposed to view: Smooth form finish.

7. Monolithic slabs:
   a. Scratch finish for surfaces to receive concrete floor topping or mortar setting bed.
   b. Trowel finish for surfaces to be exposed to view or covered with resilient flooring, carpet, tile, or other thin finish system.
   c. Trowel and fine broom finish for surfaces to receive thin-set ceramic or quarry tile.
   d. Nonslip broom finish for exterior concrete platforms, steps, and ramps.
   e. Include sub-slab vapor retarder. NOTE: Vapor retarder to be installed directly under slab—with slab poured on top of vapor retarder.
   f. At gyms: No control joints needed- such joints encourage problematic slab curl. Let slab shrinkage cracks occur wherever they may, but with less potential for slab curl.
   g. Consider polished concrete floors in locker rooms, art rooms and other spaces used by students or public. Discourage use of plain slabs and sealer in such rooms, as cosmetically it never looks good.

8. Stairs:
   a. Provide preformed steel nosing on all exposed concrete stairs, both interior and exterior.
   b. DO NOT use grooved surfaces in concrete treads which will collect dust, debris and water.

9. Exterior concrete walls:
   a. Provide provisions for skateboard deterrents on walls: minimum 1” deep x 4” wide grooves at 4’-0” maximum. Coordinate layout with Owner.

END OF SECTION

SECTION 03 37 13 - SHOTCRETE

A. SCOPE

1. Pneumatically applied mortar and concrete.
2. Employ shotcrete in specialty applications only- primarily modernization projects where shotcrete may be used to strengthen weak foundation conditions.

B. PRODUCTS

1. Wet-mix, or dry mix acceptable:

2. Reinforcing materials: steel, verify with structural engineer for each application.

3. Shotcrete materials:
   a. ASTM C 150 Type I, Portland cement; ASTM C 33 normal weight aggregates; ASTM C 618, Type C or Type F fly ash; potable water.
   b. Or, proprietary pre-bagged shotcrete materials, as acceptable to structural engineer.

4. Concrete admixtures for wet-mix shotcrete: Containing less than 0.1 percent chloride ions. Verify the following with structural engineer:
   a. Air-entraining admixture: ASTM C 260.
   b. Water-reducing admixture: ASTM C 494, Type A.
   c. High-range water-reducing admixture, super plasticizer: ASTM C 494 Type F or G.
   d. Water-reducing, retarding admixture: ASTM C 494, Type D.

5. Auxiliary materials (verify with structural engineer):
   a. Liquid membrane-forming curing compound: ASTM C 309, Type 1, Class A.
   b. Bonding compound: Polyvinyl acetate or acrylic base.
   c. Epoxy adhesive: ASTM C 881, two-component material.

6. Finish:
   a. Natural gun finish.
   b. Granular texture, flash coat with wood float finish.
   c. Coarse texture, flash coat with rubber float finish.
   d. Smooth texture, flash coat with steel trowel finish.

END OF SECTION

SECTION 03 45 00 - ARCHITECTURAL PRECAST CONCRETE

A. SCOPE

1. General use guidelines: Use architectural precast concrete minimally, only when approved by owner. Do so in limited-scope applications listed herein, and avoid use of precast as large component of building façade, due to initial cost and the fact that precast is not a widely-used material in the SPS system.

2. Architectural Precast Concrete Applications:
   a. Historic restoration (especially in cast stone restoration, or as a complement to terra cotta).
   b. Interior: limited, special applications (at entrances, for example, if consistent with exterior treatment).
   c. Copings, sills, and limited accent elements inset in or complementary to masonry.

B. QUALITY ASSURANCE

1. Standards: ACI 318, Building Code Requirements for Reinforced Concrete; CRSI Manual of Standard Practice; PCI MNL 117, Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.

2. Testing: Independent testing laboratory.

3. Fabrication and Erection Tolerance Limits: PCI MNL 117.

4. Mock-Ups: Full-size typical unit.

5. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only).

C. PRODUCTS

1. Design Mix: 4,000 psi minimum, customized to application.

2. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.

3. Reinforcing Materials: as needed by design requirements.

4. Concrete Materials—select from the following appropriate materials. Introduce pigment as may be needed for historic preservation color match.
   a. White Cement: Portland cement, ASTM C 150, Type I or Type III.
   b. Standard Gray Cement: Portland cement, ASTM C 150, Type I or Type III.
   c. Fine Aggregate for Facing Mixes: (colored as may be needed in historic preservation projects) ASTM C 33.
   c. Coarse Aggregate for Facing Mixes: (colored as may be needed in historic preservation projects) ASTM C 33.
   d. Pigments: Nonfading lime resistant pigments.

5. Surface Finish: Select from the following. (Excessively coarse finishes are discouraged due to potential for soiling and water-retaining freeze-thaw degradation. Apply water repellant sealer to all precast. At non-exposed-to-view surfaces, such as top of parapets, apply an elastomeric coating as more aggressive weather protection.)

a. Abrasive blast finish.
b. Bushhammer finish.
c. Smooth finish.
d. Textured finish. NOTE: do not use exceedingly coarse textures that create graffiti or other cleaning problems (except 8' above grade, verify with owner).

6. Stairs: do not use precast for interior stair treads.

END OF SECTION

SECTION 04 01 00 - MASONRY RESTORATION AND CLEANING

A. SCOPE

1. Masonry Restoration:
   a. Repointing mortar joints.
   b. Repair of damaged masonry.
   c. Repair of damaged cast stone.
   d. Repair of terra cotta.
   e. Blasting: only soda blasting (when testing proves no damage to masonry surface).

2. Masonry Cleaning:
   a. Removal of plant growth.
   b. Washing and cleaning exposed masonry surfaces to remove weather-caused and pollution-caused soiling.
   c. Removal of stains, roofing tar, and other man-made discoloration.

B. QUALITY ASSURANCE

1. Materials: Cleaning materials acceptable to environmental agencies and authorities having jurisdiction.

2. Test Cleaning: assess extent of masonry restoration. If significant, undertake test cleaning operation during design to determine effective cleaning and restoration techniques.

C. PRODUCTS

1. Repointing Mortar: Match existing with strength suitable for project conditions. Introduce lime as needed to match existing mortar.

2. Patching Materials: Compatible with existing materials; visual matching. Use generic/natural materials to the greatest extent possible. Use coloring agent if necessary to match existing mortar. If necessary, use Cathedral Stone products for specialty repairs such as terra cotta or cast stone.

3. Cleaning Materials: Generally use PROSOCO products. Employ gentlest effective cleaning material and technique.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY

A. SCOPE

1. Unit masonry construction: including brick and concrete masonry units (CMU).

B. ACCEPTABLE PRODUCTS

1. Brick

2. Concrete Masonry Units
   a. Split face finish locations shall be approved by owner. Do not use at the interior of the building, including vestibules.

3. Flashing: Use elastomeric sheet flashing.

4. Masonry Sealer: see Section 07 19 00 for graffiti-resistant sealers for masonry.

C. EXECUTION

1. DO NOT use glass block at exterior applications.

2. Joints: Most joints acceptable. DO NOT use raked joints.

3. DO NOT use brick veneer below grade levels.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL

A. SCOPE

1. Structural steel for building construction and related anchors, fasteners, and connectors.

B. QUALITY ASSURANCE:

1. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only). NOTE: this criterion is applied at owner discretion, only to gravity loads.

C. PRODUCTS: No special requirements. Meet code requirements.

END OF SECTION

SECTION 05 21 00 - STEEL JOISTS AND JOIST GIRDERS

A. SCOPE

1. Steel joists and joist girders for floor and roof framing.

B. QUALITY ASSURANCE:

1. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only). NOTE: this criterion is applied at owner discretion, only to gravity loads.

C. PRODUCTS: No special requirements. Meet code requirements.

END OF SECTION

SECTION 05 31 00 - STEEL DECK

A. SCOPE

1. Steel Floor and Roof Deck Units.

B. QUALITY ASSURANCE:

1. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only). NOTE: this criterion is applied at owner discretion, only to gravity loads.

C. PRODUCTS:

1. Use acoustical decking when exposed in gymnasiums, shops, auditoriums or other spaces.

END OF SECTION

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

A. SCOPE

1. Cold-Formed Metal Framing Units.

a. Bracing of exterior masonry veneer.
b. Support of structures.

B. QUALITY ASSURANCE: No special requirements.

C. PRODUCTS: No special requirements. Meet code requirements.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

A. SCOPE

1. Metal Fabrications:
   a. Metal stairs.
   b. Steel pipe railings.
   c. Ladders for roof, elevator pit, other.
   d. Loose bearing and leveling plates.
   e. Framing and supports for overhead doors.
   f. Framing and supports for suspended operable partitions.
   g. Prefabricated building columns.
   h. Miscellaneous steel trim.
   i. Metal bar gratings, if any.
   j. Floor plate and supports.
   k. Pipe bollards.
   l. Elevator entrance sill angles.
   m. Rough hardware.
   n. Sun shades (consult with owner on finish when steel-fabricated).
   o. Other metal fabrications.
   p. Decorative fences and gates.

B. PRODUCTS

1. Metal Railings:
   a. Acceptable Exterior: galvanized steel. DO NOT USE prime-painted steel except with owner advance approval, and, if approved, always specify rust-inhibitive primer.
      i. DO NOT use aluminum.
   b. Acceptable Interior: galvanized steel, or stainless steel.
      i. DO NOT use aluminum, wrought iron, copper alloy. Exception: special circumstances when approved by owner for historic preservation.
      ii. DO NOT use wood railings on metal brackets, except when approved in advance by owner.
      iii. DO NOT use prime/painted steel.

2. Stairs and ladders:
   a. Acceptable Stairs: shop-fabricated metal with concrete treads (for general foot traffic), or all-metal at service locations (for service or mechanical access).
      i. DO NOT use spiral stairs, ship's ladders or alternating tread stairs except when approved by Owner in specialty applications such as theater loft access or mechanical service access. Exception: consider ship's ladders for roof access wherever possible. Review roof access and rooftop equipment service access convenience with Owner.
      ii. DO NOT use portable ladders.

3. Sunshades: DO NOT use ferrous metals for sunshades (unless fully galvanized).

4. Decorative Gates: Provide hold-open feature at gates (or a position where the gate is held open via a mechanical holding device, and does not allow wind to blow gate shut).

5. Installation Considerations: Ensure that all roof surfaces are readily accessible with built-in ladders or other access to all roof areas.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

A. SCOPE

1. Rough Carpentry:
   a. Exterior wood framed walls.
   b. Rooftop equipment bases and support curbs.
   c. Wood grounds, nailers, and blocking.
   d. Exterior sheathing.

B. QUALITY STANDARDS

1. Roof live load design criteria: 40 lbs. per sq. ft. (new facilities only). NOTE: this criterion is applied at owner discretion, only to gravity loads.

C. PRODUCTS

1. Use preservative-treated wood for all construction related to roofs (curbs, nailers, parapets, etc.)
2. DO NOT use wood for in-ground installation. Exception: portable building foundations using code-approved all-weather wood are acceptable.
3. For exterior sheathing, use fiberglass-mat faced, moisture and mold resistant gypsum sheathing (DensGlass or approved equal).
4. Use plywood for backing at wall mounted accessories.

END OF SECTION

SECTION 06 18 00 - STRUCTURAL GLUED LAMINATED UNITS

A. SCOPE

1. Structural Glued Laminated Units are acceptable, interior and exterior. If exterior, ensure that finish sealer system is UV resistant.

B. QUALITY ASSURANCE

1. Standards: Meet current ANSI fabrication and structural standards per building code.

C. PRODUCTS

1. Structural Glued Laminated Units:
   a. Industrial grade acceptable, but should be surfaced where exposed-to-view.
   b. At exterior locations, provide metal beam caps at exposed ends.

END OF SECTION

SECTION 06 20 00 - FINISH CARPENTRY

A. SCOPE

1. Finish Carpentry:
   a. Standing and running trim and rails.
   b. MDF wainscots and trim.

B. PRODUCTS

1. Interior Standing and Running Trim: any quality hardwood acceptable.
2. Rails: DO NOT use wood rails at exterior. At interior, historic preservation and other conditions may be approved by owner.
3. Exterior siding: DO NOT use wood exterior siding. (Use mineral fiber cement panel siding if approved by owner.)
4. Stairs: DO NOT use wood stair treads.
5. Exterior fencing: NO WOOD permitted.
6. Wainscots: MDF okay. DO NOT use wheatboard. Make wainscots higher as needed in rooms such as shops, chair storage, music, band, large instrument storage, PE equipment storage, etc. Use 7’ wainscot in stairs and landings and in all gym storage areas.
7. Chair Rails: Consider chair rails from MDF at discipline-oriented rooms. Provide chair rails in Administration/Reception/Waiting Rooms/Offices.

END OF SECTION

SECTION 06 41 00 - INTERIOR ARCHITECTURAL CASEWORK

A. SCOPE

1. Interior Architectural Casework:

B. QUALITY ASSURANCE

1. Standards: Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards for Premium Grade."
2. Mock-up/Sample: require fabrication of sample cabinet that includes all primary cabinet features: with door, standard drawer, file drawer, adjustable shelf, countertop, edging, etc.

C. PRODUCTS

1. Casework:
   a. Acceptable Countertops: plastic laminate, solid surfacing, epoxy-resin, stainless steel.
      i. DO NOT use: Ceramic, glass, or stone countertops.

   b. Acceptable Vertical Surface Finishes: plastic laminate, or hardwood veneer with stain and varnish finish. Melamine acceptable for casework interior (except in chemical storage areas where chemical resistant shelf-top surfacing should be used).
      i. DO NOT use: Plain painted finishes.

2. Construction Materials:
   a. Plywood: Use plywood as the typical substrate for plastic laminate at hinges/face frames, doors, drawer fronts, drawer boxes and mobile casework units. Particleboard is acceptable in other locations consistent with AWI standards.

   b. Shelves: ¾” thick, except 1” thick at shelves over 30” long.

   c. Avoid plastic laminate self-edge at primary countertops and window sills. Instead provide hardwood edge, 3/16” minimum thickness.

D. EXECUTION

1. DO NOT use wood casework lockers.
2. DO NOT use casework lockers for musical instrument storage. (Use metal lockers.)
3. DO NOT use custom, odd-size pulls (such as 3-3/4” center-to-center wire pulls)
4. DO NOT use wheat board.
5. Pay particular attention to special sizes and separations for file drawers (for Pendaflex).
6. Training room stations require special pulls and slide-out shelves. Coordinate with Owner.
7. Provide 1” x 1” angle stops at all chemical storage shelves per Health regulations.
8. Provide minimum 18” clearance above countertop where paper towel dispensers are located.
9. Coordinate keying with Owner. Typically:
   a. Wardrobe cabinets shall be keyed alike to classroom lock.
   b. IT cabinet locks shall be of a different key than the rest of the classroom, but shall be keyed alike throughout the facility.

END OF SECTION

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

A. SCOPE

1. Bituminous Dampproofing:
   a. Employ at exterior surfaces of foundation walls where interior is below grade.
   b. NOTE: use waterproofing where active or seasonal groundwater is present, and employ drainage/relief system at foundation perimeter.

B. PRODUCTS

1. Use products appropriate for dampness or groundwater conditions identified in geotechnical report.

END OF SECTION

SECTION 07 19 00 - WATER REPELLENTS

A. SCOPE

1. Water Repellents for Vertical Surfaces:
   a. Unit masonry, concrete and precast surfaces (exterior).

B. PRODUCTS

1. Water Repellents:
   a. Professional Products of Kansas, Inc. (PPK) PROFESSIONAL Water Sealant Anti-Graffitiant Super Strength and/or Extra Strength, using multiple coats depending on surface protected, applied to all masonry, concrete and precast concrete for consistent cosmetic color and sheen. Achieve graffiti protection as recommended by manufacturer (not just masonry seal)—and ensure that specifications stipulate appropriate coats for the masonry or concrete surface (knowing that some surfaces require more product than others).

      TYPICAL APPLICATION: Provide one (1) coat sealant on all surfaces plus two (2) coats anti-graffiti products from grade to 8’ high (or door head/window head height).

   b. For smooth concrete surfaces in high profile areas, Prosoco Blok-Guard and Graffiti Control II with oil base is an acceptable anti-graffitiant, follow manufacturer’s application recommendations. Confirm use with Owner prior to specifying.

END OF SECTION

SECTION 07 21 00 - BUILDING INSULATION

A. SCOPE

1. Building insulation and vapor retarders:
   a. Foundation walls, board type.
   b. Thermal insulation in steel stud exterior walls, blanket type.
   c. Acoustic insulation at interior partitions, blanket type.
   d. Sheet vapor retarders (flame-spread rated when exposed).

B. INTERIOR AIR QUALITY

1. DO NOT USE insulation containing formaldehyde.

C. ACCEPTABLE PRODUCTS

1. Most insulation products acceptable.
   a. DO NOT USE bead board rigid insulation.
   b. DO NOT USE foamed-in-place insulation, except in masonry cores.
   c. DO NOT USE exterior insulation and finish systems (EIFS).

END OF SECTION

SECTION 07 24 00 - EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

A. SCOPE: **NOT PERMITTED. DO NOT USE THESE SYSTEMS.**

END OF SECTION

SECTION 07 31 00 – SHINGLES

A. SCOPE

1. Shingles for roofing applications.

B. WARRANTY

1. Shingle Warranty: Manufacturer's 50-year warranty.

C. PRODUCTS

1. Asphalt Shingles:
   a. Type: Three dimensional laminated strip shingles, UL Class A, ASTM D 3018.
   b. Accessories: Hip and ridge shingles; felt, ASTM D 226; rubberized asphalt perimeter underlayment; metal flashing and drip edge.

2. Wood Shingles and Wood Shakes: DO NOT USE wood shingles or wood shakes.

3. Slate Shingles:
   a. Type: Standard, ASTM C 406, Grade S1.
   b. Accessories: Felt, ASTM D 226; rubberized asphalt perimeter underlayment; metal flashing and drip edge.

4. Metal Shingles: DO NOT USE metal shingles, except for copper or other historic or special applications. Obtain owner approval.

5. Installation Considerations:
   a. Apply rubberized asphalt underlayment (ice/water shield) in all valleys, above obstructions, and from eave edge to a point 36" inside of exterior wall.
   b. Protect occupants from roof run-off with gutters.
   c. Use snow guards as appropriate. Avoid snow avalanche conditions.

END OF SECTION

SECTION 07 32 00 - ROOFING TILES

A. SCOPE

1. Roofing tiles for roofing applications.

B. QUALITY ASSURANCE

1. Field-Constructed Mock-Up: Typical area.

C. WARRANTY

1. Roofing Tile Warranty: Manufacturer's 50-year warranty.

D. ACCEPTABLE PRODUCTS

1. Clay Roofing Tiles, Concrete Roofing Tiles, Mineral/Fiber Roofing Tiles:
   a. Type: Obtain owner approval.
   b. Accessories: Hip and ridge tiles; felt, ASTM D 226; rubberized asphalt perimeter underlayment; metal flashing and fasteners.
   c. Specialties: Use snow guards as appropriate. Avoid snow avalanche conditions.

2. Installation Considerations:
   a. Apply rubberized asphalt underlayment (ice/water shield) in all valleys, above obstructions, and from eave edge to a point 36" inside of exterior wall.
   b. Protect occupants from roof run-off with gutters.

END OF SECTION

SECTION 07 41 13 - MANUFACTURED ROOF PANELS

A. SCOPE

1. Manufactured Roof Panels:

B. WARRANTY

1. Finish Warranty: 20 years.
2. Leak Warranty: 20 years.

C. PRODUCTS

1. Manufactured Roof Panels:
   a. Sheet Materials: Galvanized steel sheet, ASTM A 525 or ASTM A 526, G90 coating, 24 gage minimum.
   b. Acceptable Finishes: Fluoropolymer, Kynar 500; zincalume finished with Dura Tech 5000 (PVFZ) or approved equal; factory-finished sheet metal with 4 mil PVC "Plastisol" coating.
   c. Accessories: provide snow stops as follows:
      i. Above entrances.
      ii. Over entire area of high roofs (to avoid cascading onto low roof).
      iii. Above rooftop equipment and major penetrations (such as ductwork, vents, etc.)

END OF SECTION

SECTION 07 42 00 - MANUFACTURED WALL PANELS

A. SCOPE

1. Manufactured Wall Panels:
   a. Field-assembled wall panels with concealed fasteners, panel supports, and anchorage.

B. QUALITY ASSURANCE

1. Meeting all SMACNA other applicable industry standards.

C. WARRANTY

1. Finish Warranty: 20 years.

D. PRODUCTS

1. Manufactured Wall Panels:
   a. Sheet Materials: Steel or aluminum of sufficient gauge/thickness to resist damage, 24-gage minimum or equivalent aluminum thickness.
   b. Finish: Fluoropolymer, Kynar 500 or equivalent lifetime finish—verify with owner.

END OF SECTION

SECTION 07 50 00 – SINGLE-PLY MEMBRANE ROOFING

A. SCOPE

1. Single-ply membrane roofing and roof insulation.

B. QUALITY ASSURANCE

1. Listing: UL Class B external fire exposure, and Class 60 wind uplift.

C. WARRANTY

1. Membrane Roofing Warranty: Manufacturer's 10 year warranty. Provide fastening pattern and other measures as necessary for extended 10-year factory wind uplift warranty for 90 mile per hour wind. Provide written factory warranty accordingly.
   a. Roofing must allow for the following without voiding warrantees:
      i. trimming of exposed fasteners.
      ii. cut openings in membrane at roof drains as large as roof drain leaders.

D. PRODUCTS

1. Membrane Roofing:
   a. Type: Mechanically fastened or fully adhered.
   b. Membrane: Thermoplastic Polyolefin (TPO) Sheet (60 mils)
      i. ENERGY STAR® labeled Cool Roof with an emmissivity of at least 0.9 for a minimum of 75% of the roof surface is required.

2. Auxiliary Materials:
   a. Gypsum Board Base: ASTM C 36, Type X, as required for roof assembly.
   b. Insulation: Polyisocyanurate board: R-30 minimum.
   c. Sheet Metal Accessories: SMACNA and NRCA recommendations.

3. Installation guidelines:
   a. Roofing to be mechanically fastened or fully adhered. DO NOT USE ballasted roofs.
   b. Slope: 1/2” per foot preferred. Review with owner if circumstances suggest less than 1/2" per foot. Do not reduce slope to less than required for manufacturer’s warranty.
   c. Ponding: design roof to eliminate ponding.
   d. Review roof access and rooftop equipment service access convenience with owner. On large, complex projects ensure there are multiple, convenient access points/routes.

END OF SECTION

SECTION 07 60 00 - FLASHING AND SHEET METAL

A. SCOPE

1. Flashing and Sheet Metal.
2. Gutters, Water Collecters, Conductors.

B. ACCEPTABLE PRODUCTS

1. Flashing and Sheet Metal:
   a. Copper sheet metal.
   b. Stainless steel sheet metal.
   c. Factory-finished galvanized sheet metal.
   d. Galvanized steel sheet metal.
   e. Anodized or factory finished aluminum.
   f. DO NOT USE lead sheet metal.
   g. DO NOT USE flexible flashing in exposed conditions.
   h. DO NOT USE field-finished sheet metal.

2. Gutters, Water Collectors, Conductors:
   a. Metal piping.
   b. Copper sheet metal.
   c. Stainless steel sheet metal.
   d. Factory-finished galvanized steel sheet metal.
   e. Galvanized steel sheet metal.
   f. Anodized or factory finished aluminum.
   g. DO NOT USE molded PVC or plastic.
   h. DO NOT USE field-painted metal.

3. Installation Guidelines:
   a. Slope gutters to drain, 1/8” per foot minimum.
   b. Minimize use of gutters and downspouts. Limit use to protection above entry/exit pathways.

END OF SECTION

SECTION 07 72 33 - ROOF HATCHES

A. SCOPE

1. Roof Specialties and Accessories:

B. PRODUCTS

1. Roof Hatches:
   a. Lid: Opaque.
   b. Accessory: "Ladder-up" safety pole.
   c. Lock: Provide keyed cylinder lock, not padlocks.

C. INSTALLATION:

Ensure that all roof areas are accessible. Provide at least one complete form of access from the interior for each 100,000 sq. ft. of roof area. Preferred primary access: via ship's ladder. For unusual roof elevation changes, provide additional access from the interior.

END OF SECTION

SECTION 07 84 00 - FIRESTOPPING

A. SCOPE

1. Firestopping.

B. QUALITY ASSURANCE

1. Meet code requirements.

C. PRODUCTS

1. Firestopping is typically in concealed conditions and has no special requirements. If exposed-to-view firestopping is required, review installation with Owner for any maintenance issues.

END OF SECTION

SECTION 07 92 00 - JOINT SEALERS

A. SCOPE

1. Joint sealers at interior and exterior vertical and horizontal joints.

B. QUALITY ASSURANCE

1. Field-Constructed Mock-Ups: Each joint type.

C. ACCEPTABLE PRODUCTS

1. Urethane Elastomeric Joint Sealants:
   a. Type and Application: One-part nonsag urethane sealant, ASTM C 920, for vertical-surface joints, exterior use. Use Sonolastic or approved equal for exterior joints.
   b. Type and Application: One-part pourable urethane sealant, ASTM C 920, for horizontal-surface joints, interior use at concrete slabs exposed to view.

2. Silicone Elastomeric Joint Sealants:
   a. Type and Application: One-part silicone sealant, ASTM C 920, for vertical-surface joints, modulus as required for application, exterior use.

3. Latex Joint Sealants (interior only):
   a. Type: Acrylic-emulsion, ASTM C 834.
   b. Application: Interior joints in vertical and overhead surfaces with limited movement.

4. Compression Seals:
   a. Type: Preformed foam sealant.
   b. Application: Wide exterior joints in vertical surfaces.

5. Auxiliary Materials:
   a. Plastic foam joint fillers.
   b. Elastomeric tubing backer rods.
   c. Bond breaker tape.

END OF SECTION

SECTION 07 95 13 - EXPANSION JOINT COVER ASSEMBLIES

A. SCOPE

1. Expansion Joint Cover Assemblies:

B. QUALITY ASSURANCE: No special requirements.

C. PRODUCTS:

1. Use all-metal factory-finished assemblies.
   a. DO NOT USE vertical assemblies with resilient filler materials.

2. Installation guidelines:
   a. Ensure exterior joints are fully covered to prevent debris entry.
   b. Ensure that floor expansion joint assemblies are flush, and present minimal tripping hazard. If appropriate, use expansion joint that accommodates floor material as filler.

END OF SECTION

SECTION 08 11 00 - STEEL DOORS AND FRAMES

A. SCOPE

1. Steel Doors:
   a. Interior steel doors and frames.
   b. Exterior steel doors and frames.

B. QUALITY ASSURANCE

1. Performance Standards:
   a. Provide fire-rated doors as required by code.
   b. Provide thermal-rated exterior doors with insulated cores.
   c. Provide sound-rated doors at appropriate locations such as music rooms, auditorium doors, and other rooms where sound isolation is needed (with full-perimeter sound gaskets). Grout all thermal and sound rated door frames.
   d. Grout all frames at High School and Middle Schools, as well as at high traffic areas and exterior doors at Elementary Schools. Provide bituminous coating (or similar) inside all grouted frames to prevent rust.

2. Qualified Suppliers:
   a. Architectural Hardware
   b. Yadon Construction Specialties
   c. Spokane Hardware

C. PRODUCTS

1. Manufacturers:
   a. Subject to compliance with requirements, provide standard hollow metal doors and frames by one of the following:
      i) Ceco Corporation
      ii) Curries Company
      iii) Steelcraft Company
      iv) Amweld

2. Materials:
   a. All doors and frames shall be manufactured of commercial quality cold rolled steel per ASTM-A366 and A568 general requirements; galvanized to A60 or G60 or galvanealed to A40 minimum coating weight standard per ASTM-A924. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569.

   b. Supports and anchors shall be fabricated of not less than 18-gauge sheet steel, galvanized where galvanized frames are used.

   c. Where items are to be built into exterior walls, inserts, bolts and fasteners shall be hot dipped galvanized in compliance with ASTM-A153, Class C or D as applicable.

   d. Rust inhibitive enamel or paint primer shall be used, baked on, and suitable as a base for specified finish paints complying with ANSI A224.1, “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces on Steel Doors and Frames.”

   e. Provide all hollow metal doors and frames receiving electrified hardware with molex wiring harness and concealed plug connectors on one end to accommodate

up to twelve wires. Coordinate molex connectors on end of the wiring harness to plug directly into the electrified hardware and the electric hinge.

f. Where specified supply embossed steel doors with wood grain appearance. Wood grain shall follow the pattern of a stile and rail wood door with both vertical and horizontal grain patterns. Doors with vision lites are required to have wood grain window kits.

3. Doors:

a. Provide 1-3/4" thick doors of materials and ANSI/SDI-100 grades and models specified below, or as indicated on drawings or schedules:

i) Interior Doors: Level 2, Model 2 - Seamless

a) Interior doors shall be minimum 18-gauge steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door.

1) Ceco: Regent-18-SEM
2) Curries: 70N-18
3) Steelcraft: LF18

ii) Exterior Doors: Level 3, Model 2 – Seamless

a) Exterior doors shall be minimum 16-gauge galvanized or galvanealed steel with both lock and hinge rail edge of door intermittently welded, filled and ground smooth the full height of door. Exterior doors shall be insulated with a solid slab of expanded polystyrene or polyurethane foam permanently bonded to the inside of each face skin. The top of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes.

1) Ceco: Legion-16-SEM
2) Curries: 707N0-16
3) Steelcraft: LF16-Polystyrene

iii) Wood Grain Doors: Level 2, Model 1

a) Where indicated, provide doors with a wood grain pattern engraved into a stainable steel surface. Door face skins shall be galvanized or galvanealed with .005" deep grain to accent the color stain application. Doors shall be available in a variety of factory stained colors.

1) Ceco: Madera-16-SEM
2) Curries: CurriStain-707N-16

iv) Security Doors: Level 3, Model 2 – Seamless

a) Doors shall be minimum 16-gauge steel with both lock and hinge rail edge of door continuously wire welded the entire height of the door. Doors shall be reinforced, stiffened, insulated, and sound deadened with continuous 20 gauge vertical steel stiffeners spaced not more than 6" (152) apart. The stiffener ends shall be welded together at the top and bottom ends. All spaces between stiffeners shall be insulated with .75 pound density fiberglass insulation. The

top of all doors shall be closed flush by the addition of a 16-gauge screwed-in top cap and sealed to prevent water infiltration. The bottom channel shall include weep-holes.

1) Ceco: Medallion-16
2) Curries: 747T-16
3) Steelcraft: BW16

v) Bullet Resistant Doors

a) Bullet resistant hollow metal doors shall be constructed with vertical steel stiffeners and fully welded vertical edge seams for enhanced strength and aesthetic appearance. Internal door construction and concealed armorplate shall vary and is dependent on the required ballistic rating. Provide ballistic level doors as follows:

1) Level 1: Super 38 Automatic
2) Level 2: .357 Magnum Revolver
3) Level 3: .44 Magnum Revolver
4) Level 4: 30-06 Rifle

b) Subject with compliance to the outline requirements, provide products by the following manufacturers:

1) Ceco: Armorshield
2) Curries: 847/857

b. Egress Path Marking:

i) Where indicated provide doors with integral electroluminescent low-level exit signage that complies with NFPA101 for Floor Proximity Exit Signs. Doors shall include 22-gauge two conductor wire harness with quick connect connectors door face hole punch at 11" from bottom of door and centered in door width.

c. All doors shall be reinforced for hardware as shown below where necessary to preclude the use of thru-bolts.

i) Exit Devices: 14-gauge
ii) Door Closers: 12-gauge

d. All doors shall be beveled 1/8" in 2" and shall have top and bottom channels of not less than 16-gauge, flush or inverted, welded to the face sheets. Doors shall have a full height 14-gauge hinge rail reinforcement channel, or individual 10 gauge hinge reinforcements.

e. All doors to conform to ANSI-A250.4 Level "A" criteria and shall be tested to 1,000,000 operating cycles and 23 twist tests. Certification of Level "A" doors is to be submitted with approval drawings by supplier upon request. Do no bid or supply any type or gauge of door not having been tested and passed these criteria.

4. Frames:

a. Provide hollow metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the drawings and schedules. Conceal fastenings unless otherwise indicated.

i) Interior Frames: Level 2, 16-gauge

ii) Exterior Frames: Level 2, 16-gauge, galvanized or galvanealed
iii) Security Grade Frames: 14-gauge

a) Ceco: SU Series
b) Curries: M Series
c) Steelcraft: F Series

b. Egress Path Marking
i) Where indicated provide frames with integral egress path markings that comply with IBC 10.24 "Luminous Path Markings" that have electroluminescent light strips around the perimeter of opening. Frames shall include all knockouts, junction boxes and FlatLite kits as required for specified installation.

c. All frames over 36" in width shall be 14 gauge.

d. Fabricate frames with mitered and faces only welded corners, re-prime at the welded areas. All welds to be flush with neatly mitered or butted material cuts.

e. All frames shall have minimum 7 gauge hinge reinforcements with an additional high frequency 12-gauge hinge reinforcement welded to the top hinge, 14-gauge lock strike reinforcing, and 12-gauge closer reinforcing.

f. Provide temporary shipping bars to be removed before setting frames.

g. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single frames and two (2) silencers on heads of double frames.

h. Provide minimum 0.0179" thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

5. Fabrication:

a. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.
i) Clearances shall be no more than 1/8" at jambs and heads except between non fire rated pairs of doors which may be no more than 1/4". Not more than 3/4" at the bottom of the doors.

b. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.

c. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

d. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

e. Unless otherwise indicated, provide exposed fasteners with countersunk flat or oval heads for exposed screws and bolts.

f. At exterior locations and elsewhere as shown or scheduled, assemblies fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.
   i) Unless otherwise indicated, provide thermal-rated assemblies with a minimum U-value rating of 0.41 Btu/sq. ft. x h x deg F.

g. Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413.
   i) Unless otherwise indicated, provide acoustical assemblies with STC sound ratings of 33 or better.

h. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI-107 and ANSI-A115 Series specifications for door and frame preparation for hardware.

i. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project Site. Provide internal reinforcements for all doors to receive door closers and exit devices.

j. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

k. Provide glazing stops with minimum 0.0359-inch-thick steel or 0.040-inch thick aluminum.

l. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

m. Provide screw-applied, removable, glazing beads on inside of glass and other panels in doors.

D. INSTALLATION

1. Install steel doors, frames, and accessories according to shop drawings, manufacturer's data, and as specified.

2. Comply with provisions of SDI-105, "Recommended Erection Instructions for Steel Door Frames," unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
   a. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.

   b. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.

   c. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding

heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.

d. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

e. Install fire-rated frames according to NFPA 80.

3. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100. Install fire rated doors with clearances specified in NFPA 80.

4. For interior locations, install hollow metal frames with relites such that the glazing stops are placed on the corridor side instead of the secure side (in order to allow for the installation of blinds on the secure side).

E. ADJUSTING AND CLEANING

1. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

2. Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08 14 16 - FLUSH WOOD DOORS

A. SCOPE

1. Flush Wood Doors: Interior solid core flush doors (no exterior wood doors permitted except in special situations, such as historic preservation—obtain owner approval).

B. QUALITY ASSURANCE

1. Performance Standards:
   a. Provide fire-rated doors as required by code.
   b. Provide sound-rated doors at appropriate locations such as music rooms, auditorium doors, and other rooms where sound isolation is needed (with full-perimeter sound gaskets).
   c. Provide double door or 42” wide single door for equipment access such as weight rooms, mechanical rooms, equipment rooms.

C. PRODUCTS

1. Interior Solid Core Doors (Hollow Core Not Permitted):
   a. Grade: Premium grade.
   b. Construction: Particleboard or glued-block core (no gypsum-filled doors permitted).
   c. Faces: Transparent finish on wood grain veneer (no plastic laminate permitted).

2. Fitting and Finish:
   a. Fitting: Factory-prefit and premachine doors.
   b. Finish: Transparent stain with catalyzed lacquer finish. Include all edges. Include top and bottom.

3. Auxiliary Materials:
   a. Metal louvers.
   b. Glazing frames.
   c. Transoms.

END OF SECTION

SECTION 08 31 00 – STEEL ACCESS DOORS

A. SCOPE

1. Access doors for floors, walls and ceilings.

B. PRODUCTS

1. Access Doors:
   a. Dimensions: The construction will provide access panels and hatches sized as follows:
      1) At Walls: Not less than 3 square feet (0.276 sq. m.).
      2) At Floors and Ceilings: Not less than 4 square feet (0.368 sq. m.).
   b. Features: steel only, with full perimeter exposed frame, and solid blocking around full perimeter. Provide access panels and hatches with concealed hinges, recessed latch, and keyed cylinder at unmonitored and publicly accessible spaces.
   c. Finish/texture: match finish and texture of surrounding surfaces.

2. Where provided:
   a. At gypsum board ceilings greater than 20 sq. ft. (toilet rooms, storerooms, etc.).
   b. At all panels, valves, pumps, fire dampers and other concealed equipment requiring a person to touch it for any reason during the expected service life of the building.
   c. Ensure access door aligned with equipment or device requiring access service.

3. Installation Considerations: whenever possible, arrange for access door to open “up.”

END OF SECTION

SECTION 08 33 23 – OVERHEAD COILING DOORS

A. SCOPE

1. Overhead Coiling Doors:
   a. Interior units.
   b. Interior counter units.
   c. Exterior counter units.
   d. Exterior units.

B. QUALITY ASSURANCE

1. Fire-Rated Assemblies: As required by code.

C. PRODUCTS

1. Overhead Coiling Doors:
   a. Type: Fire-rated service doors and security gates.
   b. Door Curtain: Galvanized steel sheet, ASTM A 446, with ASTM A 525, G90 coating permitted. Stainless steel preferred.
   c. Slat Profile: Flat-face slats.
   d. Operation: Electric, motorized, with keyed switch.
   e. Steel Finish: ~~Shop primed over galvanizing for site finish.~~ Factory finish for stainless steel.
   f. Key switches: Schlage Locknetics Keyswitches (keying compatible with standard door hardware).

2. Auxiliary Materials:
   a. Helical torsion spring counterbalance with clutch.
   b. Hood for curtain and operating mechanism.
   c. Automatic reversing control for bottom bar for electric door operator.
   d. Outfit with manual chain for emergency opening/closing.

D. EXECUTION

1. Ensure that coiling door is augmented with other man-door access. Do not rely on coiling door for sole access.

2. Coiling doors preferred over Won Doors. (Won Doors required in some special locations. Obtain owner approval before designing Won Doors.)

3. Rooms with coiling doors must have alternate man-door access in the event that access door fails to operate.

4. Security gates shall be tied to the fire alarm system so that they open in an emergency.

END OF SECTION

SECTION 08 41 13 - ALUMINUM ENTRANCES AND STOREFRONTS

A. SCOPE

1. Aluminum Entrances and Storefront:
   a. Exterior entrance doors (limit to main entrances).
   b. Vestibule doors matching entrance doors.
   c. Frames for entrances.
   d. Storefront-type framing system.
   e. Transoms.
   f. Sidelights.

B. PRODUCTS

1. Aluminum Entrances and Storefront:
   a. Door Style and Size: Wide stile and rail doors. Maximum height: 7’-0”.
   b. Aluminum Members: ASTM B 221,B 209, and B 211.
   c. Steel Reinforcement: ASTM A 36, ASTM A 611, and ASTM A 570.
   d. Aluminum Finish: Type I Anodized at entrances; Type II elsewhere. Or, Fluoropolymer (Kynar 500 or equal) 3-coat system.
   e. Storefront: Do not use butt glazed corners.

