TECHNICAL SPECIFICATIONS

AND

STANDARDS

for

LITTLETON PUBLIC SCHOOLS

Prepared By

Property Management Services Department

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Conditions of the Contract

Specifications:

Division 02 - Sitework

02070 – SELECTIVE DEMOLITION –

Include salvage, demolition, disposition and/or removal from site of certain existing objectionable structures, elements, items or materials not considered conducive nor desirable to remain or become part of new or remodel work.

02100 – SITE PREPARATION –

Include clearing, grubbing, and tree, shrub, and sod removal or relocation as per instructions by **LPS** Property Management Services Department**;** stockpiling of reusable topsoil and squeegee; protection of trees, shrubs and groundcovers remaining on job site and adjacent properties.

A – **ROTOTILL** 12" using topsoil and sterilized compost in planters and lawn areas.

02200 – EARTHWORK –

Include site grading, rock removal, excavation, trenching, backfilling, granular fill, compacting, and finish grading.

02385 – DRILLED CAISSONS –

Include, as necessary: excavation, drilling, casing, concreting of shafts for drilled piers; provision of steel casings, reinforcing, anchor bolts, dewatering, disposal of excavated materials, and cleaning of loose debris from bottom of excavation; provide unit prices for extra charges or credit for caissoning below or above established bid depth elevation(s). Suitable bearing elevation(s) to be confirmed during drilling by Soils Engineer.

02390 – DRILLED FOOTINGS –

Include, as necessary: excavation, drilling, casing, concreting of shafts for drilled footings; provision of steel casings, reinforcing, anchor bolts, dewatering, disposal of excavated materials, and cleaning of loose debris from bottom of excavation; provide unit prices for extra charges or credit for footings work below or above established bid depth elevation(s). Suitable bearing elevation to be confirmed during drilling by Soils Engineer.

02500 – PAVING AND SURFACING –

Include walks, circulation and parking paving, and associated accessories. Parking areas, tennis courts, drives, sidewalks, and other exterior flatwork shall be placed on nonexpansive soils as recommended, selected, and approved by Soils Engineer.

A – **PARKING AREAS** are required for faculty, administrative staff, visitors, maintenance vehicles, and high school students. Space(s) may be provided 50-50, standard to compact size; however, standard size preferred throughout. Approved signage must be provided for handicap spaces.

B – **SERVICE TRUCK TRAFFIC** should be developed for each site and kept separate from other traffic and parking. Provisions shall be made for turnaround immediately adjacent to unloading area(s) and allowance(s) for deliveries and pickups as follows:

01 – **DAILY PICKUP** of trash. Include dumpster or roll-off location and thickened, reinforced concrete slab on compacted subsoil to carry loaded container and truck without cracking.

02 – **WEEKLY DELIVERY** of school and custodial supplies.

03 – **SUPPLIER** deliveries on occasional basis.

04 – **FOOD SERVICE** supply to Kitchen.

05 - **SPACE** for one **LPS** Property Management Services Department.

C – **ACCESS ROADS:**

01 – **MINIMUM** 16' wide for one-way traffic.

02 – **MINIMUM** 24' wide for two-way traffic.

03 – **SIGNED AND PAINTED** for "NO PARKING ALLOWED."

D – **CONCRETE CURB AND GUTTER** – Typically 6" vertical curb with 24" gutter pan; "Hollywood" type in areas approved acceptable by **LPS** Property Management Services Department.

E – **CONCRETE WALKS** – Wood float medium broom finish, sealed, 6" thick steel wire fabric-reinforced concrete slabs (8" thick unreinforced) on minimum 3" thick compacted granular fill on compacted **sterilized** earth subgrade; 8'0" preferred width, 6'0" absolute minimum; location(s) most advantageous to shortcuts for student use to and from playgrounds, streets, and parking.

F – **ASPHALTIC CONCRETE PAVING** – Minimum 2" compacted asphaltic concrete granular wearing surface on prime coat over minimum 6" compacted granular base course on compacted **sterilized** earth subgrade for **automobile parking areas;** minimum 3" compacted asphaltic concrete granular wearing surface on prime coat on minimum 8" compacted granular base course on compacted **sterilized** earth subgrade for **service and access roads.** Appropriate **full-depth asphalt** will be considered as an Alternative by **LPS** Property Management Services Department**.**

G – **CONCRETE PAVING** – Wood float medium broom finish, sealed, minimum 8" thick steel rod-reinforced concrete slabs (minimum 6" reinforced concrete in refuse disposal areas) on minimum 4" thick compacted granular fill on compacted **sterilized** earth subgrade as determined by **A/E** or **DBT.**

H – **STRIPING AND STENCILING** – Two coats **white** or **yellow** traffic paint as specified.

I – **WHEELSTOPS** – Minimum 6" x 6" x 6'0" precast concrete curbs, with driven 5/8" round by 2'0" long deformed steel reinforcing rod anchors at each end; provide wherever parking abuts curbless walks and landscape termination(s).

02505 –VEHICULAR TRAFFIC –

Bus and auto loading and unloading shall be developed on perimeter of site(s). Student loading and unloading are from right-hand side of bus. **CROSS-TRAFFIC FLOW BETWEEN CARS, BUSES AND STUDENTS IS NOT ACCEPTABLE.**

02515 – UNIT PAVERS –

Material(s), thickness(es), size(s), shape(s), color(s), location(s), pattern(s), finish(es), waterproofing(s), bedding(s), coating(s), compliance(s), protective(s), grout, and mortar as determined by **A/E** or **DBT** with **LPS** Property Management Services Department approval.

02600 – PIPED UTILITIES –

Underground water, natural gas, sanitary and waste service, distribution and transmission systems as per applicable code(s) and public utility provider(s).

02700 – DRAINAGE –

Dewatering, foundation and underslab drainage systems as required by Soils Investigation Report(s). Site drainage preferably will be surface runoff, with drainage to basins and inlets where available or established to area drains; corrugated metal pipe culvert permitted if property entry is off frontage road.

A – **PARTICULAR ATTENTION** shall be given to ground water, including seasonal fluctuations and surface water.

B – **WEATHER AND NATURAL CHARACTERISTICS** of the site shall be considered, especially wind and soil conditions. A drainage study shall be submitted to **LPS** Property Management Services Department for approval and acceptance prior to finalizing site layout. Study shall encompass flow, retention, and dispersal of water to and from the site.

C – **POSITIVE DRAINAGE** shall be provided away from building(s). Consideration shall be given to discharging roof drains into a collector system. Where roof drains discharge onto site, set at base of bank, not on top. Discharges shall not cross over sidewalks or in close proximity to building parking area(s), and shall be away from building(s).

D – **LPS STANDARDS:**

01 – **SLOPES ADJACENT TO BUILDING(S)** – Minimum 1:5; maximum 1:2. (Or as approved by **LPS** Property Management Services Department at existing facilities where the minimum slope is not achievable.)

02 – **SLOPES NOT ADJACENT TO BUILDING(S)** – Minimum 2:100; maximum 1:4; no flat area(s).

03 – **BUILDING FLOOR(S)** shall be minimum 7" above surrounding finish grades; ramps shall slope to top of walks.

04 – **BERMS** will be permitted only with **LPS** Property Management Services Department approval and acceptance.

02705 – DRAINAGE AND DUST CONTROL –

Contractor(s) shall adhere to City of Littleton, Arapahoe County, and State of Colorado regulations for erosion and fugitive dust control during construction. Proper work sequencing is responsibility of Contractor(s) to prevent erosion damage to work performed under the Construction Contract, to existing site improvements, and to adjoining properties.

02780 – POWER AND COMMUNICATION –

Underground electrical, telephone, and cable service, supports and distribution as per applicable code(s) and public utility provider(s).

02800 – IRRIGATION SYSTEM(S) –

Provide **underground** automatic sprinkler system utilizing Rainbird heads, controllers and valves. PVC mainline piping of 160 psi gained with complete bell joints; joints with clean coat, then special glue; plastic pipe laterals with stainless steel clamps; no swing joints. Install Maxicom CCU clocks for all new systems.

02831 – SECURITY FENCE AND GATES –

Chain-link type with manual operating and lockable swinging gate(s), galvanized fabric (minimum 11 gauge), posts, bracing and hardware. Vehicle gates must be 10' across; two 5' gates are acceptable.

02843 – BICYCLE RACKS –

Brandir International RIBBON RACK model RB-7 or **LPS** Property Management Services approved equivalent, hot dipped galvanized per **ASTM A53** Spec for Pipe; Steel, Black, and Hot Dipped, Zinc-Coated Welded and Seamless, Schedule 40 pipe 2.375" o.d. by .154" wall; anchored as necessary against vandalism or theft.

02850 – SIGNS, SIGNALS, MARKINGS -

on school property shall conform to "Uniform Traffic Control Device Manual" published by Colorado Department of Highways, Planning, and Research Division, and **LPS** sign standards. Signage(s) shall be approved in advance by **LPS** Property Management Services Department.

02860 – PLAYFIELDS –

A – **FOR PROTECTION OF CHILDREN** avoid the following:

01 – **Steep Slope(s)** – Maximum 1' in 50' unless sodded.

02 – **Open Drain Swales** across Playgrounds.

03 – **Retaining Walls**

B – **PROVIDE MEANS** to exclude autos, buses, trucks and motor scooters from playground area(s).

C – **PROVIDE PROTECTED ACCESS WAYS** at normal lines of pedestrian traffic.

D – **PROVIDE ACCESS** for sweepers and snow removal equipment to playfields, and minimum 16'-wide access from major street(s) for fire trucks.

02900 – LANDSCAPING –

Relocate salvageable trees and shrubs. Provide new trees, shrubs, plants, grass or sod where existing will be contaminated or destroyed; include topsoil, soil preparation, fine grading in new planting areas, fertilizing, planting, guying, and staking; maintenance through one-year guaranty/warranty period.

A – **TOPSOIL** – Use good existing soil as available on-site; off-site material: sandy loam, ripped 4" to 6" after spreading; minimum pH factor 7; free from subsoil stones, stumps, roots, weeds, clay lumps and debris over 1" diameter.

01 – **ATHLETIC FIELDS** – 8" deep with less than 20 percent clay; 3" per hour permeability desirable.

B – **SOIL AMENITIES:**

01 – **COMPOST** – Well-rotted, unleached, no animal manure/fertilizer, and reasonably free from shavings, sawdust, refuse and harmful materials.

02 – **PEAT HUMUS** – Shredded peat, low mineral and wood content, minimum 50 percent decomposed organic matter by weight, oven dry.

03 – **SUPERPHOSPHATE** – Soluble mixture of treated minerals; 20 percent available phoric acid.

04 – **COMMERCIAL FERTILIZER** – Neutral character with some elements derived from organic sources.

Spring Application Formula: 28-7-7-65-3FE (50% nitrogen from sulfur-coated urea).

Fall Application Formula: 12-11-11-55-3FE (quick-release nitrogen).

05 – **PLANT BED MULCH** – Clean "chipper chip," no twigs more than 4" long nor greater than 1/3" diameter.

C – **SOD** – Strongly rooted **2/3 Kentucky Blue & 1/3 Pern. Rye, or 2/3 Touchdown & 1/3 Pern Rye** for typical lawn areas; Ryes may be included for athletic fields, if approved in advance by **LPS** Property Management Services Department; not less than two years old, free of weeds and undesirable native grasses; rolls minimum 1" thickness; free of holes; sufficient density to prevent tearing or stretching while unrolling.

01 – **HILL AND PERIMETER AREAS** above 1' in 3' slope may be natural grass.

D – **MISCELLANEOUS MATERIALS:**

01 – **WRAPPING** – Tree-wrap tape not less than 4" wide, designed to prevent sun scald and dehydration, extending above guy-wire height. Include a plastic tube slit down one side and fit over tree trunk to prohibit infestation by bugs.

02 – **WOOD STAKES & GUYS** – Provide in accordance with good practice.

E – **EXCAVATION FOR TREES AND SHRUBS:**

01 – **EXCAVATE** pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center for proper drainage.

02 – **MAKE EXCAVATIONS** for balled-and-burlap or container-grown stock at least twice as wide as ball diameter; ball to rest on unexcavated or compacted subsoil. Do not over-excavate planting pit depth.

03 – **FOR CONTAINER GROWN STOCK,** excavate as specified for balled-and-burlap wrapped stock, except conform to container width and depth. Cut root balls vertically from top to bottom 1" into side in at least three locations around the ball.

04 – **DISPOSE** off-site all unacceptable subsoils removed from landscape grading and excavations.

05 – **MIX** two parts topsoil to one part each of peat and manure. Use for setting and filling all plants where existing soil is unacceptable for backfill.

06 – **WHERE RUBBLE FILL IS ENCOUNTERED,** prepare planting pits properly by removal of rubble or other acceptable methods.

F – **MECHANICAL SPADE PLANTING** – Larger trees and shrubs may be planted by means of mechanical spade equipment at Contractor's option. Larger plants being moved from existing locations to new locations must be transplanted by this method. Use equipment that will dig, carry, and replant with the same unit. Equipment size must be adequate for size of plant and not less than 8" of space diameter at 15" of depth per caliper inch of trunk diameter. Contractor shall assume responsibility for contacting "Blue Stakes" and obtaining underground public utility locations prior to excavating.

G – **SODDING NEW LAWNS** – Area(s) to be sodded shall be fine graded and raked to meet **LPS** Property Management Services Department approved finish grade(s). Where sod adjoins paved areas, surface of sodded lawn shall be approximately 3/4" below pavement surface. Uniform grades shall be established between paving and other established elevations. Coarse soil lumps, rocks over 1/2" diameter, roots and weeds shall be removed. Surface of ground shall be firm and smooth and of fine texture immediately before placing sod. Sod shall not contain more than two percent other grasses and weeds, and shall be free of objectionable weeds such as crabgrass, bentgrass, tall fescues, clover, dandelions, plantain, thistle, bindweed, etc.

01 – **LAY SOD** within 24 hours from time of stripping. Do not plant dormant sod or if ground is frozen.

02 – **LAY SOD TO FORM** a solid mass with tightly fitted joints. Butt the ends and sides of sod strips evenly, leaving no cracks. Do not overlap joints; stagger strips to offset joints in adjacent courses. Tamp or roll lightly to ensure contact with subgrade after first watering.

03 – **SECURE SOD ON SLOPES** with wood pegs to prevent slippage.

04 – **WATER** sod thoroughly with a fine spray immediately after planting. Water sod 10 minutes, 3 times daily until rooted.

H – **MAINTENANCE** – Furnish by Contractor for 90 calendar days as follows:

01 – **IRRIGATION** shall start immediately after 300 square feet of sod is installed to ensure against shrinkage of or damage to sod.

02 – **PERFORM** routine maintenance of watering, weeding and mowing of grass. Do necessary weeding, reseeding, resodding and removal of dead material(s). Fertilize sod twice during contract maintenance period.

03 – **CONTRACTOR** shall erect signage, fencing, or barricades to prohibit traffic or playing on new lawns until notified after acceptance by **LPS.**

I – **SHRUBS AND TREES** –

01 – **ALLOWED** – Native landscaping is desired; little water is required, and minimum fertilizer is required.

02 – **NOT ALLOWED** – **No** Cottonwoods (not even cottonless cottonwood); **No** Hedging; **No** Russian Olive trees, thorny bushes, or thorny trees. Trees without burlap ball roots are not acceptable.

