

# **MEASURE A & Z STRONG SCHOOLS BOND**



**PALO ALTO  
UNIFIED SCHOOL DISTRICT**

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Technical Specifications

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# PAUSD TECHNICAL STANDARDS

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# **Palo Alto Unified School District Technical Standards**

## **INTRODUCTION**

The following standards have been developed to assist the Design Teams in keeping designs consistent with products used throughout the district. Many of the items are sole sourced, while others are preferred items due to maintenance personnel preference due to training/ knowledge of the systems.

## **BACKGROUND**

The Palo Alto Unified School District (hereinafter referred to as PAUSD or the District) is committed to providing educational facilities that are functionally efficient, innovative in design, compatible with the local environment, architecturally appropriate, free of safety problems and economic to construct, operate and maintain. To realize these goals, definitive design policies have been established to guide the Architect/Engineer (A/E) team in designing new construction and for renovation and modernization of school facilities. The policies, parameters, requirements and criteria identified in this volume are intended to establish standards for the design of school facilities. The standards herein are part of the Palo Alto Unified District's effort to create educational spaces that are safe, sustainable and long lasting. These Technical Standards compliment the Facilities Master Plan and Educational Specification Program Standards. The Facilities Master Plan conceptually lays out the long-term vision for each campus. The Education Specification Program Standards identify the areas and adjacencies.

**FACILITES MASTER PLAN:** Conceptually lays out the long term vision for each campus.

**EDUCATIONAL SPECIFICATIONS:** Identify the areas and adjacencies.

**TECHNICAL STANDARDS:** Specifications on products and materials.

### **GENERAL REQUIREMENTS**

All schools in the Palo Alto Unified School District will be designed and constructed to meet the Design Criteria and Standards within this document, in addition to current Code, Title 24, and ADA design criteria. It is the A/E's responsibility to achieve these requirements through effective design. All parts of the school shall be constructed to maximize safety. All district projects must comply with Safety orders outlined by the Division of Industrial Safety CALOSHA requirements of the California Code of Regulations (CCR), Title 8, Industrial Relations, Chapter 4.

### **COST ALTERNATIVES**

Alternatives shall be considered by the A/E to ensure long-term, cost-effective design solutions.

### **MAINTENANCE, OPERATING, REPAIR AND REPLACEMENT COSTS**

PAUSD facilities shall be designed using products and materials as selected to minimize the cost of maintenance and repair. A primary intent of this manual is to standardize around the use of products, materials, systems and manufacturers that best meet the District's needs thereby creating long term cost efficiencies in operations and maintenance.

### **CONSERVATION RESOURCES**

Energy conservation shall be given prime consideration in the design of school facilities, consistent with the criteria established in the Cal Green code. Products, materials and systems shall be selected with a view toward minimizing the use of non-renewable resources. The A/E shall investigate and present to the District design approaches that will enhance renewable resources, i.e. daylighting, natural ventilation and use of waste heat and cooling to accommodate load requirements throughout the school where practicable.

### **INDOOR AIR QUALITY (IAQ)**

School facilities design shall meet or exceed IAQ requirements set forth by the Cal Green code criteria.

### **ACCESSIBILITY-AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE**

## **Palo Alto Unified School District Technical Standards**

All new construction will be designed in compliance with Title II of the Americans with Disabilities Act (ADA) and meet the technical requirements of the ADA accessibility guidelines, (ADAAG) as well as state and local codes. In renovation projects, in addition to technical compliance, consideration shall be given to the accessibility of the facility as a whole. This will maximize the benefit to the renovation work.

### **FORMAT**

This manual is comprised of various sections to be used as guidelines, as well as, specific standards information that are intended for incorporation by the A/E into the project specifications.

### **USE OF THIS MANUAL**

This manual is intended as a guide for the selection and use of materials to facilitate consultants' compliance with PAUSD standards, and for the district's staff and management consultant's review of the design for adherence to these standards.

### **A/E RESPONSIBILITIES**

The A/E shall incorporate the contents of this Manual in the design of each school project. Where the A/E considers various portions of the Manual too restrictive or proposes a more cost-effective solution, prior approval in writing by the District must be given. The A/E shall support its position with written justification and identified cost association.

The A/E shall review this information for completeness and coherence with the overall project specifications and notify the District in writing of any inconsistencies and suggest corrective work for approval.

The A/E shall distribute copies of this Manual to all pertinent sub consultants. This manual is to be read and utilized in its entirety; applications for design disciplines are spread throughout the Manual. Focusing on specific sections without evaluating the requirements will often lead to incomplete and conflicting design solutions.

As part of the design Quality Assurance process, the A/E and its consultants shall submit at each major design milestone (i.e., Schematic Design, Design Development and Construction Documents), a certification that all requirements and standards of this Manual have been addressed and incorporated as applicable in the design. Non-adherence of these requirements will be identified along with justification to the District for consideration.

The A/E design shall meet all current applicable codes. Where the direction provided in this manual is in conflict with applicable codes, this conflict shall be brought to the attention of the District for resolution. The A/E's design shall be in full compliance with the Americans with Disabilities Act and the technical requirements of the ADA Accessibility Guidelines (ADAAG). This includes any new standards that may be issued.

Manufacturers and products referenced in this Manual may cease to exist or change in the future. The A/E shall verify the current status of such prior to specifying and shall notify the District of obsolete information so the standards may be updated.

### **DISTRICT RESPONSIBILITIES**

The District shall provide to the A/E an electronic copy of Technical Specifications.

The District may periodically review the Design Guidelines and Technical Specifications and may issue revisions for incorporation by the A/E. Each section will be dated with a new revision date.

**Palo Alto Unified School District  
Technical Standards**

**PAUSD APPROVED MANUFACTURER LIST**

No products or materials are to contain volatile organic compounds (VOC's) or asbestos containing materials (ACM's).

<b>CSI #</b>	<b>Item</b>	<b>Manufacturer</b>
<b>06 41 00</b>	Cabinetry Hardware	
	Drawer Hardware	Accuride Grant
	Drawer Slides	Accuride Grant
	Pulls (Semi recessed) AQBS 4-1/2"	Plastiglide CO. Hafele
	Pulls 4"	Amerock
	Shelf Supports	Hettich Knape & Vogt Secure
	Drawer Locks	National Lock Secure Products
<b>07 41 13</b>	Roof Hatches	Bilco
<b>07 50 00</b>	Roof – Single Ply Membrane	GAF Firestone
<b>08 13 00</b>	Steel Doors	Steelcraft Ceco
<b>08 14 00</b>	Wood Doors	Algoma Hardwards Wyerhauser Company Cal-Wood Inc.
	<b>08 71 00</b> Door Hardware	
	Cylinders (High Security)	Primus (sole source)
	Door Protection Plates	NT Quality Hardware Trimco Ives
	Exit Devices	Von Duprin (sole source)
	Closers	LCN Norton
	Flush Bolts	Glynn-Johnson Trimco
	Hinges - Continuous	Roton
	Hinges	McKinney Stanley Hager
	Kickplates	Trinco/BBW Ives Quality
	Latch/Locksets	Schlage (Sole Source)
	Alarm Locks	Trilogy (Sole Source)
	Lock Protectors	Glynn-Johnson
	Panic Devices	Von Duprin Commercial Grade (Sole Sourced)
	Push Plates/Pulls	Pemko
	Removable Mullions	Von Duprin (Sole Source)
	Silencers	Glynn-Johnson Trimco/BBW NT Quality Hardware