2. Installation Considerations:
   a. Limit aluminum storefront and curtainwall. Use steel doors and frames to greatest extent possible.
   b. Provide continuous supplementary backing plate to receive screws for hinges. Do not rely solely on jamb frame thickness. Provide full-geared continuous hinges at all storefront doors.
   c. Note: Owner prefers steel doors and frames for entrances and storefronts. Obtain approval on any aluminum systems.
   d. All building entrances shall have vestibules.

END OF SECTION

SECTION 08 45 00 - INSULATED TRANSLUCENT PANEL SYSTEM

A. SCOPE

1. Insulated translucent panels consisting of minimum nominal 2-3/4" thick factory prefabricated sandwich panel skylight systems.

B. PRODUCTS

1. Translucent Facings: Use manufacturer's standard facings.

2. Grid Core: Thermally broken.

3. Accessories:
   a. Flashings, copings, brake shapes within the field of or around the perimeter as needed for a complete watertight installation.

END OF SECTION

SECTION 08 51 13 - ALUMINUM WINDOWS

A. SCOPE

1. Aluminum Windows:
   a. Individual units set in wall construction.

B. QUALITY ASSURANCE

1. Testing: Window performance.

C. PRODUCTS

1. Aluminum Windows:
   a. Window Operation: Fixed generally, but two operable windows per each classroom to be provided.
   b. Construction: Thermal-break type.
   c. Aluminum Finish: Type II Anodized. Or, Fluoropolymer (Kynar 500 or equal) 3-coat system.
   d. Do not use butt glazed corners.

2. Installation Considerations:
   a. Provide limit stops (4” maximum opening).
   b. Interior glazing access preferred.

END OF SECTION

SECTION 08 52 13 - ALUMINUM-CLAD WOOD WINDOWS

A. SCOPE

1. Aluminum-Clad Wood Windows

B. QUALITY ASSURANCE

1. Use aluminum-clad wood windows only in historic preservation retrofit projects.

C. PRODUCTS

1. Wood Windows:
   a. Window Type: Aluminum-clad.
   b. Window Operation: match existing windows. Single-hung typical and preferred.
   c. Window Grade: heavy commercial or monumental, especially designed for historic preservation retrofit in institutional-use setting.
   d. Glazing: Insulating glass.
   e. Glazing Color: Clear.
   f. Wood Window Members: Kiln-dried clear ponderosa pine or suitable fine-grain lumber.
   g. Locks: Provide egress keeper and catch, position on lower rail of sash, for convenient user access. No top-of-sash locks permitted. Provide custodial locks to prevent unauthorized opening from interior.
   h. Aluminum Cladding: Formed or extruded aluminum cladding mechanically bonded to sash and frame with lifetime baked enamel finish. Provide custom extrusions to match existing sill profiles and profiles of surrounding mouldings.
   j. Interior Wood Finish: Natural finish for site finish.
   i. Anchors, Clips, and Window Accessories: Aluminum, nonmagnetic stainless steel, or galvanized steel.

2. Auxiliary Materials:
   a. Insect screening: not permitted (not necessary).
   b. Integral venetian blinds: not permitted.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

A. SCOPE

1. Hardware for swinging doors.

B. QUALITY ASSURANCE

1. Performance Standards:
   a. Provide fire-rated hardware as required by code.
   b. Provide handicapped access requirements as required by code.
   c. Provide heavy duty commercial/institutional-grade hardware.
   d. Require Schlage hardware to be provided by factory-authorized dealer.

2. Qualified Suppliers (include in specification, no substitutions):
   a. Architectural Hardware
   b. Yadon Construction Specialties
   c. Spokane Hardware

C. PRODUCTS

1. Door Hardware:
   a. Provide power-assisted door operators at main entrance(s). Verify locations with owner.
   b. Provide card-key access at designated exterior doors. Verify locations with owner.
   c. Provide Schlage Classic Primus cylinders at exterior doors and at high schools, provide Everest D-Family Restricted cylinders at interior doors. Check with Owner for cylinder types at other schools. Provide and install all such cylinders.
   d. Keying Requirements: Comply with Owner's Instructions for masterkeying. All keys shall be factory combinated. Locks shall be furnished with construction master key system for use during the construction period. Stamp all keys: DO NOT DUPLICATE.
   e. Lever Locks: Furnish all lever locks with Schlage Rhodes design (unless otherwise approved by Owner), 2-3/4" backset, equipped with 6-pin cylinders. Exception: Provide Primus cylinders at all exterior doors. NOTE: Classroom, Music Rooms, Library, Gymnasium and Multi-Purpose Room locks to be intruder-resistant (lockable from interior using a key).
   f. Hinges and Butts: Full-mortise type with nonremovable pins at low-traffic exterior doors. Provide full-geared continuous hinges at high-traffic interior and exterior doors (i.e. gym and locker room doors) as well as at all aluminum storefront doors.
   g. Closers: Surface-mount on door preferred (on frame acceptable in special conditions, but not preferred). No concealed closers. When permitted by code, provide hold-open feature for custodial convenience, or for movement of equipment (musical, athletic, etc.). Do not use closer as door stop, except in combination with floor or wall stops. Provide hold-open feature at gates (or a position where the gate is held open via a mechanical holding device, and does not allow wind to blow gate shut).
   h. Stops: floor-mount or wall-mount. Minimize use of floor stops (wall stops preferred.) Minimize use of overhead stops (at low-traffic staff-only doors, for example). If overhead stops used at high-traffic doors, supplement with floor or wall stop.
   i. Kickplates: 1/8" thick stainless steel, 304/306 finish. Provide large kick plates (30" high minimum) on all custodial, restroom, DI, Library, Kitchen, Book Room and mechanical room doors. Custodial rooms to get wrap on hinge side.

j. Removable mullions: key-removable type. Use stabilizers at all mullions having exit devices.
k. Door Gaskets: provide full-perimeter gasketing for exterior doors, and interior sound-control doors (music rooms, auditorium doors, stage doors, etc.)
l. Hardware Finishes: Satin chrome or stainless steel. Exception: closer casings may be matching anodized.
m. Minimize use of emergency-exit-only exit devices with alarms. They wear out from overuse.
n. Provide power operator on different entry door leaf from door leaf outfitted with card-key access. Too much conflicting use.
o. Provide sound-rated automatic door bottoms (half-mortised type) and perimeter sound-rated gasketing at music office doors, choral offices doors, and practice room doors.

2. Manufacturers:

a.	Butts	Stanley, Bommer, Hager, McKinney, Lawrence
b.	Closers	LCN, Norton
c.	Locksets	Schlage (no substitutions)
d.	Cylinders	Schlage (no substitutions)
e.	Exit Devices	Von Duprin (specify QEL+), Sargent
f.	Stops	Ives, Trimco, Rockwood
g.	O. H. Stops	Glynn Johnson (no substitutions)
h.	Operators	Horton, LCN
i.	Threshold	Pemko, Reese, Zero
j.	Kickplates, Pulls	Trimco, Hager, Rockwood
k	Flush Bolts	Glynn-Johnson (no substitutions)
l.	Electric Strikes	HES (no substitutions)
m.	Electric Keyswitches	Schlage Locknetics (no substitutions)

3. Auxiliary Considerations:
a. Design entry hardware so that main public entry has lock controllable by staff at a nearby reception desk (with clear sight lines to controlled door, usually an interior vestibule door). Provide electric strike remotely operable by receptionist who may grant entry by pushing an electric strike release button. Coordinate with power operator which may also occur at vestibule, and ensure that electric strike releases before power operator activates.
b. Extra Materials: provide extra locks, keys, cylinders in quantities designated by Owner. Provide Schlage padlocks in quantity needed (typically for exterior gates, traffic control barriers, etc., including spares for unforeseen needs). For all other hardware, provide at least one (1) of each type used.
c. Avoid free-standing posts as switch position for power operators at entrances.
d. Be especially cognizant of doors expanding when exposed to heat (south). Provide additional precautions to prevent doors from warping and popping open.
e. Continuous hinges required on ALL primary entry doors, all aluminum storefront, and all heavily used doors.
f. Provide key-removable mullions at major entry locations, and to locations where equipment will be moved in/out frequently (e.g. gyms, music rooms, etc.). In addition, provide stabilizers with all removable mullions (both key-removable type and standard removable mullions).
g. At elementary schools, gymnasium doors leading to the playground are to be egress only (no exterior hardware).

END OF SECTION

SECTION 08 80 00 - GLASS AND GLAZING

A. SCOPE

1. Glass and Glazing, Interior and Exterior.

B. QUALITY ASSURANCE

1. Meet all code and regulatory requirements for thickness (3/16" minimum), impact resistance, fire resistance and energy conservation.
   a. NOTE: use impact resistant glass (tempered or safety glass) in all interior/exterior gym spaces, where balls or other objects may contact glass. Increase glazing thickness beyond minimum required. For glass vulnerable to frequent replacement, laminated safety glass is preferred.

2. Acoustical requirements: Consider use of insulating glass, or other sound-resistance glazing at interior relights such as instrumental rooms, choir rooms, music practice rooms, etc.

3. Consider access for window washing in design. DO NOT place windows in locations difficult to clean.

C. PRODUCTS

1. Glass:
   a. Exterior glazing: use Low-E insulating units (install from interior side wherever possible).
   b. Wire glass: avoid use of wire glass unless no other code-approved option exists.
   c. Maximum size: limit to 200 lbs. per unit.
   d. Gymnasium glazing: consider glare control. Avoid direct sunlight into gyms.
   e. Obscure glass: use in privacy situations for locker rooms (at applicable relights and exterior windows, if any).

2. Plastic: use no plastic glazing except in special circumstances approved by owner.

3. Polycarbonate glazing: do not use, except in special circumstances requested by owner.

4. Tempered vs. laminated safety glass: Laminated safety glass preferred.

END OF SECTION

General Note: Division 9. There shall be no asbestos-containing materials or adhesive in <u>any</u> product.

SECTION 09 21 13 - LATH AND PLASTER

A. SCOPE

1. Gypsum plaster and lath systems for interior walls and ceilings (only to be used in specialty applications, such as historic preservation, and only with Owner approval).

2. Portland cement plaster and lath systems for exterior walls and interior walls and ceilings (only to be used in special applications when approved by owner, and then only with integrally-colored acrylic finisher, not paint). DO NOT USE exterior insulation and finish system (EFIS).

3. Remodeling existing lath and plaster at areas of new construction (only in special remodeling or historic preservation projects—owner approval required). Ornamental plaster included in this category.

B. PRODUCTS

1. Gypsum Plaster:
   a. Application: 3 coats over metal lath, gypsum lath, or unit masonry substrate.
   a. Application: 2 coats over concrete**,** gypsum lath, or unit masonry substrate.
   b. Base Coat Plasters: ASTM C 28.
   c. Finish Coat Plasters: ASTM C 28, gypsum gauging plaster or Ready-mixed finish plaster coat.
   f. Finish: smooth-troweled finish preferred (or match existing).

2. Portland Cement Plaster:
   a. Application: 3 coats over metal lath, 3 coats over concrete unit masonry, 2 coats over concrete unit masonry type.
   b. Base and Finish Coat Cements: Portland cement, ASTM C 150, Type I or II material.
   c. Finish Coat: Job-mixed or factory-prepared finish coat.
   d. Finish: “Sand” textured finish, or other finish to match existing.

3. Lath and Plaster Support Systems: galvanized steel, expanded lath or gypsum lath.

4. Auxiliary Materials:
   a. Corner beads, casing bead, and control joints.
   b. Bonding compounds and agents.
   c. Acoustical sealant.
   d. Sound attenuation blankets, mineral-fiber type.
   e. Thermal insulation, mineral-fiber type.

END OF SECTION

SECTION 09 21 16 - GYPSUM BOARD SHAFT WALL SYSTEMS

A. SCOPE

1. Gypsum Board Shaft Wall Systems:

a. Elevator shaft enclosures, and other specialty shaft constructions.

B. QUALITY ASSURANCE

1. Performance: Fire, structural, and seismic performance meeting requirements of building code and local authorities.

C. PRODUCTS

1. Cavity Shaft Wall Assemblies:
   a. Shaftwall Board Thickness: Not less than 1 inch.
   b. Studs: I, C-H or double E studs, not less than 22 gage.

2. Gypsum Board Shaft Wall Materials:
   a. Steel Framing: ASTM C 645.
   b. Gypsum Shaftwall Board: ASTM C 442, Type X.

3. Auxiliary Materials:
   a. Cornerbeads, edge trim, and control joints.
   b. Laminating adhesive.
   c. Gypsum board screws, ASTM C 1002.

END OF SECTION

SECTION 09 26 00 - VENEER PLASTER

A. SCOPE

1. Veneer plaster base and finish for interior walls, partitions, and ceilings. NOTE: Do not use this system except in cases where limited remodeling, limited patching to match, or historic preservation circumstances require it—with approval from owner.

B. PRODUCTS

1. Gypsum Base for Veneer Plaster:
   a. ASTM C 588, regular, foil-backed, and fire-rated types.
   b. Installation Standard: ASTM C 844.

2. Veneer Plaster:
   a. Type: ASTM C 587, two-component veneer plaster, high-strength type preferred.
   b. Joint Reinforcing Materials: ASTM C 587.
   c. Installation Standard: ASTM C 843.

END OF SECTION

SECTION 09 29 00 - GYPSUM DRYWALL

A. SCOPE

1. Gypsum Drywall Systems:
   a. Interior walls, partitions, and ceilings for tape and joint compound finish.
   b. Steel framing systems to receive gypsum board.
   c. Cementitious backer units for application of tile.

2. Gypsum Drywall Attachment:
   a. Gypsum board screw-attached to steel framing and furring.

B. PRODUCTS

1. Gypsum Board:
   a. Gypsum Wallboard: ASTM C 36, regular, foil-backed, and fire-rated types, 5/8 inch typical thickness. **No asbestos-containing wallboard permitted.**
   b. Water-Resistant Gypsum Backing Board: ASTM C 630, regular and fire-rated types, 5/8 inch typical thickness. NOTE: Use cementitious board as backer at all ceramic tile wainscot conditions (minimum 16" high), and at shower conditions (minimum 72" high)—with water-resistant gypsum board above.
   c. Joint Treatment: ASTM C 475 and ASTM C 840, 3-coat system.
   d. Installation Standard: ASTM C 840.
   e. Finishing Precautions: In occupied buildings, use only wet sanding methods for gypsum board assemblies. EXCEPTION: dry sanding (upon District approval) may be allowed subject to following measures:
      i. Full isolation of space under finishing.
      ii. Plastic sheeting is installed to provide air sealing during the sanding.
      iii. Closure of all air system devices and ductwork.
      iv. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust.
      v. Worker protection is provided.

2. Cementitious Backer Units:
   a. Type: ANSI A 108.1, cement-coated portland cement panels.
   b. Thickness: 1/2 inch nominal.

3. Trim Accessories:
   a. Material: Metal trim
   b. Types: Cornerbead, edge trim, and control joints.
   c. Provide "clip in" reveal covers at reveals or control joints that intersect VWC.

4. Steel Framing for Walls and Partitions:
   a. Steel Studs and Runners: ASTM C 645, 22 gage steel studs, 3-5/8, 6 inch typical depths; 16" o.c. minimum.
   b. Furring Channels: ASTM C 645, 25 gage.
   c. Auxiliary Framing Components: Furring brackets, resilient furring channels, Z-furring members, and non-corrosive fasteners.
   d. Installation Standard: ASTM C 754.

5. Finishes: per ASTM C 840-04 and Gypsum Association Standard GA-214-07.
   a. Level 1: At concealed from view locations, plenum areas, etc. [At this level all interior angles and joints should have tape set into joint compound. The surface should be free of excess joint compound. Ridges and tool marks are acceptable. Fasteners not necessary to cover.]

b. Level 2: Panels that are substrates for tile, acoustical tile, MDF wainscot, etc. [At this level, all interior angles and joints should have tape embedded in joint compound and wiped with a trowel or joint knife, leaving a thin coating of compound. Fastener heads, corner beads, and other accessories are covered with a coat of joint compound. Ridges and tool marks are acceptable, but the surface should not have excess joint compound. If joint compound is applied over the tape when it is embedded, this is considered a separate coat of compound to satisfy the requirements of this level.]

c. Level 3: At Boiler Room and Mechanical Rooms (not painted). [At this level all joints and interior angles should have tape that's embedded in joint compound plus one additional coat of joint compound. Accessories and the heads of fasteners must be covered with two separate coats of joint compound. All joint compound must be smooth and free of ridges and tool marks.]

d. Level 4: At panel surfaces that will be exposed to view. [At this level all joints and interior angles should have tape that's embedded in joint compound plus two separate coats of compound over all flat joints and one separate coat over interior angles. Accessories and fastener heads are covered with three separate coats of joint compound. All joint compound is smooth and free of ridges and tool marks.]

6. Steel Framing for Suspended and Furred Ceilings:
   a. Furring Channels: ASTM C 645, 25 gage resilient channels.
   b. Accessories: Hangers and inserts.
   c. Installation Standard: ASTM C 754.

7. Auxiliary Materials:
   a. Gypsum board screws, ASTM C 1002.
   b. Gypsum board nails, ASTM C 514.
   c. Fastening adhesive.
   d. Concealed acoustical sealant.
   e. Mineral fiber sound attenuation blankets.
   f. Mineral fiber thermal insulation.
   g. Polyethylene vapor retarder, 6 mils.
   h. Control joints: use standard galvanized control joints (USG No. 093 or equal) in spacing recommended by manufacturer. Minimize use of extruded aluminum reveals, and do not use extruded aluminum reveals in place of standard control joints due to expense.

8. Installation Considerations:
   a. Show control joints on drawings in large/long wall panels.
   b. Require control joints at corners of door frames, relight frames, windows and other openings.

C. EXECUTION

1. No textured finishes.
2. No gypsum wallboard in corridors walls below 40” high (to avoid abrasion from various causes).
3. Ceiling heights at locker rooms to be 10’.

END OF SECTION

SECTION 09 30 00 - TILE

A. SCOPE

1. Interior Tile:
   a. Wall tile over water-resistant gypsum wallboard (at semi-wet areas).
   b. Wall tile over cementitious tile backer board at wet areas (see 09 29 00).
   c. Floor tile over concrete slab, or over wood substrate in renovation conditions (when approved).
   d. NOTE: Quarry tile preferred in kitchen, serving, and satellite serving areas.

B. QUALITY ASSURANCE

1. Tile Materials: ANSI 118 series standard specifications.

2. Tile Installation: ANSI 108 series standard specifications and Tile Council of America, Handbook for Ceramic Tile Installation.

3. No tile countertops permitted.

C. PRODUCTS

1. Tiles Permitted:
   a. Ceramic-glazed, ceramic unglazed, porcelain, other. Verify each type with owner.
   b. Size: Verify with owner.
   c. Thickness: Verify with owner.

2. Tile Accessories:
   a. Matching trim units.
   b. If Schluter strips are used, specify stainless steel only.

3. Setting Materials (vary with circumstances):
   a. Portland cement mortar, ANSI A108.1.
   b. Dry-set portland cement mortar, ANSI A118.1.
   c. Latex-portland cement mortar, ANSI A118.4.
   d. NOTE: In areas subject to deflection, especially in high-traffic corridors and stairs, use deflection-tolerant bonding and setting systems.

4. Grout:
   a. Sand-portland cement grout, ANSI A108.10.
   b. Commercial portland cement grout, ANSI A118.6.
   c. Use dark grouts in floor joints and wet areas (where light grouts are likely to become discolored and dark over time).
   d. Specify epoxy grout at quarry tile in kitchens as well as in high school public toilet rooms and toilet rooms within locker rooms.

5. Setting Accessories:
   a. Membrane waterproofing under tile.
   b. Cementitious tile backer board.

6. Elastomeric Sealants:
   a. One-part mildew-resistant silicone sealant for non-traffic areas.

END OF SECTION

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

A. SCOPE

1. Acoustical lay-in panel ceilings, trim, and exposed metal suspension system.
2. DO NOT USE linear metal ceilings, linear wood ceilings, luminous ceilings, or concealed-spline ceilings. DO NOT USE special embossed tile.

B. PRODUCTS

1. Mineral Base Panels, Nodular, Cast or Molded Type:
   a. Type, Form and Finish: ASTM E 1264, Type III, Form 1 with painted finish.
   b. Pattern and Sound Transmission Class: Fissured with CSTC 30.
   c. Edge Detail: Tegular edge preferred, square edge on approval by owner.

2. Direct-Hung Suspension Systems:
   a. Type: Fire-rated and non-fire-rated as required by code.

4. Auxiliary Materials:
   a. Edge molding and trim.
   b. Hold-down clips and impact clips.
   c. Concealed acoustical sealant.
   d. Provide extra stock for maintenance. DO NOT allow contractor to consume maintenance stock for punch list.

C. QUALITY CONTROL

1. Installation consideration: where large equipment is to be accessed/serviced above suspended ceiling, ensure large area of removable grid and panels (4'x 4') is provided below, and demarcated on Reflected Ceiling Plans.
2. Do NOT use USG ceiling tile.

D. SCHEDULE

1. Acoustical Panel Units:
   a. Corridors and Classroom Areas: 24 x 48 x 3/4".
   b. Kitchen Areas: 24 x 48 x 3/4" scrubbable.
   c. Adhesive-applied Areas: 12 x 12 x 3/4".
   d. Do not use lay-in acoustical ceiling tile in toilet rooms.

END OF SECTION

CONSIDER GENERAL ACOUSTICAL PERFORMANCE REQUIREMENTS:

1. Background Noise: The construction will provide interiors that maintain ambient sound levels in primary spaces within the following Noise Criteria (NC) ranges, as defined in ASHRAE HVAC Applications Handbook, 1999, when adjacent spaces are occupied and are being used normally:
   a. Music Room: 45-50.
   b. Classroom, Lecture Hall: 25-30.
   c. Multi Purpose, Auditorium: 25-35.
   d. Office: 30-35.
   e. Library: 30-35.
   f. Gymnasium, Locker Rooms, Restrooms: 45-50.
   g. Mechanical: 45-50.

2. Reverberation: The construction will provide reverberation times in primary spaces for frequencies of 500-1000 Hz as follows:

a. Classrooms: 0.6-0.8 seconds.

b. *Auditorium and Multipurpose Space: 1.5-1.8 seconds.*

END OF SECTION

SECTION 09 64 00 - WOOD FLOORING

A. SCOPE

1. Wood flooring:
   a. Cushioned wood flooring at gymnasiums.
      1) Surface: Equal to Maple Flooring Manufacturers Association (MFMA) Second and Better Grade (Natural) Hard Maple or better.
      2) Support (Middle and High School): Subflooring with resilient pads, rubber material, sealed air channels or otherwise fully DIN Compliant system. Basketball game court length: 94 ft. at high school; 84 ft. at middle school; and 50'x 85' overall size at elementary school (with court size to fit).
      3) Support (Elementary): Subflooring with sleepers or panelized support.
   b. Wood parquet flooring at locations where required to match existing materials.
   c. Wood strip flooring at locations where required to match existing materials.
   d. Wood flooring at high school stages: same as gym-type, but with 3/4" MDO plywood as top wear surface in lieu of Maple.

B. PRODUCTS

1. Wood Strip Flooring for Athletic Application:

   a. Gym Type: Furnish wood flooring system complete with dampproofing membrane, resilient support system, underlayment system, nails, and 25/32" x 2-1/4" Second and Better MFMA Graded Northern Hard Maple flooring. Include all components necessary for a complete installation. System Thickness: varies with manufacturer, verify.
   b. Finish: High-build gym floor finish and game markings.
      1) Minium 40% solids, 4 coats.
      2) Use Valspar 450 (a product used by owner)or equal. Use no water-borne urethanes.
      3) Provide mascot graphics at gyms.

2. Auxiliary Materials:
   a. Trim, moldings ventilating base, thresholds, and reducer strips.
   b. Underlayments, mounts, adhesives, mastics, and fasteners.

C. EXECUTION

1. Air quality:
   a. Ventilate for 72 hours areas when using high VOC installation products. Or comply with WSSP requirements.

END OF SECTION

SECTION 09 65 00 - RESILIENT FLOORING

A. SCOPE

1. Resilient flooring and floor preparation.
2. Application guidelines:
   a. Use vinyl composition tile at science-related rooms.
   b. All stair treads and risers to be Roppe rubber stair treads and risers, or approved equal.
   c. Storage rooms and Mechanical rooms to be sealed concrete. DO NOT USE VCT.

B. QUALITY ASSURANCE

1. Performance: Fire performance meeting requirements of building code and local authorities.

2. Air Quality: Ventilate for 72 hours areas when using high VOC installation products. Or comply with WSSP requirements.

C. PRODUCTS

1. Flooring Types Permitted:
   a. Sheet vinyl.
   b. Sheet linoleum.
   c. Vinyl composition tile.
   d. Rubber tile.
      1) Manufacturer's recommended post-construction initial cleaning of rubber tile flooring is to be performed by the contractor.
      2) Verify with Owner prior to use, only 3mm will be considered.

2. Auxiliary Materials:
   a. Wall Base: Rubber wall base 4 inch height, 1/8 inch thick.
   b. Resilient stair treads, risers, and skirtings: Rubber accessories.
      1) At rubber stair treads, use raised round dot pattern.
   c. Edge strips and terminations.
   d. Feature strips and inlaid borders.
   e. Extra Stock: minimum one box per each color of primary tile and base materials. Other materials: verify with owner.

D. EXECUTION

1. Do NOT use any method involving sanding of existing resilient flooring, unless determined definitely not to contain asbestos.
2. Specify two skim coats over non-concrete subfloors.

END OF SECTION

SECTION 09 66 00 – TERRAZZO

A. SCOPE

1. Cementitious Poured-in-Place Terrazzo only
   a. No precast terrazzo permitted.
   b. No thinset terrazzo permitted (without owner approval, and only on elevated floors or other special conditions).

B. PRODUCTS

1. Cementitious Terrazzo:
   a. Type: Sand cushion terrazzo.
   b. Portland Cement: ASTM C 150, Type I.
   c. Sand: ASTM C 33.
   d. Aggregate: Sound crushed marble chips.
   e. Matrix Pigments: Mineral or synthetic type.
   f. Underbed Reinforcement: Welded wire fabric, 2 by 2, 16 gage.
   g. Isolation Membrane: Polyethylene film, 4 mils.

2. Auxiliary Materials:
   a. Divider strips.
   b. Accessory strips.
   c. Control joint strips.
   d. Terrazzo sealer.
   e. Abrasive inserts.

END OF SECTION

SECTION 09 68 00 – CARPET

A. Use Spokane Public Schools latest Specification Section 09 68 00 in its entirety.

SECTION 09 68 00 – CARPET

PART I GENERAL

1.01 REFERENCES

A. 16 CFR, Chapter 11, Part 1630 – Standard for the Surface Flammability of Carpets and Rugs (FF 1-70); Code of Federal Regulations; 1988.

B. AATCC Test Method 134-1991 – Electrostatic Propensity of Carpets; American Association of Textile Chemists & Colorists; 1991.

C. ASTM E 84-91a – Standard Test Method for Surface Burning Characteristics of Building Materials; 1991.

D. ASTM E 648-94a – Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 1994.

E. ASTM E 662-93a – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 1993.

F. NFPA 253-1990 – Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 1990.

G. NFPA 255-1990 – Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 1990.

H. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 1983 (with 1987 Revision).

1.02 SUBMITTALS

A. Product Data: Submit technical data for each distinct type of carpeting material and accessory indicated.
   1. Include information, which specifically details physical properties and performance characteristics.
   2. Include information, which details installation methods for substrates indicated.

B. Shop Drawings:
   1. For broadloom, show the following:
      a. Carpet direction, seaming plan, edge strip placement.
      b. Other details as necessary to clearly indicate arrangement of carpeting materials.
   2. Include details for the following:
      a. Doorways.
      b. Carpet cutouts.

C. Verification Samples: Submit the following to serve as standards for judging the completed work:
   1. For each distinct color, pattern, or type indicated, submit sample 18 inches square, which has been prepared from actual carpet to be installed.
   2. Edging accessories: For each distinct edging accessory, which will remain exposed after installation, submit sample 12 inches long.

D. Certification:

1. Submit manufacturer's certification that materials furnished comply with requirements indicated. Include official results from independent testing agency which establish that materials meet or exceed test requirements indicated.

E. Maintenance Instructions: Submit manufacturer's instructions for maintaining appearance and condition of installed products. Include information on cleaning materials, which could damage carpet.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firm regularly engaged in manufacture of products specified in this section, whose products have been in satisfactory use, under similar service conditions, for not less than 5 years.

B. Installer's Qualifications: Firm regularly engaged in installation of products specified in this section, with a minimum of 5 years experience.

1.04 SELECTION CRITERIA AND PERFORMANCE CHARACTERISTICS

A. Warranty:

1. Minimum 25-year warranty – to cover against excessive surface wear (15% of pile fiber by weight), edge ravel, zippering, backing delamination, watermarking, shrinking or growing, and excessive static electricity (see below).

B. Maintainability:

1. Invista or Solutia Type 6-6 continuous filament nylon fiber is required.
2. Fiber can be either solution or yard dyed. A combination of the two can be utilized within a single product.
3. Multi-colored products are desired for their stain and dirt hiding capabilities.
4. Yarn "pile" weight of product must not exceed 20 oz. per square yard.
5. Tufted loop material shall be standard, with cut pile allowed via written authorization from the Spokane School District. Woven products are not allowed.
6. $1/10^{th}$ gauge or better (tighter) stitching is required. (Based upon ASTM D-418 criteria)
7. Vinyl-cushion back carpets are required.
8. Tuft Bind Test must exceed 9 lbs using ASTM D-1335 methodologies
9. Carpet seams must be able to be chemically welded. Use of a "seam sealant" is not an acceptable alternative.
10. Backing system and mid-layers must be applied to the yarn in liquid state – to help eliminate delamination.
11. Must exceed 20,000 cycles on the WIRA Method Abrasion Resistance test.
12. Must exhibit no more than 20% loss in total thickness after 100,000 repetitions of the Chair Castor Ware test, with 300 lb weight and must be visually acceptable by the Spokane School District.
13. Product must be reparable by use of a circle cutter and chemical welding.
14. Appearance Retention Rating of at least 3.5 (according to ASTM D-5252 protocol).

C. IAQ / Environmental Issues:

1. Product and adhesives Carpet must surpass meet the Carpet and Rug Institute "Green Label Plus" requirements,(ASTM D-5116) including, but not limited to:
   a. Less than 0.05 ppm formaldehyde
   b. Less than 0.5 mg/cubic meter total volatile organics
   c. Less than 50 ug/cubic meter total particulates
   d. Less than 1.0 ppb 4-PC
   e. All carpet products must pass the University of Pittsburgh (or approved equal) protocol for toxicity, being "no more toxic than wood" when burned under the same conditions.

2. Adhesives and Primers must meet the current VOC content limits of WSSP guidelines. In practice, probably a maximum of 50 g/L or 100g/L depending on sheen. Paint must survive 500 scrub cycles before failure per Leneta Calibration Scrub Panel Form P121-C as determined by ASTM D2486-06 Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints.

3. Backing system, when bonded at seams through a process of chemical welding, must form a moisture impervious barrier including the seams. (Minimum of 10,000 repetitions via Moisture Penetration by Impact test)

4. Carpet backing, when bonded at seams through a process of chemical welding, must form a barrier to reduce the flow of Radon gases.

5. Carpet system must meet EPA criteria for an asbestos enclosure. I.E., it must form an airtight, impermeable, semi-permanent barrier around ACBM flooring, and must prevent asbestos fibers from being entrained into the built environment.

D. Other:

1. Cushion back–PVC backing that can flex, stretch, and compress – shall be utilized in all classrooms, libraries, and other areas where staff would typically be standing for a good portion of their day. Polyurethane foam or other porous materials that can absorb and retain moisture shall not be allowed.

2. Static properties shall not exceed 3.5kv. (According to AATCC-134 Step Method – Static Propensity of Carpets)

3. Flammability rating must meet ASTM E-648 Class II and DOC-FF-1-70 "Pill Test", not just the general Federal Flammability Standards.

4. Carpet, including all integrated components, shall be 100% recyclable – manufacturer shall demonstrate to the District's satisfaction that there is access to an established program to accomplish this recycling of its materials. I.E., Floor coverings shall be recycled at the end of their useful life in an environmentally responsible program, and warranted by the manufacturer not to be land filled or incinerated.

5. Carpet system shall have sound absorption and reverberation dampening characteristics.

6. Carpet system shall minimize impact noise transmission.

7. Carpet system shall be ADA compliant.

8. The District shall utilize life cycle cost analysis to determine the relative "value" of materials that meet the above standards.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Take measures as required to ensure materials are not damaged or deformed. Store products in flat position in properly ventilated, dry space. Use suitable means to prevent materials from lying in direct contact with the ground.

B. Allow carpet materials to reach room temperature or minimum temperature recommended by manufacturer before installation.

C. Store carpet and adhesive in a heated room at a minimum temperature of 68 degrees F at least 3 days prior to and during installation.

1.06 SEQUENCING AND SCHEDULING

A. Coordinate work of this section with other work to ensure that installed carpeting materials are not damaged or soiled.

B. Manufacturer to provide a representative 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.

1.07 WARRANTY

A. Provide manufacturer's standard twenty-five (25) year warranty. "Lifetime" warranties shall not be acceptable. All warranties must specify in writing the specific number of years warranted by the manufacturer, as well as the specific issues covered and shall cover labor and materials.

B. Provide a standard, printed, non-prorated warranty from the Manufacturer. All warranty items to be full term, not pro-rated, for the indicated period. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the school district.

C. This warranty shall include costs associated with repair/replacement of carpet that has not performed as warranted. "Repair/Replacement costs" means the cost of replacement carpet of same product, freight, materials necessary for installation, rubber base, furniture moving, and labor to remove and install new carpet product. If same product is not currently offered as a standard product, owner expects manufacturer to manufacture this product exactly if needed to maintain continuity of facility design theme. An equal comparable product of similar specifications and color will be considered only if the affected space is independent from all other spaces and does not affect the overall design theme of the facility. If a new carpet pattern or color is allowed by owner, the entire contiguous space shall be replaced. Warranty includes all affected carpet areas including stairs and steps. Chair pads are not required for carpet warranty coverage.

D. All carpet warranties to be sole source responsibility of the Manufacturer. Second source warranties or warranties that involve parties other than the Manufacturer are unacceptable. Carpet warranties will be official standard documents, not customized, and shall not be created on a job-by-job basis. All carpet warranties shall be signed and notarized by a company representative.

E. The term of the carpet warranty shall be NO LESS THAN 25 years and shall cover against:

1. Excessive surface wear.
   Excessive wear means more than 15% loss of pile fiber weight measured before and after use.
2. Edge ravel.
3. Zippering.
4. Backing delamination. Backing delamination is defined as separation of the secondary backing from the primary backing.
5. Watermarking on any product not 100% loop construction. Watermarking means an apparent color difference between areas of the same carpet due to permanent pile reversal with random differences in pile lay direction and differences in the amount of light reflected by carpet fibers.
6. Excessive static electricity. Excessive static electricity means more than 3.0 kilovolts when tested per AATCC 134 at a relative humidity of 20% and a room temperature of 70°F.

F. Provide special Installer's Project warranty, signed by the Contractor, installer, and manufacturer (carpet mill), agreeing to repair or replace defective materials and workmanship (including steps) of carpeting work during twenty-five (25)-year warranty period following date of Substantial Completion. Attach copies of product warranties.

1.08 MAINTENANCE MATERIALS

A. Extra stock: Furnish 1% additional yardage of each carpet type and color required; extra yardage is over and above any overage provided by mill. Normal mill overage not to exceed 10% for under 1000 yards, not to exceed 1% for over 1000 yards. Deliver to the Owner uncut in clearly marked dust-proof packages; store where directed.

1.09 ALTERNATES

A. Not Used.

1.10 SUBSTITUTIONS

A. EVALUATION OF PRODUCT: All bid submittals must conform to the Carpet Selection Criteria contained in this document. To be approved, products must conform to these specifications in a manner that best suits the district for the products intended use. If a product substitution is requested, the decision of its acceptability will be based on its ability to meet the technical specifications and achieve test results in keeping with the goals identified in the district carpet standard and accompanying specifications. The approved products identified in the carpet specifications, Section 2.01, represent the level of performance and quality the district is stipulating. Such determination will, of necessity, require judgmental evaluations by district representatives. Other industry and design specialists may be used in the evaluation process at the discretion of Spokane School District No. 81. The decision resulting from the evaluation process as to which products best meets the needs of various programs remains the sole responsibility of the district and is final.

B. Any and all substitutions must be manufactured of the same basic type of materials, meet or exceed all specified requirements of the product, and be submitted with all requirements

contained within this document.

C. Any substitutions made and not fully detailed by the submitting party can cause a refusal of the bid product.

D. Submit ten (10) days prior to time of Bid any proposed substitutions for consideration as follows:

1. Manufacturer shall submit ten (10) days prior to Bid documentation showing a minimum of fifteen (15) years experience in the manufacture of this type of product described within.

2. Submit ten (10) days prior to time of Bid Manufacturer's product specifications, product testing reports, and other required documents referenced within this text.

3. Submit ten (10) days prior to time of Bid two (2) 13" x 18" finished samples of each type of proposed carpet in the quality, pattern, and color proposed. The carpet samples will be used for testing of stains. Must pass and be approved by the Spokane Operations Department carpet cleaning program.

4. Submit ten (10) days prior to time of Bid two (2) twelve (12) inch long pieces of specified molding and two (2) samples of all and any special treatment materials.

5. Submit ten (10) days prior to time of Bid at least five (5) names of installations in the Spokane area that have been in use for ten (10) years using vinyl-backing technology as described in this document. Include contact names and phone numbers.

6. Submit ten (10) days prior to time of Bid copies of the reports specified within the PERFORMANCE ASSURANCE section of this document and the following:
   a. Flooring Radiant Panel: ASTM E-648 or NFPA 253: Class 1 (CRF greater than 0.45 Watts/Sq Cm)
   b. Backing Cellular make-up: Closed cell, Microscopic - As manufactured
   c. Backing Cellular make-up: Closed Cell, Microscopic - After 100,000 Phillips Chair Cycles
   d. University of Pittsburgh Protocol (LC-50) for toxicity: "no more toxic than wood" when burned under the same conditions
   e. Moisture Barrier: Moisture Penetration by Impact @ 10 psi: No penetration after 10,000 impacts on carpet and seams.
   f. Air Permeability of Textile Fabrics: No airflow (0.0 cubic ft./min)
   g. Seam Integrity after Phillips Chair Test: Seam to remain intact after 50,000 cycles
   h. Delamination of Secondary Backing of Pile Floor Coverings- ASTM D-3936: No delamination
   i. Vetterman Drum Test, Textrapod Test, and Heaxapod Test: Minimum 3 (ASTM D5417)
   j. Lightfastness- AATCC 16E: Min 4 after 100 AFU
   k. Static Propensity- AATCC 134: 3.0 KV or less
   l. Static Coefficient of Friction- ASTM C-1028: Passes ADA requirements
   m. Backing Density- ASTM D 1667: 18.5 lbs/cu ft +/- 5%
   n. Backing Compression Set- ASTM D 1667: Max - 10%
   o. Backing Compression Deflection- ASTM D 1667: Min 7 lbs/sq in at 25%

7. Submit ten (10) days prior to time of Bid the Manufacturer's installation instructions for

all products and styles.