03 – **TREES** shall be staked with not less than three stakes. The top of the ball crown must be at least 2" to 3" above the surrounding grade. All trees and shrubs must be watered immediately after planting.

04 – **WARRANTY** shall cover replacement of shrubs and trees as needed through one full calendar year.

Division 03 - Concrete

03050 – CONCRETING PROCEDURES –

American Concrete Institute **ACI 318** Recommended Practice for Reinforced Concrete and Building Code Requirements.

03100 – CONCRETE FORMWORK –

American Concrete Institute **ACI 347** Recommended Practice for Concrete Formwork.

03150 – CONCRETE FORMS –

Remove all inadequate sub-grade material and replace with road-base. New or reused boards, plywood, metal, or combinations thereof, as required. Board material may be used only to form concealed concrete surfaces, unless special design effects are approved by **LPS** Property Management Services Department. Framing, ties, coating(s), reuse as required. Landscape edging not permitted. Remove all organic materials used in forming when concrete work is complete. Remove all excavated materials from site when project is complete.

03200 – CONCRETE REINFORCEMENT -

shall comply with provisions of Concrete Reinforcing Steel Institute **(CRSI)** MANUAL OF STANDARD PRACTICE; bars, fabric(s), tendons and specialties as determined and engineered by **A/E** or **DBT.** One set of final approved shop drawings to **LPS** Property Management Services Department files.

03250 – CONCRETE ACCESSORIES -

A – **EXPANSION AND CONTRACTION JOINTS** – Control and construction joints to be located and formed in accordance with American Concrete Institute **ACI 318** Recommended Practice for Reinforced Concrete. Column isolation joint, slip joint, keyway, control joint, chamfer strip, dovetail anchor slot, and water-stop material(s) and location(s) as required.

01 – **EXTERIOR EXPANSION/CONTRACTION JOINT FILLERS** – Full depth of slab, per **ASTM D1751** Spec for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (non-extruding and resilient bituminous types) at maximum 24'0" centers in walks, ramps, curbs, gutters, pads, aprons, truck wells and platforms.

02 – **INTERIOR EXPANSION/CONTRACTION JOINT FILLERS** – Full depth of slab, non-extruding resilient non-bituminous material meeting **ASTM D1752** Spec for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction, between slabs-on-grade and concrete or masonry walls.

03 – **SCORING** – Tooled joints at maximum 4'0" centers each way and along edges in exterior sidewalks.

03300 – ON-SITE CAST-IN-PLACE CONCRETE –

American Concrete Institute **ACI 301** Specs for Structural Concrete in Buildings as interpreted by **A/E** shall be followed as a guide for answering questions and settling disputes that may arise concerning concrete requirements.

A – **MATERIALS, PACKAGING, PRODUCTS** shall be determined and engineered by **A/E** or **DBT;** delivered, stored, handled and installed in manner to prevent weathering, damage, breakage, deterioration, intrusion, vandalism.

01 – **ACCELERATOR** – Calcium chloride or any other chloride-containing or salt-like admixture shall not be used in concrete.

02 – **HARDENER-SEALER** shall be provided on all interior and exterior flatwork slabs-on-grade, compatible with finish materials or coatings.

B – **MIXES** – Supplier shall submit current mix design(s) with compressive test results in accordance with **ACI 211.1,** showing slump(s) and air entrainment and minimum 28-day compressive strength(s) as specified.

C – **TOLERANCES:**

01 – **FLATWORK** – Tops of footings and pads shall not be out of level more than 1/4" in 10', and slabs, floors, ramps, platforms, aprons and walks shall not be out of level more than 1/8" in 10', from elevation(s) specified.

02 – **WALLS AND PIERS** shall not be out of plumb more than 1/8" in 10' nor vary more than 1/4" from true straight line(s).

03 – **TOPS OF WALLS** not out of level more than 1/4" in 10' length.

D – **FIELD QUALITY CONTROL** – **A/E, DBT,** or **LPS** Property Management Service Department will determine and have test cylinders taken and broken, at Owner expense, by an approved testing laboratory in accordance with **ASTM C31** Standard Method of Making and Curing Concrete Test Specimens.

E – **FINISHING:**

01 – **INTERIOR FLATWORK** – Floor slabs shall be hard steel-troweled smooth, except heavy broom finish at hard tile beds; no dryers to accelerate set; floor slabs free of ripples, ridges and irregularities.

02 – **EXTERIOR FLATWORK** – Walks, ramps, platforms, aprons, pads and decks shall have wood float medium broom finish, except as otherwise determined and specified by **A/E** or **DBT.**

03 – **ARCHITECTURAL FINISHING** – Exposed-to-view interior and exterior surfaces of concrete walls, columns, pilasters and beams shall have projections removed, offsets leveled, voids or damaged areas saturated with water and patched to a true and even surface with a wood float; then given a grout cleaned finish except as otherwise determined and specified by **A/E** or **DBT** for design and aesthetic reasons.

03365 – POST-TENSIONED CONCRETE –

Location(s), design and engineering by **A/E** or **DBT**; material(s) and finish(es) as determined by **A/E** or **DBT.**

A – **TENDON LOCATION MARKERS** – Noncombustible (noncom) wood, plywood or hardboard not over 1/4" (6.5mm) thick by 2" wide by 12" long, arrow shaped; secured on top of bottom form material, centered on and beneath each tendon.

B – **ANCHORAGE COMPONENTS** shall meet minimum requirements set forth in "Tentative Specifications for Post-Tensioning Materials" prepared by Pre-stressed Concrete Institute.

03400 – STRUCTURAL PRECAST CONCRETE UNITS –

Forms per Spec Section 03150; Reinforcement per Spec Section 03200; Accessories per Spec Section 03250; cement, fine and coarse aggregates, plasticizer, air-entrainment, accelerator and water per Spec Section 03300. Where approved by **LPS** Property Management Services Department, provide structural pre-cast and pre-stressed concrete columns, deck and framing panels, sections and other elements. Work includes: design, engineering, furnishing and erecting of pre-cast-pre-stressed members such as beams, columns, joists, panels; provision of inserts and anchorage items embedded in members; provision of loose connection clips, plates, rods, and bolts required to attach members and elements to one another and to other structures; furnishing of shop drawings, product data and finish samples.

03415 – MISCELLANEOUS PRECAST CONCRETE SPECIALTIES -

A – **SPLASHBLOCKS** – 36" long by 16" (tapered to 12") wide by minimum 4" high, stock manufactured pre-cast units for installation at each hose-bibb (wall hydrant) and rain leader (downspout) discharge; cast-in-place, built-in pans preferred where discharge is onto sidewalk or pavement.

03600 – GROUT –

Where required, will include provision of catalyzed metallic, nonmetallic, or epoxy nonshrink grout packing at machinery or structural steel columns resting on masonry or concrete footings, piers, slabs, pads or walls.

A – **RESTRICTIONS** – Epoxy grout may be used for patching and machinery bases only; not allowed under column base plates. Metallic grout may be used in concealed situations only. Non-corrosive metallic or nonmetallic grout is acceptable for exposed and concealed conditions as installer option, provided there are no extra cost(s) or charge(s) to Owner.

03605 – DRYPACK –

Where required, will include provision of a nonmetallic, damp bedding mortar for seating structural and nonstructural framing on masonry or concrete walls and partitions. Dry-pack is not an acceptable substitute for grout packing of column or machinery base plates.

Division 04 - Masonry

04100 – MORTAR -

A – **MATERIALS:**

01 – **CEMENT** – ASTM C150 Specification for Portland Cement, Type I, Portland; Type II if within or adjacent to earth.

02 – **LIME** – ASTM C207 Specification for Hydrated Lime for Masonry Purposes, Type S.

03 – **FINE AGGREGATE** – ASTM C144 Specification for Aggregate for Masonry mortar, natural sand.

04 – **WATER** – Fresh, clean, clear; potable, humanly consumable.

05 – CALCIUM CHLORIDE or any other salt, salt-like, or chloride-like admixture/ accelerator shall not be used in mortar.

B – **MIX** – ASTM C270 Specification for Mortar for Unit Masonry, Type S for bearing, nonbearing, and veneer walls; other circumstantial type(s) per ASTM recommendations.

04105 – CONCRETE FILL –

Cement, Fine Aggregate, Water, Calcium Chloride same as for 04100 – MORTAR preceding.

A – **COARSE AGGREGATE** – Same requirements as fine aggregate except washed gravel or crushed stone 1/8" to maximum 5/8".

B – **MIX** for bond beams, reinforced masonry walls, pilasters: determined to fulfill Structural requirements.

04150 – MASONRY ACCESSORIES -

A – **ITEMS INSTALLED BUT NOT FURNISHED**– Masonry contractor shall install loose steel lintels, bearing plates, anchors, and other miscellaneous items furnished by others at no additional cost to **LPS.**

B – **HORIZONTAL JOINT REINFORCEMENT** – Truss or ladder type as required to fulfill Design, Code, and/or Engineering requirements.

C – **VERTICAL REINFORCEMENT** – Bars, ties, and tie wire as required to fulfill Design, Code, and/or Engineering requirements.

D – **EXPANSION JOINT FILLERS** – Material, shape and type to fulfill wall thickness conditions; location(s) where required.

E – **DOVETAIL ANCHORS** – 1" wide by nominal 4" long 14-gauge galvanized corrugated sheet steel spaced maximum 1'4" centers in dovetail slots provided by concrete contractor.

04200 – UNIT MASONRY -

A – **FACE BRICK** – Grade–SW Type–FBX modular-sized, match existing in Addition situations, conforming to ASTM C216 Spec for Facing Brick (Solid Masonry Units Made from Clay or Shale); texture and color approved by **LPS** Property Management Services Department**.**

B – **GLASS BLOCK** – To meet Code and location requirements.

C – **PLAIN BLOCK** – Finish and weight required to meet Grade N Type 1 NI and NII of ASTM C90 Spec for Bearing Concrete Masonry Units and ASTM C145 Spec for Solid-Load Bearing Concrete Masonry Units.

01 – **SIZE(S)** – Modular height, width, length to fulfill designed wall and partition requirements and conditions.

02 – **SOLID UNITS** or concrete core-filled units as required shall be installed horizontally and vertically immediately under all points of structural bearing.

D – **BLOCK BRICK** – Like material, finish, strength as PLAIN BLOCK, solid, modular-sized 2-1/4" x 3-5/8" x 7-5/8" in compliance with ASTM C55 Spec for Concrete Building Brick.

E – **TEXTURED CONCRETE BLOCKS** – As required by Design to meet manufacturer requirements and as approved acceptable to **LPS** Property Management Services Department**.**

F – **PATTERNED CONCRETE BLOCKS** – As required by Design to meet manufacturer requirements and as approved acceptable to Owner.

G – **BOND** – Determined and Engineered by **A/E** or **DBT,** approved by **LPS** Property Management Services Department**.**

H – **COURSING** – Determined and Engineered by **A/E** or **DBT,** approved by **LPS** Property Management Services Department**.**

I – **JOINTS** – Determined and Engineered by **A/E** or **DBT,** approved by **LPS** Property Management Services Department**.**

J – **CLEANING** – Detergent clean exposed walls and partitions; fiber brush from top down.

04430 – SIMULATED STONE –

As required by Design, approved by **LPS** Property Management Services Department**.**

04450 – STONE VENEER –

As required by Design, approved by **LPS** Property Management Services Department**.**

04455 – MARBLE –

As required by Design, approved by **LPS** Property Management Services Department**.**

04465 – GRANITE –

As required by Design, approved by **LPS** Property Management Services Department**.**

Division 05 - Metals

05120 – STRUCTURAL STEEL

FRAMING - temporary and permanent, shall conform to the AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings; members, shapes, sizes, framing, connections, finish(es) and shop drawings, as required.

A – **WELDING** shall be in accord with Structural Welding Code-Steel of American Welding Society, and shall be made only by welders, tackers, or welding operators who have been qualified and certified within past six months by tests prescribed in **AWS D1.1.** Copies of required certification shall be a required submittal prior to starting such work. Exposed-to-view welds shall be ground smooth.

05215 – OPEN-WEB STEEL JOISTS AND GIRDERS –

Fabrication and erection in accord with documents published by Steel Joist Institute and American Institute of Steel Construction; design, series selection, accessories, engineering, and shop drawing(s) as required.

A – **WELDING** – Same as Item 05120-A preceding.

05300 – METAL DECKING –

Conform to Specifications for Design of Light Gauge Cold-Formed Steel by American Iron and Steel Institute, requirements of Steel Deck Institute Code for Recommended Standard Practice, **ASTM A611** Specification for Steel, Cold-Rolled Sheet, Carbon, Structural, and **Fed Spec QQ-S-775C;** ribbed/ corrugated Grade C structural quality noncellular steel sheets; minimum 33,000 psi design strength; galvanized **ASTM A446** for roofs, **ASTM A570** shop primed for floors.

A – **FASTENING SYSTEM** – Pneumatic or percussion preferred; welding as may be required and as acceptable to **LPS** Property Management Services Department**.**

B – **SHOP DRAWINGS** submittal shall include structural properties of decking; type, size and location of openings; type, size and extent of fastenings.

05400 – COLD FORMED METAL FRAMING –

AMICO, Bostwick, Inryco MILCOR, Keene, SPEED STEEL, USG, United States SUPER C, Wheeling STEEL FRAMING, Verco VERCOR; size(s), gauge(s), type(s), accessories, assembly, location(s) and finish(es) as required.

05500 – METAL FABRICATIONS –

Steel as per Section 05120 preceding.

A – **FASTENERS AND ANCHORS** – Screws, bolts, clip angles, plates, brackets, connectors and washers: same material and finish to match fabricated item.

B – **LINTELS** – Steel angles, channels, tees, beams and plates as required to bridge masonry openings, minimum 6" bearing each end.

C – **FRAMED ROOF OPENINGS** – Steel angle support frames between steel joists for openings in metal roof decks that are over 6" round or square and not over 4' square or diameter; as required.

D – **HAND AND GUARDRAILS** – Nominal 1¼" i.d. Standard Schedule 40 steel pipe with wall brackets, wall returns, flange accessories and screw, bolt, rawl plug, molly, toggle, tampin or expansion anchorage(s) suitable for back-up

E – **GUARD POSTS** – Nominal 6" i.d. Standard Schedule 40 steel pipe filled with minimum 3,000 psi concrete and buried at least half the total length of post.

F – **SIDEWALK GUTTERBOXES** – Not desired by **LPS** Property Management Services Department; where required, covers shall be solid with non-skid surface, galvanized steel or aluminum.

G – **TRENCH GRATING** – Iron; selected as required.

H – **ACCESS LADDERS** – Galvanized pipe, tube, bars, anchorages as required, with non-skid surface on rungs.

I – **STEEL PAN STAIRS** – Stringers, carriages, supports, framing of structural steel members; meeting Building Code live-load requirements, design as required.

J – **SHIP'S LADDERS** – Stringers, carriages, supports, framing of structural steel members to meet Building Code live-load requirements; non-skid treads.

K – **ALUMINUM TRIM** – Extruded anodized joint covers, fillers, corners, running trim in size(s), shape(s), finish(es), color(s) approved by **LPS** Property Management Services Department**.**

05700 – ORNAMENTAL METAL –

Material(s), size(s), location(s), finish(es) approved by **LPS.**

A – **SUBMITTALS** – Furnish product data edited for pertinence to project, shop drawings, samples and calculations, certifying compliance with loading requirements.