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	Stops	Trimco/BBW Glynn-Johnson Quality
	Smoke Seals	Pemko Zero National Guard
	Thresholds	Pemko, Zero, National Guard
<b>09 51 00</b>	Acoustical Ceiling	Armstrong 2910AN Random Fissured Perforated HumiGuard Plus
<b>09 60 00</b>	Flooring	
	Vinyl Composition Tile	Armstrong – Linorette Linoleum (Gobi Sand) & Marmorette Linoleum (Constellation)
	Carpet	Mohawk, First one up II, color 727 Priority (Sole Source)
	Resinous Flooring	Dex-o-tex (Slo-track), Terra color
	Base	Burke (Tweed)
	Rubber Threshold Ramp	Von Duprin Industries,
	Carpet Risers	Trimco
<b>09 72 16</b>	Specialty	
	Visual Display Boards	Greensteel Claridge Nelson-Adams
	Smart Boards	Epson Brightlink
<b>09 72 16</b>	Tackable Wall Surface	
	Tackable Wall Panels	Koroseal Spellbound
<b>09 91 00</b>	Paint	Dunn Edwards (Sole Source)
	Fire Retardant Paint	Koppers Co. Inc. “Non-Com” J.H. Baxzter and Co. Bayco Pyresote
<b>10 11 00</b>	Visual Display Boards	Greensteel Claridge Nelson-Adams
	Smartboards	Epson Brightlink
<b>10 28 13</b>	Toilet accessories	
	Soap Dispensers	District Supplied Contractor installed
	Paper Towel Dispenser	District Supplied Contractor Installed
	Toilet Paper	District Supplied Contractor Installed
	Sanitary Napkin Dispenser	Bobrick
	Mirrors	Bobrick
	Partitions	Scranton Products, Eclipse OP Glacier Grey (Sole Source)
	Electric Hand dryers	In Student Restroom and public areas Dyson MaxBlast Bobrick
<b>10 43 00</b>	AED	Philips (sole source)
<b>12 21 00</b>	Louver Blinds	Levolor
	Roller Blinds	Mecho-Shade Systems, Inc
<b>12 36 23</b>	Plastic Laminate for Casework	Sides = Nevamar Grand island Maple (W-9-371t) Top = Sidewalk Café (SD-2-1T)
<b>14 24 00</b>	Conveying equipment	
	Elevators	Tyson Crump Kone
	Wheel chair lift	Porch Lift

**Palo Alto Unified School District  
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<b>22 00 00</b>	<b>Plumbing and Utilities</b>	
	Access Doors	Milcor Plaster Karp Cesco
	Cleanouts/Drains	J.R. Smith Josan Zurn
	Drinking Fountains (Interior) With Bottle fillers	Haws - Stainless Steel Sunroc Murdock
	Drinking Fountains (Exterior)	Murdock GYQ54
	Flush Valves	Sloan Flushometers
	Faucets	American Standard Chicago
	Garbage Disposal (for staff areas only)	Insinkerator Big Genie Hobart
	Lavatories (ADA accessible)	Just Elkay
	Trap Primer	Precision Plumbing Products MIFAB
	Water Closets Wall Hung Urinals  Seats	Kohler American Standard Crane Motex Olsenite
<b>23 00 00</b>	<b>Heating and Ventilating</b>	
	Circulating Pump	Ball & Gosset Grundfos
	Gas fired heating units	Trane
	Hose Bib (roof mounted)	Zurn J.R.Smith Murdock Chicago
	Regulators	Halts Febco
	Rooftop AC units	Trane Carrier
	Rooftop Condensate drains	Zurn J.R. Smith
	Thermostats	Provided W/ Bagostsph
	Water Heaters	A.O. Smith American Move-Flo
	Point of use water heaters	Takagi Rheem Rinnai
	Energy Management System (DDC)	Alerton Technologies Inc. (sole Source)
	Boilers	Raypak
<b>26 00 00</b>	<b>Electrical Equipment</b>	

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	By-Pass Timers/Switches	Paragon Tork Eagle Sangano
	Clock/PA System	Valcom (with callback) VIP-429A-A, VIP429A-D, VIP-430A, VIP-480AL-GY, V-9805, VB-S23 (Sole Source)
	Controls and Panels	Square D
	Fire Alarm System	Silent Knight by Honeywell (Sole Source)
	Fluorescent Lamps	Phillips Daybrite Sylvania
	LED	Finelight Luminaire
	Incandescent Lamps	General Electric 99
	Light Fixtures	Wellmade
	Occupancy Sensor	Leviton No. 6768-W/ watt stopper
	Power Switches	Square D General Electric/Westinghouse
	Transformers	Challenger General Electric/Westinghouse Square D
	Toggle Switches	Hubbel Lutron
<b>27 11 00</b>	Cable Raceway	Wiremold, Model 5500, 3 Channel
	MDF Rack / Cabinet	Chatsworth or Cooper B-Line E2 "U" Height 38, W 24", D 36"
	IDF	Chatsworth or Cooper B-Line E2 Dual Hinge "U" Height 24, W 24", D 36"
	IDF Fan	Pfannenberg, Mode #DTT3500
<b>27 30 00</b>	Telephone system	ShoreTel
<b>27 41 23</b>	Apple TV	Apple
<b>32 31 00</b>	Fencing	Black Vinyl
<b>33 80 00</b>	Sprinklers	Rainbird 15C-16 or 15C-24
	Playing Field	Hunter Model 1-40 Series, adjustable
	Small Turf	Hunter PGP Series, adjustable or
	Large Turf	Rainbird 1802, 1804 Popup Hunter Model PGP Series, adjustable or
	Timers	Rainbird 47, adjustable, 51 Full. Total Control by Irritrol

**PAUSD PROVIDED PRODUCT LIST**

<b>CSI #</b>	<b>Item</b>	<b>Manufacturer</b>
<b>10 28 13</b>	Toilet Paper Dispensers	O.S.C.I.
	Paper Towel Dispensers	O.S.C.I. (In staff areas only)
	Soap Dispenser	O.S.C.I.
	Toilet Seat Protector	O.S.C.I. (In staff restrooms only)

## **TECHNICAL STANDARDS**

### **Division 01 — General Requirements**

### **Division 02 — Existing Conditions**

Architect is responsible to evaluate all existing site conditions, including but not limited to all utilities above ground and below ground, roofing, coverage of lighting Site lighting, night lighting and interior lighting coverage.

Architect shall perform site visits, meetings with maintenance staff and other staff as may be necessary and carefully examine all historical drawings and records.

### **Division 03 — Concrete**

#### **Finish**

Interior concrete shall be smooth polished finished with sealer and clear epoxy coating. Colored concrete is acceptable, color to be selected by district.

Exterior concrete shall be finished with a medium broom finish.

Exposed aggregate is acceptable to either match existing site or as accent strips with prior approval from the district.

### **Division 04 — Masonry – Not Used**

### **Division 05 — Metals – Not Used**

### **Division 06 — Wood, Plastics, and Composites**

#### **Casework:**

Provide a survey of existing cabinetry. The architect shall provide a matrix indicating the general condition (good, fair, poor) of the cabinetry. Based on the survey results, a decision will be made by District staff to determine if the cabinets will be refinished or replaced.

Generally, casework shall have plastic laminate finish; flush overlay construction, conforming to the Woodwork Institute of California (WC standards).

#### **Countertops:**

Countertops shall have self-edged plastic laminate finish with a four (4) inch high, coved backsplash.

Countertops at wet areas shall have a bullnose front edge.

Countertop material for the science rooms will be materials

Epoxy resin tops at lab stations at Middle and High School chemistry rooms

## **Palo Alto Unified School District Technical Standards**

### **Cabinets:**

Unless otherwise specified on drawings, manufacture millwork in accordance with W.C. Custom Grade, per the Woodwork Institute of California Manual of Millwork, latest edition.

Each unit of casework shall bear the WIC Certified Compliance Grade Stamp indicating specified grade and, by completion of the job, WIC Certified Compliance Certificates shall have been issued by a WIC licensee certifying that the products furnished fully meet the requirements for the specified grade.

### **WC STANDARDS Custom Grade.**

Exposed Items: Satin chromium plated 626, complying with ANSI/GHMA A156.18, except where other finishes are shown or specified.

Concealed Items: Manufacturer's standard finish, complying with applicable product class of ANSI/BHMA A156.9.

Hinges: Provide two (2) per door up to thirty-six (36) inches, three (3) per door over forty-eight (48) inches high.

Heavy-duty wrap around, tight pin, steel butts, two and one-half (2-1/2) inches wide, offset for overlay doors.

Drawer slides:

Full depth of drawers: quite type with nylon ball-bearing rollers, positive pullout stop.

Type: Slide mounted, lift out, and full extension.

### **Capacity, per pair:**

Pencil Drawers: Fifty (50) pounds.

Box Drawers: Seventy-five (75) pounds.

File drawers: One-hundred (100) pounds.

Acceptable Manufacturers:

Accuride

Grant

Or Accepted Equal.

Pulls: four and one-half (4-1/2) inches. Provide one (1) per door or drawer, except provide two (2) at drawers over thirty (30) inches wide.

Acceptable Manufacturers:

Plastiglide Company

Hafele

Or Accepted Equal.