8. Submit ten (10) days prior to time of Bid Manufacturer's maintenance instructions including cleaning equipment specifications and type, spot cleaning methods, and cleaning cycles.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Single Source Responsibility: Obtain all of each different material from a single manufacturer.

B. Carpet: Provide products complying with requirements of the contract documents and made by one of the following:
1. Mannington Commercial Carthage III, 20 oz. with Infinity Backing System (6' roll), Color and pattern to match colors specified in item 'C' below.
2. Tandus Flooring; Infinity RS, 20 oz.
3. Approved Substitutions: Tandus Flooring; Crayon RS (with Type 6.6 nylon) or Mannington R&D with Infinity Backing System (6' roll) meeting materials specifications below.
4. Owner approved equal that conforms to the requirements in this specification.

C. Colors: (to be filled in by architect)

2.02 MATERIALS

Manufacturer:	Tandus Flooring
Construction	Textured Pattern Loop
Gauge	1/13"
Pile Units per Inch	9.5
Pile Height average	0.117"
Pile Yarn Weight	20 oz.
Fiber Content	DuPont Nylon 100% type 6.6 nylon with Static Control and Ensure or approved equal
Dye Method	60% solution dyed/40% yarn dyed
Primary Tufting Substrate	Synthetic
Power Bond Backing System Fusion Coat	Sealant Vinyl
Backing	Closed Cell Vinyl Cushion that provides a barrier to moisture penetration Product to provide for a chemically-welded seam Weight 35.5 oz per sy Density 18.5 pcf Thickness .156" Compression Set – Max 10% Compression Deflection 7 psi @ 25%
Total Weight	82.7 oz per sy +/-
Adhesive System (RS Style)	Micro encapsulated Tackifier applied to 100% of material at time of manufacturing
Flooring Radiant Panel (ASTM E-648)	Class I
Test Smoke Density (ASTM E-622)	Flaming: Mean Average – 450 Max.
Flammability (CPSC FF1-70)	Passes

Electrostatic Propensity (AATCC 134)	1.3 k.v. or lower

Manufacturer	Mannington Commercial
Construction	Textured Pattern Loop
Gauge	1/10”
Stitches per inch	10
Pile Height average	0.0986”
Pile Yarn Weight	20 oz.
Fiber Content	100% DuPont Type 6.6CF Nylon with Static Control/Soil Resistant technology
Dye Method	Solution Dyed 63%; Yarn Dyed; 37%
Secondary Backing	Closed Cell Vinyl Cushion that provides a barrier to moisture penetration Product to provide for a chemically-welded seam
Primary Backing	100% Woven Polypropylene
Pre-Coat	100% PVC, Non-Acquacous Closed Cell polymer
Flooring Radiant Panel (ASTM E-648)	Class I
Test Smoke Density (ASTM E-622)	Flaming: Mean Average – 450 Max.
Electrostatic Propensity (AATCC 134)	3.0 k.v. or lower
Dimensional Stability	Passes

2.04 ACCESSORIES

A. Provide accessories recommended by carpet manufacturer.

B. Resilient Edge Strip: Rubber, size and shape indicated, colors selected by the Owner from manufacturer’s standards.

C. Metal Carpet Transition (Edge): Schluter Systems, aluminum edge trim.

D. Noncombustible Carpet Separator: Extruded aluminum; finish to match other exposed accessories.

E. Fire performance requirements indicated for carpet.

F. Adhesives Where Required: Waterproof, non-flammable carpet adhesive as furnished or recommended by carpet manufacturer for compatibility with carpet backing. Carpet adhesive shall have a flame spread of 75 or less when tested in accordance with ASTEM E84. All floor sealers, seam sealers, and adhesives shall be solvent free with VOCs. Adhesive such as Taylors #2055.

PART 3 EXECUTION

3.01 EXAMINATION

A. General: Verify that substrates are completely dry, free of harmful substances and in satisfactory condition to receive carpeting materials.

B. Notify the Owner in writing of unsatisfactory conditions. Do not begin installation until these conditions have been satisfactorily corrected.

C. Start of installation work constitutes acceptance of substrate conditions and full responsibility for the completed work.

D. Perform moisture and acidity tests on concrete surfaces where recommended by carpet manufacturer. Manufacturer and Installer must warrant installation up to 6 pounds per 1000 square feet and PH Neutral 7-9.

3.02 PREPARATION

A. General: Follow carpet manufacturer's recommendations to ensure that each substrate is properly prepared to receive carpeting. Fill all cracks, gaps, and depressions using carpet manufacturer's recommended materials and methods.
   1. Glue-down installation: Maximum variation in substrate 1/8 inch in 10 feet.

B. Level off all high spots or ridges to prevent uneven carpet wear.

C. Determine whether substrates are susceptible to dusting. Apply sealer where required to prevent formation of dust.

D. Vacuum-clean substrates thoroughly just prior to beginning installation.

E. Maintain temperature of floor and relative humidity of rooms where carpet materials are to be installed at levels and for periods recommended by carpet manufacturer before, during, and after installation.

3.03 INSTALLATION – GENERAL

A. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
   1. Maximize consistency of carpet appearance, particularly in terms of lay of pile and its direction. Follow manufacturer's recommendations for placement of seams.
   2. Continue carpet into recessed spaces such as closets, and underneath obstacles with open bases.
   3. Follow manufacturer's instructions for cutting carpet, using tools designed to cut type of carpet materials being installed.

B. Provide noncombustible carpet separator wherever carpet materials are to be installed on both sides of a fire door.

C. At door openings, orient carpet seam perpendicular to traffic direction; doorway seam must be located directly underneath door in closed position.

3.04 INSTALLATION – RS TACKIFIER SYSTEM AND GLUE-DOWN CARPET

A. Before applying adhesive to substrate (where adhesives are required), pre-fit carpet in areas where it is to be installed. Where cutting is necessary, provide properly prepared, straight, and unfrayed edges.
   1. Seams: Conform to submitted seaming plan.

B. Apply even layer of adhesive to substrate using trowel of carpet manufacturer's recommended notch size.

C. Install pre-fitted carpet; butt edges snugly at seams and against vertical obstructions.
   1. Stretch carpet tightly over substrate, so that it lies flat, is uniformly smooth and free of bulges.
   2. Apply seam sealer to all side and cross seams.

D. Install edge guards at exposed carpet edges unless indicated otherwise; provide secure attachment to substrate.

E. After installation, lightly roll carpet as recommended by carpet manufacturer.

F. Immediately remove adhesive from surface of carpet by method which will not damage carpet.

3.06 CLEANING

A. Remove carpet remnants, which are not useable; comply with Owner's instructions for final disposition of usable remnants.

B. Use commercial-quality vacuum cleaner to thoroughly clean installed carpeting; trim loose yarns where required.

C. Eliminate stains; Contractor shall pay for and replace carpet from which stains cannot be eliminated using carpet manufacturer's recommended products and methods.

3.07 PROTECTION

A. Protect installation with a nonstaining building paper. Do not use a moisture barrier such as plastic film.

B. Do not permit foot traffic or place furniture on glued-down carpet for a minimum of 48 hours after installation.
   1. Do no wet-clean any glued-down carpet within 60 days of installation.

C. Ensure that carpet will be clean and without deterioration or damage at date of substantial completion.

3.08 TRAINING

A. Vendor to include up to 4 hours total training for district custodial and maintenance staff to demonstrate manufacturer's approved cleaning and repair techniques. Training to be performed by a qualified manufacturer's factory authorized representative.

END OF SECTION

SECTION 09 72 00 - WALLCOVERINGS

A. SCOPE

1. Wallcoverings.
2. Application guidelines:
   a. Two (2) walls per room at typical classroom.
   b. Limit three (3) colors per building.

B. QUALITY ASSURANCE

1. Performance: Fire performance meeting requirements of building code and local authorities.

C. PRODUCTS

1. Vinyl Wall Covering:
   a. Type: FS CCC-W-408A, Type II heavy duty wall covering.
   b. Stain Resistance: Factory applied polyvinyl fluoride or polymer coating.

D. SCHEDULE

1. Treat substrate with sizing or primer prior to installation of wallcovering for easier future removal and repair.
2. Install at exterior walls with a gap in vinyl at base or behind chair rail to allow walls to breathe.
   a. Consider layout for walls to accommodate replacement of lower portions of vinyl which will be more heavily damaged with use; e.g. chair rail dividing the vinyl surface, more durable alternative wainscot materials or other creative solutions to ensure the integrity of the design for the service life of the facility.
   b. Vinyl wallcovering over gypsum board is acceptable for tack-surface purposes.
3. Extra stock: provide one (1) bolt of each color/type.
4. Installation considerations: no edge terminations at outside corners; no edges stopped mid-wall without abutting trim or other material that captures and encloses the edge. Protect outside corners (verify corner guard preference with owner).

END OF SECTION

SECTION 09 77 00 – SANITARY WALL COVERING

A. SCOPE

1. Fiberglass reinforced plastic panel material (commonly known as FRP), used as sanitary wall covering.

B. QUALITY ASSURANCE

1. Smoke development: 50. Fuel contributed: 5. Flame spread: 50, Class B.

C. PRODUCTS

1. Sanitary Wallcovering:
   a. Manufacturers: Glasbord, Kemlite, Structoglas, Crane Composites (Lasco).
   b. Size: 3/32” thick, 4’-0 wide panels.

D. INSTALLATION

1. Applications: kitchens, greenhouse areas, art rooms in messy/wet areas, custodial closets at mop sinks, etc.
2. At tile base and flash-coved sheet flooring base: install sanitary wall covering at top of base.
3. Apply to water-resistant substrate (plain drywall not acceptable).
4. Install at 60” minimum height as wainscot, and 24” high above countertops.

END OF SECTION

SECTION 09 84 00 - ACOUSTICAL WALL PANELS

A. SCOPE

1. Acoustical wall panels for music, and video/audio rooms.
2. Design criteria: Do not install at positions below 7', except at music practice rooms or other locations approved by owner.

B. QUALITY ASSURANCE

1. Performance: Fire performance meeting requirements of building code and local authorities.

C. PRODUCTS

1. Use edge-reinforced or edge-framed panels, fabric-covered.

2. Auxiliary Materials:
   a. Connecting splines, molding, and trim.
   b. Clips and hangers.
   c. Adhesive.
   d. Miscellaneous temporary fasteners.

END OF SECTION

SECTION 09 90 00 - PAINTING

A. SCOPE

1. Painting, interior and exterior.

B. QUALITY ASSURANCE

1. Air Quality: Ventilate for 72 hours areas when using high VOC installation products. Or comply with WSSP requirements.

C. PRODUCTS

1. Interior paints. Acceptable manufacturers are:
   a. Parker Paints
   b. Duron, Inc.
   c. Benamin Moore & Co.
   d. Rodda
   e. Devoe Paint
   f. Miller Paint
   g. Sherwin-Williams
   h. PPG Pittsburgh Paints

D. PAINTING GUIDELINES

1. Specify paint by manufacturers commercial quality level for high quality, durable finishes; do not use Federal Specification system to establish minimum standards.
2. General gloss level for predominant wall surfaces (gypsum board): MPI Gloss Level 3 (eggshell).
3. General gloss level for MDF wainscots, trim: MPI Gloss Level 4 (satin).
4. Select solid paint colors only; speckled or multi-color paint finishes are not acceptable.
5. Where concrete floors are used as an exposed surface, select clear sealer and/or integral stain; painted concrete floors are not acceptable.
6. Prime coats are required for all interior paint and high performance coatings for improved adhesion, whether required by manufacturer or not. At exterior ferrous metals, use rust-inhibitive primer.
7. Where prime and/or finish coats are applied by spray methods, specify back-rolling to improve adhesion. Backrolling with long nap roller to create light orange peel texture is acceptable as functionally equivalent to smooth.
8. For natural or stained finishes, two coats of sanding sealer followed by two coats of varnish, polyurethane or lacquer.
9. For concrete masonry units to receive painted finish, one coat block filler followed by two coats finish. Finish to be either eggshell or satin (not flat).
10. For concrete masonry units, brick masonry and concrete to remain unpainted, see Section 07 19 00 for anti-graffiti sealer.
11. For both sides of exterior doors, two coats high gloss polyurethane for best graffiti resistance.
12. Include final "as-built" paint schedule listing products, colors and where used, using District's final room names and numbers. NOTE: provide 4 copies of each draw-down card with formula in 4 separate loose-leaf notebooks.
13. Insert requirements stating “Owner reserves the right to independent special inspection of painting.”
14. Do not paint kitchen walls below 6’-0” high (use abrasion-resistant surface material).
15. Ensure that all door edges are painted (including top and bottom).
16. Do not paint Mechanical and Equipment Rooms.

17. Specify color of factory finishes in documents.
18. Do not use “no” VOC paints on metal surfaces.

END OF SECTION

SECTION 10 11 00 - VISUAL DISPLAY BOARDS

A. SCOPE

1. Visual Display Boards:
   a. Markerboards.
   b. Chalkboards.
   c. Tackboards.

B. PRODUCTS

1. Markerboards:
   a. Materials: Porcelain enamel on steel face for liquid-type markers, core material, and backing. Color: white. 50-year warranty. Typical height: 48". Maximum length: **16'**. Include maprail with cork insert, metal map clips (DO NOT use plastic map clips), tray and flagpole holder. Verify need for staff lines at music rooms. DO NOT use natural slate, painted surfaces, melamine surfaces, marker-fabric wallcovering, or baked enamel on wood fiberboard.

2. Chalkboards:
   a. Materials: Porcelain enamel on steel face, core material, and backing. 50-year warranty. Typical height: 48". Maximum length: 12'. Include maprail with cork insert, metal map clips (DO NOT use plastic map clips), tray and flagpole holder. DO NOT use natural slate, painted surfaces, melamine surfaces, marker-fabric wallcovering, baked enamel on wood fiberboard.

3. Tackboards:
   a. Materials: Integrally-colored compressed granulated cork. Typical height: 48". Maximum length: 12'. NOTE: Vinyl wallcovering (Type II) over gypsum board is acceptable substitute tack surface. DO NOT use natural cork, synthetic woven fabric, natural woven fabric, wood fiberboard, linoleum.

C. EXECUTION

1. Top of display board: typically at 84" maximum above finished floor, with bottom at 36" above finished floor. Consider lower position for lower-primary classrooms (verify with owner).
2. Ensure that wall finish (paint or VWC) continues behind display boards.
3. Mounting: USE NO ADHESIVES. Mechanically fasten.
4. Use plywood for backing.

END OF SECTION

SECTION 10 14 00 – SIGNAGE DESIGN GUIDELINES

A. Basic Function:
1. The construction will provide identifying devices fixed to interior construction that are necessary for direction to and identification of functions and spaces.
   a. Room Label Signs: The construction will provide room label signs for all primary spaces in accordance with District Policies and Procedures. DO NOT provide signs at all doors. Provide signs at mainstream student and public destinations (classrooms, labs, offices, public facilities, toilet rooms, etc.).
   b. Directional Signs: The construction will provide directional signs at all building entrances in accordance with District Policies and Procedures..
   c. Exterior Signs: The construction will provide vehicle, parking, environmental, special use and security signage in accordance with District Policies and Procedures.
   d. Architectural Signs: The construction will provide architectural signs specific to the project as determined by the program.

2. Identifying devices comprise the following elements:
   a. Room or function labels applied to doors or walls immediately adjacent to doorways.
   b. Signs that provide guidance to, or information about, building functions or spaces, including directional signs.
   c. Large decorative or architectural signs, including three dimensional graphics and illuminated lettering.

3. Text/Content of Identifying Devices: Room numbering to be determined by the School District by the end of Schematic Design.

B. Amenity and Comfort:
1. Accessibility:
   a. Identification devices will comply with ADAAG-1994.
   b. Room Labels: Dual signage for visually handicapped and normally sighted.
   c. Function Labels: Graphic and Braille signs for the following building services and functions:
      1) Stairways.
      2) Elevators.
      3) Toilets.
   d. Directional Signs: Accessible graphic and Braille signs in addition to any that are mounted above head height.

2. Visibility:
   a. Character Size: The construction will provide signs with characters of adequate size to be seen comfortably by normally sighted persons at typical viewing distances.
      1) Wall-Mounted Corridor Signs or Signs Intended for Viewing at Less Than 5 feet (1.5 m): Minimum character height of 5/8 inch (16 mm) and maximum of 2 inch (50 mm).
      2) Signs Mounted Above Head Height or Intended for Viewing at More Than 10 feet (3.0 m): Minimum character height of 3 inches (75 mm).
   b. Fonts: The construction will provide one font throughout the project
   c. Reflectivity: The construction will provide signs with matte surface measuring 11-19 degree gloss on 60 degree glossimeter.
      1) Exception: Backlighted signs may have glossy surfaces.
   d. Contrast: The construction will provide signs with contrast between characters and background of not less than 70 percent.

3. Convenience:
   a. Room Label Signs: The construction will provide signs with feature allowing Owner to change information.

4. Appearance:
   a. The construction will provide signage for entire project that is consistent in design with other interior features and coordinated with overall color scheme.

C. Health and Safety:
   1. Emergency Signs: as required by code.

D. Operation and Maintenance:
   1. Vandalism Resistance: For signs in public areas that are within reach, the construction will provide signs that are positively attached to substrate by concealed mechanical devices and not by double-sided tape, sealant, or adhesive.

END OF DESIGN GUIDELINES

SECTION 10 14 00 - SIGNS

A. SCOPE

1. Building Signage:
   a. Panel signs.
   b. Dimensional letters and numbers.
   c. Cast plaques.

B. PRODUCTS

A. Room and Function Label Signs:
   1. The construction may use one of the following:
      a. Framed or frameless metal panel signs with pre-applied characters and graphics.
      b. Framed or frameless plastic panel signs with pre-applied, etched or raised characters and graphics.
      c. DO NOT USE:
         i. Individual, 3-dimensional metal or plastic characters.
         ii. Cast metal plaques.

B. Directional Signs:
   1. The construction may use one of the following:
      a. Backlit metal box signs.
      b. Signs of same type as room and function signs.

C. Architectural Signs:
   1. The construction may use the following:
      a. Three-dimensional metal and plastic characters, mounted on wall and transilluminated.
      b. Suspended, three-dimensional metal, plastic, and other material signs to custom design.
      c. Cast metal plaques at building dedication plaque.
      d. DO NOT USE:
         i. Three-dimensional metal characters, mounted away from wall and backlighted.

D. Exterior Signs (Other than Traffic and Parking):
   1. One of the following may be used:
      a. Dimensional letter signs using aluminum, stainless steel, bronze, brass, glass, or plastic sheet letters.
      b. Lighted box signs.
      c. Neon light signs.
      d. Electronic message boards.
      e. DO NOT USE:
         i. Signs painted on the face of the exterior wall.

E. Traffic and Parking Signs:
   1. The following may be used as required, types as defined by reference to Manual for Uniform Traffic Control Devices (MUTCD) where noted. Verify with local jurisdiction (city or county) for additional requirements.
      a. No Parking, School Bus Zone
      b. Passenger Loading Zone, 8A.M.-5P.M., 3 minute time limit, Driver must remain in vehicle; R7-61
      c. No Parking: R7-1A; R8-3A; R7-74 (DB); R7-31 (DB)

d. School Speed Zone; S5-101
e. Crosswalk Signage; S12-1; S16-7; S16-9

END OF SECTION

SECTION 10 21 13 - TOILET COMPARTMENTS

A. SCOPE

1. Toilet compartments and screens.

B. PRODUCTS

1. Type and Mounting:
   a. Compartments: Floor-anchored, overhead braced.
   b. Urinal Screens: Use wall-hung screens.

2. Acceptable Toilet Compartment Materials:
   a. Solid Phenolic Compartments: High-pressure melamine surface fused to solid phenolic core.
   b. Solid Core Reinforced Composite: Acceptable only in elementary schools.
   c. Metal Toilet Compartments with Baked Enamel Finish: ASTM A 591, Class C, galvanized bonderized steel with baked enamel finish. If used, place only in "Staff Only" toilet rooms, not in public areas.
   d. DO NOT USE plastic laminate or stainless steel compartments.
   e. Use tamper-resistance fasteners.
   f. Accessories: Use continuous U-brackets for all panel connections. Use continuous hinges at all doors. Use continuous, heavy duty angles for wall connections.

END OF SECTION

SECTION 10 22 26 – OPERABLE WALLS

A. SCOPE

1. DO NOT USE unless approved by owner.
2. DO NOT USE: accordion partitions. Minimize use of operable fire-rated partitions (Won Doors) and seek approval from owner for use of same.

B. QUALITY ASSURANCE

1. System Performance:
   a. Sound Transmission Class: 50 ASTM E 413.

C. PRODUCTS

1. Folding Panel Partitions:
   a. Panel type with overhead track and ball-bearing trolley.
   b. Operation: manual or electric motorized.
   c. Features: full perimeter closure and seal.
   d. Frame: Steel with steel face.
   e. Finish: Vinyl wallcovering on gypsum wallboard.

2. Accessories:
   a. Employ pass doors and visual display boards as appropriate.
   b. Contractor to provide three partition wrenches for each operable wall.

3. Vertical Folding Panel Partitions:
   a. For use at elementary schools between the gymnasium and multi-purpose room.
   b. Acceptable manufacturers:
      i. Hufcor Summit Vertical Lift Operable Partitions
      ii. Skyfold Classic Custom Powerlift Partitions
   c. Finish(es): vinyl coated fabric, with P-lam or Acroven on the lower two panels.

END OF SECTION

SECTION 10 28 00 - TOILET AND BATH ACCESSORIES

A. SCOPE

1. Toilet accessories and metal framed mirrors.

B. PRODUCTS

1. Toilet Accessories:
   a. Paper towel dispensers.
   b. Sanitary napkin dispensers.
   c. Sanitary napkin receptacles.
   d. Toilet paper dispensers.
   e. Grab bars.
   f. Shower curtains and rods.
   g. Folding shower seats.
   h. Mop holders.
   i. Soap dispensers.
   j. Mirrors.
   k. Robe hooks.
   l. Equipment hooks.
   m. Electric Hand/Hair Dryers.
   n. Baby Changing Stations (provide backing!)

2. Item/Model/Manufacturer (Bobrick listed but also acceptable are A & J Washroom Accessories; American Specialties, Inc.; Bradley Corporation; General Accessory Manufacturing Co. (GAMCO); McKinney/Subsidiary Kidde Inc.; Trubro, Inc.; Brocar Products, Inc.):
   a. Paper Towel Dispensers: Furnished by Owner, installed by contractor, one per sink.
   b. Sanitary Napkin Dispenser: Bobrick B-352. Set coin operator at 25¢.
   c. Sanitary Napkin Receptacle: Bobrick B-270.
   d. Toilet Paper Dispensers: Bobrick B-2740.
   e. Plain, Straight Grab Bars: Equal to Bobrick 6206 series, 1-1/2” diameter, concealed mounting. L-Shaped Shower Grab Bars: Equal to Bobrick B-6861, 15-7/8” x 30-7/8”.
   f. Shower Rod and Curtain: Opaque matte white vinyl .008” thick with nickel plated brass grommets at 6” o.c., all sides hemmed, similar to Bobrick style 204, sized to fit opening(s). Provide curtain hooks. Rod equal to Bobrick B-6047. DO NOT USE fabric shower curtains or glazed shower doors.
   g. Folding Shower Seats : Bobrick Model B-517/518.
   h. Mop Holder: Bobrick B-223 series.
   i. Soap Dispensers: Furnished by Owner, installed by contractor, one per sink unless shown otherwise.
   j. Mirrors: Bobrick B-290 series. For mirrors with shelf, Bobrick B-292. Consider polished stainless steel at locations where vandalism potential is high. DO NOT USE acrylic or polycarbonate plastic. Do not use shelves above lavatories (sinks).
   k. Robe Hook: Bobrick B-2116.
   l. Equipment Hook: Bobrick B-6777.
   m. Electric Hand Dryer: Bobrick B-708. (Verify use with Owner prior to specifying)
   n. Shelves: DO NOT USE shelves above lavatories.

n. Finishes General: Use stainless steel or chrome-plated galvanized steel. DO NOT USE enameled steel or aluminum accessories.

END OF SECTION

SECTION 10 44 00 – FIRE PROTECTION SPECIALTIES

A. SCOPE

1. Fire Extinguishers and Cabinets.

B. QUALITY ASSURANCE

1. Standards: UL and FM listed products.

C. PRODUCTS

1. Acceptable Cabinets:
   a. Cold rolled steel sheet box, fabricated for fire rating required for recessed or semi-recessed installation in walls, baked enamel finish.
   b. Aluminum sheet door and trim, clear anodized finish, with break glass panel, recessed or semi-recesseed.
   c. Inside Lock and Latch: accessible through break-glass panel.
   d. Outside Access: via cylinder lock (all cabinets keyed alike throughout building).
   e. Labeling: provide silk-screened labeling identifying FIRE EXTINGUISHER.
   f. DO NOT USE surface mounted cabinets unless approved by owner.

2. Fire Extinguishers:
   a. Multi-purpose dry chemical type, UL rated 4-A:60-B:C with 10-lb. nominal capacity, typical. I.B.C. Class “K” Foam type at kitchens and cooking areas.

3. Installation guidelines:
   a. In addition to code-required fire extinguishers, provide fire extinguishers and fire blankets in each science classroom/lab, each shop, and each custodial room.

END OF SECTION

SECTION 10 51 13 - METAL LOCKERS

A. SCOPE

1. Metal lockers
   a. DO NOT USE wood lockers.
   b. DO NOT USE wood lockers for music instrument storage. (Use metal lockers especially designed for various music instrument sizes.)

B. PRODUCTS

1. Wardrobe/Corridor Lockers:
   a. Body: 24 gauge metal.
   b. Door Frame: 16 gauge metal.
   c. Door: 14 gauge metal.
   d. Handle: recessed.
   e. Latching: Single point with pry-resistant lug.
   f. Hinges: continuous piano hinges.
   g. Locking: Built-in combination lock at high schools and middle schools. Recessed handle equipped for padocks at elementary schools.
   h. Tops: Sloped (unless recessed installation).
   i. Fasteners: All connections to be riveted, not bolted.
   j. All lockers to be 15” wide.

2. Athletic Lockers:
   a. Body: 18 gauge metal with 13 gauge expanded metal ventilation panels.
   b. Door Frame: 14 gauge metal.
   c. Door: 14 gauge metal.
   e. Latching: 3-point cremone latch.
   f. Hinges: continuous piano hinges. No 5-knuckle hinges permitted.
   g. Locking: Combination padlocks.
   h. Tops: Sloped (unless recessed installation). At low-top island installation provide protective surface, verify with owner.
   i. Fasteners: All connections to be riveted, not bolted.

3. Accessories:
   a. Number plates.
   b. Locker room benches.
   c. Filler strips.

END OF SECTION

SECTION 10 75 00 - FLAGPOLES

A. SCOPE

1. Flagpole Systems

B. PRODUCTS

1. Flagpoles:
   a. Aluminum, cone-tapered, clear anodized, with sleeve, interior halyard, top ball, and all other materials needed for a complete assembly. Maximum height: 35'. Accommodate two (2) flags. In-ground mounted (do not mount on building), and provide vehicle access. DO NOT provide tilting flagpoles. DO NOT provide flagpole shafts of more than one piece (except in special circumstances approved by owner). Provide canopy of pole mounted flag lighting; no ground mounted lighting
   b. Shape: Cone tapered.
   c. Type: Vertical pole.

2. Aluminum Flagpoles:
   a. Material: ASTM B 241, alloy 6063-T6, seamless tubing, minimum wall thickness 3/16 inch.
   b. Finish: Anodized (clear preferred).

3. Fittings: Internal halyard, finial ball, trucks and cleats.

END OF SECTION

SECTION 10 82 00 - LOUVERS AND VENTS

A. SCOPE

1. Fixed metal wall louvers.
2. Adjustable metal wall louvers.
3. Wall vents.

B. PRODUCTS

1. Aluminum Louvers:
   a. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T52.
   b. Finish: Clear anodized or fluoropolymer, Kynar 500.

2. Steel Louvers:
   a. Galvanized Steel: ASTM A 526 or ASTM A 527, G90 zinc coating.
   b. Finish: Baked enamel, powder-coated, or fluoropolymer, Kynar 500.

2. Consider Appropriate Louver Accessories:
   a. Bird screens.
   b. Insect screens.
   c. Blank-off panels.
   d. Insulated blank-off panels.

END OF SECTION

SECTION 11 31 00 - RESIDENTIAL APPLIANCES

A. SCOPE

1. Kitchen area appliances.

B. PRODUCTS

1. Kitchen Appliances:
   a. Ranges, electric.
   b. Range hoods, recirculating type.
   c. Cooktops, electric.
   d. Wall ovens, electric.
   e. Refrigerator/freezers.
   f. Freezers.
   g. Microwave ovens.
   h. Dishwashers.
   i. Ice Machine: use Manitowoc model #UY-0240A at elementary schools, Manitowoc model #UY-0310A at middle schools, verify with Owner for model to be used at high schools.

2. Laundry Appliances:
   a. Clothes washers.
   b. Clothes dryers, electric.
   c. Combination clothes washers and dryers as needed for Home & Family program.

3. Approved Manufacturers:
   a. Whirlpool
   b. GE
   c. Others as approved by Owner

END OF SECTION

SECTION 11 40 00 - FOOD SERVICE EQUIPMENT

A. SCOPE

1. Commercial Food Service Equipment includes the following. Carefully coordinate all equipment selections with Owner's food service director.
   a. Food preparation equipment and exhaust hoods with integral fire suppression system.
   b. Food preparation line.
   c. Cafeteria line serving equipment.
   d. Pot washing and dishwashing equipment.
   e. Food storage (dry and refrigerated).
   f. Waste equipment (garbage disposal).

B. QUALITY ASSURANCE

1. Codes and Standards:
   a. NSF Seal of Approval.
   b. Underwriters' Laboratories Label.
   c. NFPA 54, National Fuel Gas Code.
   d. NFPA 70, National Electrical Code.
   e. NFPA 96, Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.
   f. ASME Boiler Code.

C. PRODUCTS

1. Food Service Equipment Materials:
   a. Stainless Steel: AISI Type 304, No. 4 polished finish.
   b. Tops, Sinks, Dishtables, and Drainboards: 14 gage stainless steel.
   c. Cabinet Bodies and Doors: 20 gage stainless steel. All cabinets to have doors.
   d. Drawers: 18 gage stainless steel body with 16 gage stainless steel front.
   e. Shelves: 14 gage stainless steel.
   f. Cold Pans: 14 gage stainless steel.
   g. Hardwood Work Surfaces: Laminated edge-grained hard maple.
   h. Hand Sinks: stainless steel as noted above. Include back- and side-splashes.

2. Serving line: height to be 30" at elementary schools, 36" at middle and high schools, verify with Owner.

3. Sneeze guards: In elementary schools, provide 14" sneeze guards at the main serving line, and 20" sneeze guards at the self-service units.

4. Exhaust Hoods: NFPA 96, light fixtures, exhaust duct, grease removal. Include stainless steel backsplash.

5. Refrigeration Equipment: Compressors, condensors, piping, and storage areas, capacity as required for projected quantities.
   a. Provide ThermSolutions KE2 Evaporator Efficiency controller at walk-in cooler and freezer. See cut sheet following this section.
   b. Temperature sensors at walk-in cooler and freezer require data connection.

6. Dishwashing Equipment: Hobart only, with 160-degree water wash.

7. Faucets: Chicago or T&S Brass.

8. Provide washer/dryer and lockers in kitchen.

9. Provide roller casters on combi oven units.

10. Shelving: Metroseal.

D. EXECUTION

1. Freezer/cooler:
   a. Condensate lines to be copper (insulated).
   b. Do not install floor sink in front of cooler/freezer.

2. Combi-ovens require their own cold soft water system. Filters are not acceptable.

END OF SECTION

Evaporator Controller
Specification Sheet

Evaporator Controller
(1 per evaporator)

Refrigeration Evaporator Temperature and Defrost Controller – KE2Therm or Equal

Evaporator Controller to consist of a microprocessor driven controller and include the following:

1.) 5 Analog Inputs
   a. (4) Temperature Sensors
   b. (1) Pressure Transducer
2.) 4 Relay Outputs
   a. (1) 10 Amp (Inductive) Fan Contactor
   b. (1) 20 Amp (Resistive) Defrost Contactor
   c. (1) 3 Amp (Inductive) Solenoid Relay
   d. (1) 3 Amp (Inductive) Alarm Relay
3.) 3 Programmable Digital Inputs
4.) 1 Ethernet Connection
5.) 1 Output 0-10V DC
6.) 1 Electronic Expansion Valve Driver for either unipolar or bipolar electronic expansion valve

The microprocessor board shall be potted to protect it from moisture and allow it to be located within refrigerated environment. Operating Environment -40ºF to 140ºF

The controller shall operate on 120V or 208V - 240V

The controller shall have a 4 digit alphanumeric, scrolling LED display and operating status lights showing system conditions.

The microprocessor shall have onboard web browser allowing system parameters to be monitored remotely utilizing standard TCP/IP protocols HTML, SNMP, and XML communication. Multiple controllers will have the ability to utilize TCP / IP communication to communicate with each other, providing the ability to sync compressor run/off and defrosts between multiple evaporators.

The controller's microprocessor shall have the option of controlling evaporator fans the following ways:

1.) Continuously
2.) Cycle on room temperature and coil temperature
3.) Cycle on with compressor

The controller's microprocessor shall have the option of selecting between the following defrost type:

1.) Air
2.) Electric
3.) Hot Gas

The controller's microprocessor shall have the option of selecting between defrost control method:

1.) Demand defrost which initiates defrost on loss of evaporator efficiency and is terminated on temperature
2.) Time initiated defrost – terminated by temperature.
3.) Runtime defrost which initiates defrost based on number of hours of compressor operation

The controller shall have the option of data logging at 10 minute intervals for 31 days the following:

1.) System Status
2.) Suction Pressure
3.) Suction Temperature
4.) Saturated Temperature
5.) Superheat
6.) Valve %
7.) Room Temperature

Evaporator Controller - Specification Sheet

8.) Coil Temperature
9.) Compressor Status
10.) Fan Status
11.) Defrost Status
12.) Digital Input Status
13.) Alarms

Pressure Transducer

Input 0-5VDC

Pressure Range: 0 to 150 psia
Proof Pressure: 450 psi
Burst Pressure: 1500 psi
Operating Temperature: -40ºF to 275ºF

Temperature Sensor

Operating Range -60ºF to 150ºF
Stainless steel housing
Moisture resistant package
2KΩ@77ºF

KE2 Therm Solutions, Inc.
209 Lange Dr. . Washington, MO 63090
1-888-337-3358 . www.ke2therm.com

SECTION 11 52 00 – AUDIO-VISUAL EQUIPMENT

A. SCOPE

1. Projection screens.
2. Projector mount assemblies (ceiling-mounted for computer projectors).
3. Projectors

B. PRODUCTS

1. Front Projection Screens:
   a. Operation: Manual at all locations except motorized at large, high-ceiling installations (key-operated).
   b. Mounting: Surface mounting at ceiling or wall.
      i. Surface mount: using full-length backer board equal to length of screen.
      ii. For surface mounting, use 6 ½" brackets.
      iii. Suspended Ceiling Mount: using full wrap-around T-bar hanger and wire suspension at each hanger point.
   c. Viewing Surface: Matte white surface, size proportioned to computer projector format.
   d. Edge Treatment: Black masking borders.
   e. Size: 70" square at classrooms, verify sizes for other locations with Owner.

2. Projector Mounts:
   a. Type: Peerless Model# CMJ500R1. Include all components necessary for a complete assembly.
   b. Location: Projectors should be mounted at a distance from the wall that is 1.6x screen width, and 3" left of the center of the screen. (verify with ITSC prior to installation)
   c. Connection: Four data ports at each projector mount.

3. Projectors
   a. Short throw projectors will only be allowed in special circumstances, locations must be approved by Owner.

END OF SECTION

SECTION 11 53 13 - LABORATORY FUME HOODS

A. SCOPE

1. Laboratory fume hoods.

B. QUALITY ASSURANCE

1. Face velocities for anticipated materials and use, NFPA 45:
   a. Class B service for normal hazard or toxicity.

C. PRODUCTS

1. Laboratory Fume Hood Type and Materials:
   a. Type: Conventional, variable volume.
   b. Working Surfaces: Non-asbestos composition stone.
   c. Hoods: Steel frame, non-asbestos lining.
   d. Base Cabinets: Wood.

END OF SECTION

SECTION 11 66 00 - ATHLETIC EQUIPMENT

A. SCOPE

1. Indoor Athletic Equipment:
   a. Ceiling-mounted, forward-fold backstops.
   b. Ceiling-mounted, side-fold backstops.
   c. Wall-mounted, up-fold backstops.
   d. Wall-mounted, fixed backstops.
   e. Volleyball sleeves.
   f. Wall padding.
   g. Gym divider curtains.
   h. Wrestling mat lift storage system.
   i. Ceiling-mounted bat cage.

2. Special Product Warranty:
   a. 5 years on all athletic equipment and installation.

B. PRODUCTS

1. Ceiling-Mounted Backstops:
   a. Forward-fold or side-fold.
   b. Operation: Electric motorized.
   c. Equip each backstop with 42” x 72” glass backboard, mechanically fastened safety pads, and torque-flex adjustable breakaway goal with net.
   d. Height adjustment feature (if required at elementary school applications, verify).
   e. Specify fall safety straps and all motorized backboards.
   f. Specify protective cage at all winches.
   g. Specify control switches for installation by electrical in central control cabinet.

2. Wall-Mounted Backstops:
   a. Fixed, up-fold or side-fold.
   b. Operation if applicable: Electric motorized.
   c. Equip each backstop with 42” x 72” glass backboard, mechanically fastened safety pads, and torque-flex adjustable breakaway goal with net.
   d. Height adjustment feature (if required at elementary school applications, verify).
   e. Specify fall safety straps and all motorized backboards.
   f. Specify protective cage at all winches.
   g. Specify control switches for installation by electrical in central control cabinet.

3. Volleyball and Badminton:
   a. Sleeves, floor plates, uprights, nets and padding. Manufacturer: Senoh only permitted.

4. Wall Padding:
   a. 2 ft. wide x 2 inch thick panels.
   b. Cut-outs at electrical boxes and other devices.
   c. When door openings occur in end-of-court impact zone in gyms, provide wall padding around door hardware.

5. Gym Divider Curtain:

a. Roll-up curtain with solid bottom fabric and upper mesh fabric.
b. Operation: Motor operated with up-stop-down key switch.

6. Batting Cage:
   a. 10’-0”H x 12’-0”W x length, 4-sided mesh cage with top.
   b. Operation: Motor operated with up-stop-down key switch.

END OF SECTION

SECTION 11 68 00 – PLAY FIELD EQUIPMENT AND STRUCTURES

A. SCOPE

1. Playground equipment.

B. PRODUCTS

1. Verify product and materials in advance with owner.
2. Meet specifications in the most current versions of the U.S. Consumer Product Safety Commission "Handbook for Public Playground Safety" and ASTM F 1487, "Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use."
3. DO NOT use products made of Redwood, Teak, or exotic woods.
4. NOTE: preliminary design review is required by local Health District.