05810 – EXPANSION JOINT COVER ASSEMBLIES –

Prefabricated metal expansion joint covers for interior and exterior exposed applications; material(s), size(s), configuration(s), location(s), finish(es) as determined and engineered by **A/E** or **DBT.**

A – **SUBMITTALS** – Furnish product data edited for pertinence to Project, with shop drawings, samples and calculations certifying compliance with loading requirements.

Division 06 - Wood and Plastics

06100 – ROUGH CARPENTRY WORK –

Temporary and permanent materials and methods of wood framing, sheathing, and decking for floors, walls, partitions, roof; setting of miscellaneous anchorages, back-up, and framing devices furnished by other trades.

A – **LUMBER** – WWPA Standard Grading Rules for Western Lumber, noncombustible or other pre-treatment as required by code.

01 – **BOARD LUMBER** (1" thick by 2" or more wide) – Nominal dimension S4S S-Dry No. 3 Common or Standard and Better for grounds, sleepers, furring, stripping, bucks, X-bridging, shims and rungs.

02 – **LIGHT FRAMING AND STUDS** (2" to 4" thick, 2" to 6" wide, 10' and shorter) – Nominal dimension S4S S-Dry No. 2 and Better minimum 1000Fb single for studs, posts, joists, rafters, plates, framing, strips, blocking, lintels, ledgers, solid bridging, bracing, roof curbs, stringers and carriages.

03 – **STRUCTURAL JOISTS AND PLANKS AND APPEARANCE** (2" to 4" thick, 5" and wider) – Nominal dimension S4S S-Dry Standard and Better or Stud Grade minimum 650Fb for grounds, sleepers, furring, stripping, bucks, nailers, cants and shims.

B – **SPECIAL CONSTRUCTION AIDS** – Temporary ladders, runways, platforms, catwalks of Structural, Light Framing, Board Lumber as precedingly specified for general use by all trades.

C – **ROUGH HARDWARE** – Nails, spikes, screws, bolts, ramsets, anchors, similar items not furnished by other trades but required to draw-up and rigidly secure members: wood-to-wood, wood-to-metal, wood-to-masonry, wood-to-concrete, metal-to-metal, metal-to-masonry, metal-to-concrete, and other materials to satisfactorily complete the various phases of construction toward erection of a sound, safe, nonsqueak structure.

D – **PLYWOOD** – Each panel identified with grade trademark of APA and meets requirements of PS 1, noncom where noted or required by code; type, group, grade, finish, for purpose intended.

E – **WALL SHEATHING** – Gypsum of fiberboard as determined and engineered by **A/E** or **DBT** for purpose intended in compliance with code requirements.

F – **BLOCKING/BACKING** – In-the-wall/partition miscellaneous lumber/plywood back-up blocking/backing required for installation/mounting of fixtures, frames, hardware, railings, cabinets, casework, countertops, shelving, specialties, miscellaneous items of the work.

06155 – WOOD CHORD-METAL JOISTS –

Shop-fabricated Trus-Joist or Sanford SPAN-JOIST roof and floor joists of wood top and bottom chords and tubular steel trussing steel pin jointed framing system complete with associated bridging, bracing, anchorages, fasteners, supports.

06182 – GLUED LAMINATED STRUCTURAL UNITS –

AITC Architectural Grade coast region Douglas Fir or Southern Pine roughsawn (S4S) surfaced prefabricated glue-laminated wood arch, bent, column, beam, joist, purlin, truss, lintel units with associated hardware anchorages; manufactured, quality marked, certified for Wet condition of service in conformance with Voluntary Products Standards PS 56.

A – **HARDWARE** for joining members to each other and to supports shall be structural steel fabrications prime-shop-coat-painted for interior and zinc-coated for exterior locations.

06185 – GLUED-LAMINATED VENEER LUMBER STRUCTURAL UNITS –

Trus-Joist MICRO-LAM parallel laminated 1/10" or 1/8" Douglas Fir continuous veneer strips water-proof glued-up prefabricated glued-laminated lumber beam, joist, purlin, rafter, lintel, stud, column units with associated hardware anchorages.

06190 – WOOD TRUSSES –

WWPA Douglas Fir-larch, Hem-Fir, Southern Yellow Pine or Spruce, minimum Fb=1650 psi for repetitive usage maximum 15 percent moisture content kiln dried lumber with no knots over 1" diameter, no splits, no warps, no twists; minimum E=1,500,000; maximum deflection L/480; die-stamped integral toothed galvanized steel connectors each side each joint; galvanized fasteners; galvanized bearing plate anchors and framing connectors.

06196 – PLYWOOD WEB JOISTS –

Trus-Joist solid or laminated Douglas Fir or Hemlock chords having 15 percent maximum moisture content, fingered, and glued scarf joints acceptable; Structural I C-C EXT-APA plywood webs.

06200 – FINISH CARPENTRY WORK -

includes provision of door and window hardware and hollow metalwork, thresholds, weatherstripping, doors, windows, frames, access panels, specialties, signs, millwork, siding, shelving, poles, hooks, paneling, trim, cabinetwork, counters, accessories, and other finish items not installed by other trades.

06240 – PLASTIC LAMINATE(S) –

NEMA LD 3-1.01 General Purpose, Postforming, Cabinetliner, Backer, Specific Purpose, High Wear, Fire-Rated types based on service requirements; minimum .050" thick facing sheets, minimum .020" backing sheets; NEMA LD 3-4.03 2.0 and AWI 100-G-11 resorcinol and phenol-resorcinol, casein, epoxy, polyvinyl, contact adhesive appropriate for service intended.

06310 – PRESERVATIVE TREATED WOOD/PLYWOOD –

Hoover Universal DIXIE CCA, Koppers DIXIE CCA or Koppers WOLMANIZED (CCA) Chromated Copper Arsenate preservative treated lumber and plywood.

06320 – FIRE RETARDANT TREATED WOOD/PLYWOOD -

A – **INTERIOR** – Hoover Universal INTERIOR FIRE-X, Koppers DRICON, or Osmose FLAME PROOF LHC where relative humidity does not exceed 70 percent; Loughman NCX for hardwood(s).

B – **EXTERIOR** – Hoover Universal EXTERIOR FIRE–X or Koppers NCX where relative humidity may exceed 75 percent.

06400 – ARCHITECTURAL WOODWORK -

Determined and specified by **A/E** or **DBT** with **LPS** Property Management Services Department approval and acceptance.

06415 – PLASTIC LAMINATE-FACED CASEWORK -

determined and specified by **A/E** or **DBT** with **LPS** Property Management Services Department approval and acceptance.

06418 – WOOD COUNTERTOPS -

A – **PARTICLEBOARD** – Bohemia, Boise Cascade, Georgia-Pacific, Weyerhaeuser, or Willamette Industries flat panel, ANSI A208.1 Type 1, medium density Grade B, minimum 45#/cf (720kg/m3) class 2, minimum ¾" (2cm) thick unless otherwise noted.

B – **CLEATS/BLOCKING/FRAMING/BRACING** – Nominal 2x Light Framing and Studs or Structural joists and Planks and Appearance lumber per Items 2.01-A-02 and 2.01-A-03 of Spec SECTION 06100.

C – **FABRICATION/MANUFACTURE/ASSEMBLY/CONSTRUCTION** shall be in accord with AWI Custom Grade requirements.

D – **COUNTERTOPS** shall have a formed or milled front edge molding; rolled edges are not required, and self-edging is not acceptable.

06600 – PLASTIC FABRICATIONS -

A – **VALANCE LOUVERS** – Scientific Lighting Products PARAVENT Functional Specular chrome finish or **A/E** or **DBT** accepted equivalent customized panels to fit job site conditions.

01 – **RETAINER SUPPORT CLIPS** – Shop-coated sheet steel or aluminum inverted tees, well angles, or other shapes noted/detailed.

Division 07 - Thermal and Moisture Protection

07112 – BITUMINOUS SHEET MEMBRANE WATERPROOFING -

at wall(s), deck(s), floor(s), floor area(s) and planter(s) to fulfill waterproof building requirements.

07125 – FLUID APPLIED PENETRATING SEALER -

is required by **LPS** Property Management Services Department for horizontal deck and vertical concrete and masonry wall surfaces, as determined and engineered by **A/E** or **DBT** to fulfill building design requirements.

07160 – BITUMINOUS DAMPPROOFING -

for below-grade exterior foundation walls above finish floor levels.

A – **ASPHALT OR BITUMINOUS COMPOUND** – Sonneborn HYDROCIDE 600, CELOTEX TAR BASE Damp-proof Coating, Karnak BLACK ASPHALTUM COATING or J & P Petroleum Products TEX-MASTIC No. 720 Foundation Coating; from top of footing or bottom of grade beam to indicated adjacent finish grade; apply two separate coatings, primer, and one finish coat to produce a visibly unbroken film.

07165 – BITUMASTIC COATING -

protection on miscellaneous below-grade items and materials.

A – **COVERAGE** – After bolting or welding and prior to backfilling operations by others, provide a minimum 30-mil (.030") [1mm] trowel grade J & P Petroleum Products TEX-MASTIC No. 712 or Metropolitan Roofing Supplies DUREX DAMPPROOFING MASTIC asphaltic mastic dampproofing bitumen coating on that portion of all exposed-to-earth steel, wood and/or concrete columns, and miscellaneous steel anchorage items: angles, plates and bolts associated with on-site, below-grade masonry or poured-in-place concrete foundations.

07193 – LAMINATED VAPOR RETARDER -

on top of crawl space earth floor and under new interior concrete slabs-on-grade.

A – **BARRIER** – St. Regis MOISTOP, W. R. Meadows PREMOLDED MEMBRANE, or **A/E** or **DBT** accepted equivalent heavy kraft paper laminated together with glass fiber reinforcement over-coated with black polyethylene film on each side; resistant to decay when tested according to ASTM E154; fabricated free of formaldehyde and asbestos.

B – **TAPE** – Monsanto GER-PAK black 2½" (6.5 cm) wide or accepted equivalent for securing barrier to foundation walls and for sealing barrier lap joints.

07211 – BATT AND BLANKET INSULATION -

A – **THERMAL INSULATION** – United States Gypsum THERMAFIBER Regular, Open-Faced, Foil-Faced in plenums, Flame Resistant, Fast-Fit, M-S, Z-Furring type(s) as relevant to location(s), or comparable spun rock-wool, glass or mineral fiber blankets manufactured by Johns-Manville, Owens-Corning, or Premium Brand; minimum nominal thickness(es) to meet minimum Resistant R Factors (R-30) required by local Code, Colorado Energy Code and to fulfill building design requirements.

B – **SOUND INSULATION** – United States Gypsum THERMAFIBER Sound Attenuation paperless, foil-less, semi-rigid mats, un-faced paperless rolls or batts; or comparable spun rock-wool, glass, or mineral fiber batts as manufactured by Johns-Manville, Owens-Corning, or Premium Brand meeting FS HH-I-521E Type I, as required to fulfill requirements to meet local code, building design and **LPS** Property Management Services Department requirements.

C – **FIRE SAFETY INSULATION** – United States Gypsum THERMAFIBER products meetings FS HH-I-558B, Form A, Classes 1 and 2, or comparable system(s) to fulfill design, engineering, and applicable code requirements.

D – **TOP OF WALL INSULATION** – Sound blankets or comparable paperless, foil-less, semi-rigid glass, rock, or mineral fiber mats; in single or multiple thickness compressed to snugly fill void between juncture between top of walls or partitions and upper floor or roof deck above.

07212 – BOARD INSULATION -

under floor topping on horizontal deck, applied to the underside of deck, walls, or as otherwise required, to fulfill building design requirements.

A – **INSULATION ABOVE HORIZONTAL ROOF DECK** – Extruded cellular polystyrene type; thermal conductivity of 0.20 Btu/sq. ft./hr./degrees F/inch at 75F; minimum compressive strength of 40 psi; maximum water vapor transmission 0.6 perm per inch; maximum 1 percent water absorption by volume; ship-lapped edges similar to "Styrofoam SM" manufactured by Dow Chemical USA. (See also “Bitumen Roofing Manual: Modified Bitumen Roofing for Littleton Public Schools”, published separately.)

B – **INSULATION BELOW HORIZONTAL DECK** – Celotex THERMAX exposed insulation boards in Interlocking PVC Strips Without Furring or Owens-Corning COMMERCIAL USE BOARD system to produce minimum Resistance value R-5.

C – **RIGID WALL INSULATION** – Board-stock, square edges, to produce a minimum Thermal "R" Resistance factor of 11.0; ZONALITE Styrene Foam; Dow THURANE; Owens-Corning URETHANE or accepted equivalent.

D – **PROTECTION BOARD** – Semi-rigid composition board, 1/8" thick, asphaltic laminated, non-asbestos containing pre-molded type.

E – **ADHESIVE** – Type recommended by insulation manufacturer; capable of securely adhering insulation to applicable surface.

07214 – LOOSE FILL INSULATION –

CertainTeed INSUL-SAFE II or BLOWING WOOL, Manville BLOWING WOOL, or accepted equivalent pneumatic blown loose fill fibered glass nodules manufactured and fabricated free of formaldehyde and asbestos.

07215 – SPRAYED INSULATION –

Formaldehyde and asbestos-free spray-on thermal and sound insulation where determined; national Cellulose CELBAR, American Energy Products SprayDon Type SA, Thermo Products ThermoCon, or accepted equivalent.

Roof Specifications formerly detailed in this section are now available separately. Please return to the Table of Contents for location.

07900 – JOINT SEALERS -

A – **EXTERIOR SEALANTS:**

01 – **BUILDING(S)** – ConTech SONNEBORN SONOLASTIC NP II, Pecora DYNATROL II, or other acceptable to **LPS** Property Management Services Department, two- or three-part sealant, non-sag.

02 – **PAVEMENTS AND WALKS** – Pecora UREXPAN NR-200, or other acceptable to **LPS** Property Management Services Department sealant, self-leveling.

03 – **WINDOWWALL/CURTAINWALL/STOREFRONT:**

a – **INTERNAL** – Dow or General Electric SILICONE SEALANT.

b – **PERIMETER** – Dow or General Electric SILICONE SEALANT.

B – **INTERIOR CAULKING** – DAP, Gibson-Homans, Pecora, or Tremco latex, acrylic, or oil base caulk.

01 – **FIRE RESISTANT SEAL** – Chase Technology Corporation CTC PR-855 CHASE-FOAM fire resistant silicone foam sealant for fire stops and wall/floor penetration seals.

C – **JOINT FILLER (backer rod)** – Round, square, or rectangular as appropriate to joint requirement(s), compressible gray or white polyethylene, or polyurethane foamed plastic such as DENVER FOAM, Dow ETHAFOAM SB, un-tarred oakum or fiberglass; installer option at no extra cost(s) charge(s) to **LPS.**

D – **BOND BREAKER** – Clear or opaque polyethylene tape or film; self-adhesive type where applicable.

E – **JOINT CLEANER/PRIMER/SEALER** – Material as recommended by the caulking or sealant manufacturer.

F – **COLOR(S)** selected/approved by **LPS** Property Management Services Department from manufacturer standard available colors.

Division 08 - Doors and Windows

08111 – STANDARD STEEL DOORS AND FRAMES –

Insulated hollow metal doors, pressed steel door/window frames, and stick system components for door openings, borrowed lights, casings, transoms, sidelights; with associated louvers, view panels, mouldings, labels, anchors, reinforcements, accessory items.