Shelf Supports:

End supports: Finish shall be nickel finish or equal for insertion into five (5) millimeter holes.

Acceptable Manufacturers:

Hettich

Knape and Vogt Secure.

Catches:

Magnetic door catches, thirteen (13) pounds per door.

## **Palo Alto Unified School District Technical Standards**

Locks: Provide one (1) locking cabinet per classroom, minimum.

Each classroom cabinetry lock shall be keyed alike and master keyed to the building system.

Locations: As indicated on drawings.

Door and Drawer: Finish shall be nickel-plated.

Acceptable Manufacturers:

National Lock

Security Products

Or Accepted Equal.

Bumper Pads (Silencers): Clear Plastic 2 per drawer, 2 per door minimum.

Hardware Installation: The casework fabricator shall install the hardware.

Design: Casework – Flush overlay, WC STANDARDS, Construction type II.

Door and Drawer Front Style: WC STANDARDS, Style A.

Securely bond plastic laminate to plywood; total finished thickness, three-quarters (3/4) inches minimum.

Do not miter corners of plastic laminate.

Conform to joinery requirements of WC STANDARDS Manual.

## **Division 07 — Thermal and Moisture Protection**

### **Roofing**

All work to Comply with the in-force versions of the National Roofing Contractors Association (NRCA) “Roofing and Waterproofing Manual,” ASTM, and manufacturers’ specifications, as appropriate for materials and applications procedures for the selected roofing system(s). Reference compliance with NRCA in specifications.

Roofing criteria shall be based on the particular needs of the site. As a standard the roof shall be designed based on Cool Roof guidelines.

#### **Qualifications:**

Roofing materials manufacturer shall be nationally recognized and shall possess a minimum of ten years continuous service manufacturing roofing products.

Applicator shall be certified as approved by roofing materials manufacturer and shall have a minimum of five years continuous experience with similar system applications.

Roof systems of nominally flat roofs shall slope a minimum of one quarter (1/4”) inch per foot to roof drains (1/2” where possible), where controlled flow is a requirement for sewer hookup. Storage shall be provided for the drainage system so that roof slope requirement is maintained. Nominally flat roof systems are not desired. They will be allowed only, where conditions allow no other solution.

Locate roof drains at points of maximum deflection on roof structure; do not locate adjacent to columns, beams or bearing walls. Provide sumps for roof drains where possible. Sumps shall be as required.

Verify load-carrying capability of existing roof structure before providing re-roofing system requiring ballast or insulation.

## Palo Alto Unified School District Technical Standards

Wherever possible, consolidate or group together roof penetrations to utilize a common curb for flashing. Position to minimize public visibility where possible.

Provide traffic pads (walkways) on roof from the designated access point, to and only around equipment requiring maintenance.

### Equipment supports:

Equipment/pads/supports/curbs are to be mechanically connected directly to building structure, with waterproofing systems that follow NRCA guidelines. Do not construct equipment supports directly on roofing membrane. Provide elevated roof platform to minimize membrane penetrations; extend platform three (3) feet – zero (0) inches minimum around perimeter of equipment.

At new facilities, provide adequate mechanical penthouses where possible, to eliminate roof-mounted equipment. Penthouses shall be directly accessible from within structure to discourage access by unauthorized personnel.

### Parapet walls:

At all parapet walls, the roofing membrane shall extend up the parapet and be terminated at the permanent waterproof coping/cap in compliance with NRCA standards. and precast or unit construction walls shall include a permanent waterproof coping or cap; inside vertical surface of parapet walls shall not allow water penetration to the interior. Minimum desired height for parapet walls above roof deck is eighteen (18) inches. Verify compliance with code requirements.

Nominally flat roof shall terminate within include a minimum four- (4) inches high, or NRCA compliant, can't strip at the roof edge.

Specify gutters at all sloped roof eave conditions. Size for Palo Alto, California, area rainfall and detail to provide overflow away from the building.

Provide a pre-roofing conference. The District may retain a testing and inspection agency.

Specify access to all roofs at either roof hatches or doors. Access to roofs through window or ladders accessible from the ground is not acceptable. Access to roof from within the school (i.e. mechanical room or attic space) is the preferred alternate.

Specify adequate access to mechanical spaces. Access shall allow for moving and servicing of equipment without modification of the access entrance (i.e. removing doors, panels, etc.)

Specify ladders for access from one roof to another if no inside hatches are provided. Provide side railings at ladders and safety rings. Provide lockable cover plate / door to ladders to avoid access by unauthorized people.

Consider impact of wind blowing water into buildings. Provide adequate flashing at conditions to prevent windblown water.

Provide a roof drain and overflow system that meets the City of Palo Alto Building Code. Specify adequate screening over roof drains installed in roofs to prevent clogging of drains and rodent access. Where scuppers are used, provide catch-box and rain leader.

Provide manufacturer's inspection and acceptance during installation.

Provide testing for water tightness prior to acceptance of the work, as per NRCA/ASTM standards.

Single-source materials/roofing systems are required unless especially accepted in writing.

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Provide written warranty on labor and materials, signed by Contractor and principal material supplier, agreeing to maintain the roofing system installation (labor and materials?) in a watertight condition for a period of twenty (20) years from date of acceptance of the work.

Provide roof insulation as opposed to attic insulation.

All roof top piping and HVAC ducts shall be located under roof structure to avoid material systems congestion on the roof which leads to difficulties with maintenance and reroofing activities. On roof. If the condition requires sleepers / float on walk pads, roofing shall be placed over sleepers. Locate all mechanical equipment, plus required structural support, so all exterior horizontal runs are minimized. (See section below for PV systems.

All Roofs shall be Photovoltaic (PV) ready. Follow guidelines industry standards, the Code, and best-practices for Photovoltaics (PV) or solar panels and their anchorage systems to the roof. Allow for anchorage points and system load for all new roofs.

Roof penetrations shall be based on the recommendation of a roofing consultant.

### **Sheet Metals and Miscellaneous Metals**

Avoid interior downspouts. Locate downspouts to permit discharge into storm-drain system, or on grade. Do not locate downspouts in path of travel, near doors/openings or areas normally used by students. Downspouts are to be fabricated from painted schedule 40 tube steel. The downspouts shall discharge per SWPPP and BMP design guidelines.

Clear all downspouts of existing gravel or debris.

Scuppers shall be sized correctly for the amount of water flow from the roof.

Exterior handrails shall be by standard manufacturer and shall meet the Americans with Disabilities Act (ADA) requirements. All exterior handrails are unpainted and shall be pre-galvanized

Ventilation louvers shall be heavy gauge, galvanized finish, prepared for paint. Specify twelve/fourteen (12-14) gauge material for exterior use and sixteen- (16) gauge material for interior use.

Cap all vents at exterior roof penetrations. Use twelve/fourteen (12- 14) Gauge galvanized screen material to prevent vandalism or rodent access.

## **Division 08 — Openings**

### **Doors:**

Provide one door for each room with a maximum load of less than fifty (50) occupants. All elementary classrooms shall have two (2) exit ways.

Typically exterior doors shall be metal; however, solid wood is acceptable, situation dependent. The use of solid wood doors shall be reviewed with the District's maintenance department prior to specifying. Wood doors shall be used only when deemed appropriate by the District's Facilities and Maintenance Departments.

High-use area doors shall be metal and shall be used in Multipurpose Building and Public restrooms.

All other doorframes, doors, and cased openings shall be hollowed metal with a minimum 16-gauge thickness.

Doors shall be standardized across a school site and uniform in appearance.

Where possible, undercut doors in lieu of providing louvers, shall be provided.

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Doors shall comply with the fire resistive ratings of the California Code of Regulations (CCR), Title 24.

All fire doors and frames shall be labeled with the manufacturer's rating. Do not paint over labels. Indicate location of fire doors and indicate label required.

Swinging doors shall not interfere with drinking fountains, downspouts, lighting fixtures, walk ramps, structural columns or miscellaneous equipment, all doors shall be capable of opening 180deg.

Glass in any fire rated door shall be per code requirements. Vision lights are acceptable in wood or metal doors as long as they are conforming to the standard "Narrow Lite" specification. The width of the vision light shall be a minimum of 3" and the height shall be a minimum of 12".

In all lanes of travel, doors should be "right-hand reverse" swing wherever possible.

Provide doors of sufficient size to allow installation or the removal of mechanical equipment, appliances or furnishings without having to remove the door, frame, etc. Removable mullions are acceptable.