END OF SECTION

SECTION 12 20 00 - WINDOW TREATMENT

A. SCOPE

1. Window treatment.

B. PRODUCTS

1. Acceptable Window Blinds:
   a. Horizontal aluminum blinds: Equal to Bali S3000 with additional light blocking features.
      i. Slat width: 1-inch. No 2-inch or wider slats permitted.
   b. Horizontal wood blinds.
   c. DO NOT USE:
      i. Horizontal PVC blinds.
      ii. Vertical blinds of any type.
      iii. Fabric curtains, except at blackout curtains.

2. Acceptable Window Shades:
   a. Top-mounted fabric roller shades.
   b. Bottom-mounted fabric roller shades.
   c. Top-mounted fabric cellular (honeycomb) shades.
   d. Bottom-mounted fabric cellular (honeycomb) shades.
   e. Top-mounted pleated fabric shades.
   f. Bottom-mounted pleated fabric shades.
   g. DO NOT USE:
      i. Louvered fabric shades.
      ii. Roman fabric shades.

3. Acceptable Interior Shutters:
   a. Solid wood shutters.
   b. Louvered wood shutters.
   c. Other materials acceptable for interior partitions.
   d. DO NOT USE: Louvered PVC shutters.

4. DO NOT USE Draperies and Tracks:
   1. DO NOT USE recessed or surface mounted curtain tracks.
   2. DO NOT USE fabric curtains.

C. EXECUTION

1. Use blinds at interior relites.
2. Use shades with 3% openness at exterior windows.
3. Verify with Owner where black out shade is required.
4. Use motorized shades at high bay spaces, verify with Owner.

END OF SECTION

SECTION 12 35 53 - LABORATORY CASEWORK

A. SCOPE

1. Laboratory casework, countertops, sinks, and service fixtures at Science Rooms.

B. PRODUCTS

1. Wood Casework (meet requirements of 06 41 00):
   a. Materials: Solid wood and veneer plywood, premium grade red oak.
   b. Finish: Chemical-resistant finish.

2. Countertops:
   a. Material: Epoxy resin.
   b. Chemical Resistance: Resistant to anticipated exposure.

3. Sinks, Cup Sinks, and Troughs:
   a. Material: Cast epoxy resin.
   b. Chemical Resistance: Resistant to anticipated exposure.

4. Service Fixtures:
   a. Piped Service: Air, gas, hot water, and cold water.
   b. Power: Electrical service outlets.

END OF SECTION

SECTION 12 48 13 - FLOOR MATS

A. SCOPE

1. Floor mats.

B. PRODUCTS

1. Floor Mats:
   a. Type: Carpet-type mats- verify with owner type and manufacturer consistent with carpeting specification requirements (per Section 09 68 00).
   b. Mats to be at least 6’ in length (perpendicular to door).
   c. Type: Use Connexus Super Nop 52 (aka Van Dijk Hercules NOP), other manufacturers as approved by Owner.
   d. Mounting: Surface-mounted.

END OF SECTION

SECTION 12 66 13 - TELESCOPING BLEACHERS

A. SCOPE

1. Telescoping, multiple-tiered benches for interior seating.

B. QUALITY ASSURANCE

1. Installer to have three (3) years minimum experience in bleacher installation, and to be certified by manufacturer of bleachers.
2. Warranty: Five (5) years from date of substantial completion.
3. Maintenance and Operation: provide owner four (4) copies of operation and maintenance manual. Provide on-site orientation and demonstration of all operational and maintenance procedures.

C. PRODUCTS

1. Telescoping Bleachers:
   a. Acceptable manufacturers: Hussey Seating Co., Interkal, Inc.
   b. Bench Seats: Contoured polyethylene plastic or vinyl-clad sheet steel.
   c. Mounting: Varies (wall-attached and floor-attached).
   d. Operation: Electric. Units to be controlled from plug-in walk-along pendant switch. Provide both open and closed limit switches for the integral power system—which automatically stop at fully-extended or fully-closed positions. Travel speed: 25 feet per minute (maximum).
   e. Wheel Assembly: manufacturer's standard. Include wheels of size, number, and design required to support bleacher units and to achieve smooth operation without damage to flooring surface, but not less than 4 per column, with size not less than 3-1/2 inched in diameter and 1 inch wide.
   f. Row Spacing: 24 inches.
   g. Row Rise: 10-1/4" or nearest manufacturer standard rise.
   h. Accessories: vinyl safety end panels measured to include the rear filler board length (between last row and wall), vinyl safety top deck closures, vinyl safety aisle closures (match seating color).
   i. Handicapped Seating: meet ADA requirements with first tier handicap cut-outs.
   j. Aisle Steps: self-storing type, in compliance with IBC.
   k. Handrails: meet IBC requirements with vertical aisle center handrails. Handrails to be self-storing, 34" high with an intermediate horizontal mid-rail.
   l. End rails: provide self-storing type, 42" high above seat, designed not to pass 4" sphere (or current IBC requirement).

END OF SECTION

SECTION 12 93 00 – SITE FURNISHINGS

A. SCOPE

1. Verify product selection with Owner. DO NOT use products made of terra cotta, bronze or aluminum.

B. PRODUCTS

1. Benches: Verify product and materials in advance with Owner. When set in grass, install on concrete slab with 18" apron beyond bench perimeter all around.

2. Trash Receptacles: Verify product and materials in advance with owner. Anchor assembly in concrete slab.

3. Bicycle Racks: Galvanized steel. Verify product and materials in advance with Owner.

4. Drinking Fountains: Verify product and materials in advance with Owner. Use freeze-resistant fountain outfitted with polished chrome vandal-resistant bubbler. (Do not use compression or shark tooth fittings.)

5. Sports Fixtures: Verify product and materials in advance with Owner.

6. Skateboard Inhibitor Devices: Concrete formed depressions in walls and wherever possible are preferred (perpendicular to concrete edge at 48" o.c. maximum). Alternately, use skateboard inhibitor devices equal to StopAGrind, www.stopagrind.com (verify type with Owner).

END OF SECTION

SECTION 14 20 00 – ELEVATORS

A. SCOPE

1. Prefer use of pre-engineered hydraulic passenger elevators if conveying system needed.
2. May use wheelchair lifts at existing facilities or where used to access stage or other limited use in new construction, where program or code does not require addition of a passenger elevator. Verify circumstances with owner.
3. Provide stairway chairlifts at existing facilities only if wheelchair lift or elevator is not practical.
4. DO NOT USE dumbwaiters, freight elevators, or sidewalk elevators.

B. QUALITY ASSURANCE

1. Safety Code: ASME/ANSI A17.1 and A18.1, local regulations and handicapped requirements.

C. PRODUCTS

1. Features and Components:
   a. Hydraulic Type: Single-acting holeless hydraulic unit.
   b. Control Systems: Single elevator controls.
   c. Cab Finishes: Enameled steel panels and flooring to match corridor.
   d. Door Panels: Enameled steel.
   e. Hoistway Entrances: Enameled steel.
   f. Railings: Brushed stainless steel.
   g. Control and Annunciator Panel: Brushed stainless steel.
   h. Access: via district standard key (verify with owner).

2. Auxiliary Operations and Controls:
   a. Alarm/emergency stop button.
   b. Audible signals.
   c. Automatic 2-way leveling.
   d. Key switches to lockout individual floors. (Provide dual-setting capability with restricted access via lock-out key, and unrestricted access for general public use.) Provide “momentary” on/off switches.
   e. Door nudging device.
   f. Liner blanket hooks and blankets.
   g. Emergency power operation.

D. SCHEDULE

1. Hydraulic Elevator Schedule:
   a. Capacity: 2500 pounds minimum.
   b. Speed: 100 to 125 feet per minute.
   c. Car Size: 6'-8" wide by 4’-3” deep by 7'-0" high minimum.
   d. Entrance Size: 3'-6" by 7'-0"minimum.
   e. Entrance Door Operation: Side opening or biparting.

END OF SECTION

SECTION 21 13 00 – FIRE SUPPRESSION SPRINKLER SYSTEMS

A. SCOPE

1. Wet-pipe sprinkler systems
2. Dry-pipe sprinkler systems

B. PRODUCTS

1. Wet-pipe sprinkler system- per Fire Marshal, quick response sprinkler heads are required.
2. Dry-pipe sprinkler system- per Fire Marshal, quick response sprinkler heads are required. Use for exterior if required.
3. Standpipe system.
4. Fire detection and alarm system.
5. Smoke control system.
6. DO NOT USE:
   a. Non-water extinguishing systems, except at specific locations such as computer rooms (seek Owner approval).
   b. Standpipe and hose system.
   c. CPVC piping, unless located out of harm's way; requires careful consideration of potential accidental damage in areas where maintenance work will occur (e.g. tempting to use as a hand hold).

C. EXECUTION

1. Operation and Maintenance:
   a. Ease of Use: Provide easy access to and working clearances around system components.
   b. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.
2. Construction: Pre-construction meeting with Contractor, Installer, Owner and Architect is required.

END OF SECTION

SECTION 22 00 00 – GENERAL DESIGN GUIDELINES-PLUMBING

1. Health: Construction procedures must be used to maintain the safety of the potable water source at all times.

2. Durability: Sewer and water lines at the building exterior shall be bedded in sand to protect pipes from damage during installation and in service.

3. Hot water re-circulation system: Review extent of system and proposed pumps with Owner. Provide ground lugs on hot water pumps. DO NOT use ball valves as balancing valves. Isolate all pumps with valves. DO NOT use balancing valves as isolation valves (use separate valves to isolate pumps). Provide balancing report on the system.

4. Kitchen:
   a. Provide separate hot water tank with 140 degree soft water.
   b. Provide 120 degree water to hand wash sink by a separate line or mixing valve.

5. Fan coil drains: Pipe to custodial sink or to sink drain tail piece, but preferably not classroom sinks. Provide vent on downstream side of trap (unless condensate flows to drain pan open to atmosphere).

6. Maximum water distribution working pressure: 80 psi (550 kPa).

7. Burn hazards:
   a. Maximum Fixture Discharge Temperature, Typical: 120 degrees F (49 degrees C).
   b. Maximum Exposed Surface Temperature: 105 deg F (40 deg C).
   c. Maximum Fixture Discharge Temperature at Commercial Kitchen: 140 degrees F (60 degrees C), except provide mixing valve to limit handwash sinks to 120 degrees F (49 degrees C) or supply from typical domestic water system.
   d. Provide insulation cover kits or other barrier.

8. Master shut offs: Install signs indicating the location of the water and gas master shut-offs as well as other safety items in all laboratory areas. All science rooms to have emergency gas (and power) shut-off switches.

9. Pipe access at chases: Similar to Browne Elementary School.

10. Water distillation: Owner-provided at Science Preparation rooms. Verify plumbing connection requirements.

11. Miscellaneous plumbing products:
   a. Circuit setters on hot water return piping: type that can be tested and with threaded ends.
   b. Hot water tanks are preferred over boilers with storage tanks.

12. Compressed air: verify with users the need for compressed air. Note that CADD labs may require compressed air.

END OF SECTION

SECTION 22 05 00 – COMMON WORK RESULTS FOR PLUMBING

A. SCOPE

1. Common piping materials, sleeves, escutcheons.
2. Expansion fittings and loops for plumbing piping
3. Meters and gauges for plumbing
4. General-duty valves for plumbing piping
5. Hangers and supports for plumbing piping and equipment
6. Identification for plumbing piping and equipment
7. Facility drainage piping cleanouts
8. Gaskets

B. PRODUCTS

1. Trim: faucets, tailpieces, strainers, etc. of all brass construction, chrome plated.

2. Fittings:
   a. Fittings on galvanized pipe: malleable.
   b. Fittings on copper piping: wrought, cast copper or brass.
   c. DO NOT use: Field fabricated copper fittings on domestic water system.
   d. DO NOT use: Soldered fittings on water hammer arrestors.
   e. DO NOT use: Copper female adapters on fan coil unit connections (use male adapter with brass fitting).

3. Valves:
   a. All threaded type, full port capacity exceeding system operating pressures.
   b. Isolation valves: 2” and smaller: full port threaded ball valves.
   c. Service valve: Milwaukee
   d. Swing check valves: ¼” to 3”; Stockham B319, threaded, bronze.
   e. Lift check valves: ½” to 1”; Stockham B-322B, threaded, bronze with 110 disc.
   f. Vertical check valves: ¼” to 2”; Jenkins 119, threaded, bronze with 10 disc.
   g. Stop and waste valves: ¾”; Nibco 726FF, bronze.
   h. Ball valves: ½” to 2”; Milwaukee BA-125 series, threaded. Provide 2 ¼” extension stems on all valves. DO NOT use ball valves for balancing.
   i. Gate valves: DO NOT use gate valves at sizes 2” or smaller.
   j. At globe, angle and gate valves, use Teflon impregnated packing with 25% minimum Teflon.

4. Cleanouts: MiFab Josam, Zurn, Wade, Tyler or J.R. Smith.

5. Gaskets: ASME B16.21, nonmetallic, flat, asbestos free 1/8” maximum thickness, Garlock Stress Saver XP or equal.

C. EXECUTION

1. Valves:
   a. Vertical lines and pump discharge piping: silent check valves.
   b. Domestic water service: 2” and smaller: ball valves only.
   c. Water, air steam and condensate lines: horizontal swing type or silent check valves.

d. DO NOT use: ball valves as balancing valves, Zurn Automatic Flush Valves, soldered valves.
e. Isolation valves:
   i) Provide on all branch lines at the main and on lines serving three or more fixtures.
   ii) Locate in readily accessible locations, with green location markers on ceiling grid or access panel.
   iii) Provide to isolate sections of the hot water re-circulation system.
   iv) Provide on supply line to frost-free bibbs.
      1. Locate hydrants within 100’ of any point on the exterior of the building to facilitate washing and/or sandblasting to remove graffiti.
   v) Provide for each shower column or wall mounted shower station.
   vi) Mount a valve schedule in the mechanical room with a copy to the SPS Plumbing Department.
f. Double check valves:
   i) If a double check valve is required by the city on the domestic water service, provide two double check valves in parallel to accommodate testing of the devices without disruption of service to the building.

2. Hazard labeling: the construction will clearly label domestic hot water, domestic cold water, rainwater drainage, and sanitary waste and vent systems indicating the nature of contents and direction of flow.

3. Drainage cleanouts: cleanouts will be provided as required by code and as follows:
   a. At the upstream end of each horizontal sanitary drainage pipe, for cleaning in direction of flow.
   b. At the dead end of each dead-end pipe.
   c. Pipe 3” (75 mm) and smaller: at intervals of 50’ (15 m) maximum.
   d. Pipe 4” (100 mm) to 6” (150 mm): at intervals of 80’ (24m) maximum.
   e. Pipe 8” (200 mm) and larger: at intervals of 100’ (30 m) maximum.
   f. Clearance: as required by code to allow for cleaning and rodding of pipe.

END OF SECTION

SECTION 22 07 00 – PLUMBING INSULATION

A. SCOPE

1. Piping insulation

B. PRODUCTS

1. Flexible glass fiber blanket with foil faced vapor retardant jacket.
2. Rigid glass fiber board with foil faced vapor retardant jacket.
3. Elastomeric foam
4. Flexible unicellular polyolefin
5. Calcium silicate insulation
6. Applied jackets:
   a. PVC plastic, one piece molded type, minimum 0.020” thickness, gloss white with matching pressure sensitive vinyl tape connections.
   b. Canvas jacket, UL listed fabric, 6 oz/sq. yd. treated with field diluted fire retardant lagging adhesive.
   c. Aluminum jacket, preformed with two inch overlap, minimum 0.016” thickness.

C. EXECUTION

1. Provide continuous insulation through the hangers on all domestic water piping.
2. Insulate all waste lines subject to condensation.

END OF SECTION

SECTION 22 11 00 – FACILITY WATER DISTRIBUTION

A. SCOPE

1. Domestic water piping
2. Domestic water piping specialties
3. Domestic water pumps

B. PRODUCTS

1. Above grade piping: type L copper
   a. No extruded tee connections permitted.
   b. Pipes 2” in diameter and smaller: soldered joints using lead free solder.
   c. Pipes larger than 2” in diameter: brazed joints using filler containing 15% silver.

2. Below grade piping: type K copper

3. Water hammer arrestors: threaded only.

4. Supplies, stops and traps: chrome plated, loose-keyed type stops only.
   a. Lavatory and sink traps: cast brass with 17 gauge copper tube outlets, traps to have cleanouts.
   b. Stops on lavatories: ½” female compression inlet by 3/8” compression outlet, flexible rubbing riser with ground joint connection fixture and wall escutcheon plate.
   c. Stops on classroom, workroom, etc. sinks: ½” female IPS by 3/8” compression quarter turn valves.

5. In-line circulating heating water pump: radially split cast iron body suitable for 175 psi working pressure, impeller of non-ferrous material, alloy steel pump shaft with integral thrust collars, shaft supported by; as manufactured by Armstrong or Bell & Gossett.

C. EXECUTION

1. The system will include a means of isolating the following piping segments and equipment:
   a. Each building from main water service. The construction will provide a shut-off valve located inside a valve box whose removable access cover is at grade level.
   b. Water meter from building piping.
   c. Each classroom from building service, excluding locations where there is only one fixture with its own isolation valves.
   d. Each water branch from main service.
   e. Each vertical riser from piping below.
   f. Each water branch to fixtures or equipment from main vertical riser.
   g. Piping lower than the supply, to prevent unnecessary draining in the case of disconnection.
   h. Individual fixtures and equipment. The construction will provide an isolation device within 15’ (3300 mm) of pipe connection to item.

2. Provision for drainage of water distribution piping:
   a. Slope piping toward drain: ¼” per 10’ (1:500).
   b. The construction will provide a system drain at the lowest point in the system.

c. The construction will provide an adequately sized drain for the volume of water inside the distribution system.
d. Drain valve (or fixture shut-off valve) located at each low point.

3. Roof drain leaders: provide accessible cleanout at the base and where it leaves the building. Provide metal bird screens at downspout nozzles.

4. Water hammer arrestors:
   a. Provide water hammer arrestors in locations with valves that close quickly and on battery of fixtures.
   b. Locate water hammer arrestors to be readily accessible.

5. Trap primers: avoid the use of trap primers. If unavoidable, provide drainage type, tail piece of flush valve or solenoid valve controlled operated by the Energy Management Control System (EMS).

7. Frost proof hose bibbs: provide at maximum intervals of 100’ completely around all buildings.

8. Silver brazing shall be done by persons capable of obtaining a "medical gas license" as determined by the Washington Department of Labor and Industries.

END OF SECTION

SECTION 22 13 00 – FACILITY SANITARY SEWERAGE

A. SCOPE

1. Sanitary waste and vent piping.
2. Sanitary waste piping specialties.

B. PRODUCTS

1. Above grade piping- typical:
   a. No-hub cast iron
   b. Type M copper
   c. PVC or ABS plastic on roof drain piping and non noise-sensitive areas only

2. Above grade piping- acid resisting:
   a. Schedule 40 polypropylene, flame retardant.
      i) At return air plenums and rated assemblies: PVDF pipe and fittings with flame spread rating less than 25 and smoke developed less than 50, or as required by code.
      ii) Fittings: DWV pattern to match pipe, grooved and gasketed joints or heat fusion.
   b. High silicon content cast iron:
      i) Couplings: stainless steel mechanical joint with PTFE/neoprene sleeve.
      ii) Fittings: DWV pattern to match pipe.

3. Below grade piping:
   a. No-hub cast iron
   b. ABS
   c. PVC

C. EXECUTION

1. Buried piping below slabs: 2” (51 mm) diameter, minimum.
2. Pipes 3” (75 mm) in diameter and smaller: sloped at ¼” per foot (1:50), minimum, downward in the direction of flow.
3. Pipes 4” (100 mm) in diameter and larger: sloped at ¼” per foot (1:50), minimum, downward in the direction of flow.

END OF SECTION

SECTION 22 31 00 – WATER SOFTENERS

A. SCOPE

1. Domestic water softeners.

B. PRODUCTS

1. Specify manufacturers with a local representative within a 45 mile radius of the project site, Culligan preferred.
2. Vulcan anti-scale system for domestic water system, verify use with Owner.

C. EXECUTION

1. Provide water softener at kitchen hot water system and at water for make up for boiler systems. NOTE: water treatment is important. Provide filter feeders for heating and cooling systems.
2. Combi-ovens require cold soft water.
3. Vulcan system will require an outlet next to the installation point.

END OF SECTION

SECTION 22 40 00 – PLUMBING FIXTURES

A. SCOPE

1. Faucets
2. Flushometers
3. Toilet seats
4. Fixture supports
5. Water closets
6. Urinals
7. Lavatories
8. Drinking fountains/water coolers
9. Shower valves
10. Sinks
11. Service sinks

B. PRODUCTS

1. Faucets:
   a. Chicago Faucet or T&S Brass.
   b. Standard dual temperature, manual lever control at classrooms, staff work rooms and health rooms.
   b. Electronically controlled at all restrooms for multi-station and single basins. Alternative choice- metered faucets.
      i) Multi-station basins are to have thermostatic mixing valves and soft-seated spring checks on hot and cold supply.

2. Flush valves: battery powered with top of deck access to all maintainable parts with adjustable mixing valve. Sloan Optima or Geberit. Use side mounted flush valves (Sloan model SMO). Verify all product specifications with Maintenance Department.

3. Thermostatic mixing valves: Bradley or The Brain.

4. Specialty institutional fixtures: Acorn or Bradley.

5. Fixture supports and carriers: Ancon (Watts Drainage), J.R. Smith or Zurn. Do not use compact carriers.

6. Water closets: American Standard, Eljer or Kohler.

7. Urinals: wall mount with removable bee hive strainers, Kohler K-4960-ET or equal.

8. Lavatories: American Standard, Eljer or Kohler.

9. Locker room showers: manual shower valves on the columns with master solenoid control valve on both the hot and cold water supply lines operated by a push button connected to a timer to allow the water to run for a set amount of time. Solenoid controlled by EMS.

10. Stainless steel sinks: America Standard, Elkay, Just Mfg. Co.

11. Custodial sinks:

a. Floor mount, 12” high with 6” front drop, stainless steel cap and wall flanges.
b. Separate cold water supply with proper backflow protection to supply cleaning chemical dispensers.

12. Floor drains: Equal to MiFab F1000 series, nickel bronze drain strainers except cast iron in mechanical rooms.

13. Drinking fountains: Equal to Elkay model LVRCTL8WSK for drinking fountains with bottle fillers and Elkay model VRCGRNTL8C for standard drinking fountains.

C. EXECUTION

1. Electronically controlled faucets:
   a. Hard wire faucet sensors for electronically controlled faucets at multi-station basins at elementary school toilet rooms.
   b. Gang sinks with electronic sensor operated faucets are preferred by the Owner where appropriate for the programmed use. These units must have soft seated spring check valves on hot and cold water supplies. Verify locations with Owner.

2. Flush valves:
   a. Provide side mount operator sensor flush valves on water closets and urinals for facilities intended to serve pupils in 4th grade and higher, and for general public and staff restrooms.
   b. Provide manual flush valves for water closets and urinals for facilities intended to serve pupils in 3rd grade and below, as well as at facilities for special needs students.

3. Classroom sinks: mount faucet on back of sink, with drinking fountain mounted on the right side at elementary schools.

4. Drinking fountains: At elementary schools, place drinking fountain with bottle filler in the Multi-purpose room, use standard drinking fountains at all other locations. Verify with Owner for bottle filler locations in middle and high schools.

END OF SECTION

SECTION 22 45 00 – EMERGENCY PLUMBING FIXTURES

A. SCOPE

1. Emergency showers
2. Eyewash equipment

B. PRODUCTS

1. Emergency shower/eye/face wash: equal to Bradley Model #S19-310BF.
2. Emergency/safety fixtures: Bradley, Haws or Speakman.

C. EXECUTION

1. Emergency showers: provide with floor drain.
2. Emergency eye wash stations: pipe to sanitary sewer.

END OF SECTION

SECTION 23 00 00 - GENERAL DESIGN GUIDELINES-HVAC

1. Integrate mechanical design needs early in design, and involve owner in discussions. The owner wants the engineer to hear the owner's perspective first hand.

2. Acceptable HVAC Systems:
   a. Stand-alone HVAC systems:
      i. Forced-draft, natural gas furnace with split-system cooling.
      ii. Rooftop unit with integral custom enclosure.
      iii. Fan coils are acceptable for remodel projects to address a single room.

   b. Central HVAC systems:
      i. Central chilled water and hot water heating systems with 2 pipe (acceptable) and 4 pipe (preferred) fan coil units, air handlers, and free cooling on all fan coil designs.
      ii. Existing steam heating systems.
      iii. Fan powered variable air volume (VAV), self-contained, air-conditioning unit in certain conditions, verify with Owner.
      iv. Heat pump units are discouraged unless there is a compelling reason for use on a specific project, verify with Owner. Hydronic heat pump with ground coupled heat source preferred.

3. DO NOT use the following HVAC systems:
   a. Stand-alone HVAC systems:
      i. Packaged terminal air-conditioning units.
      ii. Heat pump units, unless for a compelling reason with a specific project, verify with Owner.
      iii. Electric resistance heat, unless for a compelling reason with a specific isolated location, verify with Owner.
      iv. Custom sizes or multiple sizes of units in a single project.

   b. Central HVAC systems:
      i. Straight variable volume air handlers with air terminals.
      ii. Custom sizes or multiple sizes of units for a single project.
      iii. Gas-fired roof-top units for other than make-up air, or for use on remodel projects where acceptable to district for a specific condition. Obtain Owner approval.

4. Acceptable Auxiliary Equipment:
   a. Chemical pumps
   b. Automatic water analyzer
   c. Mineral concentration blowdown controller
   d. Sand filter
   e. Cyclone operator

5. Space Temperature Setpoint:
   a. General Occupancy Spaces, Heating Season: As defined by ANSI/ASHRAE Std 55-1992 with Addendum between 68 degrees F (20 degrees C) and 74 degrees F (23.5 degrees C).
   b. General Occupancy Spaces, Cooling Season: As defined by ANSI/ASHRAE Std 55-1992 with Addendum between 73 degrees F (23 degrees C) and 79 degrees F (26 degrees C).
   c. Computer Room and Voice/Data MDF: 72 deg F (22 deg C), plus or minus 0.5 deg F (0.3 deg C).
   d. Commercial Kitchen: 72 deg F (22 deg C), plus or minus 4 deg F (2 deg C).
   e. Vertical Air Temperature Difference: Comply with requirements of ANSI/ASHRAE Std 55-1992 with Addendum.

6. Operation and Maintenance:

a. Design Criteria:
   i. Entering Chilled Water Temperature: 45 degrees F (7.2 degrees C).
   ii. Leaving Chilled Water Temperature: 55 degrees F (12.8 degrees C).
   iii. Entering Heating Water Temperature: 180 degrees F (82 degrees C).
      a) Heating Water Reset: Reset temperature based on outside air temperature.
   iv. Leaving Heating Water Temperature: 160 degrees F (71 degrees C).
   v. Cooling Leaving Air Temperature: 55 degrees F (12.8 degrees C).
   vi. Heating Leaving Air Temperature: 105 degrees F (40 degrees C).
   vii. Entering Condenser Water Temperature: 95 degrees F (35 degrees C).
   viii. Leaving Condenser Water Temperature: 85 degrees F (30 degrees C).
   ix. Entering Air Temperature: 95 deg F (35 deg C), wet-bulb; 67 degrees F (19 degrees C) dry-bulb; except winter temperature minus 6 deg F (minus 21 deg C.
b. Access: Any equipment placed on a roof without a parapet must be located at least 10' from the roof edge.
c. Operating Parameters:
   i. Propeller Fans: Do not use propeller fans at static pressure above 1 inch water gage (250 Pa).
d. Ease of Use: Provide units with individual controls coordinated with controls specified in section 23 09 00.
e. Ease of Cleaning: Provide units with removable access panels to allow cleaning.

7. Odor Control (Air Changes Required):
   a. Toilet Room Exhaust: 10 air changes per hour.
   b. Janitors Closet Exhaust: 10 air changes per hour.
   c. Locker Room Exhaust: 10 air changes per hour.

8. Health and Safety:
   a. Electrical Shock Prevention: Provide a disconnect switch at each powered induction unit.
   b. Fire Sources: Provide air distribution elements constructed from incombustible materials.
   c. Fire Spread: Provide interlocks to prevent operation or start-up of air distribution elements when fire or smoke detection systems are in alarm condition.
   d. Dryer Exhaust: Provide measures to reduce lint build-up in duct. Provide low-leakage control dampers.
   e. Other Exhaust: Provide adequate ventilation wherever kilns, paints, glues, chemicals, arc welding and other vaporous materials are used. Provide ventilation at all rooms containing copy machines. Exhaust all fume hoods directly to the outside, away from all occupied areas and air intakes in order to prevent exhaust from reentering the building.

9. Durability:
   a. Expected Service Life Span: Provide a system which will last a minimum of 10 years in service without major repairs or operating expense.
   b. Accidental Damage: Require protection of ductwork, air handlers, fans, and condensing units from accidental damage during construction.

10. Combustion Air: Design combustion air intake strategy to prevent freezing of pipes and other items located in mechanical rooms by positive means.

11. Branch piping to be tapped off top of mains to reduce dirt in branch lines.

12. Equipment Connections (typically fan coil units):
   a. Electrical: provide final connections from equipment to disconnect with liquid-tight conduit with metallic core.
   b. Piping: Use male adapter with brass fitting. DO NOT USE copper female adapters.

13. Provide UL or similarly labeled equipment as required by the Washington State Electrical Code whenever such labeled equipment is available. Exception: Certain specialty items not available with such labels covering the entire piece of equipment or items or components of such items which are not available from at least two manufacturers with UL or equivalent label may be provided without label.

END OF SECTION

SECTION 23 05 00 – COMMON WORK RESULTS FOR HVAC

A. SCOPE

1. Joining materials
2. Access doors
3. General duty valves

B. PRODUCTS

1. Pipe-flange gasket materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8" maximum thickness unless thickness or specific material is indicated. Garlock Stress Saver XP or equal. DO NOT use red rubber gaskets.

C. EXECUTION

1. Access: Provide access panels at all panels, valves, pumps, fire dampers, water hammer arrestors and other equipment requiring a person to touch it for any reason during the expected service life of the building. Refer to Section 08 31 00 for specific requirements related to access panels.

2. Valves: All valves should be lug bolted (no through bolted connections).

END OF SECTION

SECTION 23 07 00 – HVAC INSULATION

A. SCOPE

1. Duct insulation
2. HVAC equipment insulation
3. HVAC piping insulation

B. PRODUCTS

1. At concealed conditioned air ductwork: duct wrap 0.75 PCF with FSK, facing with maximum vapor transmission rate of .02 perms.
2. At rectangular exposed conditioned air ductwork: duct liner glass fiber or mineral fiber material with minimum value of R-8 as installed and vapor barrier with perm rating of 0.5 perm maximum.
3. At round exposed conditioned air ductwork: duct wrap 1.0 PCF with FSK, facing with maximum vapor transmission rate of .02 perms.
4. Acceptable manufacturers:
   a. Armstrong World Industries, Inc.
   b. CertainTeed Corp.
   c. IMCOA
   d. Knauf
   e. Manville
   f. Nomaco
   g. Owens-Corning Fiberglas Corp.
   h. Pittsburg-Corning Corp.
   i. Rubatex Corp.

C. EXECUTION

1. 1 ½” minimum insulation thickness or in accordance with ASHRAE 90A and Energy Code.
2. Firmly butted joints, maximum 25% compression, seams overlapped 2”.
3. All seams, breaks and penetrations in facing fully sealed.
4. Application: insulate all supply and return ducts carrying conditioned air (cooled, heated, or humidified). Insulate all outside air intake ductwork.
5. Extent of exhaust discharge: extend ductwork from fume hoods to a point at least 6’ above roof surface, guyed as required for stability.

END OF SECTION

SECTION 23 09 00 – INSTRUMENTATION AND CONTROL FOR HVAC

A. SCOPE

1. Instrumentation and control devices for HVAC
2. Direct-digital control (DDC) system for HVAC

B. QUALITY ASSURANCE

1. The BAS system shall be designed and installed, commissioned and serviced by factory trained personnel of the local branch office of the manufacturer or the local, manufacturer's franchised, dealer. The manufacturer/dealer shall have an in-place support facility within 150 miles of the site with technical staff, spare parts inventory, and necessary test and diagnostic equipment.

2. The manufacturer or franchised dealer shall provide an experienced project manager for this work, responsible for direct supervision of the design, installation, start up, and commissioning of the BAS. Project manager shall have satisfactorily completed designated control system manufacturer's factory training course. Proof of training shall be provided to include date and duration of training.

3. The control contractor shall provide evidence of at least ten successful local installations of similar size and type using the same BACnet based components to be used on this project. Proprietary or other non-BACnet systems shall not be considered for this analysis.

4. The control contractor shall have a dedicated parts and service department.

5. The control contractor shall be qualified to be directly bondable for this size of control project.

6. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard of design that complies with the specification requirements.

7. The system shall have a documented history of compatibility by design for a minimum of 15 years. Future compatability shall be supported for no less than 10 years.

8. Compatability shall be defined as the ability for any existing field panel microprocessor to be connected and directly communicate with new field panels without bridges, routers or protocol converters.

9. Before acceptance of the control system the contractor shall be required to demonstrate a working control system to the owner and engineer that is in full compliance with the specifications.

C. PRODUCTS

1. Direct-digital control system: as manufactured by Siemens (specify P2) or Automated Logic (specify BACnet).
2. DO NOT use:

a. Electric control system
b. Pneumatic system
c. Combination DDC/pneumatic system
d. Floating point controllers

3. Acceptable operators and sensors:
   a. Electric valve actuators
   b. Electric damper actuators
   c. Electric thermostats
   d. Themocouples
   e. Thermistors
   f. Three-way, spring return mixing control valve (for each boiler) Belimo G7100-SR or equal. Review with owner's EMS department.
4. DO NOT use:
   a. Pneumatic valve actuators
   b. Pneumatic damper actuators
   c. Pneumatic thermostats

D. EXECUTION

1. General control: provide a thermostat for each zone to maintain the required space conditions, and monitor this zone.
2. Life safety: provide interconnection and coordination of HVAC controls with other life safety systems.
3. Equipment control and monitoring: the design will monitor and control the following equipment.
   a. Air terminals
   b. Air handlers
   c. Chillers
   d. Boilers
   e. Cooling towers
   f. Fan coil units
   g. Unit ventilators
   h. Pumps: on/off status
   i. Generators
4. Coordinate Energy Management System (EMS) with current district technology backbone to take advantage of web-based applications.
5. Operation and maintenance:
   a. System capacity: provide a building control system with sensors and points to perform as specified and add 50% more points.
   b. Ease of use:
      i. Locate field panels in telephone closets.
      ii. Locate the central controller in the maintenance office.
      iii. Provide a system which is user programmable.
      iv. Provide field panels which are independent and do not need the central controller to continue functioning.
   c. Ease of service: provide a system of modular design.
   d. Allowance for change and expansion: provide a building control system which is expandable to meet future needs.
      i. Spare capacity: provide sensors and points required to perform as specified and add 30 points more than required.

ii. Spare capacity: provide a central controller with field panel slots to perform as specified and add 5 open slots in the central controller.

e. Energy efficiency: provide the following control functions or features
   i. Holiday scheduling
   ii. Night setback
   iii. Outside air economizer
   iv. Waterside economizer
   v. Boiler staging
   vi. Boiler optimization
   vii. Chiller staging
   viii. Optimum start
   ix. Optimum stop
   x. Chilled water temperature reset
   xi. Heating water temperature reset
   xii. Chiller/cooling tower staging
   xiii. Variable speed pumping
   xiv. Demand limiting and load shedding
   xv. Exterior lighting control
   xvi. “Cold Room” alarm
   xvii. Domestic hot water temperature sensing on outlet side
   xviii. Weekly emergency generator testing

6. Provide two complete copies of “as constructed” control diagrams with, or superimposed on, 1/16” scale drawings of the building. These drawings shall be laminated in plastic after approval by the Owner’s representative. One copy shall be posted at the main control cabinet of the building and the second copy shall be given to the Owner.
7. See Electrical sections for additional EMS requirements.

END OF SECTION

SECTION 23 11 00 – FACILITY FUEL PIPING

A. SCOPE

1. Natural gas piping
2. Acetylene/Propane gas storage tanks

B. PRODUCTS

1. For natural gas piping:
   a. Use Schedule 40 black steel.
   b. Use gas cocks as manufactured by Powell or approved equal.
   c. Use gas pressure regulators as manufactured by Fisher or approved equal.

C. EXECUTION

1. All welding on gas piping to be performed by ASME welders.
2. DO NOT bury natural gas lines on owner's side of meter without specific approval by Owner.
3. Ensure that ventilation requirements are met in acetylene/propane gas storage tank areas.

END OF SECTION

SECTION 23 21 00 – HYDRONIC PIPING AND PUMPS

A. SCOPE

1. Chilled water distribution piping
2. Hot water distribution piping

B. PRODUCTS

1. Chilled water distribution piping
   a. Pipes 2 inches and smaller:
      i. Type L drawn-temper copper tubing with soldered joints that use lead-free solder.
      ii. Schedule 5 stainless steel with pressure-seal joints.
      iii. Type L copper with pressure-seal joints.
      iv. Schedule 40 steel pipe, Class 125 cast iron or Class 150 malleable-iron fittings; with threaded joints.
   b. Pipes 2 ½ to 6 inches:
      i. Type L drawn-temper copper tubing with brazed joints. Filler for brazing to contain 15% silver.
      ii. Schedule 40 steel pipe with welded joints.
   c. Pipes 8 inches and larger:
      i. Schedule 40 pipe with welded joints.

2. Heating water distribution piping
   a. Pipes 2 inches and smaller:
      i. Type L drawn-temper copper tubing with soldered joints that use lead-free solder.
      ii. Schedule 5 stainless steel with pressure-seal joints.
      iii. Schedule 40 steel pipe, Class 125 cast iron or Class 150 malleable-iron fittings, with threaded joints.
   b. Pipes 2 ½ to 6 inches:
      i. Type L drawn-temper copper tubing with brazed joints. Filler for brazing to contain 15% silver.
      ii. Schedule 40 steel pipe with welded joints.
   c. Pipes 8 inches and larger:
      i. Schedule 40 steel pipe with welded joints.
   d. System Pressure: 30 psig (210 kPa).