A – **INTERIOR FRAMES** – Minimum 14-gauge with 5/8" integral stop; knock-down (KD) type acceptable for interiors; mortised, reinforced, drilled, and tapped for hardware; anchors, connection members, clips reinforcement(s) required by code(s), manufacturer, and **LPS** Property Management Services Department for anchorage and support. All center mullions must be removable type, Vonduprin or Precision

EXTERIOR FRAMES - 14 guage galvanized prepped for concealed cont. hinges.

B – **DOORS** – Full flush panel type, with or without edge seams, no face seams, constructed of two panels minimum, 180-gauge prime commercial cold-rolled stretcher galvanized level steel free of pitting.

EXTERIOR DOORS - Must have Markar 300 series concealed cont. hinges.

01 – **CORE** – Rock-wool or Fiberglass insulation for sound deadening.

02 – **LOUVERS** – Fixed, except fusible-link in fire-rated locations.

03 – **GLAZING MOULDINGS** – Minimum 18-gauge, mitered corners.

C – **FINISH** – Doors and frames prefinished in kynar/baked enamel acceptable to **LPS** Property Management Services Department, except that revisions or additions to existing facilities may be shop-primed and field-painted to match.

D – **LABELS** – Agency approved certified or labeled doors, frames, and anchors for minimum ratings required by code.

08211 – FLUSH WOOD DOORS -

A – **INTERIOR DOORS** – Flush style, SWI Custom grade, SCL-5 core or PC-5 core with 4" (10 cm) stiles, and 6" (15 cm) rails; Rift-Sawn random match Red Oak face veneers with matching solid Red Oak (or as required to match existing) top, bottom, and side edges, for transparent finish to match existing. Fire doors shall have AWI FD ratings of 1½, 1, ¾ hour, and 20 to 30 or 20 minute, per location, meeting UL requirements, ASTM E152 and used in accord with NFPA 80.

01 – **LOUVERS** – Extruded aluminum alloy AA6063-T5 Duranodic dark bronze finish (or as required to match existing), with fixed 45-degree straight blades; fire rated, dampered, in labeled doors.

02 – **VISION PANELS** – Tempered or wire glass.

08305 – ACCESS DOORS –

Steel, sized and located on Drawings; fire rated where required by Code.

08310 – SLIDING DOORS -

are not acceptable to **LPS.**

08330 – COILING DOORS –

Interlocking, continuous length without splice, flat slat curtain, electric operated; fire rated where required by code.

08340 – COILING GRILLES –

Aluminum; electric operation.

08360 – SECTIONAL OVERHEAD DOORS –

Steel, full flush flat galvanized exterior and interior panels; insulated exterior location(s); galvanized hardware; weather stripped exterior location(s); electric operated.

08410 – ALUMINUM ENTRANCES AND STOREFRONTS –

are not desired by **LPS**.

08500 – WINDOWS -

A – **EXTERIOR WINDOWS** may be thermal-break aluminum or hollow metal framed, or vinyl-clad wood.

B – **INTERIOR WINDOWS,** borrow-light and vision panels, should be steel hollow metal construction; may be aluminum.

C – **OPERABLE WINDOW VENTS** shall be provided, even if building is air conditioned, to allow use of building in event of power outage or energy shortage. Vents shall be in-swing, weather-stripped, shall not project beyond wall line, and shall have positive interior latch.

D – **SCREENS** – Metal, vandal resistant, on vent portions of fenestration.

E – **GLAZING** – Inside glaze with snap-on beads.

F – **PROVIDE** natural window light in principal stairways. Keep windows high to reduce glass breakage.

G – **FOLLOW** requirements of ASHRAE 90 and Colorado Energy code for thermal design of exterior walls; which will affect number and size of windows used.

H – **VANDALISM REDUCTION** – Avoid using windows or window walls in areas that are screened from public view.

I – **GLASS CLEANING** – Provide hinged ventilators above ground level floor areas to allow cleaning of glazing from interior of building.

J – **GLASS HEIGHT** – Glazing below 3'0" above floor level is not acceptable, unless approval is obtained from **LPS** Property Management Services Department prior to Construction Documents Phase.

08705 – DOOR HARDWARE -

A – **MATERIALS/ITEMS:**

01 – **BUTT HINGES** – Full mortise 4½ x 4½ Heavy Duty Steel. BB (Ball Bearing) Bronze or chrome finish to match existing building hardware. Stanley FBB179, or equivalent Hager, Lawrence, McKinney, Soss. All exterior doors must have Markar 300 series concealed cont. hinges.

02 – **FLOOR PIVOTS** – Not desired by LPS.

03 – **NON-RATED SPRING HINGES** – Not desired by LPS.

04 – **FIRE-RATED SPRING HINGES** – Not desired by LPS.

05 – **LOCK AND LATCH SETS** – Best 93K Series lever locksets without interchangeable core cylinderas (no substitutes), with Medeco K3 cylinders or match existing (as determined by **LPS** Property Management Services Department). No interchangeable cores. Satin bronze or satin chrome finish to match existing building hardware. **LPS** Property Management Services will provide keying information.

06 – **DEADBOLTS** – None required (mortise locks not desired by **LPS**.)

07 – **EXIT DEVICES** – Exterior doors: Precision 2100 Series rim exit device, 1700A trim, function to be specified by LPS Property Management Services Department (no substitutions); lever handle is required on interior doors to meet ADA guidelines. All other requirements as for Lock and Latch sets. Bronze or chrome finish to match existing building hardware. Center mullions must be Von Duprin keyed removable type KR4954-SP28 or Precision model 822 key removable (no substitutes); no verticle rod exit devices.

08 – **CLOSERS** – LCN 4041 door closers (no substitutes) with EDA heavy-duty arm and 90-degree hold-open at all exterior doors, and elsewhere as appropriate. Five-year guarantee against mechanical failure. Bronze or chrome finish to match existing building hardware. Mount all closers at 180 degrees.

09 – **STOPS** – Glynn-Johnson, Brookline, Trimco.

10 – **WEATHER STRIP, SOUND STRIP, LIGHT STRIP** – Pemko.

a – **WEATHER STRIP** all exterior doors and interior vestibule doors. Pemko PEM 309AP

b –**BOTTOM SWEEPS** Pemko PEM 18062CP

11 – **THRESHOLDS** – Brookline, Reese, VonDuprin, Pemko.

12 – **FLUSH BOLTS** – Not desired by **LPS**

13 – **PULLS AND PUSH PLATES** – Brookline, Corbin, Quality, Trimco.

14 – **KICK PLATES** – Brookline, Corbin, Quality, Trimco.

15 – **SILENCERS** – Corbin, Glynn-Johnson, Russwin.

16 – **PADLOCKS** – Master. Re-keyable 1K keyway

17 – **SLIDING, POCKET HARDWARE** – Grant, Lawrence, Stanley.

18 – **BIFOLD HARDWARE** – Grant, Lawrence, Stanley.

19 – **ELECTRIC STRIKES** – HES. Model 9600 for rim exit devices.

20 – **AUTOMATIC DOORS** – Where required, shall have LCN Auto Equalizer pneumatic operator (no substitutes) with parallel arm. Bronze or chrome finish to match existing hardware. All actuators are to be hardwired.

21 – **DOOR CONTACTS** –Must be concealed and pre-approved by **LPS** Property Management Services.

B – **HARDWARE SUPPLIER** shall have in his employ a member of the American Society of Architectural Hardware Consultants (AHC) who will directly supervise the scheduling, detailing, marking, and delivery of hardware. All installations must meet ADA requirements. Hardware (and keying, if assigned to supplier) must be approved by **LPS** Property Management Services Department locksmith in pre-construction meeting with hardware supplier before submittals and schedules are released for ordering.

C – **SECURITY** – Certain parts of the building shall be secured from use by unauthorized persons. Mechanical and Electrical Equipment Rooms, Office and Storage Rooms, Kitchen Areas, Attic and Crawl Spaces, and Roofs are to be locked against access by students. Stairs and Corridors and other such spaces should also be similarly secured.

D – **COMMUNITY USE** – Some areas of a building may be available for community use during non-school hours. In order to confine traffic only to designated areas, it may be necessary to provide roll-up metal gates at certain points in Corridors. Since gates cannot be used at Stairways to restrict access to upper floors, locking exit devices will be required at certain stair doors. Location(s) of both the corridor gates and exit devices must be carefully studied to meet the requirements of each building/addition and the Building Code.

E – **THREE BUTT HINGES** (1-1/2 pair) minimum are required on each door/leaf.

F – **BUILDING ADDITIONS** –

01 – **HARDWARE FOR ADDITION(S)** to existing buildings shall be similar in design to the original hardware with the following exception:

a – **USE** cylinder locks of the type described elsewhere in this guide specification, rather than mortise locks. Match existing finishes.

02 – **REPLACEMENT** – If an addition to an existing building is of substantial size or if the old hardware is obsolete or inadequate, it may be feasible to provide for the replacement of existing locks or cylinders with new hardware. Verify in advance with **LPS** Property Management Services Department.

G – **MISCELLANEOUS HARDWARE** required for window screens, windows, metal lockers, toilet compartments, metal-clad fire doors, rolling grilles, access doors, hatches, and roof scuttles is to be furnished with those items.

H – **CABINET HARDWARE** – Drawer extension glides, sliding door hangers, and track, sheaves, guides, stops, shelf standards, and support brackets shall be furnished and installed with the Millwork. Lockable cabinets and drawers will use National C8050 Series cam-locks with D8785 keyway (no substitutes), and will be keyed alike per room, or per cubicle in the case of multi-station offices.

I – **KEYING** –

01 – **KEY REQUIREMENTS** shall be coordinated with **LPS** Property Management Services Department, who will coordinate with the building Principal.

02 – **NUMBER OF KEYS TO BE ISSUED** will be determined by LPS Property Management Services department.

03 – **HARDWARE SUPPLIER** will furnish key cut numbers for each key to **LPS** Property Management Services department.

04 – **NEW KEYING** will be cut to code using the existing system unless pre-approved by LPS Property Management Services department..

J – **MAINTENANCE MANUAL** – Furnish three copies of Maintenance Manual covering Finish Hardware for each project. Each manual should consist of printed sheets from the hardware manufacturer, bound in a three-ring binder and properly indexed. A fitting schedule shall be included for master keying.

<u>08800 – GLAZING</u> –

Provide glass and plastic glazing for interior and exterior windows, doors, transoms, entrances, storefronts, sidelights, skylights, window walls, curtain walls, spandrels, borrowed-lite panels, fixed glazed panels, unframed mirrors with associated anchorage accessories.

A – **GLAZING** shall be new glass, best grade of respective kind, free from flaws, up to grade requirements; each individual piece bearing a label which shall not be removed until professional cleaners have cleaned glass.

B – **EXTERIOR GLAZING** – Type and thickness required by location to meet Code requirements; insulating in exterior doors and windows. All exterior glazing shall be double-pane insulating glass, with tints and/or coatings as determined by the **A/E** or **DBT** and the building Principal.

C – **INTERIOR GLAZING** – Wire glass for fire rated openings; safety or wire for all other openings; polycarbonate (Lexan) at gym office windows as approved by **LPS** Property Management Services Department and fire department; thickness of material as recommended by glass manufacturer for size of opening; one thickness throughout is desirable, if possible.

D – **CODE REQUIREMENTS** – Glazing shall comply with Code and applicable portions of Colorado House Bill No. 1110 concerning the safety of glazing materials in hazardous locations.

E – **VISION STRIPS** – Required in all doors except Rest Rooms and Storerooms; wire or tempered glass; minimum 6" above panic bars; upper half of door only.

F – **MISCELLANEOUS** –

01 – **GLAZING SEALANT** – Silicon rubber, one part elastomeric; acid type for nonporous channel surfaces, nonacid type for porous channel surfaces.

02 – **GLAZING GASKETS** – Black molded or extruded neoprene of profile and hardness required for water tight construction; complying with ASTM D2000, 2BC 415 to 3BC 620.

03 – **GLAZING TAPE** – Closed cell, flexible, self-adhesive, nonextruding polyvinyl chloride foam; recommended by manufacturer for exterior, exposed, water tight installation of glass, with only nominal pressure in glazing channel; complying with ASTM D1667.

04 – **SETTING BLOCKS** – Neoprene, 70-90 durometer hardness, proven compatible with sealants used.

05 – **SPACERS** – Neoprene, 40–50 durometer hardness, proven compatible with sealants used.

06 – **COMPRESSIBLE FILLER ROD** – Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, proven compatible with sealants used, flexible, resilient with 5–10 psi (.35 – .7kg/cm^2) compression strength for 25 percent deflection.

07 – **CLEANERS, PRIMERS, SEALERS** – Type recommended by sealant or gasket manufacturer.

Division 09 - Finishes

09120 – CEILING SUSPENSION SYSTEMS –

A – **ACOUSTICAL EXPOSED GRID SYSTEM** – Standard exposed one-hour rated, cold-rolled steel T-grid system with hold-down clips, matching wall angle moldings, standard baked enamel finish color selected by **LPS** Property Management Services Department**,** all items same width of exposure.

B – **DRYWALL SUSPENSION SYSTEM** – Chicago Metallic FIRE FRONT 650 or Roblin RIGID "X" sheet steel, hot dipped, electro-galvanized or painted, minimum one-hour UL fire-rated system.

09213 – GYPSUM KEENE'S CEMENT PLASTER SYSTEM –

Metal lath, white gypsum base and Keene finish; total three coat plaster, with associated accessories.

09220 – PORTLAND CEMENT PLASTER –

Metal lath and three coat cement plaster (stucco) on cold-formed stud/joist framing, masonry, or metal suspension system, with associated accessories.

09250 – GYPSUM BOARD SYSTEMS -

shall meet requirements of National Gypsum Association; typically one-hour fire rated throughout; water-resistant W/R on wet plumbing walls and all walls (not ceilings) in wet or damp areas such as rest rooms, toilets, janitor, kitchen. DUROCK Tile Backer Board is an acceptable alternate to W/R board on wet walls and in wet or damp areas, provided it meets fire-resistive requirements and provided no extra cost(s) charge(s) to Owner. Neither W/R nor DUROCK type is an acceptable substitute for gypsum sheathing or Exterior Gypsum Ceiling Boards. In high school lobbies and corridors, gypsumboard shall be fiberglass-reinforced, or 1/4" plywood or other backing shall be installed, to resist vandalism.

09310 – CERAMIC TILE –

A – **WALL TILE** – ANSI A137.1, Section 6.1; types, finishes, sizes, patterns, colors, settings, approved by **LPS**. Property Management Services Department

B – **FLOOR TILE** – ANSI A137.1, Section 5.1; types, finishes, sizes, patterns, colors, settings, approved by **LPS** Property Management Services Department

C – **TRIM AND SPECIAL SHAPES** – Rounded external out corners; bull nose end cap trim shapes at head, jamb, sills of openings and terminations; cove base and inside corners; same material, size, finish as wall tile.

09330 – QUARRY TILE –

A – **FLOOR TILES** – ANSI A137.1; types, finishes, sizes, pattern, colors, settings, approved by **LPS** Property Management Services Department to fulfill design requirements.

B – **BASE TILES** – ANSI A137.1; types, finishes, sizes, colors, settings, determined by **A/E** or **DBT** to fulfill design requirements; bull nose outside corner units, cove inside corner units.