Exterior doors shall be out swinging and shall be protected by an overhang or canopy and shall meet the Americans with Disabilities Act (ADA) requirements. Unprotected doors shall be provided with a minimum six (6) inch canopy over door.

Door sills and thresholds shall comply with the Americans with Disabilities Act (ADA) requirements.

Provide concrete slab outside of all exterior doors, of width sufficient to take doorstop when door is opening one hundred eighty (180) degrees against building wall.

All exterior doors shall be hollowed metal.

Chemical storage rooms shall be FRP doors including pool chemical storage rooms

Specialty Classroom Doors (FRP) – Security:

### **Door Construction:**

Openings:

Openings for lights and grilles shall be made by manufacturers in accordance with manufacturer's details. Openings in exterior doors shall be sealed against moisture.

- A. The doors shall be a minimum of 1<sup>3</sup>/<sub>4</sub>" thick and have an internal tubular aluminum perimeter frame with wall thicknesses not less than .125". Edge and stop moldings shall have wall thicknesses not less than .060". Internal members are 1 1/2" x 4 1/2" at sides and bottom while the top is 1 1/2" x 6 3/4".
- B. Perimeter frame shall be assembled with extruded gussets at the joints.
- C. The core of the door shall be flush with the internal perimeter frame and shall consist of two .125" tempered hardboard backers and 3# density urethane foam. Where applicable, aluminum fire shields shall be assembled into the product as required by building code.
- D. Flush face doors will have face sheets that are standard .125 thick Fiberglass reinforced polyester (FRP) with a pebble textured embossed surface bonded to core and perimeter frame. Face sheets shall be capped with an extruded aluminum cap on all four sides.
- E. Steel reinforcing plates shall also be installed at door head to receive door closer fasteners.
- F. Mechanical joints of doors shall be additionally strengthened by use of concealed 5/16" tie rods.

## **Palo Alto Unified School District Technical Standards**

- G. Where a pair of door leaves comprise a single opening and no dividing center post is provided the edge of the door leaves shall be equipped with an adjustable astragal which shall have installed in it a double wool pile weathering.

### **Door Hardware:**

Latches and latch sets.

Lock sets; locks, cylinders, and trim shall be of same manufacturer throughout building(s) (Schlage – sole source). Key way on all cylinders for locks.

Key locks to the District’s standard system include separate master keys to each building and site-grand master. Minimum of two key blanks per lock shall be transmitted to the District Lock Shop.

Refer to the District’s Keying Schedule provided by Maintenance for each school. Primus cores shall be used on all main entrance exterior doors, non-primus with same keyway shall be used on all interior doors.

Refer to District standard lock chart as a guide for guidelines on specific hardware for common locations. (See Appendix)

### **Pulls/Levers:**

Metal door hardware shall be mounted to the door with machine screws into support backing. Minimum acceptable diameter of machine screws shall be three-sixteenths (3/16) inches with one-quarter (¼) inch clearance to meet the Americans with Disabilities Act (ADA) requirements.

Wood door hardware shall be mounted to the door with wood screws to meet the Americans with Disabilities Act (ADA) requirements.

### **Panic Devices:**

Use rim-latch type device, including removable center mullion at pairs of doors (no vertical rods).

Stainless steel construction (no aluminum)

Acceptable Manufacturers:

Von Duprin Commercial Grade

### **Hinges:**

Ball-bearing type butts, minimum of three (3) per, three (3) feet by seven (7) feet door leaf. Secure to heavy gauge backing plate(s).

Ball-bearing type butts, minimum of four (4) per door on doors larger than three (3) feet by seven (7) feet or heavy use doors.

NRP for all exterior doors

Acceptable Manufacturers:

Mc Kinley

Stanley

Hager Hinge Company.

### **Closers:**

Use offset hydraulic closers wherever possible, specifically at all exterior hallway doors.

Acceptable Manufacturers:

LCN

Norton

## **Palo Alto Unified School District Technical Standards**

### **Holders/Stops:**

The architect shall provide a survey of existing holders and stops. A matrix will be provided for the general condition (good, fair, poor) of the hardware. Based on the survey results, the architect shall make a decision what hardware must be replaced.

Provide wall-type door holder assembly – anchored to four- (4) inch x four- (4) inch by one-quarter ( $\frac{1}{4}$ ) inch steel plate, tapped to receive machine screw fastening.

Wall type stops/bumpers shall be secured through to solid substrate (framing, blocking, etc.). Masonry anchors shall use tamp-in type (no plastic anchors).

Use removable center mullion at pairs of doors, especially in areas subject to receiving large items of furniture or equipment (e.g. piano, copy machine, etc.).

Thresholds shall be installed with one-quarter ( $\frac{1}{4}$ ) inch by twenty (20) inches tamp-in anchors (no plastic inserts).

### **Windows:**

A minimum of one operable 30" x 30" window in each classroom and office space for emergency ventilation shall be provided

All windows shall receive window treatment roller shade or Levelors.

Manual pulls shall be provided for to open windows or, in the case of a high window, a manual crank system shall be provided

No awning type, casement or projecting sash of any kind shall be used except for clerestory or locations above 7'-2" high

Large glazed openings should be minimized, due to breakage potential and the high cost of maintenance. In the case of a large glazed opening, follow the requirements of California Energy Code, Title 24, Part 6

Wire glass shall not be used. In the event that openings required by the California Code of Regulations (CCR), Title 24 specify wire glass, tempered / fire rated glass products shall be used

Toilet room windows shall have obscure glass, and are to be fixed provided that there is adequate ventilation

Minimize number of sash-type windows in buildings. Double-hung, single-hung, hopper or sliding sash type windows are acceptable

All window stops shall be removable only from interior and shall be secured in place with vandal resistant screws. Exterior stops shall be integral with frame

Glass shall be glazed at the exterior perimeter for each sash/frame

No glass block is to be used for windows or skylights, except as specifically directed

Security sash shall be used at locations with high security requirements

Windows shall be aluminum. Other materials must be approved by the District

Keep individual sidelights to a maximum of 3'0" to 4'0" include shades of covers.

Refer to other considerations relating to windows and sustainability design

## **Palo Alto Unified School District Technical Standards**

### **Screens:**

Sunshade screens may be used on clearstory and transom type windows where direct sunlight and glare are a problem.

Insect screens must be installed on all operable windows in Multipurpose Room, Food Preparation and Toilet Rooms.

## **Division 09 — Finishes**

### **Interior Colors and Finishes:**

Interior Wall Paint: Dunn Edwards “Celtic Linen”  
Door & Window Trim: Dunn Edwards See site color chart.  
Tackable wall surface & Tackboard: Koroseal “Apollo”  
Carpet Tile: Mohawk “First one up II color = 727 Priority”  
VCT Field: Armstrong Marmorette Linoleum “Constellation”  
VCT Walkoff Areas: Armstrong Linorette Linoleum “Gobi Sand”  
Base: Burke Wall Base “Tweed”  
Countertops: Nevamar Co. “Sidewalk Café”  
Cabinets: Nevamar Co. “Grand Isle Maple”

### **Flooring:**

Resilient Flooring: vinyl composition tile (VCT) or Linoleum at the following locations: such as walk off areas, art rooms, wet locations in class rooms,

Armstrong – Linorette Linoleum color Gerflor Landscape Collection 0070/Rocky Brown for small areas (such as walk off areas)

Armstrong – Marmorette Linoleum color LP555 Constellation for larger areas (such as Public Area Lobby, Cafeteria)

Forbo – Marmoleum in any size areas. Color to be selected by the District.

Carpet: All areas, Mohawk, First one up II, color 727 Priority

Resinous coved flooring: Dex-o-tex – (sole source)

Sealed concrete:

Wood flooring:

Grout for ceramic tile shall be epoxy-based. Color to be selected by District.

### **Wall Base:**

Rubber Wall Base: Base shall be four (4) inches high, top set, coved; rubber with pre-molded outside corners throughout, except where resinous flooring is used or where six (6) inch base is required. All base shall be continuous uninterrupted in length when installed. Should base need to be cut, it shall not be cut less than four (4) feet in length. (Rubber wall base by Burke, color 508 Tweed):

### **Wall Finishes:**

5/8” type X. Gyp board with Level 5 finish. Tack board on all walls at elementary sites, teaching wall at middle schools. See division 10

## **Palo Alto Unified School District Technical Standards**

### **Paint:**

Use semi-gloss paint on all wall surfaces, unless otherwise noted (Dunn Edwards – sole sourced, color interior wall paint “Celtic Linen”)

Kindergarten restroom walls shall be painted and shall not have ceramic tile wainscot.