C. EXECUTION

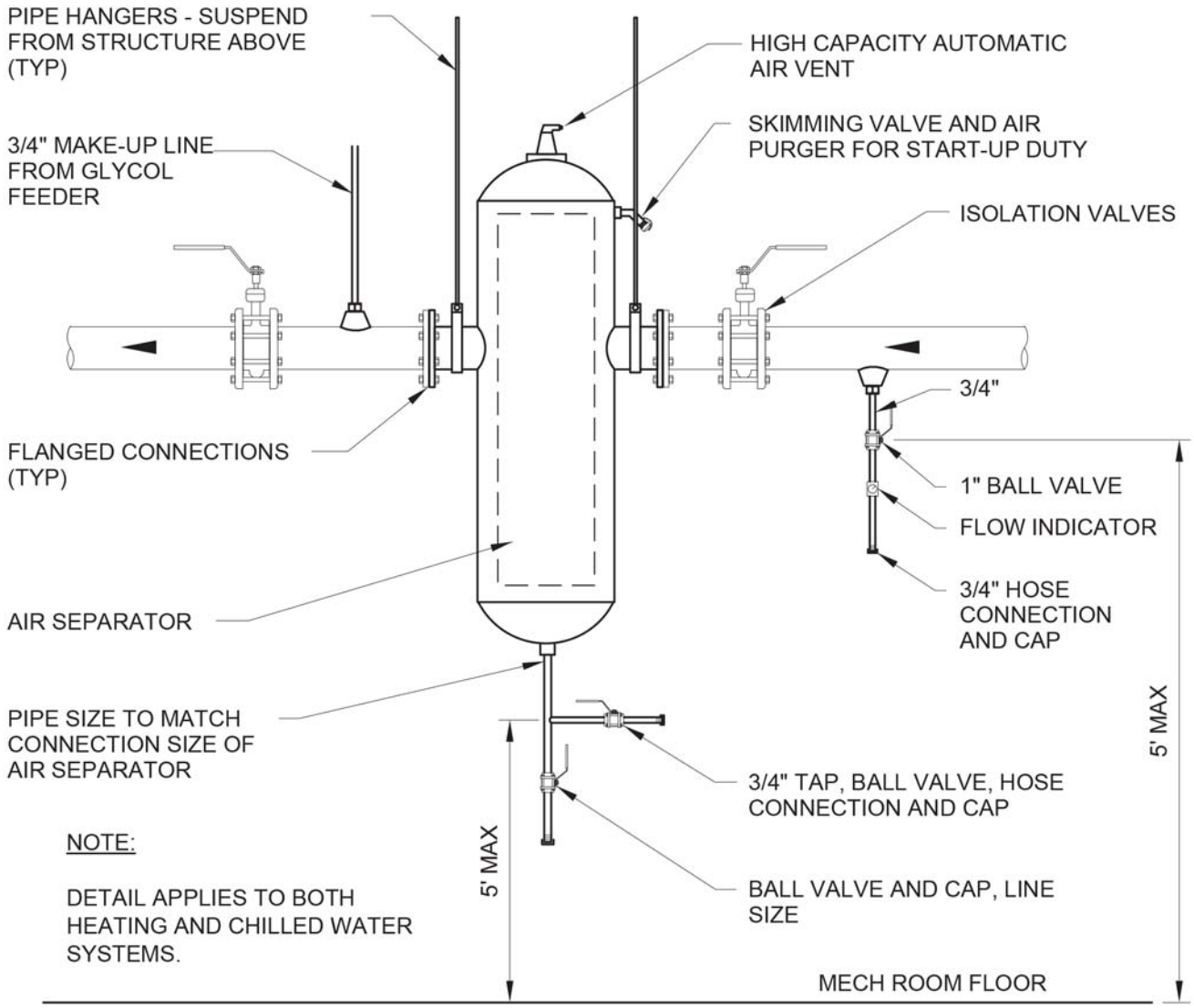
1. Chilled water distribution temperature: 45 degrees F (7.2 degrees C)
2. Heating water distribution temperature: 180 deg F (82 deg C).
3. Air coils: provide pressure ratings of 450 psig (3100kPa) and which exceed the pressure rating of the system in which they are installed.
4. Silver brazing shall be done by persons capable of obtaining a "medical gas license" as determined by the Washington Department of Labor and Industries.
5. Pumps: The construction will provide multiple pumps to deliver design flow requirements for heating system.
   i. For 2 Pumps: Each will be sized at 100 percent of design flow.
   ii. For 3 Pumps: Each will be sized at 50 percent of design flow.

iii. The construction will provide a stand-by pump for each heated water system installed.
iv. Install pumps with seal-tite electrical cord with 24” service loop to facilitate maintenance.

Base mounted pump shafts will be laser aligned after installation to ensure correct alignment and longer motor and bearing life. Base mounted pumps will be grouted solid to better maintain alignment.

6. Air separator and feed/filter connection: Use the following detail. No pot feeder is necessary.

END OF SECTION



AIR SEPARATOR AND FEED/FILTER CONNECTION DETAIL

Scale: NOT TO SCALE

SECTION 23 22 00 – STEAM AND CONDENSATE PIPING AND PUMPS

A. SCOPE

1. Steam piping
2. Condensate piping

B. PRODUCTS

1. Steam piping
   a. Pipes 2 inches (50 mm) in diameter and smaller:
      i. Schedule 40, continuous welded steel pipe with threaded Class 125 cast iron fittings.
      ii. Extra strong, electric resistance welded pipe with threaded Class 250 cast iron fittings.
      iii. Copper piping brazed with a filler containing at least 15% silver, minimum type “L.”
   b. Pipes larger than 2 inches (50mm) in diameter:
      i. Schedule 40, electric resistance welded pipe with welded Standard Class or flanged Class 150 wrought steel fittings.
      ii. Extra strong, electric resistance welded pipe with welded Class XS or Class 300 flanged or welded wrought steel fittings.
   c. Feedwater equipment and accessories.
   d. Air coils: provide pressure ratings of 450 psig (3100 kPa) and which exceed the pressure rating of the system in which they are installed.

2. Condensate piping
   a. Pipes 2 inches (50 mm) in diameter and smaller:
      i. Schedule 80, continuous welded steel pipe with threaded Class 125 cast iron fittings.
      ii. Schedule 80, electric resistance welded pipe with threaded Class 250 cast iron fittings.
      iii. Copper piping brazed with a filler containing at least 15% silver, minimum Type “L.”
   b. Pipes larger than 2 inches (50 mm) in diameter:
      i. Schedule 80, electric resistance welded pipe with welded Standard Class or flanged Class 150 wrought steel fittings.
      ii. Schedule 80, electric resistance welded pipe with welded Class XS or Class 300 flanged or welded wrought steel fittings.
   c. Site condensate system pressure: 30 psig (210 kPa).

C. EXECUTION

1. Silver brazing shall be done by persons capable of obtaining a "medical gas license" as determined by the Washington Department of Labor and Industries.

END OF SECTION

SECTION 23 23 00 – REFRIGERANT PIPING

A. SCOPE

1. Refrigerant piping
2. Refrigerant piping valves
3. Refrigerant piping specialties
4. Refrigerants

B. PRODUCTS

1. Refrigerant piping:
   a. Seamless copper tubing, hard drawn, Type L
   b. Wall thickness per ASTM B88 except not less than 0.030” at tubing with outside diameter of 1/4” and .032” at tubing with outside diameter of 3/8”.
   c. Soft annealed copper tubing meeting ASTM B280 acceptable where flare connections to gauges are required, only in nominal sizes less than 3/8”.

2. Refrigerant piping valves. All valves to be lug bolted:
   a. Globe and angle valves: forged brass or bronze alloy with packed stem and seal cap.
      i. Packless type with hand wheels and forged brass alloy bodies with brazing ends may be used up to and including 7/8” OD.
      ii. Bonnets replaceable with valve in place.
      iii. Back-seated so valve can be repacked under pressure.
   b. Check valves: forged brass or bronze alloy with brazing ends. Swing or lift type designed for low pressure drop.
   c. Safety relief valves: forged brass and non-ferrous corrosion resistant internal working parts, installed and set in accordance with ANSI B9.1.

3. Strainers: single body type with brass bodies; as manufactured by Henry, Mueller, Sprolan or Refrigerating Specialties.

4. Driers: solid desiccant type, water capacity, flow rate capacity conforming to requirements of ARI Standard 710, capable of withstanding pressure of 350 psi; as manufactured by Sprolan. May be combination drier-indicator type.

5. Moisture Indicators: brass, bronze or heavily copper-plated steel fittings with indicator material under a bulls-eye, capable of withstanding pressure of 350 psi; as manufactured by Sprolan. May be combination drier-indicator type.

6. Sight Glasses: double port see-through type with two bulls-eyes, forged brass or bronze with same fittings as for piping, capable of withstanding pressure of 350 psi; as manufactured by Sprolan.

7. Pressure Gauges: Weksler BQ1 or approved by Henry, Marsh, Mueller or Terrice Co.

END OF SECTION

SECTION 23 31 00 – HVAC DUCTS AND CASINGS

A. SCOPE

1. Metal ducts
2. Nonmetal ducts
3. HVAC casings

B. PRODUCTS

1. Galvanized sheet metal duct (except use aluminum at dryer vents).
2. Aluminum sheet metal duct.
3. Flexible duct, within 3 feet of units only for sound attenuation.
4. Fabric ductwork such as "DuctSox" where approved by the school district.
5. Duct liner, as needed to meet sound attenuation requirements.
6. At ductwork connected to fume hoods: minimum 20 gauge Type 316 stainless steel with welded, airtight construction.
7. DO NOT use steel sheet metal duct or fibrous glass duct.

C. EXECUTION

1. Duct Construction: In accordance with SMACNA HVAC Duct Construction Standards 1995 with Addendum No. 1, based on the following:
   a) All Ducts Pressure Class: 2 inches w.g. (500 Pa).
   b) Duct Seal Class B for Duct Pressure Class 2 inches w.g. (500 Pa).
   c) Duct Seal Class C for Duct Pressure Class 1 inch w.g. (250 Pa).
2. Maximum Air Velocity:
   a) For 2 inches w.g. (500 Pa) Duct Pressure Class: 1500 feet per minute (8 m/s).
   b) For 1 inch w.g. (250 Pa) Duct Pressure Class: 1500 feet per minute (8 m/s).

END OF SECTION

SECTION 23 34 00 – HVAC FANS

A. SCOPE

1. In-line exhaust or rooftop exhaust fans

B. PRODUCTS

1. Steel fan housing with an aluminum propeller
2. Steel fan housing with a stamped steel propeller
3. Aluminum fan housing with an aluminum propeller
4. Aluminum fan housing with an aluminum centrifugal wheel
5. Steel fan housing with an aluminum centrifugal wheel
6. Steel fan housing with a steel centrifugal wheel
7. Approved fan manufacturers: Cook or Greenheck
8. DO NOT use:
   a. Plastic fan propellers, except at explosion proof units or fans less than 100 cfm.
   b. Plastic fan wheels, except at explosion proof units or fans less than 100 cfm.

C. EXECUTION

1. Fan pressure characteristics will be matched to the air distribution system pressure characteristics including the system effect factors; pressure characteristics based on ANSI/AMCA Standard 210-1999 fan ratings and system characteristics based on engineering calculations.

END OF SECTION

SECTION 23 37 13 – DIFFUSERS, REGISTERS, AND GRILLES

A. SCOPE

1. Diffusers

B. PRODUCTS

1. Acceptable diffusers:
   a. Steel diffusers
   b. Aluminum diffusers
   c. Stainless steel diffusers
   d. DO NOT use linear slot diffusers combined with VAV systems at classrooms, due to past experience of inadequate air delivery to floor.

END OF SECTION

SECTION 23 40 00 – HVAC AIR CLEANING DEVICES

A. SCOPE

1. Air filters

B. PRODUCTS

1. Pleated panel filters, medium efficiency, nominal 2” thick.
2. ASHRAE standard sizes
3. DO NOT use:
   a. Automatic roll filters
   b. Extended surface filters
   c. Cartridge filters
   d. Bag-type filters, except for make-up air units
   e. Cleanable media filters
   f. Custom size filters of any type or excessive multiple sizes on any given project
3. Acceptable manufacturers: Camfil Farr or Flanders

C. EXECUTION

1. Filter efficiency:
   a. 85% arrestance per ASHRAE Standard 52.1-1992.
   b. 25% atmospheric dust-spot efficiency per ASHRAE Standard 52.1-1992.
2. Initial resistance at 500 fpm not exceeding 0.30 w.g.

END OF SECTION

SECTION 23 51 00 – BREECHINGS, CHIMNEYS, AND STACKS

A. SCOPE

1. Breechings, chimneys and stacks.

B. PRODUCTS

1. The construction may use one or more of the following:
   a. Double-walled; stainless steel inner and aluminum coated steel outer duct.
   b. Double-walled; stainless steel inner and aluminum coated steel outer duct with 1 inch (2.5 cm) thick insulation between inner and outer walls.
   c. Manufacturer: Ampco or Selkirk Metalbestos

2. DO NOT use:
   a. Double-walled; aluminum inner and galvanized outer Type B gas vents, except for horizontal gas-fired furnaces specifically rated for use with this type of vent.
   b. Welded black steel with 1 inch thick calcium silicate insulation.
   c. Single wall galvanized duct.
   d. Single wall stainless steel duct.

3. Provide flues designed for flue gas temperature of 400 degrees F (204 degrees C).

END OF SECTION

SECTION 23 52 00 – HEATING BOILERS

A. SCOPE

1. Water boilers

B. PRODUCTS

1. Steel tube water boiler type, boiler operating water pressure and temperature 160 psig at 250 degrees F.
2. Provide complete DDC boiler sensor/alarm system.
3. Preferred manufacturer: Finned water-tube boilers as manufactured by Thermal Solutions or equal.
4. Acceptable alternate manufacturers:
   a. Bryan Flextube (90%)
   b. Lochinvar

C. EXECUTION

1. The construction may use the following:
   a. Heating using hot water.
   b. Equipment fueled by natural gas.

2. DO NOT use:
   a. Pulse burner.
   b. Face ground boiler sections (in order to avoid damaging corrosion protective outer skin).

3. Boiler Design Capacity: The construction will provide multiple boilers to deliver design load capacity.
   i. For 2 Boilers: Each will be sized at 60 percent of design load capacity.
   ii. For 3 Boilers: Each will be sized at 50 percent of design load capacity.

4. Boiler Operation and Maintenance:
   i. Ease of Use: The construction will provide access to and working clearances around heating equipment as recommended by the manufacturer

END OF SECTION

SECTION 23 54 00 – FURNACES

A. SCOPE

1. Furnaces

B. PRODUCTS

1. Use one or more of the following in areas where extending the hydronic heating system is not cost effective.
   a. Horizontal gas-fired furnaces.
   b. Horizontal condensing gas-fired furnaces.

END OF SECTION

SECTION 23 60 00 – CENTRAL COOLING EQUIPMENT

A. SCOPE

1. Refrigeration/heat rejection systems

B. PRODUCTS

1. Air cooled condensing units as manufactured by York, Carrier or Trane
2. DO NOT use:
   a. Cooling towers: the use of cooling towers is discouraged due to ongoing operational cost of chemical treatment. If acceptable to the district for a specific project, the construction may provide multiple cooling towers to deliver design load capacity.
      i. For 2 Cooling Towers: Each will be sized at 60 percent of design load capacity.
      ii. For 3 Cooling Towers: Each will be sized at 50 percent of design load capacity.

   b. Packaged terminal air-conditioners - heat pumps.

C. EXECUTION

1. Cooling: Design cooling system to accommodate small fractional loads to serve year round areas like Administration as well as to accommodate janitorial staff working throughout buildings in the summer.

END OF SECTION

SECTION 23 64 00 – PACKAGED WATER CHILLERS

A. SCOPE

1. Specify scroll water chillers ONLY.
2. DO NOT use:
   a. Reciprocating chillers
   b. Centrifugal chillers.

B. PRODUCTS

1. Acceptable water chillers: Carrier, Trane or York (model carefully after Carrier specification)
2. Temperature endurance: the construction will provide equipment designed for temperatures ranging from 10 degrees F to 122 degrees F (-12 degrees C to 50 degrees C).
3. Energy efficiency: Provide units with energy efficiency ratings in the top 15% for each category of equipment.
4. Specified chiller must have a 5 year warranty.
5. 407C refrigerant is preferred. Specify the use of 407C over 410A, where listed as an option from the manufacturer. DO NOT use HCFC refrigerant.

C. EXECUTION

1. Provide safe access to all parts that must be serviced, including railings at edges of platforms and cages on ladders.
2. Where maintenance personnel could be exposed to chemicals during routine maintenance and repair, the contract will include all personal safety equipment and clothing necessary for adequate protection.
3. Protect all equipment from access by non-maintenance personnel, especially children.
4. Chiller Noise: Provide high enclosures at air cooled chillers to attenuate noise to the school facility and to adjacent property.
5. Chiller Design Capacity: The construction will provide multiple air cooled chillers to deliver design load capacity. Coordinate capacity with manufacturer recommendations and verify (or reconcile differences) with the following owner preferences:
   i. For 2 Chillers: Each will be sized at 60 percent of design load capacity.
   ii. For 3 Chillers: Each will be sized at 50 percent of design load capacity.
   iii. Single chiller may be provided for design loads of 120 tons or less.
6. Cooling: Design cooling system to accommodate small fractional loads to serve year round areas like Administration as well as to accommodate janitorial staff working throughout buildings in the summer.

END OF SECTION

SECTION 23 70 00 – CENTRAL HVAC EQUIPMENT

A. SCOPE

1. Air handling units and accessories

B. PRODUCTS

1. Variable speed drives:
   a. Units compatible with specified air handling fan motors.
   b. Manufacturer with service center or service representative within 50 miles of project site, capable of the following:
      i. Factory coordinated start up service.
      ii. Emergency service calls, including replacement parts, within 24 hours.
      iii. Service contracts.
      iv. Training of customer personnel in operation and basic troubleshooting.
      v. Stock of frequently replaceable parts at local warehouse.
   c. Acceptable manufacturers: Cutler-Hammer, ABB Series ACH, or Danfoss Graham.

C. EXECUTION

1. Air Movement:
   a. The construction will provide an air distribution system that limits the air velocity to 50 fpm (0.25 m/s), maximum.
   b. Adjustments: The construction will provide an air distribution system which allows relocating supply diffusers, adjusting direction of airflow from supply diffusers, adjusting dampers, and changing the thermostat set-point.
   c. Ducted returns are required for recirculated air (no open plenums).

2. Acoustical Performance:
   a. Air Distribution Background Noise: The construction will provide systems which comply with the acoustical requirements of Chapter C - Interiors and the following RC Levels as defined in ASHRAE HVAC Applications Handbook, 1999. Do not exceed the sound pressure level for any octave band at the specified RC.
      i. Halls, Corridors, and Lobbies: 35-45, neutral.
      ii. Executive and Private Offices: 25-35, neutral.
      iii. Classrooms: 35, maximum, neutral.
      iv. Libraries: 30-40, neutral.

   b. The construction will provide equipment with sound ratings which comply with testing and rating requirements of ARI 880-1998.

END OF SECTION

SECTION 23 82 19 – FAN COIL UNITS

A. SCOPE

1. Fan coil units

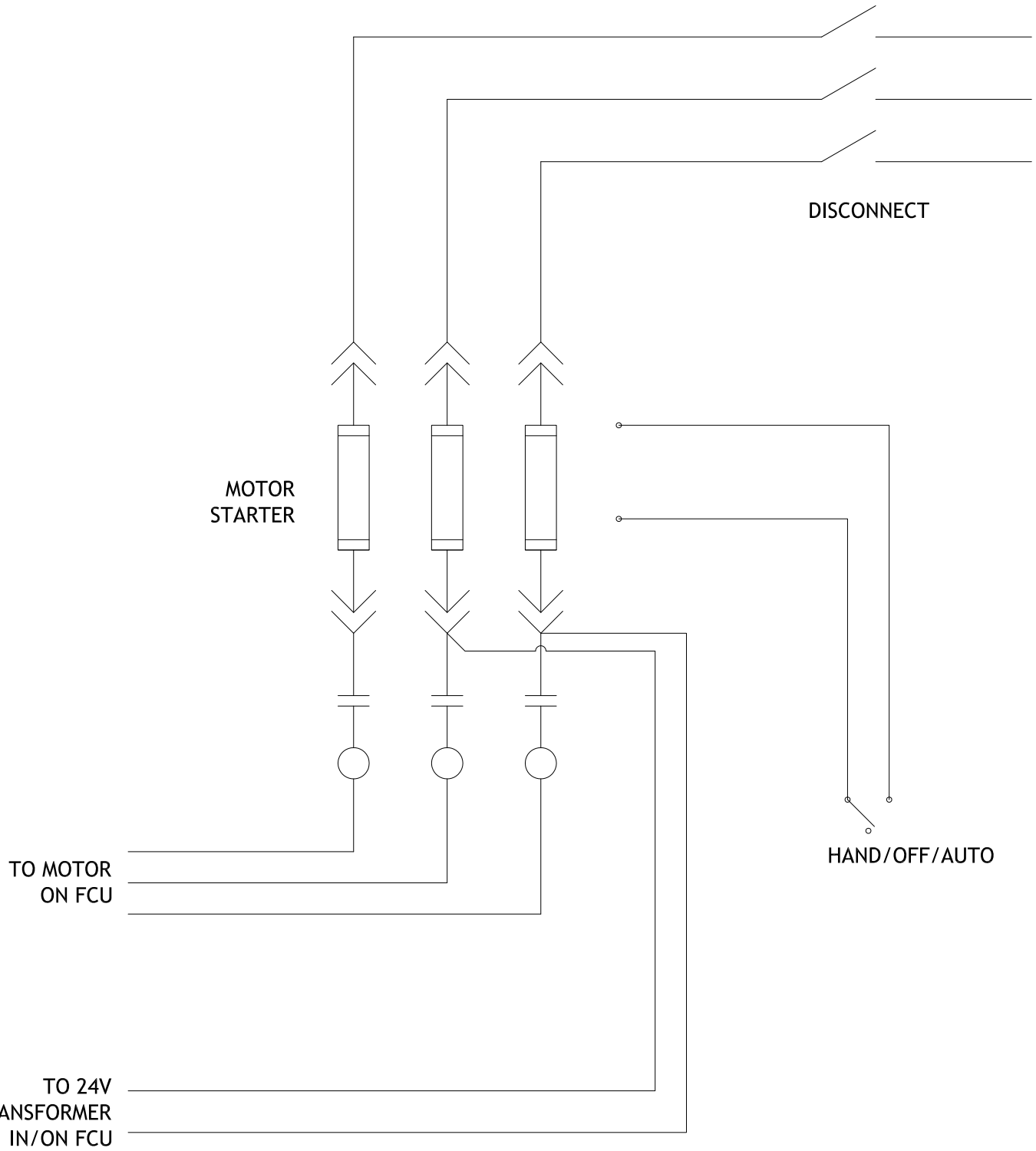
B. PRODUCTS

1. Carrier, Trane, Titus, Envirotech or International Environmental Corporation (IEC).

C. EXECUTION

1. Provide FCU control with HOA switch similar to attached detail. Coordinate with electrical.
2. Label each fan coil unit with unit number and area served (by room number).

END OF SECTION



FAN COIL UNIT CONTROL DIAGRAM

SCALE: NTS

SECTION 26 00 00 - GENERAL DESIGN GUIDELINES-ELECTRICAL

1. Do not place site lights in same locations as trees. (Trees mature and obscure site lighting.)
2. Do not use in-ground lighting.
3. Do not use site lighting that broadcasts to neighboring property.
4. Design exterior lighting system for control by Energy Management System (EMS), and not separate system.
5. Do not overdo exterior lighting due to high cost of lamps.
6. Ensure that emergency lighting occurs in toilet rooms that are otherwise blacked-out in power outage.
7. Install spare conduits in site trenches, as general practice.
8. Provide adequate exterior convenience outlets for general maintenance use. Install behind locking doors.
9. Limit use of floor boxes in heavy-use rooms (like cafeteria), due to breakage from floor polishers; and generally avoid floor boxes unless there is no other alternative.
10. Do not situate high hard-to-change lamps above island cabinets where ladder access is difficult.
11. Do not place light fixtures in stairs within easy reach for abuse. Also place where lamps can be changed without extraordinary access problems (such as a ladder that doesn't want to set on a staircase).
12. Same considerations (per Item 11) apply to smoke detectors.
13. Provide single-location lighting controls for gyms, and ability to shut-off emergency lighting for special performances or productions.
14. Generally, DO NOT place lighting fixtures at low position exposed to abuse.
15. Generally, DO NOT over-illuminate corridors, and keep lighting controls simple.
16. Generally, avoid a wide diversity of lamp types.
17. Generally, integrate electrical design needs early in design, and involve owner in discussions. The owner wants the engineer to hear the owner's perspective first hand.
18. Provide electrical lockable weatherproof outlets at 100' max. completely around the building.
19. Staff work room work-counter islands need power and data.
20. Commons/gymnasiums/conference rooms need projector and screen and power for both.
21. Provide power for trash compactor (future).
22. Provide lighting and power in elevator pit.
23. Provide for public information monitor position at concessions line.
24. Provide video cable and ceiling receptacles for overhead cameras at science rooms.
25. Provide key-controlled switches for emergency gas shut-off at science rooms. Use cylindrical lock switches compatible with primary door hardware key system.
26. Provide wire guards on all devices in gyms and locker rooms.
27. Provide electrical rough-in for future black-out shades in choir rooms.
28. Provide separate lighting controls for concessions (from Commons).
29. Provide lights in display cases.
30. Triple check sight lines to clocks (pendant lighting fixtures, beams, columns, etc.).
31. Provide lighting control for all halls and stairs.
32. Allow for Owner provided wireless access system to be installed after substantial completion.
33. Interlock kiln power with exhaust fan.
34. Position emergency generator alarm annunciator at front entry near FA annunciator, security key pad, etc.

35. Design for complete black-out lighting shutdown during unoccupied periods (typically after 11 p.m. when custodians shut down and lock the building). Include shutdown of emergency lighting. Provide control at convenient exit location (verify with owner).
36. Provide proven, practical lighting control system. Review with SPS electrical engineer prior to final design and specification.
37. Make every effort to use standard replaceable fixtures and lamps. Consider maintenance and long-term replacement for all fixtures.
38. Equipment Connections: provide liquid-tight conduit with metallic core.
39. Science Rooms: provide emergency power shut-off.
40. Provide outlets for wireless access points.
41. Discuss lighting control in detail with Owner early in design development.
42. Provide emergency lighting transfer device in classrooms with emergency lighting.
43. Provide emergency lighting outside entry doors; may need quartz restrike.
44. Emergency lighting blackout is issue; find out where key switches should be located.
45. Commons area lighting blackout is issue; find out where switches should be located.
46. Discuss sound system in classrooms; ask about wireless mic and assisted listening.
47. Provide independent circuit/zone for each AHU.
48. Deactivation of security system shall activate egress lighting circuits.

END OF SECTION

SECTION 26 00 01 – GENERAL REQUIREMENTS

A. GENERAL

1. Emergency power shall be designed for supplying power to emergency, egress, exit lighting, fire alarm panel, intercom system, data/telephone entrance and hub equipment, etc.

2. Panels and switchboards shall be designed for a minimum of 20% spare space with hardware and 30% spare loading capacity. Additional space and capacity may be requested for the main service.

B. MATERIALS

1. All materials and equipment shall bear the U.L. label

C. EXECUTION

1. Remove any abandoned cable/wire related to project work.

2. Work on the project shall be performed to suit the requirements of the Owner in regard to the school facility's educational process.

3. De-energizing of any feeder, switchboard, panel, branch circuit or other existing electrical device or item shall be affected only after notification and scheduling with the owner's project coordinator.

4. The above notification and scheduling requirement may necessitate rescheduling, partial completion and reconnection, overtime work at night or on weekends or delay of the work.

5. Cutting of concrete or other building materials shall be avoided where possible.

6. Holes through concrete or masonry shall be made only with a core drill unless pre-approved by Owner.

7. No penetrations into concrete beams with internal pre-stressed cable design or concrete floor slabs with pre-stressed cabling will be allowed without prior written analysis by a structural engineer.

8. All penetrations through building roofing shall be flashed by a qualified roofing contractor normally in the business of commercial roofing. Flashing shall be in accordance with NRCA standard practices.

9. Prevent spillage during hauling operations. In case of spills (including trenching materials) clean streets, walkways, courtyards, etc. by means of proper sweepers or other approved methods.

10. School dumpsters shall not be used by the Contractor.

END OF SECTION

SECTION 26 05 19 – ELECTRICAL POWER CONDUCTORS AND CABLES

A. SCOPE

1. Building wires and cables
2. Connectors, splices and terminations

B. MATERIALS

1. Prohibited materials
   a. Type MC cable, similar to Armor Cable and like material.

2. Materials
   a. All wiring shall be copper. Wiring shall be rated at 600 volts.

   b. Wire sizes 12 and 10 shall be solid, Type THHN. Wire sizes 8 and larger shall be stranded, Type THW, THHN/THWN, minimum wire size shall be 12 AWG, unless noted otherwise.

   c. Molded connectors with metal thread-on core shall be used for splicing 12 and 10 wire.

   d. Stranded cable shall be connected to lugs using mechanical connectors and shall be wrapped with electrical tape to a thickness equal to the wire insulation connecting block.

3. System Cabling Type and Color Standard

   a. EMS System
      i) Type: Plenum (plenum required for reason of the slickness of the outer jacket to facilitate future cable pulls as the EMS system monitoring expands)

         Color: White

   b. Lighting Controls and Occupancy Sensor
      i) Type: As required Color: Orange

   c. Security System
      i) Type: As specified in Section 28 00 00 (attached) Color: Yellow

   d. Data Cat 5e
      i) Type: Non-Plenum Color: Blue
      ii) Type: Plenum Color: White

   e. Intercom System
      i) Type: Non-Plenum Color: Gray
      ii) Type: Plenum Color: Gray

   f. Data/Phone patch cables within MDF and LBB data cabinets:

i) Data: Blue
ii) Phone: Green
iii) Cash: Yellow
iv) EMS: White
v) High speed data to hub: Red
vi) Wireless device: Black

C. EXECUTION

1. Installation
   a. Where more than three current carrying conductors are installed in a single raceway, the minimum wire size shall be increased to comply with NEC 310-16, Note 8.

   b. Where the distance from the over current device to the first outlet exceeds 100 feet, the minimum wire size shall be #10 AWG.

   c. All circuits shall have separate neutrals. No shared neutrals will be allowed. Neutral conductor shall be considered as "current-carrying" for the purpose of applying N.E.C. Table 310-16, Note 8 above.

   d. Provide separate ground bonding conductor full length inside all conduit.

   e. Do not make splices in homeruns.

2. Identification
   a. Feeder Cables: For writing continuity, all feeder cables shall have each phase identified according to the following color code at all junction boxes and terminals. No exceptions permitted. Left-to-right, top-to-bottom or front-to-rear shall read A-B-C and be color coded as follows:

      i) 208Y/120 Volt System

Black	Phase A
Red	Phase B
Blue	Phase C
White	Neutral
Green	Ground

      ii) 480Y/277 Volt System

Brown	Phase A
Orange	Phase B
Yellow	Phase C
Gray	Neutral
Green	Ground

END OF SECTION

SECTION 26 05 19.01 – EXISTING FEEDER CIRCUITS

A. EXECUTION

1. Splices: For #8 and larger conductors, splicing of the copper conductors (both power and ground conductors) shall be made only with tool applied compression (swaged) fittings, listed for the use and insulated with shrink type insulation. Provide new pull box at interception point for termination of new and existing wiring. All splices shall be made within the pull box.

2. Each feeder extension shall match the ampacity of the existing feeder.

END OF SECTION

SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

A. SCOPE

1. Main service grounding electrodes
2. Equipment ground
3. Enclosure bonding
4. Raceway bonding
5. Underground distribution grounding

B. MATERIALS

1. All conductors shall be copper.
2. Ground rods: Copperweld ¾"x 10' - 0"
3. Exothermic Welds: Cadweld
4. Compression type – hydraulically-crimped fittings, listed

C. EXECUTION

1. Installation
   a. Install ground rod vertically, with top flush with ground level unless physically protected. Connect to water service on street side of main shutoff valve, building structural steel, and service transformer ground rod.

   b. Install ground rod at each transformer and make connection to all exposed metal parts.

   c. Provide exothermic or braze all concealed or below grade connections. Provide exothermic connections to building steel.

   d. Compression connections shall be made using a hydraulic 4-way compression die. All compression connections shall be exposed.

   e. Provide separate ground conductor full length of all raceways.

   f. Provide main grounding busbar for telephone/data, intercom, television system head end equipment. Grounding conductor for telephone/data, intercom, television system main grounding busbar shall be #6 AWG, 600 volt, insulated copper conductor.

   g. Bond all telecommunication equipment chassis, ladder racks, cable trays, conduits, equipment frames, cabinets, and all other telecommunications room and equipment room metallic components to the main grounding busbar.

END OF SECTION

SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

A. SCOPE

1. Hangers and supports for electrical equipment and systems.

B. MATERIALS

1. Prohibited Materials
   a. Nails, wires, perforated tape or plumber's tape are unacceptable for support or securing of conduits.

2. Materials
   a. One or two hole pipe straps shall be Kindorf HS-100 or HS-900.

   b. Lay-in pipe hangers shall be Kindorf C-149.

   c. Trapeze or wall surface supports shall be Kindorf "bolt-hole" base galvanized steel channels with C105 and C106 single bolt pipe straps.

   d. For existing construction, and if approved by the Owner, raceways across roofs shall be sufficiently supported using Cooper B-Line Dura-Blok supports or approved equal, every 8 feet, within 1 foot of a 45 degree, 90 degree, condulet and flex conduit as a minimum.

C. INSTALLATION

1. Individual conduits shall be secured with steel pipe straps or lay-in pipe hangers.

2. Multiple rows of suspended conduit shall be supported from trapeze style hangers, providing 20% spare room for future raceways.

3. Multiple runs of conduit on ceiling or wall surfaces shall be mounted on flush or surface steel channels in unfinished areas.

END OF SECTION

SECTION 26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

A. SCOPE

1. Pull and junction boxes
2. Outlet boxes
3. Raceways
4. Surface raceways
5. Fittings
6. Enclosures and cabinets for electrical wiring

B. MATERIALS

1. Pull and junction boxes
   a. 100 cubic inches or smaller: standard outlet box with stamped knockouts.

   b. 150 cubic inches of larger: Code gauge steel with sides formed and welded, with screw covers unless shown to have hinged doors. Hinged doors shall have locking device same as furnished for panelboards.

   c. Knockouts shall be factory stamped, or formed in the field with a cutting tool to provide a clean symmetrically-cut hole.

   d. Exterior or Wet areas: Weatherproofed galvanized steel construction with proper gaskets and corrosion resistant fasteners.

   e. Device outlets shall be a minimum of 2-1/8” inches deep, minimum 4 inches square.

   f. For existing walls, use 2-1/2” deep min. cut-in box.

   g. Prohibited materials
      i) “Handy boxes”

2. Outlet boxes
   a. Materials
      i) Flush outlet boxes shall be galvanized pressed steel, of the knockout type, not less than 4" square, 2-1/8"deep, minimum 14 U.S. gauge, with return flange and screw retained cover.

      ii) Provide extension rings for all flush boxes. Boxes which occur in concrete block walls shall be equipped with 1-½" square cornered tile extensions.

      iii) Outlet boxes installed in surface metallic raceway systems shall be shallow boxes manufactured as part of the system.

   b. Prohibited materials
      i) Sectional outlet boxes shall not be utilized.

3. Raceway:
   a. Rigid aluminum conduit
      i) Not permitted.

b. Rigid galvanized steel conduit (RGS) and intermediate metal conduit (IMC)
   i) Fittings to be galvanized malleable iron or non-corrosive alloy compatible with galvanized conduit.

c. Electrical metallic tubing (EMT)
   i) Couplings and connectors for raintight shall be steel. Set screw type shall be steel and used indoors for sizes up to 1-1/2" conduit size.

d. Flexible conduit
   i) Galvanized flexible steel for dry locations. Fittings shall be steel.
   ii) PVC waterproof cover over flexible steel conduit (liquid tight) for damp and wet locations. Fittings shall be steel. PVC waterproof flex without the flexible steel core is prohibited.

e. Rigid non-metallic conduit
   i) Polyvinyl chloride, schedule 40, heavy wall.
   ii) For underground installation (24 inches minimum, 30 inches maximum under grade).
   iii) Provide rigid steel bends in conduit runs.

f. Surface mounted raceway
   i) Anchors for 2 hole strips shall utilize Powers Poly-Toggle Cat #2305.
   ii) Raceway assemblies shall be as manufactured by Wiremold (or approved equal, including Walkerduct) of type 700, 2000 or 4000 series (including devices) as noted on the drawings. Color shall be ivory.
   iii) Provide all required mounting hardware, miscellaneous fittings, end caps, etc. as manufactured by Wiremold.
   iv) One gang device boxes for use with Wiremold 700 product shall be Wiremold part #V5748. Two gang device boxes for use with Wiremold 700 product shall be Wiremold part #V5748-2.
   v) One gang device boxes for use with Wiremold 2000 product shall be Wiremold part #V2048. Two gang device boxes for use with Wiremold 2000 product shall be Wiremold part #V2048-2.
   vi) One gang device mounting cover for Wiremold 4000 product shall be part #V4007C-1. One gang GFCI receptacle mounting cover for Wiremold 4000 product shall be part #V4007C-1R. This product will allow the use of the stainless steel covers as required in Section 26 27 26.

4. Expansion Fittings
   a. Provide expansion fittings for all rigidly fastened conduits spanning a building expansion joint, and for all runs 1-1/2" or larger exceeding 150 feet in length. Fittings shall be hot-dipped galvanized malleable iron with a packing ring to exclude water, a pressure ring, and a separate external copper bonding jumper.

C. EXECUTION

1. Pull and junction boxes
   a. Installation
      i) Coordinate and locate boxes to ensure accessibility of electrical wiring.

ii) Secure boxes rigidly to the building element on which they are mounted, or solidly embed boxes in concrete or masonry.

iii) Identify all pull and junction boxes with a permanent felt marker, neatly showing the individual feeder or electrical system.

iv) Install pull boxes and junction boxes above accessible ceilings, crawl spaces, tunnels and in unfinished areas only.

b. Prohibited installation methods

i) No box shall be secured to the ceiling system, HVAC ductwork, or mechanical piping.

2. Outlet boxes

a. Mounting Heights

i) Contractor shall carefully lay out all outlets and verify that the existing plumbing, heating, ventilating and other utilities are not rendered inaccessible due to equipment or raceway passing over, under, across, or in close proximity to same, or to cause the devices or fixtures to be inaccessible for use of maintenance.

ii) Where different type devices occur adjacent to each other, space outlet boxes so that finish plates will be spaced a minimum of one inch apart at same height.

iii) Contractor shall consult the Owner for height of all outlets which may be in question.

iv) Where a new outlet occurs near an existing outlet, they shall be mounted at the same height.

v) Grout around all outlet boxes to seal space between box and wall or ceiling materials.

vi) In spaces where existing outlets are installed, new outlets shall be mounted at the same height as existing similar outlets. Exception: Outlet height to meet ADA requirements or 16 inches minimum above floor.

3. Raceway

a. Where possible, raceway runs shall be made above ceiling, in attic spaces, in crawl spaces or pipe tunnels.

b. Conduit and surface mounted raceway shall be installed in neat symmetrical lines parallel and/or perpendicular to the ceiling, floors and walls of the building and tunnel construction.

c. Raceway shall be installed with a minimum separation of 12 inches of free air from steam and hot water pipes and a minimum separation of 3 inches of free air space from all other mechanical piping.

d. No section of conduit shall be longer than 100 feet or contain more than three (3) 90 degree bends between pull points or pull boxes.

e. Where conduits penetrate floor slabs, or fire rated walls, they shall be sealed around the penetration with fire resistant sealant suitable for the fire rating required.

f. Surface mounted raceway shall be used only where other routes are unavailable and where it is mutually agreed to be desirable by the Contractor and Owner.

g. Metallic raceway shall be continuous and bonded/grounded. Transitions to ceiling, crawl or tunnel spaces are to be made from a junction box on the "concealed space" side of the penetration.

h. Rigid non-metallic conduit shall not be used in above grade floor slabs, or in walls or open spaces of any type.

i. Flexible conduit shall be used for flush mount receptacles in existing walls and shall be limited to dry locations.

j. Utilize rigid steel conduit below all roadways. At depths of less than 24" encase in concrete. Over 24" depth, wrap with scotch insulating tape, or utilize conduit with factory applied PVC coating.

k. Minimum size conduit to be 3/4" (metallic and non-metallic) except where a single circuit of two #12 AWG conductors is installed which requires 1/2" conduit minimum.