09500 – ACOUSTICAL TREATMENT –

A – **A 42 SOUND TRANSMISSION COEFFICIENT (STC)** minimum value shall be provided in noncritical areas such as Kitchens, Classrooms, Corridors, Athletic Facilities.

B – **A 55 STC** minimum value shall be furnished in critical areas such as Conference Rooms, Private Offices, Band Rooms, Vocal Rooms.

C – **NONACOUSTICAL AREAS** include Storage Rooms, Mechanical Equipment Rooms, Janitor (Custodian) Rooms, Stairwells.

D – **LAY-IN PANELS** – Size(s), finish and ratings as approved by **LPS** Property Management Services Department and to meet local Code requirements.

09560 – WOOD STRIP FLOORING –

Size(s), Species, finish(es), fastening(s) as approved by **LPS** Property Management Services Department**;** strips tongued and grooved and end matched.

A – **ADHESIVE** – Type recommended by flooring manufacturer, complying with flammability and environmental control regulations.

B – **ASSOCIATED WOOD TRIM** – Same species and cut as flooring.

09570 – WOOD PARQUET FLOORING –

Natural or plastic impregnated in sizes, species and finishes approved by **LPS** Property Management Services Department**.**

09600 – STONE FLOORING –

Natural granite, marble, slate, flagstone; in shapes, sizes and settings approved by **LPS** Property Management Services Department**.**

09635 – BRICK FLOORING –

A – **PAVER UNITS** – Split type in sizes, colors, and settings approved by **LPS** Property Management Services Department**.**

09650 – RESILIENT FLOORING –

Asbestos- and formaldehyde-free tile or sheet material acceptable to **LPS** Property Management Services Department in sizes, colors, patterns, textures, and locations approved by **LPS** Property Management Services Department**.** Base shall be rubber, top-set cove with preformed interior and exterior corners.

A – **WAX** – Clear, nonfade, nonslip type as manufactured or recommended by flooring manufacturer.

B – **MAINTENANCE MATERIAL** – Furnish an overrun to **LPS** Property Management Services Department in minimum amount of three percent (3%), in full size units/sheets for each color, each pattern, each type resilient flooring and accessory.

09680 – CARPETING AND CUSHIONING –

Tufted loop pile (no cut-pile) with solution-dyed nylon fiber and reinforced man-made composition backing, including permanent anti-static and anti-microbial protection and fluorocarbon soil-resistant treatment. Minimum standards: pile yarn weight of 20 oz. per square yard; finished pile thickness (per ASTM D418) of 0.094 inches; 1/10 gauge; 9.0 stitches per inch; Average Pile Yarn Density of 5333; total product weight of 85 oz. per square yard; and minimum sheet width of 72 inches.

A – **PREPARATION FOR INSTALLATION** in new or remodel areas shall be the responsibility of the Contractor.

B – **WARRANTY** – Minimum 15-year, non-prorated limited warranty (including edge ravel, dimensional stability, delamination and static protection).

C – **BACKING** shall be man-made, non absorbent composition material, condensed at offices or high-traffic areas and closed-cell cushioned at classrooms or other instructional areas. Backing shall be reinforced for dimensional stability and shall be permanent anti-static.

D – **YARN** shall be continuous filament, plied and heat-set, using Type 6,6 nylon fiber manufactured by DuPont or Monsanto, with a cationic polymer additive at extrusion for enhanced stain resistance.

E – **ADHESIVES**, whether factory-applied to backing or field-applied, shall be free of hazardous chemical emissions within 24 hours after installation.

F – **SEAMING** shall be solvent-based, chemical-fusing, with no hazardous chemical emissions continuing more than 24 hours after installation.

G – **FLAMMABILITY TESTING**: Radiant panel Class 1 (ASTM-E648); NBS smoke density less than 450, flaming mode (ASTM E-662).

H – **ANTIMICROBIAL PROTECTION** shall be permanent, for both face of carpet and backing, meeting GSA Requirements with 15 washings. (GSA Protocol - AATCC138; AATCC174 Part I or II, and Part III.)

I – **MAINTENANCE MATERIAL** – Deliver to **LPS** Property Management Services Department all carpet scraps larger than 48 inches in length by 12 inches in width, and furnish an overrun in the amount of three percent (3%) in full-width for each color/dye-lot, each pattern, and each type.

09900 – PAINTING –

Provide coatings for normally painted/stained exterior and interior surfaces including gloss, semigloss, flat paints; transparent or opaque finishes; water or solvent-based coatings; stains, primers, fillers, waxes, and preparation of surfaces to receive coatings. Furnish all formulas to the **LPS** Property Management Services Department. Preferred brand to be designated by the **LPS** Property Management Services Department.

A – **SAMPLES** – Furnish for approval minimum 12" by 12" samples of surface(s) to be painted or finished. Paint as specified shall be applied in manner clearly indicating degree of finish at various stages of completion, with succeeding coats overlapping previous coats, taking care to establish a definite line of demarcation. Samples, when approved, will become standard of comparison, and finished surfaces not equal to sample color shall be refinished at Painting Contractor’s expense.

B – **PAINT AND STAIN** shall be manufacturer’s best, top-of-line commercial grade, type, kind available (commercial and/or residential low grades not acceptable); manufacturer, supplier or

installer shall furnish written certification thereof to **GC, A/E, DBT,** and **LPS** Property Management Services Department prior to and upon delivery of materials to jobsite. Acceptable products shall be from those manufactured by Samuel Cabot, Benjamin Moore, Devoe, Pratt & Lambert, Martin Senour, Sherwin-Williams. Choice of products may be made in accord with Spec Section 01630.

C – **MIXERS** – Materials not specifically designated, such as **linseed** oil, shellac, mineral spirits, turpentine; wood, masonry, and concrete fillers, shall be recommended quality products of known manufacturer which will perform as required for specific surface.

D – **COLORS** will be selected by **LPS** Property Management Services Department or **DBT** from manufacturer(s) complete catalog or brochure of factory-tinted colors. Apply only colors scheduled and approved.

E – **DOORS** – Regardless of door manufacturer prefinishing paint or stain, finish bottoms, tops and all edges of overhead, coiling, wood, and hollow metal swing, sliding and pocket doors, same as balance of door, after fitting.

F – **A PAINT SCHEDULE** shall be furnished to **LPS** Property Management Services Department prior to application, covering painting and finishing of normally painted interior and exterior surfaces. Any surface not specifically listed herein but normally being considered a surface to receive paint, unless specifically excluded, will be painted or finished in identical manner as for comparable surfaces. Nonferrous metals, factory- or shop-finished equipment and materials, and other surfaces not normally painted will not be painted or finished, unless otherwise noted or specified.

09950 – WALL COVERINGS -

including vinyl and upholstered fabric wall coverings, wrapped wall panels, wallpaper, flexible wood sheets, for approval and acceptance by **LPS** Property Management Services**.**

Division 10 - Specialties

10100 – CHALKBOARDS, MARKERBOARDS AND TACKBOARDS -

shall be approved and accepted by **LPS** Property Management Services Department.

A – **TRIM** – Extruded 6063-T5 standard satin anodized aluminum.

B – **COLORS** – Selected with **LPS** Property Management Services Department approval/acceptance.

C – **COMPUTER AREAS** will incorporate use of porcelain boards and compatible accessories (no chalkboards permitted).

101660 – METAL TOILET COMPARTMENTS –

Head rail braced flush panel type; flush doors and pilaster fronts; stall compartment door each stall; wall-mounted urinal screens; privacy (entrance and sight) screens as required.

10210 – METAL WALL LOUVERS –

Galvanized sheet steel or anodized aluminum.

10352 – GROUND SET FLAGPOLE –

25’ high, tapered aluminum complete with: ball finial; revolving, non-fouling truck; two sets of halyards, sheaves and cleats; collar, ground sleeve, ground spike and other fittings as required.

10400 – IDENTIFYING DEVICES –

Provide signs for all occupied spaces in building, including signs for handicapped and blind. Provide Building Directory at main entrance for new building. If directory is existing, new additions and/or remodeled areas must be incorporated into the existing directory.

A – **INTERIOR SIGNS** – Dimensional letters, engraved, identifying door and room, as approved by **LPS** Property Management Services Department, to match existing signage at each building.

B – **EXTERIOR SIGNS** – Cast aluminum dimensional letters, school sign, post and panel/pylon, illuminated or non-illuminated, as approved by **LPS** Property Management Services, to match existing signage at each building.

10505 – METAL LOCKERS –

Cold rolled mild annealed or leveled sheet steel; welded and ventilated; baked enamel finish in color(s) approved by **LPS** Property Management Services Department**;** doors provided with lock hole filler to permit use of built-in key or combination lock; aluminum number plates with minimum 3/8" high embossed or etched figures near top of door. Non-recessed and freestanding type lockers shall have sloped top and front and end closed bases.

A – **STUDENT LOCKERS** recessed in Hallways; masonry backup; located in manner easily supervised by Faculty.

B – **BENCHES** – Provide in Athletic Areas; clear hardwood tops finished with three coats plastic sealers; supported by steel standards finished in same color as lockers.

10520 – FIRE PROTECTION SPECIALTIES –

A – **CABINETS** – Recessed or semi-recessed cabinets, as approved by **LPS** Property Management Services Department.

B – **EXTINGUISHERS** – Furnished and installed by **LPS** Property Management Services Department as required by Code.

C – **WALL BRACKETS** – Extinguisher manufacturer standard material and design, provided by General Contractor.

10800 – TOILET AND BATH ACCESSORIES –

Dispenser-type accessories shall be as manufactured by Cormatic; other accessories shall be Cormatic, Bobrick or approved equal acceptable to **LPS** Property Management Services Department.

A – **MARKED BROCHURES** shall be submitted by the Contractor for approval by **LPS** Property Management Services Department, with accessories specifically intended for use on this Project clearly identified.

B – **MARKED TYPICAL DISPENSERS**, available without charge for LPS facilities from Northern Colorado Paper (303-443-9240, attn: Mr. Bill Regar) include the following:

01 – Paper towel dispenser Kimberly Clark S-4-9706

02 – Toilet paper dispenser Model S-4 “Smoke”

03 – Soap dispenser Model L-1 “Smoke”

C – **GRAB-BARS AND RAILINGS** as required per ADAG.

Division 11 - Equipment

11400 – FOOD SERVICE EQUIPMENT –

A – **SCHEDULE** – Equipment, both **LPS-** and Contractor-furnished, shall be planned and scheduled on the Drawings. Equipment Schedule, keyed to minimum ¼"=1'0" scale Kitchen Area Layout Plan, shall include for all equipment: description (manufacturer and catalog number), indication of who furnishes and who installs each item, rough-in location(s) and connection(s) required by Mechanical and/or Electrical Contractor(s).

B – **MULTIPLE USE** of Cafeteria must be considered in order to decrease idle time of area when it is not being used for meal service. Principal at each school shall be consulted to determine schedule for use of the Cafeteria for meal service. Cafeterias in schools with enrollment of up to 500 should be at least 1,000 square feet.

01 – **CAFETERIAS** in schools with enrollment between :

a – **501 and 600** – Minimum 1,500 square feet.

b – **601 and 700** – Minimum 1,800 square feet.

c – **701 and 875** – Minimum 2,450 square feet.

d – **876 and 1000** – Minimum 2,800 square feet.

02 – **CAFETERIAS** in schools with enrollment between 501 and 1,000 should be available for meal service between hours 10:30 a.m. and 1:30 p.m.

03 – **CAFETERIAS** in schools with enrollment of over 1,000 should be sized so that 1/3 of student body can be seated at one time, allowing 14 square feet per student; and should be available for meal service between 10:00 a.m. and 1:00 p.m.

C – **SERVING LINES** should be accessible from Kitchen without breaking through lines of customers during serving times; a serving window opening directly into the Cafeteria is preferable to a line separated from the cafeteria by a wall. In elementaries each serving line shall consist of at least 3 hot wells. In secondaries each serving line shall consist of one display case refrigerated counter-top 6 foot long sliding door with lock unit, one Hatco Glo-Ray 5 foot designer merchandising warmers (must be manufactured by Hatco unless pre-approved by **LPS** Food Services. Single point of sale should be located at end of service line, with space for cashier and cash register with power source. Dirty dish returns should connect directly to the kitchen, reasonably close to dish machines, and should not require crossing of serving line(s). Plans should assume:

01 – **1-LINE** – for enrollment of up to 400.

02 – **2-LINES** – for enrollment of 401 to 600.

03 – **3-LINES**– for enrollment of 601 to 800.

04 – **4-LINES** – for enrollment of 801 to 1,200.

05 – **5-LINES** – for enrollment over 1,201.

D – **DRESSING ROOM(S)** with three full-length lockers per Serving Line; space, hookups and vents available for residential-sized top-loading clothes washing machine and front-loading clothes dryer located within six feet of Locker Room.

E – **CUSTODIAN CLOSET** with terrazzo receptor type floor sink adjacent to and within close access to Kitchen, containing storage space for cleaning chemicals, mop bucket, wringer, and mop rack for four mops.

F – **EQUIPMENT AND SPACE REQUIREMENTS** for On-site School Kitchens are outlined in "Equipment Guide for On-site School Kitchens" Program Aid No. 1091, U.S. Department of Agriculture. Use space requirements outlined in that document, except use following **LPS** guidelines for storage space:

01 – **WALK-IN REFRIGERATOR:**

a – **72 square feet** for non-kindergarten enrollment up to 700.

b – **89 square feet** for non-kindergarten enrollment 701 to 1,000.

c – **96 square feet** for non-kindergarten enrollment 1,001 to 1,100.

d – **105 square feet** for non-kindergarten enrollment 1,101 to 1,200.

e – **104 square feet** for non-kindergarten enrollment over 1,201.

02 – **WALK-IN FREEZER:**

a – **92 square feet** for non-kindergarten enrollment up to 700.

b – **132 square feet** for non-kindergarten enrollment 701 to 1,000.

c – **145 square feet** for non-kindergarten enrollment 1,001 to 1,100.

d – **158 square feet** for non-kindergarten enrollment 1,101 to 1,200.

e – **211 square feet** for non-kindergarten enrollment over 1,201.

03 – **WALK-IN REFRIGERATORS AND FREEZERS** shall be manufactured by Bally, unless pre-approved by LPS Food Services. Units shall be 88” wide with a minimum 37” door; raised floors are not desirable. Units with raised floors must have a ramp as wide as the door, with a maximum run of 20” and a slope of 3:20 or less; ramps shall not extend into a kitchen walkway. If ramp is located within the box, total area of walk-in shall be increased 7 square feet. All units shall include 5-shelf Metro Max polymer shelves (or approved equal), 6'2" high by 1'6" deep, on 3 walls. Equipment will comply with NSF Standard #7 and be approved by Tri-County Health Department for cold storage. Refrigerators and Freezers to include a stop device that will prevent the door from closing while someone is inside.

04 – **DRY STORAGE:**

a – **210 square feet** for non-kindergarten enrollment up to 700.

b – **300 square feet** for non-kindergarten enrollment 701 to 1,000.

c – **330 square feet** for non-kindergarten enrollment 1,001 to 1,100.

d – **360 square feet** for non-kindergarten enrollment 1,101 to 1,200.

e – **480 square feet** for non-kindergarten enrollment over 1,201.