Staff restroom walls shall be painted and shall not have ceramic tile wainscot.

Ceramic tile wainscot will be used at major toilet rooms and shower room walls.

The tile wainscot height in elementary restrooms shall be 6’-0”, and the remaining wall shall be painted above.

The tile wainscot height in secondary restrooms shall be eight (8) feet – zero (0) inches, and the remaining wall shall be painted above.

Ceramic tile wainscot will not be installed in kindergarten restrooms, nurse’s restroom or staff restrooms.

### **Acoustical Treatment:**

Tile shall be Dale tile 4 ¼ x 4 ¼ white P-100, accent tile and pattern to match existing site.

The entire school facilities should be acoustically treated with due consideration for noise levels of each activity.

Follow CHPS rating as a minimum standard for dB ratings (CHPS Best Practices Manual Planning, Optimize Acoustics, standard S12.60 or related sections).

### **Ceiling Systems:**

The system shall comply with the fire resistive construction requirements of the project and the Division of State Architecture Office (DSA) State Fire Marshal.

Use suspended acoustical lay-in ceilings **except** in corridors, toilet rooms, wet areas, or where otherwise indicated in program.

Lay-in acoustical panels, twenty-four (24) inches by forty-eight (48) inches, shall be used for typical ceilings in classrooms, offices and areas with heights of ten (10) feet – zero (0) inches or lower.

Lay-in acoustical panels, twenty-four (24) inches by twenty-four (24) inches may be used in specialty areas such as Conference Rooms, Lobby Areas, Auditoriums, etc.

Use recessed or drop-in light fixtures in suspended acoustical lay-in ceilings to resist vandalism, where possible.

Use five-eighths (5/8)-inch gypsum board or Veneer Base and Veneer Plaster in areas where acoustic tile is not required. In areas where walls are plastered, ceilings may be plastered.

Materials are to comply with applicable CBC standards. Gypsum board is a minimum of 5/8 inch in thickness.

Gypboard ceilings should not support building components other than air conditioning/heating grills or light fixtures. All such components shall be supported either directly from main runners, or by supplemental framing which is supported by main runners. No vertical loads other than gypsum board dead load shall be applied to cross-furring.

### **Corridor Ceilings:**

Recommended construction for corridor ceilings shall be acoustical tile applied to five-eighths (5/8)-inch gypsum board backing. Or hard lid

## **Palo Alto Unified School District Technical Standards**

Suspended acoustical lay-in ceilings shall not be used in corridors, wet location, restrooms or athletic areas when activates may damage panels.

Corridor ceiling height shall be not less than eight (8) feet – six (6) inches clear. Provide damage-resistant ceiling system if ceiling is lower than nine (9) feet – zero (0) inches.

Other types of ceiling construction shall be used only if approved by the District.

Toilet room and Shower Ceilings:

Ceiling height shall not be less than eight (8) feet – six (6) inches clear.

Ceilings shall be washable and shall be cement plaster in shower and “wet” areas.

### **Walls:**

Studs shall be lightweight metal wherever possible and acceptable to code requirements.

Use five-eighths (5/8)-inch gypsum board where gypsum board material is required.

Cement based lath and plaster shall be used in “hard-wear” areas (i.e., major student toilet rooms, corridors, stairways, gymnasium locker rooms, exercise rooms).

Demountable: System components constructed in a factory assembled in the field.

Designed to allow systematic disassembly with minimum damage to component parts for purpose of reassemble.

May be used at Administration Building, Library, Special Needs Classroom (Science, Homemaking, etc.), and other areas and at locations with minimum building utilities.

Manufactured by several major manufacturers.

Folding Wall System: Constructed in a factory Provide name of preferred vendors or systems.

Designed to divide or combine areas.

Normally used as a sight divider only, but can be used as a sound divider as well, achieves a sound transmission class (STC) rating of thirty (30); divides classrooms, dining, conference, administrative and assembly arrears. Stipulate whether to be used for sight, sound, or both functions; set a STC rating, and define which spaces can use the folding wall systems.

Operation must be by teacher only.

Operable Walls: Constructed in a factory Provide name of preferred vendors or systems.

Designed to divide or combine areas frequently.

Capable of providing sound as well as visual barrier with marker board and tack board included; divides classroom and special areas, (i.e. oral arts, etc.), and achieves a sound transmission class (STC) rating of forty (40). Provide when marker and/or tack boards need to be included; set a STC rating.

Fixed flexibility (but may be used at any time). Operation may be by administrator or teacher.

It should be noted that the use of non-bearing partitions is only one part of flexibility in space planning. Electrical and mechanical considerations should also be taken into account.

## **Palo Alto Unified School District Technical Standards**

Clear-span structural design, proper location of doors and exits, and the use on non-bearing partitions, where applicable, will all contribute towards greater flexibility.

### ***Recommendations:***

Use studs with drywall, veneer plaster or plaster wherever possible.

Establish uniform ceiling height of nine (10) feet – zero (0) inches, wherever partitions are used.

Establish a unit ceiling grid and partition module of four (4) feet – zero (0) inches.

Non-rated partitions – use continuous tack board (vinyl surface with fiberboard back reduces weight for ease of moving).

Design mechanical and electrical systems to accommodate cost-effective flexibility.

Where possible, modular components and other cabinets should be relocatable.

The following items shall be carefully considered during the planning stage:

Location of shear and bearing partitions and column spacing. Locations of stairways, corridors, and doors.  
Location of sinks and built-in cabinetry. Flexibility of cabinets. Accessible ceiling-spaces for location of utilities above ceiling. Use of carpet at portable partitions. Mechanical and electrical design.

## **Division 10 — Specialties**

### **Tackable:**

Tackable Surfaces shall be vinyl-faced twenty-six (26) ounce, pebble finish, neutral color. (See district standards)

Each classroom shall have a minimum of one entire wall that is a tack surface

### **Marker Boards:**

Marker boards shall have tray(s) for markers. Map hooks and flag holders and be magnetic. (See standards)

In Elementary and special education classrooms, marker boards will be installed at a lower height to accommodate special height requirements and curriculum of various grade levels. Adjustable marker boards may be mounted on permanent floor to ceiling tracks in tack board walls classroom, unless otherwise directed by District.

### **Toilet Room Accessories:**

Adult restrooms; shall have sink, mirror, paper towel dispenser (OSCI), soap dispenser (OSCI), toilet paper dispenser, trash receptacle sanitary napkin dispenser.

Student restrooms; shall have sink, mirror, electric had dryer, soap dispenser (OSCI), toilet paper dispenser (OSCI), trash receptacle, sanitary napkin dispensers in secondary sites.

### **AED**

Philips AED complete with alarmed cabinet and signage. Locations shall be places such as Main office, gyms, multi-use buildings, Athletic field's additional locations as requested by the district.

# **Palo Alto Unified School District Technical Standards**

## **Fire Protection Specialties**

Each space will have a minimum of 1-10lb type ABC wall hung fire extinguisher, fire extinguisher cabinets shall be used in spaces such as: theaters, multi-use rooms, cafeterias.

## **Division 11 — Equipment**

Theater equipment, AV equipment, food service equipment

## **Division 12 — Furnishings**

Roller shades  
Fixed audience seating

## **Division 13 — Special Construction**

### **Swimming pools**

Shall be at all Middle and High Schools. Lighting on the deck and bottom of the pool shall meet code requirements.

### **Vaults**

Each main site office area shall have 1 – 1 cubic foot safe (floor or wall) fire resistive for 1 hour at 1200 degrees that is securely fastened to the building. Safe to have changeable combinations.

### **Bleachers**

## **Division 14 — Conveying Equipment**

### **Elevator**

At all exterior elevators controls shall be connected to Trilogy electronic lock

### **Stair lift**

For all locations where ramps are not practical.

## **Division 21 — Fire Suppression**

### **Fire Suppression System:**

Automatic Sprinkler System – As required by Code.

Fire Hose(s) - As required by Code.

Fire Extinguisher and Cabinets: As required by Code.

Fire Extinguisher locations shall be contained inside building(s). Units are subject to vandalism and theft.

Locations to be readily accessible and in visible positions per Code.