4. Surface raceway
   a. Attach raceway assemblies to wall surface by method recommended by manufacturer for the particular wall construction. Use anchors similar to Powers Poly-toggle, catalog #2305 with 1-1/2" screw minimum.

   b. Wiremold raceway shall be ivory factory color and shall not be painted. Any raceway attached to the Wiremold product in an unconcealed area which does not come pre-painted from the manufacturer shall be properly prepared for painting and shall be Wiremold #IWE-S ivory spray enamel.

5. Electrical metallic tubing (EMT)
   a. EMT shall be used in concealed spaces. Electrical metallic tubing may not be used in finished areas unless indicated on the Drawings. Electrical metallic tubing may be used for exposed work in unfinished areas where not exposed to physical damage. Raceways in traffic areas shall be considered exposed to physical damage where within 10 feet of floor.

   b. If used in finished areas, must be painted to match existing wall/surface color.

6. Flexible conduit
   a. Installations shall be kept to a minimum and shall not exceed 6'-0" in length, except where it is used vertically in remodel projects in finished walls for single flush mount receptacle only.

7. Raceways that penetrate building exterior
   a. The section of the raceway within the wall or roof shall be sealed inside (sealing conduit body and sealant shall be U.L. approved for the application) and around raceway exterior using approved sealant.

   b. All penetrations through building roofing shall be flashed by a qualified roofing contractor normally in the business of commercial roofing. Flashing shall be in accordance with NRCA standard practices.

8. Securing raceways
   a. Fasten raceway to frame structures by means of clamps, screws, metal inserts or toggle bolts. Nails not permitted. For installation of surface mounted raceway onto dry wall, use two hole straps and anchors similar to Powers Poly-Toggle cat# 2305 with 1-1/2" screw minimum.

   b. Where raceway traverses across flat roofs, conduit shall be supported every 8'-0" o.c. with Cooper B-Line Dura-Blok supports or approved equal.

END OF SECTION

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

A. SCOPE

1. Identification for conductors
2. Warning labels and signs
3. Instruction signs
4. Equipment identification labels
5. Device plate identification
6. Labels to indicate equipment location above suspended ceilings

B. GENERAL

1. Install nameplates on all main and distribution switchboards, panelboards, disconnect switches, and miscellaneous systems junction boxes and cabinets installed under this contract.
2. Install bakelite nameplates at each protective device in switchboard and distribution centers, showing circuit service.
3. Install circuit directory cards in all panelboards. Cards shall be typed or computer printed for neatness.
4. All wiring in all outlet and junction boxes shall be properly identified as to circuit number. Type of marker shall be made with Brady ID PAL printer/labeler with ¾” labels; locate label on inside of device box.

C. MATERIALS

1. Prohibited Materials
   a. Dymo (or equivalent) labels shall not be utilized, unless specifically noted.

2. Materials
   a. Nameplates shall be fabricated from white bakelite, with 3/8" engraved black letters.

   b. Schedules - provide typewritten directory for each panel, on heavy card stock, showing all circuit numbers.

D. EXECUTION

1. Installation
   a. Nameplates

      i) Panelboards: Mount inside door, on dead front, above circuit breakers, unless panelboard is located in a utility-type room, then install nameplate on outside of panelboard above door.

      ii) Disconnect switches: Mount nameplate on outside of cabinet, near top. Omit nameplate from disconnect switches if located adjacent to equipment.

   b. Schedules

i) Panelboards: Mount in frame under plastic cover, on back side of door. Schedule shall be typed or printed and show circuit service for each circuit breaker, using room numbers. Spares and spaces shall be written in pencil.

ii) Existing Panelboards: Revise existing schedules to reflect current circuit configuration. Retype on new schedules, showing new and existing circuits.

END OF SECTION

SECTION 26 09 13 – ELECTRICAL POWER MONITORING AND CONTROL

A. GENERAL

1. Provide electronic readout (with key pad control) where indicated on the Plans to display the values defined in the sections below.

B. MATERIALS

1. Metering equipment shall be as manufactured by Square D Powerlogic Circuit Monitor, series 2000 or latest version, with pulse output for connection to existing EMS system. Other manufacturer's equipment shall be approved by the Engineer on an item by item basis. System shall be provided with one optical interface and software to allow downloading data into a laptop computer. Metering shall provide the following features:
   a. Line-to-neutral voltage for all phases
   b. Line-to neutral average voltage
   c. Line-to-line voltage for all phases
   d. Line-to-line average voltage
   e. Current on each phase
   f. Average current
   g. Neutral current
   h. kVA, kW for all phases, kWh for all phases
   i. kW Demand
   j. kVAR, kVARh for all phases
   k. Power Factor
   l. Thd
   m. Frequency

2. System shall be provided with one optical interface and software to allow downloading data into a laptop computer.

3. Instantaneous values for these parameters shall be accessible via local indication, and through the remote I/O link, equipped with smart communications card.

4. Provide form C output contacts.

C. EXECUTION

1. Provide conduit and cabling to connect pulsed meter output to existing EMS System.

END OF SECTION

SECTION 26 09 23 – LIGHTING CONTROL DEVICES

A. SCOPE

1. Interior and exterior lighting control

B. PRODUCTS

1. Acceptable manufacturers include nLight, Cooper Greengate, Hubbell, and Wattstopper.
2. Exterior lighting to be controlled by EMS via contactors, not by the lighting control system.

C. EXECUTION

1. Lighting control Sequence of Operation is generally as follows:

   a. Administration:
      i) The lighting will be divided into four zones of control, Zone ‘a’ - general; Zone ‘b’ - general; Zone ‘c’- down lights; and Zone ‘d’ - waiting.
      ii) The lighting shall automatically turn ‘ON’ to 50%, Zone ‘a’ via the room occupancy sensor upon room entry. To achieve 100% light output of all luminaires will require a manual input from the user at the room lighting control station.
      iii) The lighting shall automatically turn ‘Off’ after 30 minutes of vacancy during occupied hours (7:00am-6:00pm M-F) and shall automatically turn “OFF” after 5 minutes of vacancy during unoccupied hours (6:01pm-6:59am M-F, weekends, and holidays) via the room occupancy sensor.
      iv) The control station will consist of four buttons station: 1) Button shall turn ‘ON/OFF’ the “general” to 50%. 2) Button shall turn ‘ON/OFF’ the “general” to 100%. 3) Button shall turn ‘ON/OFF’ the “down lights” luminaires. 4) Button shall turn ‘ON/OFF’ the “waiting” luminaires

   b. Health Room:
      i) The lighting will be divided into three zones of control, Zone ‘a’- general; Zone ‘b’- health bed 1; and Zone ‘c’ – health bed 2.
      ii) The lighting shall automatically turn ‘ON’ to 50%, Zone ‘a’ via the room occupancy sensor upon room entry. To achieve 100% light output will require a manual input from the user at the room lighting control station.
      iii) The lighting shall automatically turn ‘Off’ after 30 minutes of vacancy during occupied hours (7:00am-4:00pm M-F) and shall automatically turn “OFF” after 5 minutes of vacancy during unoccupied hours (4:01pm-6:59am M-F, weekends, and holidays) via the room occupancy sensor.
      iv) The control station will consist of four buttons station: 1) Button shall manually dim all dimming luminaires together to a level no less than 30% light output or raise to 100% output. 2) Button shall turn ‘ON’ the “general” luminaires and set the “health bed” luminaires to ‘OFF’. 3) Button shall turn ‘ON/OFF‘ the “health bed 1” luminaires. 4) Button shall turn ‘ON/OFF’ the “health bed 2” luminaires.

   c. Corridor:

The corridors are controlled from multiple control stations, which control multiple normal power and emergency (egress lighting) relays in the network lighting control panel.

i) All emergency egress lighting will automatically turn 'ON' upon de-activation of the security alarm system upon entry. The lighting on the normal power will be turned 'ON' at 7:00am during normal school hours by the lighting control panel.

ii) Each corridor has independent control from multiple lighting control station at each end of the associated space. The control station shall be programed 'ON' only during occupied hours (7:00am-4:00pm), and during un-occupied hours (4:01pm-6:59am) as a manual 'On/Off'. During the unoccupied hours the corridor control shall be programmed to provide a 2 hour (adjustable to 4 hour) over-ride of the lighting control panel sweep. The lighting control panel shall provide flash warning of the lighting 2 minutes prior to the sweep 'OFF'.

iii) The lighting control panel will sweep 'OFF' the lighting on the normal power relays at 5:00pm, 8:30pm, and once again at 12:00am.

iv) All emergency egress lighting will automatically turn 'OFF' upon activation of the security alarm system.

v) All emergency egress lighting will turn 'On' in the case of an alarm event of the security alarm system or the fire alarm system. Security system shall provide alarm contact to lighting control system.

vi) All corridor lighting on the normal power relays shall turn 'ON/OFF' from a master control station located in the Custodian Office in addition to local manual control. This master station shall override or delay automatic sweeps by two hours. Override switches shall be located near door (along with EMS override) at a higher level (60" aff) and will be labeled.

d. Classroom:

i) The lighting will be divided into two zones of control, Zone 'a'- general; and Zone 'b'- teaching wall.

ii) The lighting shall automatically turn 'ON' to 50% via the room occupancy sensor upon room entry. To achieve 100% light output will require a manual input from the user at the room lighting control station.

iii) The lighting shall automatically turn 'OFF' after 30 minutes of vacancy during occupied hours (7:00am-4:00pm M-F) and shall automatically turn 'OFF' after 5 minutes of vacancy during unoccupied hours (4:01pm-6:59am M-F, weekends, and holidays) via the room occupancy sensor.

iv) The control station will consist of four buttons station: 1) Button shall manually dim all luminaires simultaneously to a level no less than 30% light output or raise to 100% output. 2) Button shall turn 'ON' the "teaching wall" luminaires and set the "general" luminaires dimmed to 30%. 3) Button shall turn 'OFF 'the "teaching wall" luminaires and set the "general" luminaires to 100%. 4) Button shall turn 'ON' all luminaires to 100%. In the instance that there is a button not used it shall be programmed to be "ON/OFF" of all luminaires, all buttons shall perform some sort of behavior.

v) The photocell for each designated daylight zone will provide control for the luminaires within that zone. The photocell shall automatically dim the

luminaires in that zone to a baseline light level of no less than 35 footcandles. All daylight zones shall return to their automatically set level after a cycle of occupancy from a manual input.

e. Library:

i) The lighting will be divided into seven zones of control, Zone ‘a’,’e’ – general; Zone ‘b’,’d’ - teaching wall; Zone ‘c’ - general circulation; and Zone ‘f’, ‘g’ - whiteboard.

ii) The lighting shall automatically turn ‘ON’ to 50% via the room occupancy sensor upon room entry. To achieve 100% light output will require a manual input from the user at the room lighting control station.

iii) The lighting shall automatically turn ‘Off’ after 30 minutes of vacancy during occupied hours (7:00am-4:00pm M-F) and shall automatically turn “OFF” after 5 minutes of vacancy during unoccupied hours (4:01pm-6:59am M-F, weekends, and holidays) via the room occupancy sensor.

iv) The control stations will consist of four buttons: 1) Button shall manually dim all luminaires simultaneously to a level no less than 30% light output or raise to 100% output. 2) Button shall turn ‘ON’ the “teaching wall” luminaires and set the “general” luminaires dimmed to 30%. 3) Button shall turn ‘OFF’ the “teaching wall” luminaires and set the “general” luminaires to 100%. 4) Button shall turn ‘ON’ all luminaires to 100%. In the instance that there is a button not used it shall be programmed to be “ON/OFF” of all luminaires, all buttons shall perform some sort of behavior.

v) The photocell for each designated daylight zone will provide control for the luminaires within that zone. The photocell shall automatically dim the luminaires in that zone to a baseline light level of no less than 35 footcandles. All daylight zones shall return to their automatically set level after a cycle of occupancy from a manual input.

f. Art/Community Room (at Elementary Schools):

i) The lighting will be divided into three zones of control, Zone ‘a’- general; Zone ‘b’- teaching wall; and Zone ‘c’ - down lights.

ii) The lighting shall automatically turn ‘ON’ to 50% via the room occupancy sensor upon room entry. To achieve 100% light output will require a manual input from the user at the room lighting control station.

iii) The lighting shall automatically turn ‘Off’ after 30 minutes of vacancy during occupied hours (7:00am-4:00pm M-F) and shall automatically turn “OFF” after 5 minutes of vacancy during unoccupied hours (4:01pm-6:59am M-F, weekends, and holidays) via the room occupancy sensor.

iv) The control station will consist of four buttons station: 1) Button shall manually dim all luminaires simultaneously to a level no less than 30% light output or raise to 100% output. 2) Button shall turn ‘ON’ the “teaching wall” luminaires and set the “general” luminaires dimmed to 30%. 3) Button shall turn ‘OFF’ the “teaching wall” luminaires and set the “general” luminaires to 100%. 4) Button shall turn ‘ON/OFF’ the “down lights”. In the instance that there is a button not used it shall be programmed to be “ON/OFF” of all luminaires, all buttons shall perform some sort of behavior.

v) The photocell for each designated daylight zone will provide control for the luminaires within that zone. The photocell shall automatically dim the

luminaires in that zone to a baseline light level of no less than 35 footcandles. All daylight zones shall return to their automatically set level after a cycle of occupancy from a manual input.

g. Gymnasium:
The Gym lighting is controlled from multiple control stations, which control multiple normal power and emergency (egress lighting) relays in the network lighting control panel.

i) All emergency egress lighting will automatically turn 'ON' upon de-activation of the security alarm system upon entry. The lighting on the normal power relays will be turned 'ON/OFF' manually via one of the gym room controllers and from the master control station located in the Custodian Office.
ii) The gym luminaires have inboard/outboard lamping to provide two levels of light. 1) Button shall turn 'On/OFF' outboard lamps; 2) Button shall turn 'ON/OFF' inboard lamps.
iii) An integral photocell will provide control for the luminaires within the daylight zone. The photocell shall automatically turn 'ON/OFF' the inboard lamps of the luminaires in that zone to a baseline light level of no less than 35 foot candles.
iv) The lighting control panel will sweep 'OFF' the lighting on the normal power relay at 12:00am.
v) All emergency egress lighting will automatically turn 'OFF' upon activation of the security alarm system.
vi) All emergency egress lighting will turn 'On' in the case of an alarm event of the security alarm system or the fire alarm system. Security system shall provide alarm contact to lighting control system.

h. Multi-purpose Room (at Elementary Schools):
The multi-purpose lighting is controlled from multiple control stations, which control multiple normal power and emergency (egress lighting) relays in the network lighting control panel.

i) All emergency egress lighting will automatically turn 'ON' upon de-activation of the security alarm system upon entry. The lighting on the normal power relays will be turned 'ON/OFF' manually via one of the room controllers and from the master control station located in the Custodian Office.
ii) The luminaires have two lamps cross section. 1) Button shall turn 'On/OFF' one set of lamps; 2) Button shall turn 'ON/OFF' one set of lamps.
iii) The lighting control panel will sweep 'OFF' the lighting on the normal power relays at 10:00pm and once again at 12:00am. The lighting control panel shall provide flash warning of the lights 2 minutes prior to the sweep 'OFF'.
iv) All emergency egress lighting will automatically turn 'OFF' upon activation of the security alarm system.
v) All emergency egress lighting will turn 'On' in the case of an alarm event of the security alarm system or the fire alarm system.

vi) Track lighting has manual ‘ON/OFF’ control. The lighting control panel will sweep ‘OFF’ the track lighting in the multi-purpose and at the stage at 12:00am.

i. Exterior building perimeter:

i) The building perimeter lighting is controlled from the lighting contactors, controlled via EMS time based schedule. Lighting will turn ‘On’ in the case of an alarm event (either security alarm or fire alarm). Schedule as follows:

- Lighting on at dusk (in no case earlier than 3:30pm) until 11:30pm
- Lighting off 11:31pm-4:59am
- Lighting on 5:00am until dawn (in no case later than 9:15am)

ii) All emergency egress lighting will turn ‘On’ in the case of an alarm event of the security alarm system or the fire alarm system.

j. Exterior lighting (parking lot/walkway):

i) The parking lot/walkway lighting is controlled from the lighting contactors, controlled via EMS time based schedule. Schedule as follows:

- Lighting on at dusk (in no case earlier than 3:30pm) until 11:30pm
- Lighting off 11:31pm-4:59am
- Lighting on 5:00am until dawn (in no case later than 9:15am)

END OF SECTION

SECTION 26 24 13 – SWITCHBOARDS

A. SCOPE

1. Service and distribution switchboards

B. MATERIALS

1. Switchboards
   a. The switchboard shall be fully bussed allowing full use and expansion for future circuit breaker installation.
   b. The switchboard shall be dead front, completely metal enclosed, self-supporting structure independent of wall supports.
   c. Switchboard shall be front accessible.
   a. All bussing shall be copper.
   b. Breakers shall be bolt-on type.
   c. A ground bus shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.
   d. A-B-C type bus arrangement, left-to-right, top-to-bottom, and front-to-rear, as viewed from the front, shall be used throughout.
   e. Construction shall allow maintenance of incoming line terminations, main device connections and all main bus bolted connections to be performed without rear access. The feeder or branch devices shall be removable form the front and shall be panel mounted with the necessary device line and load connection front accessible.

C. EXECUTION

1. Concrete Pads
   a. Mount switchboards on 4-inch housekeeping pads extending 2-inches beyond the equipment foot print on the front and sides of the equipment, 1-inch on the backside of the equipment. Switchboard shall be structurally fastened to the floor in a manner that is consistent with the requirement of the building code, seismic codes, and the recommendations of the manufacturer.

2. Phase Rotation
   a. Where new equipment is replacing existing equipment, verify that the prior motor rotation is maintained.

3. Testing Laboratories
   a. If a new switchboard section is tapped to the bus of the existing service switchboard, the design must first be approved by the Spokane Public Schools A&E department electrical engineer. The tapped work affecting any part of the existing switchboard shall be inspected and approved by an L&I accredited testing laboratory. All costs associated with this work shall be borne by the contractor and shall be part of the project cost.

END OF SECTION

SECTION 26 24 16 – PANELBOARDS

A. SCOPE

1. Distribution panelboards

B. MATERIALS

1. Panelboards:
   a. Panels shall include ground bus and all circuit protective devices shown on the Drawings. All devices shall be connected with bar connection straps having line and load connections accessible from the front.

   b. Busing shall be copper, rated at 208Y/120 volt or 460Y/277 volt, three phase, four wire, of ampacity, capacity and short circuit rating as shown on the Drawings.

   c. Breakers shall be bolt-on type.

END OF SECTION

SECTION 26 27 13 – ELECTRICITY METERING

A. SCOPE

1. Metering

B. GENERAL

1. Provide and install metering conduit/conductors (as described on the plans) from the meter cabinet to a new EMS enclosure to be located near the service equipment. This will allow for demand meter data to be transmitted from the utility meter to the school district's EMS.

C. MATERIALS

1. Metering Equipment
   a. Where new service equipment is to be installed (and therefore new utility metering equipment), the contractor shall request from the local power company that the installed utility meter shall be capable of two pulsed outputs, one for the utility's use and one for the Owner's use for EMS (Energy Management System) monitoring.

D. EXECUTION

1. For utility metering equipment installation, a raceway and wire as identified on the plans shall be provided from the utility meter to the building's EMS (Energy Management System) cabinet for future energy monitoring use.

END OF SECTION

SECTION 26 27 26 – WIRING DEVICES

A. SCOPE

1. Receptacles
2. Wall switches
3. Vertical multi-outlets
4. Device plates

B. MATERIALS

1. Wall switches:
   a. Wall switches shall be as follows:
      i) Single Pole Switches Hubbell #1221-I
      ii) 3-way Switches Hubbell #1223-I

   b. Wall key switches shall be as follows:
      i) Barrel type key switch Hubbell #HBL1221RKL with on/off marked stainless steel cover plate

2. Wall receptacles shall be as follows:
   a. Duplex Receptacles
      i) Receptacles originating from surge protected panels for existing construction

         20A Hubbell CR5362GY (Gray Color)

      ii) Receptacles connected to UPS

         20A Hubbell CR5362BL (Blue)

      iii) Receptacles connected to emergency generator

         20A Hubbell CR5362R (Red)

      iv) In new construction where all 120V circuits originate from surge protected panels

         20A Hubbell CR5362 (Ivory or white depending on architectural preference and owner approval)

3. Vertical multi-outlets
   a. Free-standing multi-outlet assemblies shall be Walkerduct #5PA 10-4, equipped with single grounded type receptacles.

   b. Each unit shall be equipped with T-bar hanger, carpet or tile pad as required, power fed junction box, and ceiling trim plate.

   c. All receptacles shall be pre-wired (with ground wire) to power fed junction box.

   d. Length of each unit shall be selected to match ceiling height.

e. Color of units shall be ivory.

f. Acceptable manufacturers:
   i) Wiremold equipment which is the approved equal of the equipment specified above is considered acceptable.

   ii) Substitutions may be considered only when submitted in conformance with Section 26 00 00.

4. Device plates
   a. All devices shall be equipped with stainless steel 0.04" thick with #302 satin finish.

   b. All junction boxes in finished areas shall be provided with stainless steel plates.

   c. Prohibited materials:
      i) Sectional plates shall not be utilized.

   d. Acceptable manufacturers:
      i) Plates shall be Sierra type, S-Line.

      ii) Substitutions may be considered only when submitted in conformance with Section 26 00 00.

C. EXECUTION

1. Barrel type key switches shall be used to control lighting in corridors, gyms, cafeterias and restrooms (not required for single occupant restrooms).

2. Orient receptacles so that ground pin is at bottom or to the right.

3. Outlet height to meet ADA requirements or 16 inches minimum above floor.

END OF SECTION

SECTION 26 28 13 – FUSES

A. SCOPE

1. Fuses
2. Fuse cabinets

B. MATERIALS

1. Fuses:

MAIN SWITCHES	250 V	600 V
0-600A	LPNRK	LPSRK
ABOVE 600A	KRPC	KRP
FEEDERS		
0-660A	LPNRK	LPSRK
ABOVE 600A	KRPC	KRPC
GENERAL PURPOSE	FRNR	FRSR
TRANSFORMERS (LINE SIDE)	LPNRK	LPSRK

2. Fuse cabinet:
   a. Fuse cabinet shall be of same type and finish as panelboards.

   b. Cabinet shall be sized as required to contain spare fuses as required in Section 26 28 13. Arrange so fuses are stored on adjustable steel shelves with end of fuse carton exposed when door is open.

   c. Cabinet shall have provisions for installation of directory card of size required to display information described below. Card shall be behind glass cover.

C. EXECUTION

1. Install fuses in fuse holder with fuse rating visible.

2. Provide (3) spare fuses of each different type and size used on the project.

3. Provide typewritten directory card indicating all fusible devices, together with associated fuse size and type.

END OF SECTION

SECTION 26 28 16 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

A. SCOPE

1. Circuit breakers

B. MATERIALS

1. Circuit breakers shall be fully rated, bolt-on type. Series rated breakers are not acceptable.

2. Disconnect switches shall be heavy duty rated, externally operable, quick-make, quick-break, with neutral connecting block as required, and lockable operating handle in the on and off position. Mount in code gauge steel cabinet.

C. EXECUTION

1. Circuit breakers:
   a. Molded case breaker connections shall be rechecked after the first load cycle has been applied to the breakers.

   b. Individual units in enclosure shall be mounted at 4'-6" above the floor on walls.

END OF SECTION

SECTION 26 29 13 – MOTOR CONTROLLERS

A. SCOPE

1. Combination starters
2. Manual controls and starters

B. MATERIALS

1. Provide all required relays, wiring, and miscellaneous equipment for Fire Alarm Fan Shutdown compliant with applicable fire codes in conjunction with the site's Energy Management System (EMS). Interconnecting controls shall be rated to match starter control voltage.

2. Unless noted otherwise, all starters shall be of the combination, full voltage, non-reversing, solid state motor protection type with two sets of NO/NC auxiliary contacts to include the following motor protection features:
   a. Adjustable overload protection
   b. Ground fault protection
   c. Phase loss and phase unbalance protection

3. Motor starters shall be Cutler-Hammer Advantage series or Siemens. Substitution may be considered only when submitted in conformance with Section 26 00 00.

4. Variable Frequency Drives
   a. Motor starters shall be ABB. Substitution may be considered only when submitted in conformance with Section 26 00 00.

C. EXECUTION

1. Provide shutdown for HVAC equipment through the site's EMS system.
2. Provide nameplate as described in Section 26 05 53 for each starter.

END OF SECTION

SECTION 26 32 13 – ENGINE GENERATORS

A. SCOPE

1. Emergency generator

B. EXECUTION

1. Connection to DDC system- provide one set of dry contacts each for signaling the DDC system for the following:
   a. Generator status
   b. Start/stop with a load
   c. Weekly testing
   d. Proof of run
   e. Proof of transfer
   f. Failure alarm point

END OF SECTION

SECTION 26 43 00 – TRANSIENT VOLTAGE SUPPRESSION

A. GENERAL

1. Provide Transient Voltage Surge Suppression (TVSS) Device suitable for protection of 208Y/120V, 3 phase, 4 wire electrical system.

B. MATERIALS

1. The TVSS device and enclosure shall be surface mount Leviton #52120-M3.

C. EXECUTION

1. TVSS unit shall be mounted adjacent to panel. Leads to the 3P-20A breaker in the panel shall be no more than 18 inches in length, #10 stranded copper conductors.

2. TVSS System components shall be identified.

END OF SECTION

SECTION 26 50 00 – LIGHTING

A. SCOPE

1. Interior lighting
2. Exterior lighting

B. GENERAL

1. Exterior lighting shall be EMS (energy management system) controlled. Lighting shall be turned on through the EMS system with photo-cell input and turned off through an EMS determined time schedule. Provide outside lighting over-ride within custodian's office.

2. Provide emergency lighting in restrooms, mechanical rooms, hazardous areas (i.e. chemical storage rooms) and all areas required by code.

3. Lighting shall be divided into controllable zones, to include parking areas, sidewalk/path lighting, entrance lighting, hallway zones, commons area, library area, lobby areas, gyms, and multi-purpose rooms. These zones shall ultimately be controlled via the EMS system so that they can be selectively enabled during after school events.

C. MATERIALS

1. Prohibited Fixtures
   a. U tube type fixtures
   b. Fluorescent fixtures with lamps greater than 4 foot in length
   c. High pressure sodium fixtures
   d. Incandescent fixtures

2. Fixtures
   a. All lighting fixtures must bear U.L. labels.

   b. Direct/Indirect (40% up, 60% down) Lighting shall be similar to:
      i) Columbia Alera #SLS 2T8 40/60 CM LD EB8LH UNV SYL

   c. Downlight fixture
      i) LED based downlight can

   d. Surface mount fluorescent fixture
      i) Use only for existing construction where ceiling cannot be cut into or is non-accessible
      ii) Wrap around type, T8, 4100K, 82 CRI

   e. T-bar troffer
      i) Low profile 2'x4' troffer
      ii) T5 or T8 (4100K, 82 CRI) with ½ light level switching electronic ballast (all lamps can operate at full or half lumen output)

   f. Gym fixtures
      i) T5 HO based low/high bay fluorescent, 4100K, 82 CRI

ii) Vandal resistant type to endure direct physical impacts with lens and wireguard
iii) LED lights may be acceptable, verify with Owner.

g. Exterior/area (parking, etc.) fixtures
i) LED type as manufactured by Cooper, Kim or prior approved by Owner.
ii) Induction type lighting may be considered.
iii) Metal Halide and High Pressure Sodium type lighting is no longer preferred (move to LED and induction types).
iv) Designer shall provide lighting calculations, foot candle calc layout and fixture types used, marked on the layout

h. Light Poles and Bases
i) Steel or Aluminum (all other types prohibited including concrete, fiberglass, wood). Hand hole covers shall utilize tamper resistant hardware
ii) Pole base in parking area subject to vehicle contact shall be 24" diameter, 30" extending above finished grade
iii) Pole base in areas not subject to vehicle damage shall be 18" minimum diameter, 6" extending above finished grade
iv) Fixture height on pole in residential neighborhoods limited to 25' above finished grade. Commercial area limited to 30'.

3. Interior lighting
a. Fluorescent Ballasts:
i) T-8, T5 or T5HO Electronic Ballasts shall be used. Less than 10% total harmonic distortion.
ii) All ballast cases to be steel.

b. T-8 Lamps
i) Color temperature 4100ºK.
ii) Color rendering index 82 minimum. Exceptions may be considered with owner approval. (i.e. lighting artwork or exterior lighting, etc.)
iii) Low Mercury/Non-Hazardous rated – equal to Phillips F32T8/TL841/ALTO.

c. Compact Fluorescent Lamps:
i) Color temperature 4100ºK.
ii) Color rendering index 82 minimum.
iii) Ambient Starting Temperature
23ºF indoors.
0ºF outdoors.
iv) Rated life, 10,000 hours.
v) Lamps and sockets shall be U.S. standard and a readily available commodity type (vs. European standards).

D. EXECUTION

1. Installation
a. Implementation
i) Use low profile 2x4 troffer with T8 fluorescent lamps for classroom areas
ii) Minimize use of compact based fluorescent fixtures

iii) Use T5 HO fluorescent based fixtures in gyms and similar high bay spaces

b. Surface Mount
i) Do not use toggle bolts

c. Pendant / Cable Mount
i) Aircraft adjustable cable for fluorescent low/high bay and direct/indirect fixtures is preferred. Chain mount prohibited.

END OF SECTION

SECTION 27 15 00 - LAN- DATA/TELEPHONE

A. Use Spokane Public Schools latest Specification Section 27 15 00 in its entirety.

END OF SECTION

SECTION 27 15 00- LAN Data/Telephone

PART I – GENERAL

1.01 SCOPE OF WORK

A. Provide a complete cable network as indicated on the Drawings and Specifications. Provide panel enclosure at classroom hub locations as indicated on Drawings. Provide LIU fiber optic patch panel and Category 5e Voice/Data patch panels in each classroom hub panel enclosure and in the MDF main hub room panel enclosure. All cabling to be labeled as detailed herein. Owner to provide cross-connect labor and materials.

B. Provide all voice/data outlet boxes, pull boxes, plates and jacks. The jacks for both voice and data shall be the same RJ-45 Category 5e. There is no distinction between voice and data jacks, as cross connect cables determine jack function at the classroom hub panel.

C. Installation of cable, equipment and terminations shall be performed by a full Leviton Certified Cable System (CCS) Company to maintain the existing data system warrantee by Leviton. All equipment and installation shall meet the requirements of the Leviton System Warrantee.

D. Provide (1) 6-strand fiber optic cable between the classroom hub panel and the MDF panel. Terminate the cable at the LIU's with SC connectors at each end. Identify cables with machine generated labels.

E. Provide (2) Category 5e cables between each classroom hub panel and the site's MDF panel. For rooms requiring 7 or more phones, provide Category 5e-25 pair telephone cable in lieu of Category 5e cabling. These cables are to support the voice communications and shall be terminated on (3) 24 port Category 5e patch panels at the MDF. Three (3) more 24 port patch panels at the MDF shall provide termination of cabling from the phone switch [(3) 25 pair cables]. Cross connect cables will be used to connect a specific telephone number to a specific room number, allowing easy future changes.

F. Provide Category 5e cables from the classroom hub voice/data patch panel to the individual voice/data jacks at the locations identified on the Drawing.

G. All active electronic devices and patch cables provided by Owner.

H. The MDF shall not contain any end user cross connects; i.e. the MDF shall not directly feed data taps in an adjacent area (this limits access to the MDF to authorized data personnel only, while non-data personnel have access to the classroom hubs for changing cross connect cables to accommodate changes in room/computer layout).

I. Power receptacles for equipment shall be from a standby generator circuit.

1.02 COMPLIANCE

A. The contractor installing the data cabling system shall be a fully Certified Cable System (CCS) company. The companies meeting this criteria in the Spokane, Washington area are as follows:

- Cochran Technologies
- Powercom

- E3 Solutions, Inc.
- Evergreen Technologies
- Interwest Communications
- Interwest Technology Systems, Inc.
- SystemTech

B. Contractors not noted in the above listing shall be submitted to the Owner for prior approval. Submittal shall include, but not be limited to, a copy of the Letter of Authorization, a copy of the actual Authorized Installer Certification document from Leviton, and a list of reference projects that have included similar work. All requests for substitutions must be in owner's office five (5) working days before quote opening.

C. Comply with NEC and BICSI as applicable to construction, pathways, and installation of cables, wires, spaces, cable support and connectors.

D. Comply with EIA/TIA 568B, 606, and 607 standards for Category 5e cable, components, and installation (EIA/TIA 569).

E. Comply with the current BICSI, TDM manual for installation and termination of fiber optic cable.

1.03 PRODUCT SUBMITTALS AND AS-BUILT DRAWINGS

A. Before ordering any materials or equipment, the Contractor shall submit data for all materials and equipment specified in the Leviton System Warranty.

B. The submittal data shall be as follows:

1. Catalog Cuts: Furnish for all standard (off-the-shelf) catalog items. Catalog number, manufacturer, rating specifications for each type of distribution device and for each type of equipment rack and cabinet shall all be shown.

2. Shop Drawings: Furnish distribution system connection diagrams, riser diagrams and floor plan distribution system drawings.

3. Copy of Pre-Registration Warranty submitted to manufacturer.

4. Certificate of Calibration from the manufacturer(s) of all test equipment to be utilized during project.

5. Submittals, when approved, shall be an addition to these specifications and shall be in equal force in that no variation shall be permitted except with the written approval of the Owner. The Owner's approval of equipment shall not relieve the Contractor's responsibility for errors, as said approval is only general and is not intended to serve as a check and does not relieve the Contractor from furnishing materials and performing the work as required by the contract documents.

6. Three copies of submittals shall be submitted to the Project Manager for Owner's review. All information shall be folded to 8-1/2" x 11" in size. One (1) copy shall be returned to the Contractor. Contractor shall be responsible for making additional copies for his use.

7. Complete and accurate record drawings (and other required submittals) are important to the Owner. Proper documentation eliminates a

significant amount of time and expense when maintenance, repair, alterations or expansion becomes necessary.

8. The Owner will not consider the obligations of the contract as being fulfilled, and will not grant final acceptance off the work of the contract until satisfactory record drawings (and other required submittals) have been received and reviewed.

PART II – PRODUCTS

2.01 MATERIALS

A. Equipment and cabling shall meet the requirements of the Limited Lifetime Leviton system warranty when installed by a Leviton Certified Contractor.

B. Modular patching cords shall have a lifetime application assurance warranty when used as part of manufacturer's structured cabling system.

C. Raceways, boxes, etc., shall be as specified in Sections 26 05 33 and 26 05 40.

D. Cable Supports and Wraps

1. Cable J-Hook

a. Approved manufacturers are Caddy, B-Line, or equal.

b. Bridle rings are not approved for use.

c. J-Hook width shall be minimum 3/4". Provide size appropriate for conductor quantity. Multi-Tier J-Hooks shall be provided to separate different low voltage systems where a common route or pathway is used.

d. Acceptable alternate product: Caddy# CATCR50 cable retainer.

2. Tie-Wrap:

a. Approved manufacturer is Leviton or equal.

b. Tie-Wraps shall be recloseable loop wrap style. Available in 1/2" wide, 15'-75'bulk rolls of Hook and Loop Wrap, Leviton # 43115-015 and 43115-075.

c. Plastic fasteners are not approved for use.

E. Classroom Racks: Standard swing gate wall rack, 24.5"H x 18"D, 13 RMU, dual hinges to open right or left, stopping at 90º, universal 5/8"-5/8"-1/2" alternating hole pattern with (50) #12-24 mounting screws, black finish. Provide at locations as indicated on the Drawings. Chatsworth #11790-718 or approved equal. Include power strip Chatsworth #12816-705 or approved equal.

F. Equipment Rack: Two post, rack, 7'Hx19"W, 45 U, Black finish. Chatsworth #55053-703 with double sided type VCS vertical wire management on each side and power strip.

G. Category 5e Voice/Data Patch Panels: Patch panels must provide Retention Force Technology and be capable of multiple re-terminations- Leviton, 24-port, #5G596-U24.

H. LIU Fiber Optic Patch Panels: Leviton, 6-pair LIU, Rack Mt./Loaded with 12 SC Connectors, Leviton Enclosure #5R1UM-S03 and two Leviton adapter plates #5F100-6QC.

I. Fiber Optic Cable: Berk-Tek, 6-Strand; inside application; 62.5/125 graded index; Loss: -3.50 db/km & 200 MHZ/km @ 850 nm, 1.0 db/km & 500 MHZ/km @ 1300 nm. Riser (PDR006CB3510/25) or Plenum (PDP006CB3510/25)

J. Category 5e Cable: UTP cable shall be Data Grade meeting EIA/TIA 568-C standards for Category 5e cable for application on 100 Mbps LAN system. The cable shall be Berk-Tek, HyperPlus 5e Patch, 24 gauge, four twisted pair, solid copper conductors, CMP plenum rated for plenum areas or as noted in these specifications or the Drawings. Plenum rated cable shall be white in color. Non-plenum rated cable shall be blue in color.

K. Telephone cable: Berk-Tek 25 pair, #24 AWG, solid copper, color coded as per telephone industry standard.

L. Voice/Data Jacks: Leviton, RJ-45 configuration multi-media jack, 568-C compliant, flush mount. The jacks shall include Retention Force Technology and pair separation towers. Leviton #5G110-RI5, where "I" is color.

M. Wall plate shall be single gang, 2-, 4- or 6-port stainless steel as indicated, with designation window, Leviton #43080-1L2, #43080-1L4 or #43080-1L6, no substitutions.

N. Fiber Optic Connectors: Type SC. They shall meet the Leviton system warranty standards. Leviton #49990-MSC.

O. Voice/Data concealed conduits shall be a minimum ¾"C. No exception.

EIA/TIA 568B

MINIMUM CABLE & COMPONENT SPECIFICATIONS

Frequency	AWG	Impedance	Cable		Connectors		Channel	
	22/24	100+15%	Atten	Next	Atten	Next	Atten	Next
1 MHz			2.0db	65.3db	.1db	-65db	2.2db	>60.0
4 MHz			4.1db	56.3db	.1db	-65db	4.5db	53.5
10 MHz			6.5db	50.3db	.1db	-60db	7.1db	47.0
16 MHz			8.2db	47.3db	.2db	-56db	9.1db	43.6
20 MHz			9.3db	45.8db	.2db	-54db	10.2db	42.0
100 MHz			22.0db	35.3db	.2db	-40db	24.0db	30.1

PART III – EXECUTION

3.01 INSTALLATION

A. Installation of cable equipment and terminations shall be performed by a Leviton Certified Contractor. See above for allowable contractors.

B. All labels will be machine generated.

C. All data device plates shall be labeled using the printed window labels showing room number, device box number, and jack number. Labeling sequence of device boxes shall occur in a counter-clockwise fashion when entering the room. (i.e. the third data jack in the second device box, in room 132 would be labeled as 132-2-3).