G – **KITCHEN, SERVING, STORAGE, AND SERVICE AREAS** should be at grade ground level location; not upper story, garden level or basement. Kitchens should have one outside door which opens onto a 4'6" high dock, with adjacent access stairs allowing safe pedestrian traffic while trucks are unloading.

01 – **STORAGE AREAS** should be in close proximity to the outside door. Storage areas, including walk-in coolers, shall have one door opening into the Kitchen.

02 – **CONTRACTOR** shall accomplish necessary steps to obtain approval of both Kitchen design and finished Kitchen by Tri-County Health Department and all other agencies which regulate the food service industry.

H – **KITCHEN EQUIPMENT** shall be furnished and installed by Contractor.

I – **KITCHENS** should have Walk-In Refrigerator, Cooler, Freezer conforming with **NSF** Standard #7 and Dry Storage space, accessible from Receiving Area; Convection Oven(s) with self-locking wheels and minimum 12" space behind; The ovens should have capacity for 10 18x26 inch baking sheets. Four-Unit Flat-top Range; Range Hood(s) minimum 6'8" above floor; Cook's, Baker's, Salad Tables; and Convection Steamer; Dirty and Clean dish Tables; Dishwasher with booster electric heater immediately adjacent; three compartment sink; 2 compartment vegetable preparation sink with indirect drain; Hand Wash Sink; Pan Cart Racks; Commercial Microwave Oven; and mixer with flat beater, dough hook and vegetable grater attachment, sized based upon school size as follows:

01 – **30-quart** – for enrollment of up to 400.

02 – **60-quart** – for enrollment of 401 to 2,000.

J – **ADDITIONAL EQUIPMENT:**

01 – **ELEMENTARY SCHOOL** – Milk Cooler; Proofing Cabinet(s); Heated Cabinets.

02 – **SECONDARY SCHOOL** – In addition to equipment listed above for an Elementary school— Deep Fat Fryer; Grill; Exhaust Hood with Fire Protection System; Refrigerator Cabinet at end of each serving line; One extra (2 total) Convection Ovens with 10 18" x 26" pan capacity; Heated Cabinets.

11480 – GYMNASIUM EQUIPMENT –

A – **CURTAIN DIVIDER(S)** shall be provided to divide cross courts for Physical Education (PE).

B – **LOCKERS** – Welded, ventilated, metal, double-tiered.

C – **FLOOR ANCHORS** – Provide inserts, clamps, matt straps, etc., for ropes, nets, etc., at location(s) determined by **LPS** Property Management Services Department**.** Unless noted otherwise in Bid Documents, **LPS** will furnish equipment for installation by the contractor(s).

Division 12 - Furnishings

Provided by LPS (Owner)

Division 13 - Special Construction

Installation will be in accordance with Division 16000 - Revised October, 2004

13825 – SECURITY SYSTEMS –

TECHNICAL SPECIFICATIONS FOR THE EXISTING SECURITY SYSTEM ARE AVAILABLE IN THE **LPS** PROPERTY MANAGMENT SERVICES DEPARTMENT.

In new Building and Addition construction projects, design and engineer security system(s) acceptably approved by **LPS** Property Management Services Department, before Construction Documents are finalized for bidding.

A – **MOTION DETECTORS** will be installed where designated by **LPS** Property Management Services Department, who also shall approve routing of conduit and wiring runs.

13860 - COMPUTER/COMMUNICATIONS SYSTEMS -

Communication systems will be defined for the purposes of this document as any voice, data, video, intercom and public address system. The term system will be defined as all of the components required for a fully functional communications system.

A – **CONSTRUCTION REQUIREMENTS**

01 – **REMODELING AND NEW CONSTRUCTION PROJECTS.**

A pre-construction meeting will be required with designated **LPS** I.T.S. personnel a minimum of 30 days before project commencement. The purpose of this meeting will be to review the project scope of work, identify potential effects on existing communication systems, and to appoint an **LPS** I.T.S. point of contact for the project. The **LPS** I.T.S. contact will work with project managers and building personnel to identify locations for new communication interfaces.

The designated **LPS** I.T.S. contact must be notified a minimum of ten working days prior to any demolition involving existing LPS facilities. **LPS** I.T.S. personnel will help identify potential disruptions to existing communications systems. Any communication system that needs to be disconnected due to new construction will be done under supervision of the **LPS** I.T.S. contact. Upon completion of any construction project requiring the disconnection of a communication system, reconnection of that communication system will also be done under supervision of the **LPS** I.T.S. contact.

The contractor will be solely responsible for replacing any communication system component(s) damaged as a result of that contractor's construction activities.

02 – **COMMUNICATION INTERFACES**

Communication interfaces will be defined for the purposes of this document as all of the components required to make a fully functional access point to a communications system.

A cable access system will be installed by the contractor for all communication interface access points. The cable access system will consist of a secured ¾" conduit located within a fixed partition extending from a minimum 4" above ceiling level to near floor level. A single or double gang electrical box will be installed on the lower end of the conduit. The height from finish floor elevation to the top of the electrical box will be a standard 16 or 48 inches, depending upon the application. (Note: Special applications may require the placement of the electrical box at non-standard heights.) The electrical box will be left open for cable termination, which will be accomplished by **LPS** I.T.S. personnel.

Electrical outlets will be installed by the contractor within a distance of 24" horizontally from all communication interface points used for data. The load requirements and number of outlets will depend on the application.

All horizontal conduit runs greater than 10'0" in length shall have pull-cords installed between access points, to facilitate cabling by **LPS** I.T.S.

Care shall be taken to ensure that all communication conduit and cable runs be kept separate from electrical power wiring and devices.

All work must conform to all applicable electrical, life safety and building codes and UL requirements.

All cable installation, termination, and testing will be performed by **LPS** I.T.S. personnel. Materials required will be funded out of the project construction cost budget.

B – **DISTRIBUTION ROOMS**

01 – **ENVIRONMENTAL**

The main distribution room and satellite distribution rooms shall be one-hour rated construction, with standard locksets on all doors. Air conditioning shall be such as will stabilize temperatures between 60 and 80 degrees Fahrenheit and humidity from 40 to 80 percent.

02 – **ELECTRICAL REQUIREMENTS**

Minimum requirement in each distribution room shall be two dedicated 120 volt, 20 amp circuits, each circuit to have a four-plex outlet.

03 – **BACKBOARDS**

Plywood backboards shall be mounted on the wall in each distribution room, sized as required for systems to be installed, but each shall be a minimum 3/4" x 4' x 4'. Backboards shall be painted to match walls.

Division 14 - Conveying Systems

Where passenger elevators and/or chairlifts are required, systems shall comply in full with all applicable building codes, regulations, Americans with Disabilities Act Guidelines, laws and ordinances, including both the technical provisions and the administrative guidelines of the State of Colorado.

Emergency (battery) backup power shall be provided, and all elevators shall be key-access only.

Elevator cars or enclosed platform chairlifts shall include audible emergency alarms and remote alarm signals to building administration office, in lieu of car telephones.

Division 15

15010 – BASIC MECHANICAL REQUIREMENTS –

A – **PERFORMANCE** – Work shall be provided in accord with Underwriters Laboratories, local Public Utility, City of Littleton, City of Centennial, Arapahoe County, and State of Colorado codes, ordinances, and regulations and **LPS** special requirements. Licensed craftsmen are required to be on site at all times while work is being performed. Licensed craftsmen required by regulations to have license in possession and present upon request.

B – **CONSTRUCTION COST(S)** shall include natural gas hookup and installation fees, water meter, water and sewer tap fees, and associated piping and fittings.

C – **OPERATIONAL CERTIFICATION(S)** – Upon completion of project work, all necessary adjustments shall be made to balance Heating and Cooling Systems. Complete written report of systems operations shall be furnished to Property Management Services Department with data sheets indicating amount of air handled, hydronic flow, room temperatures, exterior weather data, equipment data, and other pertinent data. Same procedure will be repeated during first winter and first summer after occupancy at no additional cost to **LPS**. **LPS** Property Management Services Department reserves the right to confirm HVAC testing and balancing by a separate contractor working directly for **LPS**.

D – **MAINTENANCE AND OPERATION MANUALS** – Three typed/typeset copies of Operation and Maintenance manuals shall be furnished **LPS** Property Management Services Department on completion of, and prior to **LPS** acceptance and payment for, installation. **LPS** Property Management Services Department representatives shall be instructed on proper operation and maintenance of system(s) using manual as a guide. Furnish detailed written instructions for Custodian and Property Management Services Department personnel that spell out daily, weekly, monthly, and yearly duties. Deficiencies in Mechanical installation(s) and equipment will be corrected during first year (or as designated by extended warranty or legal obligation) of operation of the installation at no additional cost to **LPS.**

E – **ALTERNATING/STAND-BY PUMPS** shall be provided in main Heating Circulating system(s). Pumps should be: sized slightly above performance curve; be properly supported; not be close-coupled; have bronze impellers for domestic side, iron impellers for heating side; include by-pass as feasible; include isolation Ball valves at gauges; include back-up or stand-by for main or boiler pumps; have temperature/pressure gauge at main circulation pumps; pumps not to be installed overhead.

F – **EVAPORATIVE COOLERS** will be considered by **LPS**.

G – **ENVIRONMENTAL** air conditioning requirements shall be provided to accommodate computer installations.

H – **EQUIPMENT, MOTORS, AND CONTROLS** associated with addition and remodel areas will be same manufacturer as existing, and/or shall comply with **LPS** Property Management Services Department list of acceptable products (see Appendix, this Section.) Motors should: be energy-efficient; have sealed bearings; not be split-phase; be variable-speed if 20 hp or larger.

I – **AUTOMATION SENSORS** will be provided on designated equipment by Mechanical Contractor, coordinated with LPS central management system.

J – **A/E AND DBT RESPONSIBILITIES** include defining Contractor(s) responsibilities relative to existing **LPS** automation connection points. **A/E and DBT** are responsible for coordinating instructions with **LPS** Property Management Services Department before specifications are completed and ready for bid.

K – **SECURITY AND FIRE ALARM SYSTEM(S)** are to be coordinated between Drawings Specification(s) prior to receipt of bids.

L – **TEMPERATURE CONTROL SYSTEMS AND EQUIPMENT** must match existing **LPS** Direct Digital Control (DDC) systems and equipment by Johnson Controls.

01 – New equipment shall be factory-ordered without factory digital controller, with installed control devices, i.e., 0-10/4-20 ma modulating gas valves, dampers and conventional thermostat interface for connection to field installed Johnson Controls BAS. All new equipment must be pre-approved by LPS Property Management Services department.

02 – Control of existing equipment shall be maintained via existing Honeywell or Johnson control devices, field-modified as required.

03 – New contros shall be DDC, no pneumatics.

M – **ELECTRICAL TEMPERATURE CONTROL SYSTEMS** shall be installed in accordance with Division 16000.

N – **BOILER AND GAS LINE WORK** –

01 – **CONTRACTOR(S)** will not do any work on gas lines on or near building(s) while building is occupied.

02 – **NO WORK** on boilers, furnaces, or gas lines will be permitted without prior notification and approval of **LPS** Property Management Services Department.

03 – **BOILERS AND FURNACES** will not be turned on or off by Contractor(s). When boilers or furnaces are to be turned on or off, the **LPS** Property Management Services Department will be notified, and appropriate personnel will be dispatched to carry out necessary procedures.

04 – **BOILERS** shall: be energy-efficient; be dual-burner types (oil, gas) at high schools; be forced-draft; include an automatic make-up water system.

O – **VALVES AND VALVED SYSTEMS** – Should have the ability to isolate zones (supply and return); be accessible; systems should contain a midway isolation valve where feasible; isolation valves should be installed on each side of individual equipment, especially circulation pumps; main valves should be color-coded; manual air-bleeds should be piped to ground/floor level, automatic bleeds should be valved; no iron plug valves; **no dielectric unions** (brass only).

01 – No triple duty valves. Isolation, check, and balance valves must be separate.

02 – Isolation valves are to be butter-fly valves or ball valves.

P – **STEAM PIPING** –

01 – All steam **supply piping** shall be Schedule 40.

02 – All steam **return piping** shall be Schedule 80.

15300 – FIRE PROTECTION –

A – **SPRINKLER SYSTEM** supply lines shall be installed overhead, not underground, for easy inspection and drainage.

B – **NORMAL REQUIREMENT** is two hydrants within 500' of maximum risk; one within 700' of furthest risk. Basement area(s), corridor(s)/exit(s), Auditorium Platform(s), Boiler Room(s), and Kitchen Area(s) shall be investigated to determine fire protection requirements within the Building(s), as required by latest edition Building Code(s).

C – **FIRE ALARM SYSTEM(S)/EXTENSION(S)** shall be provided to match existing system(s) or as otherwise approved by **LPS** Property Management Services Department and governing fire department

15400 – PLUMBING –

Skilled crafts required by regulation to have license available for presentation upon request. Licensed crafts are required to be on job site while work is being performed. Comply with local and state codes governing plumbing. Provide adequate facilities for cleaning of sewer and waste lines. Provide stub-out of utilities for temporary facilities required by design program. Consider future addition(s) when sizing utilities. Refer to Food Service Section 11400 for Kitchen requirements.

A – **FIXTURES** – Vitreous china, low water volume type.

01 – **UTILITY COUNTERTOP SINKS** may be stainless steel.

B – **BRASS** – Plated type; chrome preferred.

C – **PIPING** – Copper service and supply; cast iron, PVC waste and vent preferred.

15500 – HEATING, VENTILATING, AIR CONDITIONING (HVAC) -

Systems shall have nighttime free-cooling capabilities and shall be sound isolated.

A – **MECHANICAL COOLING** on **LPS**-designated projects shall be selected as most appropriate and cost-effective for specific building conditions. Preference shall be given to (1) gas-absorption or DX cooling, (2) roof-top package units, especially where no ducted air distribution exists. No heat pumps or centrifugal chillers will be considered. All equipment must meet Colorado Regulation 15.

B – **HEATING AND COOLING SYSTEMS** shall furnish positive ventilation and comply with current ASHRAE standards. Projects without mechanical cooling shall have provision for introducing up to 100 percent outside air when heating is not required.

C – **HIGH VELOCITY AIR SYSTEM(S)** shall not be provided without mechanical cooling.

D – **HEAT SOURCE** shall be, hot water, or approved gas-fired unit(s).

E – **DIRECT FIRED HEAT EXCHANGERS** not allowed.

F – **BASIC HEATING AND VENTILATING EQUIPMENT** may be Rooftop, Central Station Type.

G – **SUPPLEMENTAL HEATING** may be Unit Heaters, Cabinet heaters, Radiation, etc., as acceptable to **LPS** Property Management Services Department.

H – **ELECTRIC HEAT** will be permitted only with **LPS** Property Management Services Department special approval.

I – **OCCUPIED SPACE(S) WITHIN BUILDING(S)** – Provide forced mechanical ventilation.

J – **EXHAUST** – Provide through relief opening or fan. Wherever space(s) require exhaust air only, provide make-up air from areas of the building, as permitted by applicable Code.

K – **SUPPLY, RETURN, EXHAUST AIR SYSTEM(S)** – Variable volume, variable temperature supply air distribution is preferred. Design and balance systems so that the building will have slight positive pressure at all times. Standards for Air Ventilation Rates must meet current ASHRAE standards.

L – **VENTILATION REQUIREMENTS** – Conform to latest edition(s) of the Uniform Building Code and Colorado Energy Conservation Code. Requirements contained therein will be considered as minimum.