Identification signs are to be posted for the respective location(s).

Each classroom shall be equipped with a ten (10) pound capacity fire extinguisher ABC Type.

**Palo Alto Unified School District  
Technical Standards**

**Division 22 — Plumbing**

**Plumbing Systems:**

Toilets: Sloan flush valves.

Lavatories: Kohler, American Standard, Crane.

Hose bib connection on all roofs for air conditioning systems. In each student restroom and no more than 200' apart in any outside space

Heating/Cooling System: Gas.

**Unique Plumbing Criteria by Space/Function:**

Teacher's Lounge: Provide hospitality sink, garbage disposal, and dishwasher.

General Classrooms: Elementary classrooms shall have hospitality sinks with hot and cold water with bubbler.

Science Classrooms: Provide chemistry classrooms with acid resistant piping materials and neutralizing sump as per local code. Biology classrooms shall be equipped with particulate traps (solids interceptors); provide air gas and vacuum outlets as required to meet educational program requirements; furnish emergency shower / eyewashes as required by code. Provide drains for water carry off complete with trap primers. Provide manual emergency shutoffs adjacent to instructor's table or near exit from classroom. Provide emergency eye wash/shower as required.

Home Economics: Provide water and waste for specialty equipment such as dishwasher, sinks, etc.

Art: Provide clay traps on sinks where pottery materials are used. Incorporate eyewashes where exposure to dyes and chemicals (particularly film development) will be used.

Provide special tempering needs where the process demands.

Gymnasiums: Large capacity shall be considered for hot water demands within the shower areas due to the high proportion of students who shower following physical education or other activities within the gymnasium.

Theaters/Performing Arts: Do not locate plumbing on auditorium common walls.

Toilets – Staff: Provide hose bib in each room providing the wall/floor covering is water-resistant.

Toilets – Students: Provide hose bib in each room.

Kitchens: Provide grease interceptors where appropriate. Furnish water and waste needs of special kitchen equipment, including pressure-reducing valves for dishwashers, etc.

Warming Kitchens: Provide sink with hot and cold running water and waste disposal.

Shops: Provide emergency shower / eyewashes as required.

Multi-Purpose: Provide adjacent restrooms and drinking fountains.

Library / Media: Provide a hospitality sink with hot and cold running water

## **Palo Alto Unified School District Technical Standards**

### **Pipe and Pipe Fittings:**

#### **Water, chilled water, and heating hot water:**

Sizes 3" and smaller: Use Copper, Type K, wrought copper fittings, silver brazed joints.

Sizes 4" thru 6": Use Schedule 40, steel with galvanized threaded fittings, malleable iron fittings.

Sizes 8" and larger: Use Schedule 40, black steel with welding fittings.

For below ground or in-slab piping use pipe wrap, coat, and/or sleeves.

Provide adequate surge arrestors.

Verify adequate supply pressure. Provide booster pumps as necessary. Provide pressure regulator as necessary for Code compliance.

Provide backflow prevention devices per Code to protect domestic water system.

Provide "future stubs" for lawn sprinkler systems; included backflow prevention.

#### **Soil, Waste, and Vent:**

All sizes thru 10": Use hubless cast iron soil with hubless joints.

Compressed Air, Condensate Drain and Trap Primer:

Use Copper, Type L, wrought copper fittings, and lead free solder.

For below ground or in-slab piping use pipe wrap, coat, and/or sleeves.

#### **Natural Gas:**

Below grade all sizes: Use Polyethylene with socket or heat fused joints.

Above grade:

Sizes 4" and larger: Use Schedule 40, black steel with welding fittings.

#### **Valves:**

Provide ample valves to permit isolation logical portions of piping for repairs or maintenance, without extensive securing of buildings – in addition to:

Isolation at each Building.

Isolation of section of the site:

Clearly mark (permanently) shut –off valve.

Provide proper wrenches.

Where buried, provide two (2) inch by two (2) inch plug top.

Isolation at each Toilet Room.

Provide valves with packed stems on supply to all fixtures.

Lubricated plug valves on water service are not permitted.

Valves shall be permanently labeled with numbers for identification.

Hang tags are unacceptable, as they tend to get lost.

## **Palo Alto Unified School District Technical Standards**

Subsurface valves shall be placed within adequately sized valve box for maneuverability.

### **Insulation:**

To be specified according to equipment and material performance and/or requirements.

Insulations for piping and ducts shall comply with requirements of CMC and Title 24, Part 6 California Energy Code.

### **Domestic Water System:**

Hot Water: install tank less units avoiding point of use where ever possible.

All water lines to be insulated.

Accessible areas to be shielded from scalding water (except Kitchens).

Water heater boosters must be mounted on four (4) inch concrete base.

Cold Water

Storm Drainage System – per Code requirements.

Sanitary Sewer System

Vents through roof shall have vandal resistant caps to prevent objects from being placed in them.

Place vents within parapet roofs to appropriate height to vacate odors.

### **Fixtures and Trim:**

#### **Lavatories:**

Water closets to be elongated bowl. Wall hung Sloan valves

#### **Urinals:**

Waterless wherever practical

Flushometer valves (Sloan) no substitution. No automatic flushing.

Wall hung.

#### **Service Sink:**

Well-type with hot and cold water in each janitorial room.

Provide fasteners into walls. “Tapered hangers” that lavatories slip onto are unacceptable.

Vandal-proof fixtures are to be used.

All fixtures to be equipped with key stop valves.

Drinking Fountains: to include bottle fillers.

## **Palo Alto Unified School District Technical Standards**

Stainless steel

### **Faucets:**

Lead-free valve and stem construction.

Single-lever mixing faucets require special care and create maintenance problems, these should be avoided.

### **Roof/Condensate/Floor Drains:**

Floor drains are required.

Mechanical Rooms with water or condensate service shall have sloped floor with drain.

### **Hose Bibs:**

Buildings: In each Toilet Room, locker room, and Mechanical Room and building face no more than 200 feet apart  
Roof tops where required for service.

### **Grounds:**

Install quick coupling valves underground in valve boxes and connected to the irrigation main line supply in landscape areas that may be adjacent to walkways, lunch shelters and raised planters. There shall be a separate meter for Irrigation water.

Provide substantial backing to all wall-hung fixtures, including wall finish.

### **Irrigation Sprinklers:**

Specifications shall meet the City of Palo Alto and PAUSD Requirements.

### **Gas Piping System:**

Underground gas lines shall be Polyethylene tubing and installed under the specifications required by the City of Palo Alto or approved code requirements.

Backfill must be free of rock or other material that might damage the wrapping. Provide twelve (12) inch minimum sand around all gas lines.

### **Chilled Water Circulating System:**

Water treatment systems shall have chemical feeders and initial kits for testing.

Confirm “non-water” systems, to eliminate chemicals.

Verify closed systems with the District.

**Palo Alto Unified School District  
Technical Standards**

**Division 23 — Heating, Ventilating, and Air Conditioning (HVAC)**

Work and materials shall be in full accordance with the rules and regulations of the latest adopted edition of the following:

California Building Code (CBC).  
California Mechanical Code (CMC).  
California Building Code (CBC).  
California Fire Code (CFC).  
Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 6  
State Fire Marshal  
Occupational Safety and Health Administration (OSHA).  
National Electric Code  
National Fire Codes published by the National Fire Protection Association (NFPA).  
Underwriters' Laboratories, Inc. (U.L.).  
American National Standards Institute (ANSI).  
American Society of Mechanical Engineers (ASME).  
National Electrical Manufacturers Association (NEMA).  
Factory Mutual (FM).  
Any other applicable Federal, State and local laws and regulations.

**Mechanical – General:**

Locate equipment to facilitate ease of maintenance, repair and replacement.

Equipment shall not be located where it is necessary to remove portions of roofs, walls, partitions or ceilings to effect replacement, repair or adjustment ideally.

Ample space shall be allocated for all equipment and movement around such equipment.

Four (4) feet minimum clearance surrounding equipment to facility maintenance. (Additional space requirements of the manufacturer/installer shall supersede the minimum, when access to internal parts and replacements are necessary).

Provide adequate lighting in mechanical rooms for maintenance and repair operations.

Verify compliance with requirements and regulations of California Building Code, California Mechanical Code, California Fire Code, and CALOSHA for mechanical equipment rooms, exit requirements, access to roof mounted equipment, and posting of emergency instructions.