D. Tag all cables at both ends and at all intermediate pull boxes. All cables, fiber optic and Category 5e shall be labeled with a Brady ID PAL professional printer/labeler printed label. Cabling shall be labeled on each end of wire with Brady ID PAL labels of ¾" width or approved equal. Labeling shall be located within 4 inches of the end or termination of the wire / cable. Category 5e cables shall show room number, device box number, jack number (see example above). Fiber optic cabling shall be labeled showing room number and strand number.

E. All cables shall be run through walls in conduit stub-ups.

F. Install fiber optic and Category 5e cables in continuous length from classroom hub location to main hub room MDF location.

G. Install Category 5e cables in a continuous length from classroom hub location to outlet locations.

H. LAN and other system cables in tunnels shall be supported with J-hooks on 3 foot centers. No other system cables shall be run with the data cables. Cables shall be loosely bundled (where grouped) and supported as required to prevent sharp bends or kinking. Support shall be adequate for the cable weight.

I. Bond all systems stub-ups and raceways per NEC requirements.

J. Sleeves shall be installed at each cable penetration through walls, floors and ceilings. Sleeves shall be minimum 3/4" with insulated inserts. Sleeves shall be installed regardless of wall type construction, fire rated or non-fire rated.

K. At fire walls provide 2" rigid steel conduit threaded nipples with bushings (both sides) or EMT fitted with threaded, nylon throated end connectors. Provide fire seal as specified in Section 26 05 33 wherever passage through any type of fire wall is required.

L. All cables must be terminated using a compression connection tool. All cables shall be installed using EIA/TIA 568, 569, 570, BICSI and standards as follows: Wire pair twists must be maintained to within ½" of IDC contacts on each jack, jacketing must be undamaged for the full length of the cable run and must continue to within ½" of IDC contacts on each jack, each end of each cable must be secured to the jack module with a velcro cable tie. Any cables damaged during pulling shall be the responsibility of the pulling party/parties (electrical contractor or LAN installer). Any failing or marginal tests (see above) shall be re-terminated, re-routed, re-tested, etc., until no other alternatives exist, at which time it will be assumed that a bad cable run (too much twisting of the cable, compression of jacketing and wire pairs, etc.) has resulted (at the discretion of the LAN Tester) and the pulling party/parties will have to bear the responsibility of re-pulling new cable to replace it.

M. The Contractor shall:

1. Provide raceway system as indicated. Open wiring is permitted within the tunnels and above accessible ceilings provided plenum rated cables are neatly arranged and supported with J-hooks every 3 feet and in accordance with industry standards. Routing of cables in tunnels shall occur along sides of tunnels - stay away from center.
2. Provide category 5e cable from all computer outlets to classroom hub voice/data patch panels as indicated.
3. Provide fiber optic cable from classroom hub to MDF LIU patch panels as indicated.
4. Provide classroom hub panel enclosures.
5. Provide LIU fiber optic patch panel in classroom hub enclosure as indicated.
6. Provide category 5e voice/data patch panels in classroom hub enclosures and MDF rack as indicated.
7. Terminate all wires and fibers in all cables at both ends. Provide identification on all cables at both ends. Coordinate with Owner (if required) for actual connection points.
8. Provide all associated hardware as described above.
9. Active electronics are furnished by the Owner.
10. Category 5e patch cords and connection of those cords provided by Owner.
11. Provide drawings, patch panel documentation, full testing and required reports, and warranty all parts and labor (using newly installed cable tests as reference point) excluding outside physical damage or extreme conditions/circumstances.
12. At completion of pulling cable and making terminations, provide the owner with a complete as-built record drawing of the cabling system installation. Provide a hard copy booklet showing the arrangement of each terminal board, terminal block and the arrangement of the cables with each cable termination labeled.

3.02 TESTING

A. Cable Test

1. Perform cable tests in accordance with Cable Test set manufacturer's written instructions. All cables must pass at 100 Mhz.
2. Connect the NEXT test set to the cable to be tested at the centralized network location.
3. Correct malfunctions when detected and proceed with testing. Record test results on a standard UTP Category 5e Cable Test Results form. Contractor must guarantee the cabling meets EIA/TIA ~~568B~~ 568-C performance specifications and the Limited Lifetime Leviton data system warranty agreement for Spokane Public Schools.

B. Fiber Optic Test

1. All fibers shall be tested with a fiber optic OTDR at 850nm (on the reel before the Contractor accepts the product and after installation).

2. The documented test results from the F/O OTDR shall be given to the Owner to form a baseline for loss budget and future troubleshooting. The test (after installation) shall be performed with all connectors installed and show measurements from connector to connector. The fibers must test less than 1 db difference between the worst and best fiber within the cable.

C. Final Test

1. Verify network distribution signal to all installed outlets. Where any outlet does not receive the proper network signal, repeat Category 5e cable and termination tests to determine the source of the problem.

3.03 DELIVERABLES

A. As-built drawings to include the following:

1. 3 hard copies of drawings.
2. Floor Plan shall show jack and equipment locations with applicable ID numbers.
3. Drawings and diagrams (in AutoCAD format); provide files on CD-ROM media. AutoCAD floor plan backgrounds shall be made available from Owner for each site location.
4. Documented test results for installed system jacks, cabling, etc. noted in 3.02 above.
5. Leviton Limited Lifetime Certificate of Warranty.

END OF SECTION

SECTION 27 51 00 – INTERCOM SYSTEM

A. GENERAL

1. Scope of Work
   a. Design shall be call switch based with wall, flush mount speakers

   b. All components shall be the product of the same manufacturer. Provision for spare capacity in equipment to allow future addition of at least ten remote stations.

   c. Administration control through a standard DTMF single line phone with digital display of classroom calling status.

   d. Provide wall-mount readout display showing intercom status, wall mounted at location shown on the Drawing. Readout shall display time, active bell, schedule and call-in information. Display must be readable from at least 20 feet.

   e. Provide AM/FM tuner, cassette player and compact multi-disc program distribution to each remote station. Provide 1/4 wave stainless steel whip antenna on a steel mast (1-1/4" diameter rigid minimum) mounted on roof with coaxial cable run back to equipment rack. Rack mounted antenna is not acceptable.

   f. Provide tone generator to transmit clock controlled signals through the intercom speakers.

   g. Power source shall be from a standby generator, dedicated circuit.

   h. Provide uninterruptible power supply (UPS) with power conditioning surge protection for equipment. Provide at least 10 minutes back-up at full power.

   i. All programmable functions of the intercom panel shall be accessible through a laptop computer.

   j. Provide interface to the telephone system via a trunk port for administration control (2 trunk lines).

   k. Hallway speakers shall be for announcement only and shall be flush mount.

   l. Mechanical room speaker horn shall be designed for paging in high noise level areas.

A. MATERIALS

1. Supplier
   a. Company specializing in supplying products specified in this Section with minimum five (5) years documented experience.

   b. Intercom station speakers shall be 8" speaker cone.

c. Rauland (supporting vendor EVCO Sound & Electronics, Inc.), Bogen (supporting vendor Dimensional Communications) and Telecor (supporting vendor Camtek, Inc) are preferred manufacturers/vendors.

B. EXECUTION

1. Qualifications
   a. Contractor shall be an authorized representative of the manufacturer and specializing in installing the products specified in this Section with minimum ten (10) years documented experience.

2. Installation
   a. For existing installations, communication cable shall be 22 AWG, solid, 2 pair shielded with drain, where necessary to match existing system. Conductor insulation shall be red and black for speaker connection, white and green for intercom call switch connection. Wire splices shall be made with crimp connector (T&B RB44 or approved equal) or connecting block. Category 5e cable shall be used for new construction.

   b. When cables are spliced in junction boxes, drain wires shall be insulated using a sleeve (small plastic tubing) taped cables. Drain wire shall project through the sleeve to allow splicing. Splicing method to be approved by School District Electrical Shop Foreman.

   c. Identify both ends of each wire with room number or location of component to match identification or wiring diagram. Wire markers shall be located adjacent to connection point where easily visible. Marking system shall be Brady IDPro Printer with WML-311-292 labels or approved equal.

   d. Terminations shall be made and marked at the switch bank in numerical order of room numbers.

   e. Final connections between the equipment and the wiring system shall be made under the supervision of a representative of the intercommunications system manufacturer.

3. Programming
   a. Intercom system shall be programmed as required to transmit schedule tone (end of class, etc.) signals through the intercom speakers.

   b. Contractor shall contact and meet with the School District Electrical Shop Foreman for intercom programming format. No programming shall occur prior to this meeting. Also, no programming of the intercom system shall occur without the Foreman being present.

   c. Contractor shall notify the School District Electrical Shop Foreman prior to any modifications or changes made to the intercom system after the final demonstration of the system to the School District.

4. Training

a. The Contractor shall provide two (2) hours minimum of training for the Owner's staff (school's principal and office personnel) in the operation of the intercom system. Training shall include how it interfaces with the telephone system and the functions available through the telephone system.

b. The Contractor shall provide four (4) hours minimum of training for the Owner's maintenance personnel. Training time shall be for the maintenance and programming of the intercom system. Training shall include all pertinent topics and shall be adequately covered.

c. Use submitted operation and maintenance manual as reference during demonstration and training.

d. On site training with system checkout shall be conducted after all items below are completed and available for use during the training session:
   i) As-built drawings – to include the following:

      - 3 hard copies of drawings
      - Floor plan shall show equipment locations with applicable ID number and zone boundaries
      - Riser and wiring diagram for the system, showing all ID numbers associated with the equipment
      - Drawings and diagrams (in AutoCAD format); provide files on CD-ROM media

   ii) Operation and Maintenance manual for the system – 3 copies

   iii) Software and connecting cable for a laptop PC connection to the system

e. The maintenance training shall be conducted by a representative of the System Vendor who is thoroughly familiar with the equipment, features, and installation. The training shall include instruction and over-the-shoulder hands-on training. As a minimum, the training shall cover, but not be limited to, the following topics:
   i) General overview of system features, including expansion capability

   ii) Programming of system

   iii) Recommended and required maintenance procedures and intervals

END OF SECTION

SECTION 27 53 13 – WIRED CLOCK SYSTEM

A. GENERAL

1. Scope of Work
   a. Furnish and install a complete operational solid state, digital master time controlled clock system as shown on the Drawings. The master time control unit shall be programmable via connection to a laptop computer. Software shall be provided with the package.
      i) The system shall be a 4-wire synchronized type system with analog clock movements.

      ii) The master clock shall automatically or manually operate no-voltage control circuits to the intercom system console that shall be utilized for distribution of class program signals via the paging speakers.

   b. Qualifications
      i) Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience.

B. MATERIALS

1. Master Clock
   a. Master clock shall be an eight-zone, solid-state, microprocessor-based time and program controller with the following features:
      i) Capability of storing and selecting a minimum of eight (8) different schedules.

      ii) Front display with programming key pad and displays for time, zone, day, and schedule.

      iii) Capacity for storing 350 events and 100 holidays in the non-volatile memory.

      iv) Fully automatic holiday program execution. Bells can be silenced or special schedules can be implemented. Normal bells will resume after the holiday period.

      v) User-programmable automated Daylight Savings Time change.

      vi) Separate bell duration for each zone circuit.

      vii) Ability to auto test all output zone circuits.

      viii) Interface with analog synchronous wired or minute-impulse secondary clocks without the use of external synchronous adapters.

      ix) Programmable via laptop computer.

x) Master clock to be synchronized via connection to the LAN network (internet) for standard time correction.

xi) Prefer to have master clock as part of the intercom system.

b. Analog Clocks

i) Secondary analog clock: The clock shall be a microprocessor controlled movement. The clock shall provide fast recovery correction without the need for a correctional signal. The clock shall also provide synchronized second hand correction and automatic sensing and response to the master clock synchronization signals. The clock is to operate off the intercom speaker cable. Provide model similar to Rauland WAC13S (12"), American Time or Signal, and larger clocks similar to Rauland (16"), American Time or Signal in gyms and cafeteria. Provide wire guard for clocks in the gyms.

c. Wire Guards

i) Formed steel guards with flanges for attaching to wall surface. Guards shall have matte white finish.

C. EXECUTION

1. Installation

a. All wiring shall be installed in metallic raceway and arranged as shown on the Equipment Supplier's shop drawings.

b. Clocks shall be wired using a standard plug, allowing ease of removal for servicing.

c. Source power shall be from a standby generator, dedicated circuit.

2. Spare Parts

a. Analog Clocks: Provide the Owner with five (5) spare clocks. Clocks shall be delivered in original packaging.

3. Identification

a. Identify both ends of each cable with room number or location of component to match riser/wiring diagram.

b. Marking system shall be Brady ID PAL printer/labeler with ¾" labels or approved equal.

4. On-Site Training

a. The Contractor shall provide two (2) hours minimum of training for the Owner's staff (school's principal and office personnel) in the operation of the clock system (how to change bell schedule days, etc).

b. The Contractor shall provide four (4) hours minimum of training for the Owner's electrical maintenance personnel in the maintenance of the clock system. Training time shall be for the operation, maintenance and configuration of the clock system. Training shall include programming with laptop computer connection and all pertinent topics adequately covered.

c. Onsite training with system checkout shall be conducted after all items below are completed and available for use during the training session:

i) As-built drawings – to include the following:

- 3 hard copies of drawings
- Floor plan shall show equipment locations with applicable ID number and zone boundaries
- Riser and wiring diagram for the system, showing all ID numbers associated with the equipment
- Drawings and diagrams (in AutoCAD format); provide files on CD-ROM media

ii) Operation and Maintenance manual for the system – 3 copies

iii) Software and connecting cable for a laptop PC connection to the system

END OF SECTION

SECTION 28 00 00 – SECURITY SYSTEMS

A. Use Spokane Public Schools latest Specification Section 28 00 00 in its entirety.

B. Security system is to monitor temperature alarm for kitchen freezer and cooler as well as cold room alarms for classrooms. Security system shall also monitor fire alarm panel outputs for alarm, trouble and supervisory.

END OF SECTION

SECTION 28 00 00- ELECTRICAL REQUIREMENTS FOR INTEGRATED SECURITY SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. This section is a Division 26-28 Basic Electrical Materials and Methods section, and is part of each Division 26-28 section.

B. Drawings and General Provisions of contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. This section shall indicate the scope of work required by the Division 26 Electrical Contractor to coordinate with the Integrated Security Systems installation. The general term “Integrated Security Systems” shall include Intrusion, Access Control, and Surveillance.

B. The Division 26 contractor shall install all raceway, boxes, low voltage cabling, 120-volt power connections, backboards, grounding, and other basic infrastructure required for the Integrated Security Systems. Cabling for the system shall be provided under Division 27 and 28 requirements. Division 26 contractor shall coordinate all related work with the Integrated Security Systems contractor.

C. The Integrated Security Systems contractor will be under direct contract to the Spokane Schools. The security contractor will furnish and install all devices and equipment, terminate cables, programming and system commissioning.

1.03 CONTRACTOR INTERFACE AND COORDINATION

A. This installation requires extensive interfacing - It is the sole and exclusive responsibility of this contractor to clarify any questions or discrepancies with the Integrated Security System contractor and the Owner’s representative and to ascertain and verify all installation conditions about which he is unsure prior to commencing work. No additional post bid allowances will be made.

PART 2 - MATERIALS

2.01 GENERAL

A. Raceway systems including conduit, boxes, cable tray, supporting devices, etc. shall be as specified in other Division 26 sections.

B. Backboards shall be furnished and installed by the Electrical Contractor. Backboard shall be 3/4" plywood (AD grade), one side finished smooth (mounted outward), painted with two coats of white fire retardant paint. Size as required to accommodate installed equipment.

C. Cable supports and wraps.

1. Cable J-Hook

a. Approved manufactures are Caddy, B-Line, or equal.

b. Bridal rings are not approved for use.

c. J-Hook width shall be minimum 3/4". Provide size appropriate for conductor quantity. Multi-Tier J-Hooks shall be provided to separate different low voltage systems where a common route or pathway is used.

2. Tie-Wrap:

a. Approved manufactures are Leviton or equal.

b. Tie-Wraps shall be recloseable loop wrap style. Available in 1/2" wide, 15'-75'bulk rolls of Hook and Loop Wrap.

c. Plastic fasteners are not approved for use.

2.02 CABLE

A. Division 26 shall furnish and install the following cable types from each device. The following cable is distributed by Anixter, Kent, WA 1-800-426-7665.

ACCESS CONTROL DEVICE	CABLE DESCRIPTION	CAT. NO.
1. Door Position Switch	4C #22 OAS Yellow Plenum	Tappan # 2280AB4M/CMP-YE
2. Electric Strike	2C #18 OAS Yellow Plenum	Tappan # 1880AB2M/CMP-YE
3. Request-to-Exit Pushbutton	4C #22 OAS Yellow Plenum	Tappan # 2280AB4M/CMP-YE
4. Request-to-Exit Motion Detector	4C #22 OAS Yellow Plenum	Tappan # 2280AB4M/CMP-YE
5. Proximity Card Reader	6C #22 OAS Yellow Plenum	Tappan # 2280AB6M/CMP-YE
6. Proximity Arming Reader	6C #22 OAS Yellow Plenum	Tappan # 2280AB6M/CMP-YE

SECURITY SYSTEM DEVICE		CABLE DESCRIPTION	CAT. NO.
7.	Addressable POPIT	4C #18 OAS Yellow Plenum	Tappan #1880AB4M/CMP-YE
8.	Door or Window Position Switch	4C #18 OAS Yellow Plenum	Tappan #1880AB4M/CMP-YE
9.	Glass Break Detector	4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
10.	Removable Center Mullion	4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
11.	Arm/Disarm Keypad	4C #22 OAS Yellow Plenum	Tappan # 2280AB4M/CMP-YE
12.	Blue Strobe	2C #18 OAS Yellow Plenum	Tappan # 1880AB2M/CMP-YE
13.	Security Siren	2C #18 OAS Yellow Plenum	Tappan # 1880AB2M/CMP-YE
14.	Temperature Monitoring Sensor and Freezer and Cooler	4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
15.	Overhead Door Contact	4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
16.	Sounder (Piezo)	2C #18 OAS Yellow Plenum	Tappan # 1880AB2M/CMP-YE
17.	Sargent Electric Latch Retraction Device “Lock”	4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
18.	McKinney Electric Hinge	(1) 4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
19.	Lock Down Pull Station to Galaxy Head End Equipment	(1) 4C #18 OAS Yellow Plenum	Tappan # 1880AB4M/CMP-YE
	CAMERA DEVICE	CABLE DESCRIPTION	CAT.NO.
20.	PTZ Camera Indoor or Outdoor	(1) 2C #18 OAS Yellow Plenum (1) CAT 5E Yellow Plenum	Tappan # 1880AB2M/CMP-YE CAT 5E per Requirements of Specification 27 10 00
21.	Interior Fixed IP PoE Camera	(1) CAT 5E Yellow Plenum	CAT 5E per Requirements of Specification 27 10 00

22.	PoE Midspan Power Injector	(1) 1 Foot CAT 5E Yellow Plenum Patch Cord (1) 3 Foot CAT 5E Yellow Plenum Patch Cord (1) 110 volt outlet for AC Power	
23.	Exterior Fixed IP Camera	(1) 2C #18 OAS Yellow Plenum (1) CAT 5E Yellow Plenum	Tappan # 1880AB2M/CMP-YE CAT 5E per Requirements of Specification 27 10 00
24.	Video Monitor	(1) RG-59 Shielded Plenum (1) 110 Volt outlet for AC Power	White Cable Jacket
25.	Fire Alarm Reporting for Alarm, Trouble, Supervisory	(3) 2C #18 OAS Yellow Plenum	Tappan # 1880AB2M/CMP-YE

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

A. All access control cables shall be installed as individual home runs from the device to the access control main panel. No mid-run cable splices will be allowed.

B. The following security devices shall also be installed as individual home runs from the device to the security control main panel. No mid-run cable splices will be allowed. These devices are as follows: LCD Keypad, Security Siren, Blue Strobe, and Piezo.

C. All remaining security devices and removable mullions shall be installed on 4C #18 AWG wiring and utilize addressable “POPIT” or “point of protection input transponder” modules. POPIT modules provide a maximum configuration of 238 off board points, 2 data loops per control panel, 119 points per data loop with no single data loop greater than 2300 feet. POPIT modules must be mounted within 15 feet from the device.

D. Visually inspect all wire and cable for faulty insulation prior to installation. All access control and security junction boxes are to be painted yellow (color of the cable jacket) for easy system identification.

E. Neatly coil 24 inches of free cable at the security or access control device outlet and coil and bundle 20 feet of free cable at the security and access control main panel head end equipment location.

F. For interior cameras, neatly coil four feet free cable at the device outlet and coil and bundle (20’) twenty feet of free cable at the head patch panel location of the camera equipment and PoE midspans. For exterior cameras neatly coil (20’) twenty feet of free cable at the exterior camera location and coil and bundle (20’) twenty feet of free cable at the head end patch panel. Power supplies for exterior cameras shall be located within the interior of the building and are to be mounted within fifty (50’) feet of the exterior camera location.

G. Provide supports as required at 4’-0” intervals minimum. Integrated Security Systems cabling shall be supported separately from other low voltage system wiring. Install multiple J-hooks to separate various systems where a common routing path is used.

H. Neatly bundle and wrap all vertical run wire and cable at 10’- 0” intervals.

I. All system wiring within vertical riser shafts (if required) shall be bundled, wrapped and tied to the structure at l0'-0" intervals in order to isolate it from other wire and cable within the shaft. Additionally, all wire and cable within the shaft shall be supported at least every two floors using Greenlee Slack Strips (split mesh lace closing) or approved equal. Provide all personnel and equipment necessary to install and support the cable. All wire and supports shall be UL listed for the application and meet the requirements of the owner.

J. Wire and cables shall be protected from physical damage by ensuring that the bundles are kept off the floor in traffic areas. Care shall be taken to ensure that excess stress is not placed on large bundles of wire and cable at the Head-end. Adequate means shall be provided for fully protecting all materials and equipment against damage from any cause until final acceptance of the work.

K. Provide grommets and strain relief material where necessary to avoid abrasion and tension on the wire and cable.

L. Testing: Wiring shall be completely installed and tested for continuity and short circuits before final connections by the Integrated Security Systems contractor are made.

M. Labeling: Mark all cables in common at both ends using a permanent method such as self-laminating electronic printer cable marking tape, handwritten labels are not acceptable. Labels shall be installed when wire and cables are installed. Permanent labels will be installed by the Integrated Security Systems contractor when terminations are made.

N. Bond all systems raceways per Section 26 05 26.

O. Stub conduits from device outlet box to accessible ceiling. Install insulated throat liner or insulated bushing at stub end.

P. Provide wiring and connections for all line voltage equipment panels and power supplies as required by the Integrated Security Systems contractor.

Q. Coordinate the routing of low voltage wire and cable to avoid interference from line voltage systems. Separate parallel runs by 12". Crossing runs shall be separated 6". Do not allow Class 2 cable to be housed or come into contact with Class 1, power or lighting cable. Observe all requirements of NEC including Article 725 and 760. All CAT 5E cable is to be installed and terminated per requirements of Specification 27 10 00.

R. Sleeves shall be installed at each cable penetration through walls, floors and ceilings. Sleeves shall be minimum 3/4" with insulated inserts. Sleeves shall be installed regardless of wall type construction, fire rated or non-fire rated.

S. Firestop all conduits that pass through floors, ceilings and walls. Sealing of openings between floors or through walls, existing or created by the contractor for cable pass through shall be the responsibility of the contractor. Sealing material and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work and comply with all specifications and requirements of the owner. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.

T. In no instance shall any UL labeled door or frame be modified without prior approval of the owner.

U. Roof penetrations shall be flashed to prevent leakage. All roof penetrations shall be flashed by a qualified roofing contractor (approved by the owner) normally in the

business of commercial roofing. Flashing shall be in accordance with NRCA standard practices. Provide guy wires to adequately support cable weight with ice loading and strain.

V. Seal all outdoor system components or those subject to water or moisture with neoprene gaskets or silicon sealant. Use a UL listed compound for all watertight seals. Contractor shall ensure that exterior wall penetrations are installed in such a manner as to prevent water seepage.

W. All cutting and patching of new and existing construction required for the installation of systems and equipment shall be the responsibility of this contractor. All cutting shall be accomplished with masonry saws, drills or similar equipment to provide neat uniform openings. Refer to other Division 26 specification sections for complete cutting and patching information.

X. Provide Security System (Bosch panel) monitoring connection to the building FACP. Reference Fire Alarm System specification section 28 31 11.

3.02 SUMMARY OF INSTALLATION REQUIREMENTS FOR INTEGRATED SECURITY SYSTEMS

A. Division 26-28 shall furnish and install the following:

1. Outlet boxes at each device location: Boxes containing (3) three or more cables coming into the box or passing through the box and containing (1) one POPIT shall be enclosed in a 4”x 2-1/8” square box with 1-gang ring. Boxes containing less then (3) wires coming into the box or passing through the box shall be enclosed in a 4”x 1-1/2” square box with 1-gang ring. Boxes above the ceiling are to be painted yellow for identification.
2. 3/8” flex into door frames for door position switches.
3. Stub out 3/4” conduit from each box to accessible ceiling space.
4. Sleeve all cable penetrations though walls, floors and ceilings.
5. Grounding and bonding.
6. Wire and cable from each device to head-end equipment as specified in section 2.02 CABLE and 3.01 GENERAL INSTALLATION.
7. Label all wire and cables, coordinate with the Integrated Security Systems Contractor for labeling requirements, handwritten labels will not be allowed.
8. Test all security and access control wire and cables for continuity and short-circuit.
9. Test all Cat5E camera per Specification 27 10 00.
10. Support, bundle and use only approved Velcro cable ties.
11. 3/4" thick communications backboards.
12. Firestopping around conduits that penetrate fire rated floors, ceilings and walls.
13. All 120 VAC power connections.

END OF SECTION

SECTION 28 31 00 – FIRE ALARM SYSTEM

A. GENERAL

1. Scope of Work
   a. Provide a complete, constantly supervised, networked, analog addressable, battery-backed fire alarm system with audible and visual signals for evacuation and a digital communicator for connection to a central monitoring agency.

   b. System shall be configured for central monitoring by a U.L. listed Central Station. Central Station shall be Stanley Security (current monitoring agency).

   c. Design shall be reviewed by a NICET 4 level certified designer for compliance with local codes and the local authority having jurisdiction (this is to avoid costly change orders due to non-compliance).

   d. All fire alarm submittals to the City of Spokane must be accompanied by a fire alarm designer registration stamp. This is required by the architect/engineer as well as the vendor preparing the shop drawings.

2. Qualifications
   a. The System Vendor shall employ factory-trained technicians skilled in maintenance of fire alarm systems, and shall maintain a service organization with spare parts in stock within 50 miles of the Project site.

   b. The System Installer shall be an organization specializing in installation of low-voltage systems and having a minimum of 3 years experience in installing fire alarm systems similar in scope and complexity to the system required for this project.

   c. All personnel working on the fire alarm system shall be NICET Level 2 certified and have a City of Spokane Fire Department License.

   d. Approved vendors and installers are:
      i) Allied Security
      ii) Camtek, Inc.
      iii) Moon Security

B. MATERIALS

1. Products
   a. System Replacement where existing wiring is reused:

      i) Control panels, expansion units, annunciators, etc. shall be Silent Knight IFP-1000 or IFP-2000, latest version.

   b. New facility construction:

      i) Control panels, expansion units, annunciators, etc. shall be Silent Knight IFP-1000 or IFP-2000 latest version.

c. Lockable cabinet, 16” x 16” x 4”, hinged door, red with lock kit (Hoffman #APLKJIC), mounted near fire alarm control panel for storage of fire alarm prints and documentation.

2. Device Protection

a. Guards: Fire alarm signals and manual stations installed in the Gymnasium, Wrestling, Weight Training, Fitness areas and exterior located devices shall have guards. Guards for manual stations shall allow ready access to manual stations either through the front of the guard or by lifting a hinged guard.

b. Guards shall be formed steel with flanges for attaching to wall surface. Guards shall have matte white finish.

C. EXECUTION

1. Installation

a. Fire alarm panel and supporting system equipment shall be from a standby generator, dedicated circuit.

b. All personnel working on the fire alarm system shall be NICET Level 2 certified and have a City of Spokane Fire Department License.

c. Fire alarm equipment and devices shall be protected from dust during construction. Smoke detector heads shall be installed only after dust-producing activities have completely ceased, building surfaces have been finished and clean-up by all trades has been completed. The plastic covers shipped with the detectors are for protection during shipping and storage, and are not suitable to protect detectors from construction dust.

d. Provide back boxes matched to the device or equipment in all cases. Back boxes and cabinets shall be plumb and perfectly aligned.

e. All wiring shall be installed in a metallic raceway system arranged as shown on the shop drawings. The conduit arrangement shown on the Contract Drawings is illustrative only, and shall not relieve the Contractor from responsibility to provide separate conduit for wiring connected to different class power supplies in accordance with NEC Article 760.

f. Maintain consistent color-coding of conductors throughout the project. Color coding shall be as follows:

i) Horn circuit
+ Red
- Black

ii) Initiating circuit
+ Orange
- Brown

iii) Control circuit
+ Blue
- Yellow

iv) Addressable loops and horn circuit loops may be twisted pair cabling, rated for the use.

g. Wiring in cabinets and terminal boxes shall be neatly arranged and bundled with nylon wire ties.

h. Identify both ends of all wiring and cabling with zone, area, floor, etc. to match identification on wiring diagram. Wire markers shall be located adjacent to connection points where easily visible. Marking system shall be made using a Brady ID PAL printer/labeler with ¾" labels or approved labeling method.

i. Where EMT raceway is used (in accordance with Section 16110), conduit shall be colored with a bright red topcoat.

j. Label all smoke, duct smoke, heat detectors, pull stations, control relays, etc. with ID number using an electronic labeling printer (similar to those as manufactured by Brother). Label shall be 1/4" red lettering on white background. Device label shall match as-built drawings and programming entries.

k. Label all batteries with the installation date using an electronic labeling printer (similar to label printer noted above).

l. Locate ceiling mounted detectors (both smoke and heat) so that they are easily accessible for future testing using pole mounted test equipment operated from the floor level.

m. Locate heat detectors which are in concealed areas (i.e. chair storage areas under gym platforms/stages) so that they are readily accessible for future testing.

n. Provide isolated loop circuit protectors on all initiating, indicating and signaling circuits extending beyond the building perimeter, including addressable loop and annunciator communications lines and associated shielding. Locate the protectors as close as practical to the point where the circuits enter and leave the building. Connect the ground terminal of protector to the building grounding system with a grounding conductor no smaller than 12 AWG.

o. Locate ceiling-mounted smoke detectors at least 48" from supply air diffusers, and at least 12" from return air grilles.

p. Where smoke detectors or duct smoke detectors are located above ceilings or otherwise are not readily visible, provide remote indicator lights equipped with key operated test switches. Provide a permanently attached placard indicating the location of the detector and the area served.

q. The fire alarm control panel shall report to the Bosch Security panel using (3) 2C#18 yellow jacketed plenum rated cables. The Bosch Security panel will then report to the U.L. listed central station via two communication lines: one Cat 5e data line to the District's network (internet connection) and one CenturyLink telephone line (existing FAX) wired to seize control of the line (the CenturyLink line is the backup). The system is to report to a UL listed Central Station (Stanley Security) for fire alarm system reporting in accordance with code requirements and

those of the local Fire Department. The fire alarm system shall be connected to transmit alarm, supervisory and trouble conditions with the alarm signal having priority over the other signals. The output shall match the Central Reporting Agency protocol with final verification/approval of Spokane Public Schools facilities and maintenance shop.

2. Programming
   a. Programming shall be performed by an authorized manufacturer's representative.

   b. Relay names in the programming shall note the location and what they control.

   c. All device point names in the programming shall be descriptive of the device location, and if the number of characters in the field allows, the device description (it has been found that the fields do not have enough characters allotted to allow the device description, so the device location is more important). Default point name assignments are not acceptable (i.e. "module 33 point 75"). The nearest room number (room must have room number signage readily visible to a building occupant) shall be given first, followed by the room description as data entry space allows. An acceptable example is "Room 231 – Science Lab". For corridors (primary hall/passage ways), hallways (secondary hall/passage ways) and stairways, the device shall be labeled as follows:
      Corridor – by Rm 152
      Hallway – by Rm 132
      Stair – by Rm 202

   d. The 'Rm' notation may be left off (leaving only the actual room #) if the number of characters is limited in the programming field. Also, corridor and hallway may be abbreviated (Corr & Hall) as necessary to fit within the programming field.

   e. The contractor shall also deliver to the Owner a copy of the system program in electronic format. The electronic file shall be delivered on CD-ROM media. The Contractor shall also deliver to the Owner all auxiliary programs and patch cables required to load the program into the fire alarm system memory.

3. Testing
   a. Notify the Owner's Representative at least one (1) week in advance of the dates when the above testing and demonstration will be performed, so that test may be witnessed.

   b. When testing the fire alarm system at any time, the Contractor shall lock out all HVAC equipment from shutdown (problems resulting in maintenance costs have been experienced in the past from multiple shutdown/startups of the HVAC due to fire alarm testing – Contractor may be responsible for any repair costs to HVAC equipment resulting from failure to lockout the HVAC equipment during fire alarm testing).

4. On-Site Training
   a. The Contractor shall provide eight (8) hours minimum of training for the Owner's staff in the operation of the fire alarm system. In addition, the Contractor shall provide eight (8) hours minimum of further training for the Owner's maintenance personnel in the maintenance of the fire alarm system. Training time shall be for the Owner's maintenance personnel in the maintenance of the fire alarm system.

Training time shall be extended as necessary to satisfy the Owner's representative that all pertinent topics have been adequately covered.

b. Onsite training with system checkout shall be conducted after all items below are completed and submitted to the Owner prior to the training session:

i) As built drawings (3 copies) are to include the following:

Floor plan(s) shall show equipment and detector locations (with ID number) and zone boundaries. Relays and damper locations shall be shown. Relays shall be noted as to what they control. ID shall match devices and programming entries.

Riser and wiring diagrams for the system, showing all ID numbers associated with detectors, equipment and field wire labeling.

Shop drawings including battery calculations, notification appliance circuit voltage drop calculations, wire size, etc.

Documented current draws and voltages at the batteries for each panel and also at the furthest device on each notification circuit during full alarm condition. Document the battery voltage and amp-hour rating of the batteries affiliated with those measurements.

ii) Operation and Maintenance manual for the system (3 copies)

iii) Work with school district's electrical shop foreman to install/update the fire alarm system software on three (3) district electrical shop laptop computers.

c. A training plan shall be submitted in advance for acceptance. The training plan shall outline the topics to be covered, the publications to be used, and the training schedule.

d. The training shall be conducted by a representative of the System Vendor who is thoroughly familiar with the equipment and its features, and also with the installation on this project. The training shall include instruction and over-the-shoulder hands-on training. As a minimum, the training shall cover, but not be limited to, the following topics:

i) General overview of system features, including expansion capability
ii) Interpretation of system outputs (signal tones, annunciator displays, printouts)
iii) Operation of system controls (fire drill, acknowledge, silence, reset)
iv) Programming of system
v) Recommended and required maintenance procedures and intervals
vi) Detailed trouble-shooting instructions for each trouble condition annunciated by the system.
vii) Explanation of service agreement options
viii) Installer level programming

5. Record Documents

a. Complete and accurate record drawings (including the as-built requirements above and other required submittals) are important to the Owner. Proper documentation eliminates a significant amount of time and expense when maintenance, repair, alterations or expansion becomes necessary.

b. Drawings shall include a floor plan showing equipment and detector locations (with ID number) and zone boundaries, riser and wiring diagram for the system showing all ID numbers associated with detectors and equipment. Relays and damper locations shall be shown. Relays shall be noted as to what they control. ID shall match devices and programming entries.

c. O&M manuals and as-built drawings as noted above.

d. Listing of devices, their model number and quantity of device types.

6. Spare Equipment

a. Provide the Owner with the following spare equipment. Deliver spare equipment to the Owner in the original factory packaging.

i) Smoke Detectors: 3% of total installed, minimum 2
ii) Heat Detectors: 3% of total installed, minimum 2
iii) Manual Stations: 3% of total installed, minimum 2
iv) Addressable Modules: 5% of total installed, minimum 2

END OF SECTION

31 00 00 - GENERAL DESIGN GUIDELINES-SITE

1. General Health and Safety:
    a. Safety of Pedestrian Surfaces:

        i. Slip Resistance: Provide walking surfaces of exterior stairs, ramps, and walkways with a minimum static coefficient of friction of 0.80, measured in accordance with ASTM D 2047-1999.
        ii. Trip Hazards: Walkway surfaces should be even and unobstructed, surfaced in stable materials such as concrete or asphalt; unstable materials create trip and fall hazards and are difficult to maintain and keep clear of snow and ice. Pavers, brick and patio blocks are not allowed in pedestrian walkways as they become uneven over time and present trip hazards.
        iii. Fall Hazards: Provide handrails on exterior walkways located on inclines where slips and falls are likely to occur during inclement weather or icy conditions. Any walk way may become hazardous in icy weather even those that meet ADA requirements for slope. Handrails should be placed along the sides of the walkways not down the middle. Placing the handrails in the middle interferes with proper snow removal. All walkways with slopes 1:20 or steeper require handrails.

2. Pedestrian and Vehicular Safety: The construction will comply with the code and the following:
    a. Wherever possible, pedestrian and vehicular traffic should be separated for safety of pedestrians by buffer zones or parking strips so that students are not crowded into a vehicle lane.

    b. Provide visual barriers at extreme changes in elevation near roadways.

    c. Provide tactile warnings where pedestrian walkways cross or run adjacent to roadways.

    d. Provide safe motor vehicle drop-off and pick-up locations for student arrival and departure, with appropriate signage.

    e. Drop off areas should be located in areas with the least amount of pedestrian traffic, provide for the safe loading and unloading of students and situated so as to promote smooth traffic flow.

    f. Parent drop off areas should be located remote from the bus loading and unloading zones. Students with special needs require accessible drop-off zones.

    g. Provide safe bus drop-off and pick-up locations for student arrival and departure, with appropriate signage.

    h. Bus zone needs to have separate vehicle entrance and exit separate from parent/visitor/teacher parking locations.

    i. Drop off areas should be located in areas with the least amount of pedestrian traffic, provide for the safe loading and unloading of students and situated so as to promote smooth traffic flow. If located off District property, locate on adjacent side street rather than main street/arterial.

    j. Location should be central in proximity to school population so students can access buses on timely basis.

k. Students with special needs also need to be considered.

l. Drop-off locations need to be away from building ventilation system (air intake).

m. Keep slope/grade of roadway to minimum to avoid slides in event of snow and ice.

n. Bus area should have camera surveillance system with monitor in main office. Office staff should be able to monitor bus arrivals and departure as well as student behavior.

o. Allow 45 feet curb length per bus, number of buses as determined by the Ed Specs for the specific school.

p. Provide parent/visitor/teacher parking and student parking (high schools only) at locations separate from bus zones and pedestrian traffic. Provide designated space for Maintenance.

q. Roadways and Driveways: The construction will provide paved surfaces as required for vehicular access to the project site and to various functional areas requiring vehicular access, including main entrance, parking areas, and loading and unloading zones.
a. Minimum Widths: Traffic lanes not less than 11 ft (3.35 m) wide.
b. Maximum Slopes: 1:10 (at side slopes of curb cuts)
c. Curbs: Minimum 6 inch barrier curbs at all roadways and driveways.

r. Parking Areas: The construction will provide paved surfaces as required for vehicular parking.
i. Minimum Width of Parking Spaces: 96 in (2.44 m).
ii. Bumpers or Bollards: Located and sized to prevent damage to fixed objects, vehicular access to landscaping, playgrounds, and encroachment on pedestrian walkways. (Wheelstops are acceptable but discouraged.) Concrete benches are preferred.
iii. Parking Signage: As required by code and project program.

s. Walkways, Pedestrian Ramps, and Exterior Stairs: The construction will provide paved surfaces as required for pedestrian movement on the site without damage to landscaping.
i. Minimum Widths: Sized to allow comfortable two-way traffic.
ii. Handrails, Railings, or Protective Walls: Required when pedestrian surfaces are more than 12 in (300 mm) above adjacent grade.
iii. Provide steel nosings on exterior stairs (verify type with owner).

t. Drainage at Retaining Walls or Other Water-Dam Conditions: provide proper drainage at all such conditions.

u. Drainage Swale Inlets: at concrete swale inlets, embed rocks in concrete or provide other barrier to discourage use as a motocross bike or skateboard play area.

v. Provide exterior accessible storage for winter equipment and materials.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

A. SCOPE

1. Protection of existing trees, vegetation, landscaping materials, and site improvements not scheduled for clearing which might be damaged by construction activities. (See attached tree-protection specifications bound hereinafter.)