M – **INDEPENDENT HVAC** systems provided for Administration area (and other areas as designated by **LPS**) shall be separate from primary building HVAC systems.

15960 – ENERGY MANAGEMENT AND CONSERVATION SYSTEMS -

Energy Conservation Standards of Colorado, latest edition, will be followed in Design of Heating and Cooling System(s) with cross-reference to Electrical Energy utilized. Life Cycle costing **(LCC)** for base system and any proposed alternates shall be researched and reported in writing to **LPS** Property Management Services Department when Design Development Documents are submitted for approval. The following items are to be in the Report:

A – **LCC** of Conventional Systems, air and water, and related electrical energy.

B – **LCC** of Conventional Systems, air and water, and related electrical energy.

C – **LCC** of Conventional Systems, air and water, and related electrical energy.

APPENDIX - DIVISION 15

Specifications for Mechanical Work shall incorporate the following **LPS** standard list of acceptable manufacturers and products, as applicable:

15100 – VALVES -

Valves should: be accessible, be able to isolate zones (supply and return).

A. Globe, check valves: Crane, Jenkins, Lunkenheimer, Nibco, Walworth.

B. Ball valves: Apollo, Crane, Nibco. (600WOG full-port rated.)

C. Butterfly valves: Crane, Tyco International, Nibco.

D. Gas valves: ITT General, Walworth.

E. Drain valves: Crane, Walworth, Josam.

F. Plug valves: No plug valves are to be used in **LPS** building systems.

15121 – EXPANSION COMPENSATION -

Flexonics, Garlock, Hyspan, Thermo-Tech. (Prefer flanged, if threaded, use in conjunction with unions.)

15150 – METERS AND GAUGES -

A. Thermometers: Ashcroft, Duro, Marshalltown, Tel-Tru, Trerice, Weiss, Weksler, Ametek.

B. Pressure gauges: Ashcroft, Duro, U.S. Gauge, Ametek.

C. Air filter gauges: Dwyer, Elllison.

D. Flow measuring devices:

1. 2” and smaller: Flow-set, Gerand, Presco, Blue-White

2. 2-1/2” and larger: Barco, Dieterich Standard Corp., Gerand, Presco, Blue-White, Piro..

E. Test plugs: Fairfax, Peterson, Sisco, Universal Lancaster.

15160 – PUMPS -

A. Base-mounted, double suction pumps: Bell & Gossett. Engineered so that planned useage is not at the edge of pump curve. No trimmed impellars-factory standard sized impellar only.

B. Base-mounted, ball-bearing pumps, flexible-coupled: Bell & Gossett. Engineered so that planned useage is not at the edge of pump curve. No trimmed impellars-factory standard sized impellar only.

C. Vertical turbine pumps: Allis-Chalmers, Goulds.

D. In-line pumps: Bell & Gossett, Taco.

E. Condensate return units: ITT Domestic, Skidmore.

15170 – MOTORS, STARTERS & DRIVES -

A. Starters: Square D/Schneider, Allen Bradley.

B. Variable-frequency drives: Danfos, ABB.

15175 – TANKS -

A. Expansion tanks: Bell & Gossett, Eaton Metal Products, Taco.

B. Pressurized expansion tanks: Bell & Gossett.

C. Domestic hot water storage tanks: Eaton Metal Products, Flexcon, Patterson-Kelley, Rheem/Ruud/Vanguard.

15190 – MECHANICAL IDENTIFICATION -

Line Guard, T& B Westline, W.H. Brady, Panduit.

15200 – WATER TREATMENT -

Rocky Mountain Aqua Tech.

15240 – VIBRATION ISOLATION -

Korfund, Mason Industries, Peabody Kinetics, Vibration Eliminator Co., Vibration Mountings & Controls.

15250 – MECHANICAL INSULATION -

CertainTeed, Owens-Corning.Re-insulation of piping as appropriate.

15300 – FIRE PROTECTION -

A. Valves: Nibco, Kennedy, Mueller, Stockham, Simplex/Grinnell, Milwaukee, Central, Mission, Automatic,
Firematic.

B. Flow switches: Notifier.

C. Fire Department connections: Croker, Potter-Roemer, Standard, Elkhart.

D. Dry pipe valves: Reliable, Viking, Simplex/Grinnell.

E. Air maintenance devices: Reliable, Viking, Grinnell, General Air.

15310 – FIRE SPRINKLER SYSTEM -

Gem, Central, Automatic, Reliable, Viking, Grinnell.

15330 – STANDPIPE AND FIRE HOSE SYSTEM -

Croker, Elkhart, Larsen, Potter-Roemer, Standard.

15340 – FIRE PUMPS -

Allis-Chalmers, Aurora, Fairbanks Morse, Patterson, Peerless.

15440 – PLUMBING SYSTEMS -

A. Cleanouts; shock arrestors; floor, roof and area drains; wall and yard hydrants: Josam, J.R. Smith, Woodford, Zurn, Watts.

B. Trench drains: Polycast, Quazite.

C. Hose bibbs: Crane, Josam, Nibco, Woodford, Zurn.

D. Domestic water heaters: A.O. Smith, Rheem/Ruud/Vanguard, State.

E. Hot water generators (general use): Bell & Gossett, Taco.

F. Hot water generators (kitchen use): Sanitizing, commercial use, electric; Rheem/Ruud/Vanguard.

G. Hot water storage tanks: American Steel & Iron Works, Eaton Metal Products, Engineered Sales & Service, Inc, Rheem/Ruud/Vanguard.

H. Sewage ejectors and sump pumps: Metropolitan pumps, suction, above ground, Zoeller and Weil.

I. Pressure and temperature relief valves: Watts.

J. Water pressure regulating valves: Bell & Gossett, Watts, Wilkins.

K. Backflow preventers: Febco 860 Ufor most applications. Watts acceptable for small in-line applications.

L. Water tempering valves: Lawler, Powers, Watts.

M. Precast concrete basins: Copeland.

15450 – PLUMBING FIXTURES AND TRIM -

A. Water closets, urinals, lavatories, bathtubs: American Standard, Crane, Kohler, Sloan.

B. Showers:

1. Stall (stainless steel, only): Aquarius, Eljer, Gerber, Kohler, Lasco.

2. Column shower: Bradley, Acorn.

3. Base: Arco, Fiat, Stern-Williams.

C. Sinks:

1. Stainless steel: Crane, Elkay.

2. Vitreous china: American Standard, Crane, Eljer, Kohler.

3. Enameled cast iron: American Standard, Crane, Eljer, Kohler.

D. Mop service basins: Arco, Fiat, Stern-Williams.

E. Electric water coolers, drinking fountains: Elkay, Halsey-Taylor, Haws. (Prefer Halsey-Taylor model #HAC-8F-Q surface mounted.)

F. Wash fountains: Bradley.

G. Emergency eye-wash, shower: Guardian Equipment, Haws, Speakman.

H. Toilet seats: Bemis, Church, Olsonite.

I. Auto/-Electric Flush valves: Zurn Aqua Advantage - **Only**.
Prefer:
• Urinal - ZER 6003 AV
• Toilet - ZER 6000 AV

J. Lavatory and sink supply faucets: American Standard, Chicago Faucet, Crane, Delta Workforce, Kohler, Moen Sani-Stream. All metal construction, no plastic.
Prefer:
• Lavatory faucet - Moen Chateau model #L64601
• Kitchen - with 8" centers, Moen Chateau model #67425

K. Metering faucets: No metering faucets are to be used in LPS buildings.

L. Shower valves, heads: American Standard, Bradley, Chicago, Powers.

M. Water tempering valves: Bradley, Powers.

N. Supply and drain fittings: American Standard, Brassco, Chicago, Crane, Kohler.

O. Food waste disposals (Stainless steel construction): In-Sink-Erator, National, Waste King.

P. Fixture carriers: Josam, J.R. Smith, Wade, Zurn.

15485 – SPECIAL PIPING SYSTEMS -

Vacuum pumps: ITT Pneumotive, Lammert, Quincy.

15485 – HYDRONIC SPECIALTIES -

A. Expansion tanks: Bell & Gossett, Taco, Eaton Metal Products.

B. Air separators: Bell & Gossett, Maid-O-Mist, Taco, Wilkerson.

C. Relief valves: Watts Regulator Co., McDonnell & Miller, Inc., Conbraco.

D. Combination check and shut-off valves: Crane Co., Lunkenheimer.

E. Combination pump inlet and strainer fittings: Bell & Gossett.

F. Pressure reducing valves: Bell & Gossett, Taco, Watts Regulator Co., Cash-Acme.

15516 – STEAM SPECIALTIES -

A. Steam traps: Dunhan-Busch, Hoffman, Sarco.

B. Steam air vents: Acme, Hoffman.

C. Steam pressure reducing valves: Watts Regulator Co.

D. Steam pressure relief valves: Watts Regulator Co., McDonnell & Miller, Inc.

15517 – GLYCOL SYSTEMS -

Glycol solutions: Ashland, Colorado Petroleum Products Co., Dow Chemical, Industrial Chemicals Corp., Siegel Oil Co.

15521 – CAST IRON BOILERS -

Peerless, Weil-Mclain.

15522 – CAST IRON MODULAR BOILERS -

Hydrotherm, Weil-Mclain.

15526 – PACKAGED STEEL WATER TUBE BOILERS -

Aerco, Bryan, Cleaver-Brooks, Gasmaster.

15527 – PACKAGED STEEL FIRE TUBE BOILERS -

Aerco, Cleaver-Brooks, Gasmaster, Kewanee.

15575 – CHIMNEY AND BREECHING -

Prefabricated chimneys: Van Packer.

15671 – RECIPROCATING CHILLERS -

Carrier, McQuay, Trane.

15710 – COOLING TOWERS -

A. Induced-draft cooling tower: Baltimore Air Coil, Ceramic Cooling Tower Co., Marley Cooling Tower Co.

B. Blow-through cooling tower: Baltimore Air Coil.

15755 – HEAT EXCHANGER -

A. Steam/water to water heat exchanger: Aerco, Bell & Gossett, Taco.

B. Air to air heat exchanger: Pace.

15781 – PACKAGED ROOFTOP UNITS -

A. Single-zone heating and air conditioning rooftop units (commercial quality):
Carrier, Lennox, McQuay, Trane, York. Engineered Air

B. Multi-zone heating and air conditioning rooftop units: Carrier, McQuay, Engineered Air.

C. Heating and ventilating rooftop units (commercial quality): McQuay, Reznor Engineered Air.

15782 – SPLIT SYSTEM AIR CONDITIONING EQUIPMENT -

Carrier, Lennox, McQuay, Trane, York Engineered Air.

15787 – COMPUTER ROOM AIR CONDITIONING UNIT -

Liebert.

15790 – COILS -

Carrier, McQuay, Trane, York.

15830 – TERMINAL HEAT TRANSFER UNITS -

A. Unit ventilators: Dunham-Bush, Nesbitt, Trane (provide manufacturer's sound ratings data).

B. Fin-tube radiation: American Air Filter, Trane.

C. Cabinet heaters, unit heaters, convectors: American Air Filter, McQuay.

D. Fan-coil units: American Air Filter, McQuay, Trane, York.

E. Water-source heat pump: Not acceptable.

F. Gas-fired unit heaters and duct heaters: Reznor, Trane.

G. Gas-fired unit heaters and duct heaters (sealed combustion type): Reznor.

H. Gas-fired infrared heaters: Roberts-Gordon (Co-Ray-Vac), Ambi-rad Radiant.

I. Electric fin-tube radiation: Not acceptable.

J. Electric cabinet heaters (prefer not to use): Airtherm, Trane.

K. Electric unit heaters (prefer not to use): Trane.

15855 – AIR HANDLING UNIT -

American Air Filter, Carrier, McQuay, Pace, Trane, York.

15860 – AIR DISTRIBUTION EQUIPMENT -

A. Centrifugal roof, wall up-blast fume exhaust fan: Barry, Carnes, Greenheck, Jenn-Air, Penn.

B. Centifugal ceiling exhaust fan: Carnes, Greenheck, Jenn-Air, Penn.

C. Propeller wall exhaust fan: Carnes, Greenheck, Jenn-Air, Penn.

D. Utility fan: Barry, Greenheck, New York Blower, Trane, York.

E. Centrifugal fan: Barry, New York Blower, Pace, Trane, York.

F. In-line tubular centrifugal fan: Greenheck, Penn, Barry, Greenheck, New York Blower, York.

G. In-line vane axial fan: Barry, New York Blower.

H. Cabinet fan: American Air Filter, Greenheck, Trane.

I. Roof hood: Carnes, Greenheck, Penn, Vent Systems.

15886 – AIR FILTERS -

American Air Filter, Farr, Airguard. Pleated high efficiency.

15890 – DUCTWORK -

A. Acoustical plenum: Aerocoustics, DynaSonics, Environmental Air Products, Gale, Industrial Acoustics, Koppers, Semco.

B. Fiberglass ductwork: Not acceptable.

C. Duct lining: Owens-Corning.

15910 – DUCT ACCESSORIES -

A. Air flow measuring station: Brant, Air Monitor, Cambridge.

B. Acoustical sound attenuator: Aerocoustics, DynaSonics, Enelco, Gale, Environmental Air Products, Industrial Acoustics, Semco, United Acoustical.

15930 – AIR TERMINAL UNITS -

Anemostat, Carnes, Trane.

15931 – AIR DEVICES -

Registers, grilles and diffusers: Anemostat-Waterloo, Carnes.

15970 – CONTROLS AND INSTRUMENTATION -

Coordinate with existing equipment and Metasys DDC control system by Johnson Controls.

1. All new HVAC equipment will be directly controlled by existing BAS (Johnson Controls Metasys) integration only with **LPS** pre-approval.

2. Minimum points on RTU's and AHU's include: Start/stop, pump/fan status, temperature sensors for mixed, discharge, and zone. Mixed air control (dampers) and control of heating/coolingstages.

3. Minimum points on boilers and domestic hot water include: Start/stop, pump/unit status, supply and return temps, alarm contacts and the ability to reset supply temp.

4. Minimum points on chiller systems include: Start/Stop, pump/unit status, alarm contacts, supply and return temps, and the ability to reset supply temp.

5. Variable frequence drives to be used whenever possible to maximize energy conservation.

6. Control schemes need to be reviewed and approved by district personnel.

7. Direct Digital Controls to be installed v pneumatic.

8. Prior to demolition of old equipment and controls, district personnel are requird to verify what is to be removed.

Division 16 - Electrical

16100 – INSTALLATION CRITERIA –

A – **WORKMANSHIP** –All installations shall be performed by licensed electricians and apprentices. Licensed personnel shall be on site while work is being done. Licenses will be presented to district personnel upon request. Installation shall be performed in a neat and workman like manner and in accordance with all applicable local, state, and national code requirements.

B – **CONDUIT AND CABLING** – Existing building piping shall not be used except by specific permission of authorized **LPS** Property Management Services Department representative. New conduit and cabling shall be aligned parallel and perpendicular to building structure, and shall be concealed except in equipment rooms or by permission of **LPS** Property Management Services Department. All roof installed raceways to have steel fitting and be properly supported by Unistrut type roof stands (Micro Industries, B-Line, etc.). Fabrications may be submitted for **LPS** Property Managment Services approval.

C – **CONDUCTORS** – Conductors of 50 volts or more shall be installed in approved raceways. Cabling of less than 50 volts when not installed in approved raceways shall be plenum rated.