**Specifications shall require the following:**

Construction mark-up drawings and accurate As-Built record drawings are required. Construction contractor shall maintain current mark-up drawings detailing construction progress and shall submit final As-Built plans reflecting the actual installed conditions of all items.

All Energy Management System (EMS) controls shall be fully documented with schematics, plans, sequence of operation descriptions, and backup data files of controls programs. As-builts of these documents and operation manuals on all mechanical equipment are to be submitted at completion of construction.

Final payments will not be made until these drawings, files, and manuals are received by the District.

Roof-mounted equipment shall be served from permanent interior steel ladders.

## **Palo Alto Unified School District Technical Standards**

Piping systems shall be permanently marked with stencil for flow direction. (Decals do not stay and will not be acceptable.)

Instructions and Training of District personnel by manufacturer representatives will be mandatory for specialized equipment and controls.

Include extended warranty in specifications.

Switches for mechanical equipment shall be located in such a position as to avoid unauthorized access. Switches should not be located behind cabinets, shelving, equipment, etc.

Coordinate Mechanical with Architectural design to provide energy efficient systems.

Where possible consider Green Building, practices using sustainable materials.

Building and system designs shall comply with Title 24, Part 6 California Energy Code for building materials, insulations, fenestrations, equipment efficiencies, ventilation requirements, and controls requirements.

All mechanical systems shall be designed so that the sound level during operation does not interfere with the teaching of classes.

Mechanical requirements shall be coordinated with structural engineer for framing details for passage of ventilating ducts, vents, etc. Verify shear walls are not penetrated.

Utilities shall be connected to the Energy Management System (EMS).

### **Heating, Ventilating and Air Conditioning Systems:**

General consideration should be given to minimizing the use of air conditioning. Reducing solar heat gain by way of architecture (passive solutions are encouraged).

#### **Indoor Temperature Criteria:**

Occupied Heating = selectable range of 65 – 70°F

Occupied Cooling = selectable range of 72 – 78°F

Unoccupied set back = 5°

#### **Exterior Temperature Criteria:**

Heating = 26°F winter median of extremes

Cooling = 85°F db, 64°F MCWB (0.5%)

#### **Ventilation Criteria:**

The minimum outdoor air and ventilation rates to all occupied spaces shall be as required by Title 24, Part 6 Section 121.

#### **The minimum supply air circulation rates shall be:**

One-half (.5) CFM/SF for the following areas: Corridors, Storage Rooms, and Toilet Rooms

One (1.0) CFM/SF for the following areas: Offices, Library/Media Centers, Shops, Gymnasiums, Theaters and Kitchens

## **Palo Alto Unified School District Technical Standards**

One and one-half (1.5) CFM/SF for Classrooms, Multi-Purpose, Lecture Rooms.

### **Exhaust Criteria:**

General exhaust air shall move from clean areas to dirty areas with a discharge velocity of no greater than seven hundred (700) CFM.

Toilet Rooms: Fifteen- (15) air changes per hour (negative pressure).

Locker Rooms: Ten- (10) air changes per hour (negative pressure).

Snack Bars/Kitchen: Hood exhaust tied to make up air (slightly positive pressure).

Shops: Dedicated exhaust systems for auto exhaust, sawdust, welding, paint booths.

Science Classrooms: Dedicated exhaust systems for fume hoods; six (6) air changes per hour, general exhaust manually switched.

Art: Dedicated exhaust systems for kilns, dye tables, etc.

Home Economics: Dedicated exhaust for ventilators if used in conjunction with ranges.

Dark Rooms: Twenty (20) air changes localized at developing tables if possible, continuous, negative pressure.

### **Unique HVAC Criteria by Space / Function:**

The following noise criteria are the maximum allowed at any location within an enclosed space. The noise criteria shall be measured after installation and with the system fully operational.

Administration: Zone by exposure and occupancy. Noise criteria = Noise Coefficient of thirty (30). Minimum one inlet and one outlet per enclosed room. Fully ducted.

General Classrooms: Separate zone for each classroom. Noise criteria = Noise Coefficient of thirty (30). Minimum of two supply air outlets, and one return air inlet per room.

Science Classrooms: Separate zone for each classroom. Noise criteria = Noise Coefficient of thirty (30). Fume hood exhaust independent of classroom heating, ventilating, cooling system (HVAC), and interlocked with hoods. Hoods will be on whenever the classroom unit is on. General overhead exhaust shall be independent of classroom heating, ventilating, and cooling system (HVAC) system and fume hoods.

Home Economics: Separate zone for each classroom. Noise criteria = Noise Coefficient of thirty (30). Air distribution shall be the same as general classroom.

Art: Separate zone for each classroom, Noise criteria = Noise Coefficient of thirty (30). Provide separate exhaust for kilns, ovens, dye tables, photo labs/dark rooms. Exhaust shall be dedicated, localized, source capture style whenever possible. Same supply air and return air outlet criteria as general classroom.

Gymnasiums: Arrange distribution to provide maximum clearance for sports functions inside gymnasium, i.e., volleyball, etc. Distribution shall provide minimum of twenty-five (25) feet per minute (FPM) velocity at floor level throughout the occupied area of the gym, including bleachers. Noise criteria for diffusers = Noise Coefficient of forty (40).

Theaters/Performing Arts: Zoning by exposure and occupancy. Preferred distribution is by supplying overhead up high at low velocity and returning down low at seating level. Noise criteria = Noise Coefficient of twenty-five (25).

## **Palo Alto Unified School District Technical Standards**

Toilets – Staff: Consideration shall be given to heating and cooling with the overhead air distribution system serving adjacent occupied spaces.

Toilets – Student: If student toilets require heating, use forced air heating with the overhead air distribution system serving adjacent occupied spaces. Typically, heat is not provided in student restrooms.

Kitchens: Kitchens minimally shall be evaporatively cooled with the make up air system interlocked with the exhaust hoods. In larger, central kitchens, consideration shall be given to refrigerated air conditioning. Noise criteria = Noise Coefficient of forty (40).

Shops: Separate zone for each shop. At high ceilings and more industrial spaces such as auto shop and metal shop, make up air systems shall be provided for large exhaust systems. Noise criteria = Noise Coefficient of forty (40).

Multipurpose: Zone by exposure and occupancy. Noise criteria = Noise Coefficient of twenty-five (25).

Library / Media Center: Zone by exposure and occupancy. Noise criteria = Noise Coefficient of twenty-five (25).

### **Internal Load Criteria:**

Occupant Densities: UBC or actual, whichever is higher

Lighting: Minimum two and one-half (2.5) watts/square feet or actual, whichever is higher.

Equipment: Minimum one (1.0) watts/square feet or actual, whichever is higher.

### **Equipment Efficiency Ratings:**

All mechanical equipment shall be specified with ratings meeting at least the minimum requirements set by Title 24, Part 6 Sections 112 and 113.

Where higher efficiency equipment is available, a life-cycle cost evaluation shall be performed in order to determine the benefit, if any, of specifying the higher efficiency equipment.

### **Chase Walls:**

In all occupied spaces, utility services for mechanical equipment shall be concealed within furred spaces or chases

Exhaust venting as necessary shall be provided for the following areas:

Ceramic kiln locations

Chemistry Room fume hoods

Science rooms

Ceramic and Finish Room spray hoods

Welding booths

Dust-generating equipment

Rooms with cooking facilities

Rooms with gas-fired appliances

Shower/locker areas

## **Palo Alto Unified School District Technical Standards**

Photo laboratories

Restrooms

Automotive shops

### **Division 25 — Integrated Automation – Not Used**

### **Division 26 — Electrical**

#### **Electrical:**

Electrical capacity will address future computer, cable and electronic expansion.

Electrical conduit runs will anticipate future portable classroom placement.

Special attention should be paid to nighttime use exterior lighting. Areas which will require such lighting include:

Parking lots

Immediate building perimeter

All building entries

Outdoor eating areas.

#### **Thermostat Conduit: EMT**

Security Alarm: EMT, conduit to each perimeter door

Key pad Locations: Consult with District.

Isolation Ground/Dedicated Line: Computers and copiers.

#### **General**

Provide for future building growth in accordance with Master Plan.

Future relocatable classroom loads to be added.

2 (two) - 2 (two) inch conduits shall be stubbed from each building for future use.

Properly identify conduits with District standard, color-coded labels.

Allowances shall be made for the addition of air conditioning to buildings at a future date:

Minimum Conduit - 1 (one) inch.