2. Trimming of existing trees and vegetation as recommended by arborist for protection during construction activities.

3. Clearing and grubbing of stumps, vegetation, debris, rubbish, designated trees, and site improvements. No burning permitted.

4. Topsoil stripping and stockpiling.

5. Temporary erosion control, siltation control, and dust control.

6. Temporary protection of adjacent property, structures, benchmarks, and monuments.

7. Temporary relocation of play structures, fencing, and site improvements scheduled for reuse.

8. Watering of trees and vegetation during construction activities.

9. Removal and legal disposal of cleared materials.

10. Comply with applicable dust control standards of Spokane Regional Clean Air Agency (SRCAA).

B. PRODUCTS

1. Tree protection, erosion control, siltation control, and dust control materials suitable for site conditions.

SAMPLE SPECIFICATIONS

PROTECTION AND PRESERVATION OF EXISTING VEGETATION AND TREES

Contractor shall protect from damage all existing vegetation determined by the Owner to remain and on adjacent property. Contractor shall repair any damage, including that to the adjacent property resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.

1. All trees, not to be removed, shall be flagged with a distinctive colored ribbon. After flagging and prior to commencement of any work, the Contractor shall notify the Owner's representative who will verify that the correct trees are flagged.

2. Flagged trees and other vegetation to remain shall be protected by a temporary 3 foot ht. min. chain link fence. The Contractor shall be responsible for providing temporary fencing as required to protect all existing vegetation to remain. The fencing shall be placed outside the drip line of the tree to be protected. The protective fence shall not be disturbed or removed until all exterior construction has been completed.

3. Contractor shall construct an earthen berm 8" min. height on the uphill side of the protective fence to divert runoff from the construction site to the protected trees. The berm shall be maintained until protective fence is removed from the project site

4. Do not park any vehicles or equipment, nor allow equipment wash-down, nor store any materials, nor dispose of chemicals, petroleum products or other detrimental substances within the fence line protecting the trees. Restrict vehicular traffic to areas outside the drip line of the tree. Restrict foot traffic to prevent excessive compaction of soil over root systems.

5. Protect trees from flame, smoke, paint spray, heat and exhaust from generators, compressors or construction vehicles. The diameter of the fencing shall not be reduced without written instructions from the Owner.

6. Under no circumstances shall the Contractor remove existing trees that are indicated not to be removed.

7. Removal of interfering branches of trees shall not be allowed except as specifically indicated and/or otherwise approved by the Owner's representative.

8. Any tree that is specifically shown to not be removed and/or which is destroyed or damaged during construction operations to the extent that, in the opinion of the Owner, the continued life of the tree is questionable shall be removed by the Contractor at his/her own expense. Removal shall include the tree and stump to 2 ft. below grade. The stump hole shall be backfilled and compacted to 85% modified proctor.

   In addition thereto the trees shall be replaced with trees of the same species and equal size. Replaced trees shall be free of disease, injury and insect infestation, and fully foliaged when in leaf. Replacement trees shall be guaranteed for a period of two years (two growing seasons) after final acceptance. Trees that are not established and flourishing at the end of this period shall be replaced at no additional charge.

9. Trees which cannot be replaced due to unavailability of species or size shall be paid for at the rate of $500.00 per square inch of cross sectional area measured three feet above existing grade for trees up

to and including six (6) inches caliper, and at the rate of $1,000.00 per square inch of cross sectional area measured three feet above existing grade for trees greater than six (6) inches caliper.

10. Contractor shall confine all operations, including storage of materials, to prior approved areas. Delete this section if no tree protection is required.

CONSTRUCTION AROUND PROTECTED TREES

1. Open trenches are not to be routed beneath the over-story of trees that are to be preserved unless impossible to avoid; in which case damage may be reduced by careful placement by hand-digging of trenches to avoid large roots by tunneling under rather than cutting roots greater than 1-1/2" in diameter.

2. Do not cut main lateral roots or tap roots. Roots to be cut shall be pruned cleanly. Protect all exposed roots with moist organic mulch or burlap, backfill as soon as possible.

3. Water shall be applied 2 times a week until the completion of exterior construction.

4. No rototilling or major soil disturbance shall take place within this zone of protection, before, during, or after the construction, unless designated within construction documents.

5. Promptly repair trees damaged by construction within 24 hours.

6. Treatment of damaged trunks, limbs, and roots will conform to ANSI A300-Part 1-1995 pruning standards.

7. All pruning will conform to ANSI A300-Part 1-1995 pruning standards, with the supervision of the Owner's representative, to remove damaged branches and encourage healthy new growth.

   Owner will review completed pruning and direct additional work if it is necessary in his opinion.

8. If at any time the Contractor judges that the protection of a tree designated to be saved is incompatible with work required, or if operations necessary threaten the health of a tree, notify immediately the Owner and do no further work affecting the tree until a written agreement is reached concerning acceptable procedures.

END OF SECTION

SECTION 31 20 00 - EARTHWORK

A. SCOPE

1. Excavation, filling, compaction, and grading for buildings, site improvements, and utilities.
2. Materials for subbase, drainage fill, and backfill for slabs, pavements, and improvements.
3. Rock excavation without blasting unless authorized.
4. Supply of additional materials from offsite if required.
5. Removal and legal disposal of excavated materials.
6. Reconditioning hardpan at lay-down yards and parking areas.

B. QUALITY ASSURANCE

1. Compaction:
   a. Under structures: meet recommendations of geotechnical report.
   b. Under lawns or unpaved areas, 83 to 85 percent maximum density. Do not over-compact planting areas as it inhibits root development, especial with grass.

C. PRODUCTS

1. Subbase Material: meet recommendations of geotechnical report.

2. Drainage Fill: meet recommendations of geotechnical report.

3. Backfill and Fill Materials: meet recommendations of geotechnical report.

4. Sand cushion under slab (and over vapor barrier): do not employ this construction technique. Experience suggests that this sand/vapor-barrier construction traps curing moisture, and directs it slowly through the slab, keeping the moisture level too high to receive flooring adhesives, and causing flooring to delaminate over months and years.

D. INSTALLATION

1. Maximum Slopes:
   a. Slopes with Smooth Pavement: 1:10, unless restricted to vehicular use.
   b. Slopes Covered with Grass: 1:5, unless less than 3 feet (1 m) in height.
   c. Slopes with Pedestrian-Inhibiting Vegetation: 1:1, unless less than 5 feet (1.5 m) in height.
   d. Slopes With No Access From Top: Limited only by structural stability and resistance to erosion.
   e. Side Slopes and Parking Lots: 1/4" in 12" maximum.

END OF SECTION

SECTION 32 12 16 - ASPHALT PAVING

A. SCOPE

1. Hot-Mixed Asphalt Paving Over Prepared Subbase:
   a. Roads.
   b. Parking areas.
   c. Driveways.
   d. Walkways.
   e. Curbs.

B. QUALITY ASSURANCE

1. Meet recommended thicknesses for base and paving per geotechnical recommendation. Ensure added thickness installed for heavy-traffic bus lanes and delivery lanes (garbage trucks, tractor-trailer vehicles, etc.). Minimum thicknesses: 4" crushed rock base, with 2" asphaltic paving.

2. NOTE: In heavy-traffic high-use areas, 6" reinforced concrete is preferred in lieu of asphaltic paving. Verify such areas' extent with owner. Always include dumpster and recycling areas in this high-use category.

3. DO NOT use the following:

   a. River-washed gravel over compacted subbase.
   b. Decorative stone of any kind of a size suitable and tempting for throwing.
   c. Mulch or wood chips.

C. PRODUCTS

1. Asphalt-Aggregate Mixture: Plant-mixed, hot-laid asphalt-aggregate mixture, ASTM D 3515, complying with local DOT and DPW regulations.

2. Herbicide Treatment: Commercial chemical for weed control registered by Environmental Protection Agency and acceptable to authorities having jurisdiction. Meet Washington State Department of Agriculture (WSDA) standards. **NOTE: Notify Department of Agriculture and Owner prior to application of herbicides.**

3. Lane and Parking Area Marking Paint, Yellow Color: Alkyd-resin type, ready-mixed, AASHTO M 248, Type I.

4. Lane and Parking Area Marking Paint, color: single color preferred, or as current regulations require.

END OF SECTION

SECTION 32 13 13 - CONCRETE PAVING

A. SCOPE

1. Cast-in-place concrete paving over prepared sub-base:
   a. Parking areas.
   b. Driveways.
   c. Vehicular entrances.
   d. Walkways.
   e. Curbs.
   f. Mow strips (12” wide each side of fencing; 18” wide next to building).

2. NOTE: In heavy-traffic high-use areas, 6” reinforced concrete is preferred in lieu of asphaltic paving. Verify such areas’ extent with owner. Ensure that sidewalks exposed to this loading are increased in thickness and reinforced.

3. Do not caulk expansion joints.

B. PRODUCTS

1. Concrete: ASTM C 150, Type 1, Portland cement; ASTM C 33, normal weight aggregates; potable water.
   a. Design Mix: 6 sacks per cubic yard
   b. Air Content: 5 to 8 percent.
   c. Finish: Broom finish, with broom strokes perpendicular to traffic direction.

2. Liquid-Membrane Forming and Sealing Curing Compound: ASTM C 309, Type I, Class A.

END OF SECTION

SECTION 32 14 00 - UNIT PAVING

A. SCOPE

1. Generally pavers are not allowed as high-maintenance compared to concrete walks.
   a. Exterior concrete pavers over prepared setting bed are permitted only in specialty applications approved by owner. Examples include special landscaped areas with limited access (Shadle courtyards, for example), historic school sites (where pavers have historic precedent), paver locations where engraving by alumni may be approved by owner, etc.

B. QUALITY ASSURANCE

C. PRODUCTS

1. Use concrete pavers especially manufactured for paver installation. Do not use clay-based brick pavers (unless necessitated by historic preservation or other special circumstances, and then only with owner approval).

END OF SECTION

SECTION 32 18 00 – ATHLETIC AND RECREATIONAL SURFACING

A. SCOPE

1. Playground protective surfacing
2. Athletic paving and surfacing
3. Running track
4. Tennis courts

B. PRODUCTS

1. Playground protective surfacing:
   a. Engineered Wood Fiber (EWF) typical at playground equipment. Equal to Fibar Systems. Include rubber mats at slides, swings and other locations where appropriate. Verify product and materials in advance with owner. Install in accordance with CPSC and ASTM guidelines with proper use zones and protective surfacing under and around each activity. Engineered Wood Fiber at a depth of 12-inches minimum should be used as the protective surfacing (verify depth with current standards).
   b. IPEMA approved rubber mats may also be used in conjunction with the EWF in landing areas such as at slide exits. Use “Dynacushion” or equal product.
   c. Provide weed barrier fabric underlayment at EWF locations, overlap fabric 12” where edges meet.

2. Athletic paving and surfacing:
   a. Verify product and materials in advance with Owner.

3. Running track (high schools):
   a. Polyurethane base mat surfacing on asphalt base. Verify product in advance with Owner.

4. Tennis courts:
   a. Acrylic latex colored surfacing on asphalt base. Verify product in advance with Owner.

END OF SECTION

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

A. SCOPE

1. Chain link fence and gates. NOTE: Use vinyl-coated fabric in special applications. Use wrought-iron fencing in special applications (such as historic preservation projects). USE NO wood board or panel fencing, no aluminized chain link fencing, painted ornamental steel fencing, or extruded aluminum fencing. Vinyl fencing is acceptable for perimeter boundary fencing when required as visual barrier by zoning regulations. Consider use of privacy slats in chain link for some applications—and if acceptable under zoning regulation. Verify all final fencing applications with owner.

B. PRODUCTS

1. Fabric:
   a. Material: Schedule 40 galvanized steel, ASTM A 392, Class 2 finish.
   b. Size: 2 inch mesh, 9 gage steel. (1-3/4" x 1/3/4" mesh at tennis courts.)
   c. Height: 6'-0" minimum (unless otherwise approved by owner).
   d. Selvage: Knuckle/knuckle.

3. Framework: Galvanized steel, ASTM F 1083

4. Foundations: 36" deep concrete, typical.

5. Gates: Swinging type. (Seek owner's approval for wheel gates.)
   a. Width: 12'-0" wide for vehicle access. 4'-0" width for foot traffic service gates. NOTE: For general public access, maze gates wide enough for ADA access are preferred. Provide hold-open feature at gates (or a position where the gate is held open via a mechanical holding device, and does not allow wind to blow gate shut).

5. Framing and Fittings:
   a. End, corner, and pull posts.
   b. Line and intermediate posts.
   c. Gate posts.
   d. Top rail.
   e. Tension wire.
   f. Tie wires.
   g. Top rail required (no exposed selvage with tension wire permitted).
   h. Intermediate rail.
   i. Bottom rail.
   j. Full-height posts and fittings.
   k. See Section 32 13 13 for concrete mow strip requirements.

END OF SECTION

SECTION 32 80 00 - IRRIGATION SYSTEMS

A. SCOPE

1. Irrigation system pipe, fittings, valves, sprinklers, and automatic controls.

B. QUALITY ASSURANCE

1. Irrigation system shall be designed to water entire system in 6 hours with proper precipitation rate to provide 1" of precipitation watering three days a week. NO DRIP SYSTEMS ALLOWED. Coverage shall be 5% beyond head-to-head (in windy conditions).

2. Include requirement for warranty, maintenance manuals and record drawings consistent with Division 1 requirements.
   a. Contractor shall warranty work and parts for a period of one year beginning on the date of the final "Punch List" walk-thru. Any repairs or replacements deemed to be the contractor's responsibility shall be remedied immediately with originally-specified material and to the owner's satisfaction and at no cost to the owner. The contractor shall replace material within 15 days of written notice from owner's representative. INCLUDE letter of warranty consistent with these terms.

   b. An extra print of irrigation plans will be furnished to the contractor on which he shall indicate, on a daily basis, all deviations in the plans of the locations of piping, valves or other equipment. The contractor shall also indicate any discovered utilities on these plans.

   c. Upon completion of this project, and prior to final payment, the contractor shall return to the owner the Record Drawings, ("as-builts"), irrigation plans, at the same scale as originally published, and in CD Auto Cad file format.

   d. Contractor shall supply two hermetically sealed reproductions of record drawings to fit an eleven by seventeen format. All zones will be color coded for ease of identification. One copy shall be mounted on the wall next to the controller and one copy given to SPS plumbing dept.

   f. Certified Tester shall test the "Backflow Prevention" devices per local City Water Department requirements and the successful results shall be forwarded to the owner.

3. NOTE THE FOLLOWING: Existing Site Conditions: Locations of existing utilities and other improvements shown on the drawings are approximate. Existing conditions shall be verified and should any utilities be encountered during construction, the contractor shall indicate them on the "Record Drawings" with coordinated dimensions from fixed above ground structures and as per depth, size and type of material. The contractor shall always protect existing utilities.

4. Include requirement for first winterization, and first spring start-up.

C. SUBMITTALS

1. Prior to starting any work, the contractor shall present for approval by the owner's representative, three (3) packages of the following information. The submittals shall be neatly bound with a cover letter on the company's letterhead, indicating the contents and purpose of the submittals. All items shall be provided within one submittal package.
   a. Project name and location.
   b. Job site foreman's name that will be responsible for the project at all times.

c. Table of Contents listing all material and equipment to be used on the project indicating brand names, model numbers and or shop drawings. Cut sheets of all the following landscape irrigation items are required.
   i. Automatic Controller
   ii. Backflow preventer
   iii. Quick coupler
   iv. Isolation gate valve
   v. Pipe:
   vi. Mainline
   vii. Lateral
   viii. Sleeves
   ix. Unions and fittings Spray heads Automatic control valves
   x. Control wire
   xi. Wire connectors
   xii. Valve boxes and concrete vaults
   xiii. Metallic identification ribbon

d. NOTE; all substitutions for proposed products shall be called out in the Table of Contents.

D. PRODUCTS

1. Pressure Pipe: PVC plastic pipe, ASTM D 1785, Schedule 40. DO NOT use copper tubing or polyethylene pipe. Use PVC solvent cement compatible with PVC pipe. (NO quick-drying cement permitted.)

2. Circuit Pipe: PVC plastic pipe, ASTM D 1785, Schedule 40. DO NOT use copper tubing or polyethylene pipe. Use PVC solvent cement compatible with PVC pipe. (NO quick-drying cement permitted.)

3. Pipe Fittings for PVC Pipe: ASTM D 2464 socket fittings; ASTM D 2466 threaded fittings. Use PVC solvent cement compatible with PVC pipe. (NO quick-drying cement permitted.)

4. Pipe Fittings for Galvanized Steel Pipe: ANSI B16.3 galvanized malleable-iron screwed fittings.

5. Valves, Molded Plastic Automatic Diaphragm Type: Rainbird Sprinkler Mfg. Corp., or Irritrol Systems.
   a. Manual Circuit Valves: 24 Volt DC.
   b. Master Control Valve: equal to Rainbird 300-BPE
   c. NO BATTERY-OPERATED VALVES PERMITTED.

6. Sleeves: All PVC ‘sleeve’ pipe under pavements and roadways shall be Class 200, ASTM D 1784 or 5. ALL SLEEVES SHALL BE 6” DIAMETER or if not called out a minimum of twice the size as the inserted pipe. LOW VOLTAGE WIRING SHALL BE PLACED IN MINIMUM 3” DIAMETER SLEEVE (all by itself without water piping), unless otherwise noted. All sleeves shall extend a minimum 12” beyond paved edge.

7. Sprinklers: Rainbird Sprinkler Mfg. Corp, or Hunter Industries (stream rotors only)
   a. Pop-up spray type with fixed pattern: RainBird Series 1800, commercial grade
   b. Pop-up rotary spray type, gear drive RainBird Series 5000, 7000 and 8000, commercial grade; Hunter Series I-20 Ultra with blue nozzles, I-25 and I-40.
   c. Above-ground rotary: impact drive type.
   d. Do not use Netafim.

8. Quick-coupler: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered locking cap; hose swivel with ASME B1.20.7, ¾ - 11.5 threads for garden hose on outlet; and operating key.
   a. Manufacturer: RainBird Sprinkler Manufacturing Corp.

9. Backflow Preventer: WATTS, Model 007M1QT unless otherwise approved by owner.

10. Valve Box:
   a. Polymer type rectangular 15" x 21.5" x 12" deep with lock down cover with lettering “IRRIGATION” on top. Round valve boxes, 10" diameter top access, shall be used for quick-coupler or main-line isolation valves only. (Armorcast Products, Carson Industries, or Ametek Mfg.)

   b. For Valve Boxes at athletic fields, use detail following this section. Vaults must be kept out of play areas of playfields. Locations are to be shown on drawings and verified with Owner and Architect in the field prior to construction.

11. Automatic Control System:
   a. Manufacturer: Shall be ‘CALSENSE’ unless otherwise noted on irrigation legend and shall be installed per notes and details. All ‘CALSENSE’ equipment installation shall be inspected by a Calsense field service representative.

   b. The ‘CALSENSE’ controller shall include the following:
      i. One (1) Calsense Ethernet ready controller with remote board (model #ET2000-??-EN-RR). Verify model number for unique site requirements with the School District Plumbing Foreman.
      ii. One (1) Calsense heavy duty surge protection package (model #TPP).
      iii. One (1) Calsense Flow Sensor (model #FM2)
      iv. One (1) Calsense remote transceiver with carrying case (model #RR-TRAN).
      v. One (1) Calsense background mounting assembly (model #SSBB-2432).

12. Control Wire: 24 volt solid wire, UF No. 14 AWG minimum, UL approved for direct burial in ground. N0. 14 wire for up to 1000’ and No. 12 wire above 1000’ length. Use color for lead and white for common. Exposed control wire to the controller shall only be placed in Electrical Metallic Tubing (EMT) conduit for interior building locations and PVC pipe for exterior building locations.

13. Commissioning: Coordinate with owner’s Commissioning Agent and Division 1 requirements.

E. INSTALLATION:

1. Under pavement: All pipe placed under pavement shall be within sleeves.
2. Cover over mainline and control wires - 24” deep
3. Cover over lateral line - 18” deep
4. Cover over sleeves (all lines) - 24” deep from top of base rock under roads (bottom of pavement). Sleeves under sidewalks shall match proposed mainline and lateral depths.
5. Trenching: All trenches shall be open, vertical construction, sufficiently wide enough to provide ample working space and at depths as specified. Trenching around roots shall be hand excavated to pipe depth when roots of 2 inches in diameter or greater are encountered. Trench width shall be 4 inches minimum or 1-1/2 times the diameter of the pipe or whichever is wider.

6. Backfill: All work must be inspected, tested and approved by the owner's representative prior to backfilling. Backfill shall be thoroughly tamped to 80% to 85% modified proctor. Pipe shall have a firm, uniform bearing for the entire length of each pipeline to prevent uneven settlement. Wedging or blocking of pipe shall not be permitted. All backfill in turf areas shall proceed as follows: (No Deviations): Place first lift (1/2 of trench depth) in trench and flood to settle. Final lift shall be placed and compacted even with finish grade. The contractor shall encase all PVC pipe within a 3" layer in all directions, with clean sand before commencing with the backfill process.
7. Plastic pipe and fittings: solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where threaded connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic brush. Primer and solvent shall be applied so that a small, clean bead of same shall be visible. Other than this type of treatment shall be considered an "unfit" installation and shall be requested to do-over. Make all connections between plastic pipe and metal valves or pipe with Teflon tape using plastic male adapters.
8. Pipe Assembly: pipe may be assembled and welded outside of the trench. Snake pipe from side to side in trench bottom to allow for expansion and contraction. ALL MARKINGS SHALL FACE UP FOR EASE OF READING.
9. Sprinkler heads and quick coupler valves: Locate as shown on the drawings, except where existing conditions prohibit, or to better suit field conditions, and to achieve as good, or better, coverage under the same conditions. Change without the owner's representative's consent is subject to disapproval and may require replacement at no extra charge to the owner. Sprinkler heads and quick couplers will be installed with swing joints. ~~Swing joints will consist of Schedule 80 PVC nipples and three galvanized elbows~~. Sprinkler head swing joint shall consist of three schedule 40 PVC street elbows and a schedule 80 PVC nipple. QC swing joint shall consist of galvanized elbows and nipple. Sprinkler heads will have 2" clearance between heads and side walks or mow strips. No sprinkler heads will be allowed on curb side of parking strips along any street.
10. Flushing: Remove end of heads and operate system full pressure until all rust, scale and sand is removed. Divert water to prevent ponding or damage to finished work.
11. Backflow Preventer: Locate in vault (unless impossible, verify with owner). Install level, plumb and in compliance with local codes.
12. Valve boxes shall be placed in a neat, orderly fashion, no closer than 12" apart and shall be placed with consideration to mowing and upkeep on adjacent areas (i.e., not on sloped planted areas).
13. Automatic Control Valves: Valve shall be installed with swing joint consisting of schedule 80 nipples and galvanized elbows. Install remote control valves within landscape areas. DO NOT piggy-back valves. Control valves shall be no deeper than 18" from top of pipe leaving valve to finished grade. Valve shall be identified with brass tag with zone number attached to valve. Tee for valve will be taken off the side of the main line (not the top) and the tee will be large enough to use a slip-by threaded bushing instead of a tapped tee. Place within 24" to paved edges of sidewalks, roads or parking lot curbs in a neat and orderly fashion. Valve boxes shall be installed so that the box cover will follow the proposed slopes and contours. (flush with slopes) This may require more than one-extension box. This will occur in all turf grass areas only not in shrub beds or groundcover areas.
14. No valve boxes shall be allowed in the bottom or within 18" of the bottom of swales.
15. Automatic controller: Locate and install as shown on drawing and as directed by owner's representative. A reduced copy of the "Record Drawings" shall be laminated and adhered to the cabinet door for ease of viewing. The copy shall be colored to indicate which control valve operates which lateral line.
16. Control wire: Connect remote control valves to controller in sequence as shown on drawings.
    a. Install control wires at same depth as main line pipe, and lay to the side of main line. Provide 24" minimum, looped slack wire within each control valve box and at 100' intervals, and snake wires in trench to allow for contraction of wires. Tie wires

in bundles every 10'. Contractor shall lay a spare control wire throughout the irrigation system and loop common wire at every control valve. The spare wire can be orange, yellow or other unique color for easy identification.

b. All splices are to be in valve boxes only. Connect wire together with approved connector only within valve boxes. No direct burial of wire connections.

c. Seal connection with approved sealing pack (see details). The path of the control wire shall be indicated on the "Record Drawings," by the landscape contractor. Exposed control wire to the controller shall be placed in an Electrical Metallic Tubing (EMT) for interior building locations and PVC Sch. 40 pipe for exterior building locations.

d. All control wire shall be labeled within the controller at the point of each station connection. Identify both ends of each wire with station number to match sprinkler diagram. Wire identifications shall be located adjacent to connection point at each end and easily visible. Marking system shall be 'BRADY LAB PAL' with ½" labels. Each label shall read: ZONE – 1, ZONE – 2, ZONE – 3 etc.

e. Seal connection will be 3M product #3570, Spears DS-100w/DS300 sealant, splice connector or an approved equal.

17. Hydrostatic Tests:

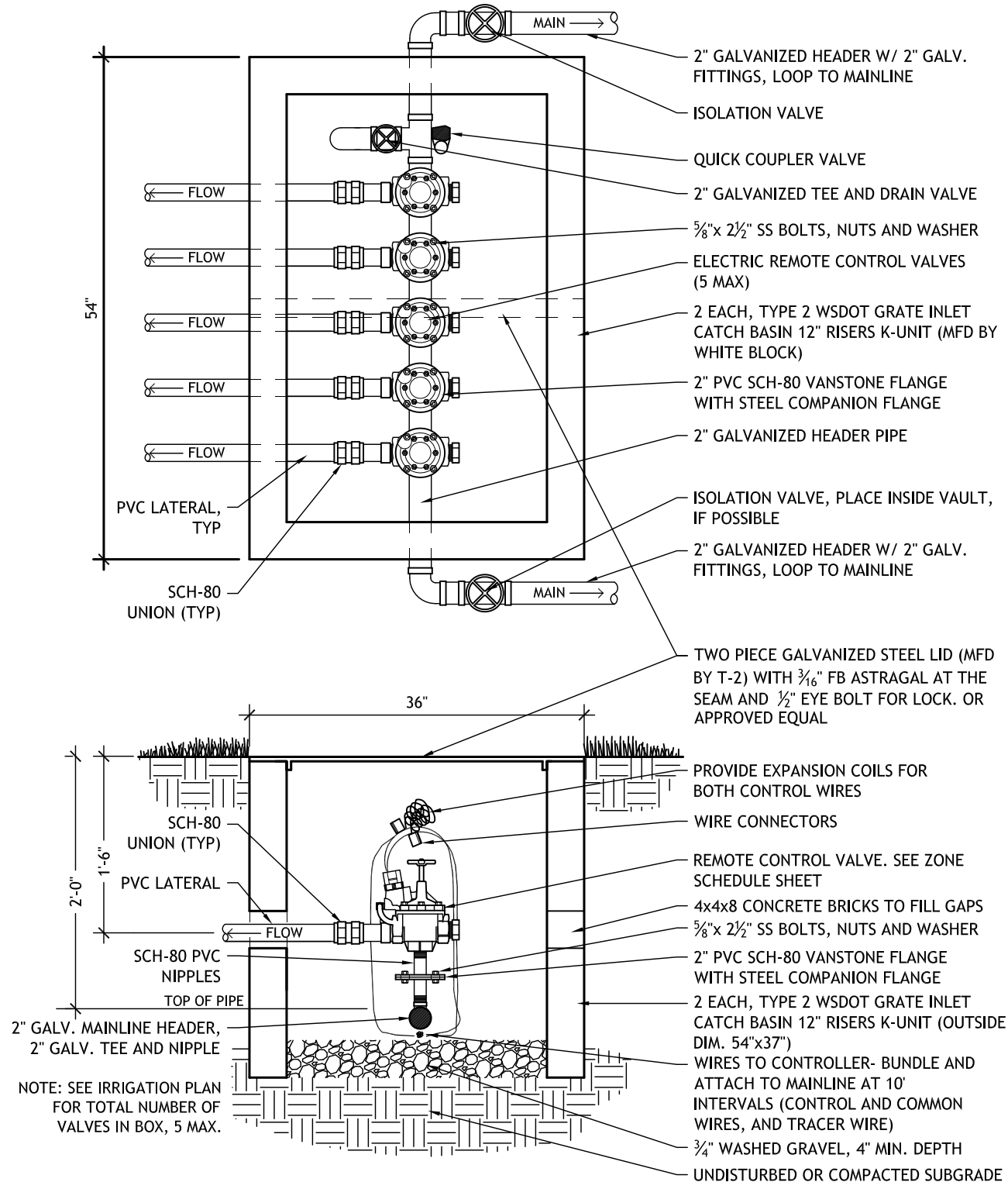
a. Request the presence of the owner's representative at least forty-eight (48) hours in advance of testing.

b. Testing shall be accomplished under this section in the presence of the owner's representative. The backflow preventer shall be tested and approved by a certified contractor as to its working condition and the certificate shall be presented to the owner.

c. Center load piping with backfill to prevent arching or slipping under pressure.

d. Apply continuous water pressure of 100 psi after welded plastic joints have cured at least 24 hours, and with the risers capped as follows: All main-lines shall be tested for two hours. All laterals shall be tested with static pressure only for 1 hour. Repair all defects.

END OF SECTION



VALVE BOX/MULTI REMOTE CONTROL VALVES

SCALE: NTS

SECTION 32 90 00 - PLANTING

A. SCOPE

1. Landscape Work:
   a. Trees, shrubs, and ground cover.
   b. Finish grading and lawns.
   c. Topsoil and soil amendments.
   d. Initial maintenance of landscape materials.

B. QUALITY ASSURANCE

1. Balled and burlapped plants and trees: Graded to American Standard for Nursery Stock, ANSI Z60.1. Minimum caliper: two inches (2").

2. Testing: Laboratory testing for suitable soil amendments and fertilizer.

3. Lawn (seed ~~and sod~~): Require full maintenance through course of one year's season. Include mowing, fertilizing and irrigation. Extend maintenance period, if necessary, until turf is established.

4. Lawn (sod): Require full maintenance through October 15th or for 30 days, as determined per project, verify with Owner.

5. Plant selection: Include no fruit-bearing trees. Comply with City of Spokane (or Spokane County, as applicable) tree-planting regulations, but select trees that minimize leaf production and clean-up. Review plant selection in advance with owner.

C. PRODUCTS

1. Plant Materials:
   a. Acceptable deciduous trees.
   b. Acceptable evergreen shrubs:
      i. Boxwood.
      ii. Holly.
      iii. Juniper.
      iv. Rhododendron. Prefer dwarf variety for security purposes.
      v. Other shrubs as may be acceptable to District.
   c. Acceptable deciduous shrubs:
      i. Verify with owner, many are acceptable.
      ii. DO NOT use Russian Olive, or Scotch Broom.
      iii. Avoid shrubs and trees adjacent to building.
   d. Acceptable vines:
      i. Clematis.
      ii. Honeysuckle.
      iii. Wisteria.
      iv. Verify others with owner.
   e. Acceptable evergreen ground covers:
      i. Euonymus fortunei (wintercreeper).
      ii. Juniper.
      iii. Vinca minor (periwinkle).
      iv. Pachysandra.
      v. Other plants as may be acceptable to owner.
      vi. DO NOT use English ivy.

f. Acceptable shade trees:
   i. Gingko.
   ii. Honey locust.
   iii. Maple.
   iv. Other trees as may be acceptable to District. Coordinate with zoning regulations' requirements. DO NOT use Horse Chestnut, Poplar, Cottonwood, Alder or Elm.

g. Acceptable specimen trees:
   i. Birch, ornamental.
   ii. Honey locust.
   iii. Maple.
   iv. Other trees as may be acceptable to District. Coordinate with zoning regulations' requirements. DO NOT use Horse Chestnut, Poplar, Cottonwood, Alder

2. Lawns: Sod, strongly rooted, 2 years old. If seeded, use drill seeding method, two passes. Use a mix of bluegrass, fine fescue and perennial ryegrass. DO NOT use single-species turf seed.

3. Topsoil: Fertile, friable topsoil from offsite.

4. Landscape Materials:
   a. Gravel: USE NO exposed rounded riverbed gravel.
   b. Anti-Erosion Mulch: use ground or shredded bark, chipped bark, or wood over non-woven polypropylene or polyester fabric. DO NOT use pine needles, nut shells of any kind, peat moss, rounded riverbed gravel, crushed/chipped marble or granite.
   c. Filtration Fabric: Water permeable fiberglass or polypropylene fabric.
   d. Wrapping: Tree-wrap tape.
   e. Stakes and Guys: New hardwood, treated softwood, or redwood.

5. Edging Materials:
   a. Acceptable: concrete, extruded aluminum or polyethylene plastic.
   b. DO NOT use brick, wood, or galvanized steel (painted or unpainted).

D. INSTALLATION:

1. Require complete removal of wire cages and unwrap burlap from all trees and shrubs prior to planting, based on data gathered from 20-year study.

2. Avoid plants and trees close to building.

3. Trees planted near security cameras and exterior lights must be coordinated with electrical engineer and approved by District.

4. ALL seeding MUST be complete by September 1st.

END OF SECTION

SECTION 33 11 00 - WATER UTILITY DISTRIBUTION PIPING

A. SCOPE

1. Water service system and piping, accessories, and appurtenances for domestic water and fire service. NOTE: verify standards of other water purveyors if not in City of Spokane. Verify adequate water pressure or provide booster pumps.

B. QUALITY CONTROL

1. Testing and Inspection Service: Ensure that contractor coordinates inspection and testing with the City of Spokane (or other purveyor at project site) through acceptance, and shall be responsible for all inspection and testing fees.

   Ensure that contractor provides a trench excavation safety system per chapter 39.04 RCW meeting the provisions of the Washington Safety and Health Act, Chapter 49.17 RCW, for all trenches in excess of four (4) feet deep in compliance with OSHA and WISHA.

C. PRODUCTS

1. Metal Pipe:
   a. All two or three-inch water pipe and fittings shall be to City of Spokane Water Department Standards conforming to ASTM A-53 galvanized steel pipe. All water pipe up to 1 ½ inch to be seamless, Type "K" copper with flared fittings. All water pipe four inches and larger to be ductile iron with push-on joints conforming to AWWA C151, Class 50 minimum. Fittings for pipes four inches and larger to be ductile or cast iron conforming to AWWA C110 or C153. Pipes shall have restrained joints. The restrained joint system shall be of a type approved by the City of Spokane Water Department.

2. PVC Pipe 4 Inches and Larger: AWWA C900, Class 150.
   a. Gaskets: ASTM F 477, elastomeric seal.
   b. PVC Couplings and Fittings: AWWA C900 with ASTM F 477 elastomeric seal gaskets.
   c. Ductile Iron and Cast Iron Fittings: AWWA C110, 250 psi pressure rating; AWWA C104 cement mortar lining; AWWA C111 rubber gaskets.

3. Valves:
   a. Gate valves to be resilient seat valves meeting the requirements of AWWA C509, Class 200, unless otherwise required by City of Spokane. Curb stop valves to Meuller brand as approved by City of Spokane Water Department. All valves to have cast or ductile iron adjustable valve boxes with the word "WATER" cast into the cover. All gate valves shall have non-rising stems and 2-inch square operating nuts and shall open clockwise.

      Post indicator valves shall be either flanged end or have mechanical joint connections to pipeline. Must conform to FM and UL standards. Shall be of double revolving DISC. Underground valves shall have 2" square wrench nut. All parking lot valves shall be provided with four (4) –6" bollards for traffic protection.

4. Fire Hydrants: Install hydrants as detailed. Refer to City of Spokane Standard Specifications, Section 9-30.5 and Standard Plan Y-101. Hydrant shall be restrained from the main to the hydrant.

5. Backflow Preventer: Backflow preventers are to be provided and installed by the Contractor. Contractor is responsible for any fees associated with the permitting and installation of the backflow preventers. NOTE: downstream of meter provide two (2) double check valves installed in parallel on domestic water supply (for testing of backflow preventers).

6. Vault: Refer City specs. Size to include Electrical Breaker. Locate manhole access in hard surface area (not in playfields).

END OF SECTION

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES
SECTION 33 40 00 – STORM DRAINAGE UTILITIES

A. SCOPE

1. Storm sewerage system piping, manholes, catch basins, and tap connections (separate section for Storm Sewerage encouraged).
2. Sanitary sewerage system piping and manholes (separate section for Sanitary Sewerage encouraged).

B. PRODUCTS

1. Pipe and Fittings:
   a. PVC Sewer Pipe and Fittings: ASTM C 478 (478M), per City of Spokane standards.

2. Manholes:
   a. Precast Concrete Manholes: ASTM C 478, per City of Spokane standards.
   b. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron with lettering, per City of Spokane standards. Use vandal-proof bolts on all surface covers.
   c. Vaults: Provide ladder accessibility with ladder rungs within 12” of finish top and bottom. Provide adequate access and interior room to remove/replace double check valves.

3. Cleanouts:
   a. Cast-iron, per City of Spokane standards.
   b. PVC risers: do not use gasketed joints.
   c. Cleanouts in grass: to be poured in small concrete slab, flush with surrounding grade.
   d. Use vandal-proof bolts on all surface covers.

4. Catch Basins for Storm Sewerage System:
   a. Precast Concrete Catch Basins: ASTM C 478 or ASTM C 858, , per City of Spokane standards.
   b. Catch Basin Frames and Grates: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron, per City of Spokane standards.
   c. Curb Inlets: meet City of Spokane standards.

5. Dry Wells for Storm Sewerage System: Meet City of Spokane standards.

6. Trench Drains for Storm Sewerage System: Interlocking precast polymer concrete modular units with grates, channel caps, and related accessories. Secure grates with vandal-proof bolts. Use heavy-traffic rated covers where appropriate.

7. Identification: Metallic-lined plastic underground warning tapes.

END OF SECTION