D – **INSULATION PROTECTION** – Electrical conduit shall be properly reamed to prevent damage to wire insulation.

E – **PIPE CUTTERS** – Plumbing type pipe cutters shall not be used on electrical conduit except when used for cutting ridged (GRC) and proper care is taken not to reduce internal diameter.

F – **BOX SUPPORT** – Boxes in walls shall be securely fastened in such a manner as not to rely on cover trim plate for support.

G – **PENETRATIONS** – Penetrations shall be made in such a way as to maintain structural integrity and fire wall rating. Non-fire walls will be patched as required to prevent environmental air from passing from one zone to another. All penetrations will be sealed with expanding foam to prevent airflow by 98 percent minimum. Roofs and outside walls will be properly sealed to prevent leakage.

H – **LABELING** – Panel boards, switch gear, and motor control centers shall have permanent, engraved-plastic nameplates clearly designating equipment or panel, and will include a complete, typewritten list identifying circuit use. When circuits are to be added to existing panels, new circuits shall be clearly identified. Junction boxes shall be identified with panel and circuit number. Concealed or mechanical room junction boxes shall be labeled on outside of cover. Exposed junction boxes shall be labeled on inside of cover.

I – **MATERIALS AND EQUIPMENT —** shall comply with **LPS** Property Management Services Department list of acceptable products (see Appendix, this Section). Variation requires written approval from LPS Property Managment Services.

J – **CONDUCTORS —** #8 and smaller conductors must be manually twisted before wire conductors are applied.

16200 – TEMPORARY WIRING –

Special safety considerations are required for temporary wiring installations in school buildings. All OSHA and NEC standards shall be met, as well as state and local building codes. The contractor shall be responsible for any personal injury or property damage resulting from temporary wiring improperly installed or improperly protected. All temporary wiring whall be removed upon completion of project.

16300 – EXISTING WIRING –

No additional loads will be attached to existing circuits except by permission of authorized **LPS** Property Management Services Department representatives.

16400 – DEMOLITION –

A – **PERSONNEL** – Demolition required during construction shall be performed by qualified electrical personnel in such a manner as not to interrupt or destroy the integrity of existing systems.

B – **RECONNECTION** – All systems, including phone, PA, or computer systems, that are disconnected due to construction needs, shall be reconnected upon completion of project. Exceptions must be authorized, in writing, by the designated **LPS** Property Management Services Department project manager. Contractor assumes the responsibility of reporting all system deficiencies, in writing, to **LPS** Property Management Services department prior to project commencement. All systems will be considered fully functional and operational prior to project commencement unless properly reported.

C – **REMOVAL** – All abandoned electrical conduit wiring and devices shall be removed and existing holes patched. Abandoned circuits and feeders shall be removed all the way back to the panels.

D – **REINSTALLATION** – It shall be the responsibility of the contractor to ensure proper installation and operation of existing electrical systems that may be affected by construction.

16500 – ELECTRICAL OUTAGES –

Outages of any kind involving existing building systems will be scheduled in advance with the authorized **LPS** Property Management Services Department representative. Life safety systems must remain functional while building is occupied. Any exceptions must be prearranged and authorized by LPS Property Management Services Department.

16600 – FIRE ALARM SYSTEMS –

All applicable State and local codes shall be adhered to including but not limited to NFPA 72, NEC 70, IFC, NFPA 101, NFPA 90 and ADA. Fire alarm drawings and specifications shall be reviewed by LPS Property Managment Services prior to fire department review for permit. Fire alarm duct detectors shall be installed inside building structure. It shall be the responsibility of the contractor to obtain any technical assistance that is necessary to ensure proper installation and operation of existing and new fire alarm systems that may be affected due to construction. Fire alarm work shall not be preformed without a fire alarm permit.

A - PRODUCTS -

1. Fire alarm system shall be UL listed for fire alarm use and be of the following manufacturer: Johnson Controls
2. Fire alarm pull stations shall be of the addressable type and function in such a manor as to not send an alarm when opened for routine maintenance. [Spec. Johnson controls]
3. Remote test switches shall be of the key type.

B-SYSTEM

1. Primary power shall be of a dedicated source and be clearly identified by panel and circuit at the fire alarm panel.
2. Where possible primary power shall be of an EM source.
3. Sequence of operation shall be defined by LPS.
4. Zone allocation will be defined by LPS standard.
5. A manual pull station will be located with-in five feet of the main fire alarm panel, and programmed with no delay.

C-EXECUTION

1. Prior to the execution of any fire alarm work it shall be the contractor's responsibility to perform a complete function test, and point report of the system to identify any and all deficiencies in existing equipment.
2. The documented result of this test will be reported to LPS including smoke detector levels of contamination.
3. Fire alarm work shall in no way disrupt or impede educational activity by student or staff.

D-PERSONNEL

1. Installation Supervisor shall hold a Colorado State Journeyman Electrical License; have a minimum of five years fire alarm installation and or NICET level two or better certification.

E- INSTALLATION

1. LPS wire standard to be followed.
2. Duct detectors shall not be installed on exterior of building.
3. T-taps are not allowed in SLC and NAC wiring.
4. Junction box covers in classrooms, offices, and open space must be ivory, stainless steel, or painted to match walls. They shall be clearly marked on the inside of the cover.
5. All SLC shields must be Tappe to protect shield.
6. All underground installation must use wire rated for underground use.
7. All fire alarm devices will be installed in accessible locations and clearly marked with LPS approved labels to identify device address, circuit, and function.
8. Unused portions of existing fire alarm system will be removed.
9. Upon completion of construction demonstrate existing portions of fire alarm system to be restored to original or better condition.
10. Smoke detector levels of contamination shall not exceed levels found prior to construction

F-SYSTEM TEST AND ACCEPTANCE.

1. LPS personnel will attend pre-test and fire alarm final.
2. Fire alarm system will not be considered as functional until the Fire Department and LPS have approved it.
3. Final acceptance test will be documented by an NFPA 72 record of completion form.
4. A warranty of one year will begin after 30 consequtive days of trouble free service and upon the receipt of all construction documents including but not limited too: accurate As-build drawings, graphic maps, fire alarm program-software, owner's manuals and test records.

<u>16700 – FINAL ACCEPTANCE AND SYSTEM DEMONSTRATION</u> –

All electrical equipment will be demonstrated as being fully functional. Installation, adds, changes, or modifications to new or existing fire alarm, temperature control, intercom, or any other control function type systems shall be demonstrated to the authorized **LPS** Property Management Services

Department representative as fully functional before final acceptance. The cost of repairing any damage to existing systems due to improper equipment or improper wiring shall be the responsibility of the contractor.

16750 – SPECIAL ELECTRICAL CONDITIONS –

A – **EACH MAIN ELECTRIC PANEL** shall be oversized 25 percent to assure power and circuit breaker capability for requirements occurring after occupancy.

B – **MERCURY VAPOR LAMPS** and incandescent bulbs are not acceptable .

C – **BUILDING EXTERIORS,** when lighted for security purposes, are to utilize high pressure sodium lighting controlled through photo cells, or astronomical clock. Exterior fixtures shall be vandal resistant. Parking lot lighting shall be controlled by both photo cells and astronomical clocks, for energy management purposes.

1. Photo Cells to be Tork 2101 or 2104

2. Time clocks to be Intermatic ET70115C, ET70115CR, ET70115CR8, ET70115CR24, ET70215C, ET70215CR, ET70215CR8, ET70215CR24. Substitutions must be have written approval from **LPS** Property Management Services.

D – **SUFFICIENT ELECTRICAL CHARACTERISTICS** and capabilities shall be provided to support Classroom and Office computer installations. A minimum of two dedicated 20amp circuits to each classroom. Excluding computer rooms which require special consideration.

16800 – SERVICE AND DISTRIBUTION –

Provide underground service from Utility Company lines to transformers and service equipment at load center location.

A – **STANDBY SERVICE** – Provide automatic emergency standby power source as required by applicable codes and regulations fueled by natural gas.

B – **DISTRIBUTION PANELS** – Circuit breaker type of the "quick-make, quick-break" switch and fuse unit type.

C – **SECONDARY FEEDERS** – Conductors #6 or smaller shall be copper; those larger than #6 may be aluminum, provided that connectors shall be those specified by the manufacturer solely for aluminum conductors and shall be torqued in strict accordance with manufacturer’s specifications.

16900 – LIGHTING –

Basically conform to UL and local requirements, except where **LPS** Standards or Property Management Services Department requirements are more stringent. The maximum electrical power used to provide general lighting for new construction or a remodeled area shall be three watt per square foot.

A – **LIGHT FIXTURES** shall be T-8 in areas or buildings without T-5s. T-5s are to be installed where T-5s currently exist or where 80% of the light fixtures are being replaced. All ballasts are to be electronic type, or halogen lamps, and are to be compatible with existing system.

B – **BULBS AND FLUORESCENT TUBES** will be of an energy-efficient type approved for installation by **LPS** Property Management Services Department**.**

C – **DIMMERS** shall be provided on Computer Room Lighting. Dimmers shall be of non-resistive energy efficient type, except as necessary for stage lighting.

D – **EMERGENCY LIGHTING** – All exit and emergency lighting must be powered by emergency systems, with 20-minute battery backup for emergency/night lights. LED exit signs shall be used in new construction and remodel areas. Exit lights are to be Lithonia Model #LQMSW3G 120/277 (add ELM to number for battery backup). Frog-Eye battery emergency lights shall be dual LZ2 Type. Substitutions require written approval from LPS Property Managment Services Department.

E – **SWITCHING** – Switching will allow for use of natural light in portions of any room or area where conditions will permit. Hallways and passage areas shall allow for two levels: full and reduced occupancy, with switching available at several convenient locations so as to facilitate adjustment. Motion sensors will be used in all restrooms.

F – **DESIGN CRITERIA/TASK ILLUMINATION LEVELS** – A range of lighting levels is presented due to the impracticality of obtaining and maintaining a specific foot-candle number. Simple photometer measurement can only be used to define the quantity of illumination, not the quality. Lighting energy requirements are of major proportion, 31 to 37 percent of total energy requirements used in School and Office type Buildings, so it becomes obvious that significant energy savings can be realized if it is possible to reduce energy demands of artificial illumination.

Table of Task Illumination Levels

Task	Range Of Footcandle Power	Recommended Footcandle Power
Reading: Printed Material	30 to 50	35
Handwriting – Ink or Soft Pencil	50 to 80	60
Note Taking	30 to 50	40
Lab Work – Detailed Experiments	50 to 70	60
Sewing	60 to 80	70
Cooking	30 to 60	45
Computer Labs	30 to 50	40
Music Playing	40 to 60	50
Arts and Crafts Work	50 to 90	70
Drafting	70 to 90	80
Bench Work (Shops)	70 to 90	80
Conference and Interview Rooms	30 to 40	35
Gymnasiums	45 to 55	50
Pool Area	50 to 70	60
Theater	10 to 30	20
Lecture Rooms	30 to 50	40
Dining	5 to 10	7.5
Cleaning	10 to 20	15
Kitchen	50 to 90	70
Serving	30 to 60	45
Circulation (Corridors and Halls)	10 to 20	15
Stairways	10 to 20	15

APPENDIX - DIVISION 16

Specifications for Electrical Work shall incorporate the following **LPS** standard list of acceptable manufacturers and products, as applicable:

16112 – CABLE TRAY RACEWAYS -

B-Line Systems, Globe, Husky-Burndy.

16115 – SURFACE METALLIC RACEWAYS -

Wiremold 700 Series (preferred), or Walker.

16132 – FLOOR BOXES -

Hubbell, Wiremold.

16141 – WALL SWITCHES -

Hubbell, Leviton. (No quick-connector or residential.)

16145 – RECEPTACLES -

Hubbell, Leviton. (No quick-connector or residential.)

16146 – MULTI-OUTLET ASSEMBLIES -

Hubbell, Wiremold.

16147 – DEVICE PLATES -

Leviton, Mulberry, Stenco. (Metal only, no plastic.)

16148– WIRE CONNECTORS -

Push, Quick, Stab Lock, and/or equivalent are prohibited.
Splitbolt, Setscrew, Compression, Wingnut, Wirenut, and Scotchlock wire connectors are acceptable.

16170 – MOTOR AND CIRCUIT DISCONNECTS -

General Electric, Square D, Siemens, and Westinghouse.

16210 – ENGINE-GENERATOR SETS -

Generac, Onan or by prior approval by LPS Property Managment Services department.

16250 – AUTOMATIC TRANSFER SWITCHES -

ASCO, Onan, General Electric.

16320 – PAD-MOUNTED TRANSFORMERS -

Westinghouse, General Electric.

16430 – METERING -

A. Meter mounting device: Crouse-Hinds, Durham, Landis & Gyr..

B. Current transformer enclosure: Erikson, Hoffman.

16460 – DRY-TYPE TRANSFORMERS -

General Electric, Westinghouse, Square D, and Siemens.

16465 – BUS DUCT -

General Electric, Square D, Westinghouse, and Siemens.

16470 – BRANCH CIRCUIT PANELBOARDS -

General Electric, Westinghouse, Siemens/ITE, Square D.(Bolt-in breakers, only.) Panels are to be hinged.

16471 – DISTRIBUTION PANELBOARDS -

General Electric, Siemens, Square D, Westinghouse. If panel cover is one piece, it is to be the hinged type.

16475 – OVERCURRENT PROTECTIVE DEVICES -

A. Circuit breakers (bolt-in only; by same manufacturer as panelboard, disconnecting device, etc.): General Electric, Siemens/ITE, Square D.

16480 – MOTOR CONTROL CENTERS -

Motor control center: General Electric, Square D, Westinghouse.

16485 – MOTOR STARTERS -

A. Magnetic motor starters (full voltage, no light-duty): General Electric, Square D Westinghouse, Siemens.

B. Manual motor protection switches: General Electric, Square D, Westinghouse, Siemens.

16501 – LAMPS -

A. 32WT8 lamps for electronic ballasts: General Electric, Westinghouse, Sylvania, Phillips, Osram.

B. Where special lamps are indicated, furnish exactly as specified.

16502 – BALLASTS, CONTROLS AND ACCESSORIES -

Electronic ballasts with 5-year warranty: Motorola, General Electric, Advance, Universal, Jefferson.

16503 – POLES AND STANDARDS -

A. Lighting poles shall be constructed so that all metallic parts are continuously grounded, with grounding stud inside hand-hole.

B. Poles shall be set on concrete base, with top elevation 3’-0” above grade at parking areas and 6” above grade at all other areas.

C. Pole material and wall thickness shall be sufficient to support effective projected area of luminaire and pole, without damage to lamp filaments, for a wind gust factor of 130 mph.

16512 – LIGHTING DIMMERS -

Hubbell, Lutron.

16720 – FIRE ALARM AND DETECTION SYSTEM -

All equipment by same manufacturer, as possible: Johnson Controls.

16725 – INTRUSION DETECTION SYSTEM -

Must be 12 volt DC for system compatible to monitor modum of Johnson Control + Detection Systems Inc.

16775 – CLOCK AND PROGRAM SYSTEM -

All master clocks or slaves for time keeping shall be Simplex. Master clocks shall be 6400. Slaves shall be synchronus and of the type specified by LPS. Hard wiring or frequency type varies by by building and will be determined by LPS Property Management Services.

16856 – ICE- AND SNOW-MELT CABLE -

Raychem.