- 1) Future conduits from telephone/data panel – 2- (two) inch minimum 3 (three) per panel.
- 2) Future conduits from telephone panel – 2- (two) inch minimum 3 (three) per panel.
- 3) Future conduits from between classrooms – 2 (two) inches minimum 3 (three) per classroom.

## **Palo Alto Unified School District Technical Standards**

- 4) Future conduit stub-outs per building – 2- (two) inch minimum 3 (three) per building.

All new conduit runs must be supplied with a pull-string and caps for future wire installations.

Specifications shall require “accurate” As-Built record drawings provided to the District during project closeout.

Locate equipment to facilitate ease of maintenance, repair and replacement.

Equipment shall not be located where it is necessary to remove portions of roofs, walls, partitions or ceilings to effect replacement, repair or adjustment.

Ample clearance space per code shall be allocated for all equipment, and movement/servicing around such equipment.

Space requirements of the manufacturer/installer shall supersede the minimum, when access to internal parts, and replacements are necessary.

Instructions and Training of District personnel by Manufacturer’s Representative will be mandatory for specialized equipment and controls.

### **Motors and Motor Controls:**

New motors and controls shall be provided for economy when renovating existing mechanical systems.

Electrical Power Equipment

Provide adequate power distribution and expansion capabilities.

Provide a disconnect switch for all equipment per code requirements.

Transformer manholes shall be avoided due to maintenance problems. This item (C-3) is applicable to Palo Alto High School only.

### **Standby Electrical Systems:**

Cost comparisons shall be evaluated for using a central emergency lighting system versus using individual battery-type battery ballasts.

Emergency lighting per code requirements.

Where emergency generators are required by code, they shall be natural gas, internal combustion engine type, and automatic switch over for fuel.

### **Electrical Substations:**

Preferred locations for substations shall be outside building structures.

Where applicable, substations may be included within a total enclosure, designed to fit surroundings.

### **Electrical Service Systems:**

Service over 600 (six hundred) volts shall be fiber duct, or plastic conduit encased in concrete per code.

Cable shall be copper with jacketed insulation for mechanical protection.

## **Palo Alto Unified School District Technical Standards**

Provide lockable, toggle switches in lieu of “keyed” switches.

Lockable switches shall be provided in Shower Rooms, Locker Rooms and Corridors.

Locate switches within area served as opposed to remote locations to comply with California Title 24 lighting standards.

Breakers shall not be used to control lighting.

Science Labs shall have “cut-off” switch(es) for all power and gas service. Locate at Teacher controlled area (i.e. demonstration area, office, etc.) or next to exit door. Switch shall shutdown the entire system.

### **Electrical Distribution Systems:**

Rigid metal conduit in all cavity wall, ceiling, room construction.

Schedule 40 (forty) polyvinyl chloride (PVC) may be used underground, within masonry or concrete floors and/or walls.

Copper wire for service of 600 (six hundred) volts or less.

Underground wire runs shall utilize THWN or TWN insulated wire.

New construction distribution: Four-eighty, two-seventy-seven (480/277) volt, three (3)-phase, four (4)-wire. Mixing with one hundred and twenty (120) volt systems is not acceptable, without District’s prior approval.

Locate dry-type transformers where noise will not affect adjacent rooms and objectionable to normal activities.

New panelboards shall match existing panelboards in style not manufacturer - as feasible.

Minimum size electrical conduit shall be three quarter ( $\frac{3}{4}$ )-inch.

Lighting conduits shall be three quarter ( $\frac{3}{4}$ ) inches between fixtures; home runs shall be a minimum of one (1) inch.

MATV conduits shall be per code requirements.

Panels shall have a minimum of six (6) spare circuits with breakers installed.

Transformers with underground systems shall not be used.

Transformers shall be air-cooled – NOT OIL and comply with Palo Alto City utility requirements.

Acceptable Manufacturers:  
Challenger  
General Electric/Westinghouse  
Square D.

Neutral bus bar is grounded.

Each classroom shall have multiple-zone branch loads.

Provide a minimum of four (4) circuits per standard classroom.

### **Three-channel wire mold shall be used on classroom walls:**

Elementary Schools – Three (3) Walls

Secondary Schools – Four (4) Walls

## **Palo Alto Unified School District Technical Standards**

The use of floor outlet systems shall be minimized.

Computer area designations shall be provided with data ports, which include two (2) data, one (1) voice connection per station.

Provide weatherproof lockable convenience outlets and intercom outlets adjacent to outdoor assembly areas.

Provide ample duplex receptacles in all work areas, classrooms, passageways, etc.

### **Provide sufficient convenience receptacles in Teacher Work Areas:**

Review the use of wall mounted wire mold for flexibility.

Provide a minimum of one (1) receptacle on walls without wire mold.

Provide dedicated receptacles /circuits for large copy machines and laser printers.

Provide “special location” convenience outlets:

One (1) duplex receptacle adjacent to each MATV outlet with isolated ground.

Duplex receptacles to Corridors for maintenance equipment (maximum twenty (20) feet cord lengths).

Provide exterior lockable power source approximately every twenty- (20) feet on outside of building(s) adjacent to “open-areas”.

Audiovisual and one hundred twenty (120) volt receptacles at center stage floor(s).

Include spare conduit stubs from all panels to attic. Where panel is relatively close to an outside wall or is above a suspended floor, include stubs to those locations.

Conduit installed to serve permanent floor mounted equipment (e.g., shop equipment) shall terminate at a conduit riser at the finished floor with a threaded coupling, pull string and finish plug.

All toggle switches shall be a minimum twenty- (20) ampere capacity and installed at heights to comply with the Americans with Disabilities Act (ADA).

Acceptable Manufacturers (Primary power switches/secondary switches):

Hubbel.

Lutron.

Accepted equal.

Motion switches – per code.

Include final connections of District furnished equipment: Owner-Furnished-Contractor-Installed (OFCI).

### **Indoor Lighting:**

Design indoor lighting to IESNA foot candle criteria to comply with California Building Code (Title 24) allowed lighting power limits and Design classroom lighting to 35-40-foot candles.

Provide adequate lighting to all mechanical spaces, including attics, heating closets, etc.

Provide a safe method of re-lamping all light fixtures mounted above 12’ in areas such as Auditoriums, Gymnasiums, Multi-Purpose, etc.

## **Palo Alto Unified School District Technical Standards**

Utilize suspended direct/indirect LED lighting in classrooms rather than 2' x 4' lighting for reduced glare, provide better uniformity.

Ceiling mount passive / infrared 360° motion sensors shall control lighting in all classrooms, offices and toilets - with override capability. Employ time of day controls for larger public spaces.

Provide automatic dimming controls to reduce artificial light when natural light from windows, clearstory windows or skylights is available.

Provide manual switching and dimming controls that allow classroom lighting to be configured to meet the needs of the room.

Provide LED lighting fixtures in all indoor spaces. Any exceptions shall be approved by the District.

### **Outdoor Lighting:**

Provide parking area lighting for areas intended for more than twenty-five (25) vehicles.

Use the Industrial Engineering Standards (IES) standard for lighting levels: One-half (0.5) foot candles (minimum).

LED lamps, preferred.

Light standards to be mounted on concrete pedestals.  
Aluminum poles are preferred to reduce maintenance costs.

Shock resistant lenses shall be used to deter vandalism. Provide 10 percent extra of stock lenses to the District Maintenance personnel at the conclusion of construction.

Provide lighting for accessibility throughout campus, where "street-lighting" is not sufficient.

Mount area lighting at minimum twelve- (12) foot height to minimize vandalism.

Lighting below twelve (12) feet high shall have metal or high-impact material guards.

Any pole-mounted fixture shall have hand-hole accessibility, with secure cover(s).

Provide two (2) levels of lighting: Night lighting and Security lighting.

Night lighting and security lighting shall be controlled by the District's Energy Management System (EMS).

Building perimeter lighting should be wall-mounted using medium base (70) watt LED lamps and shall be connected to the Building Management System or EMS.

**Palo Alto Unified School District  
Technical Standards**

**Division 27 — Communications**

VoIP Equipment

The District shall provide phones.

Contractor shall provide wiring/data drops in all areas including, without limitation:

All office areas, except utility and equipment rooms (1)

Auditorium, Control Booth (1)

Classrooms and Labs (1)

Conference Rooms (1)

Dressing rooms (1)

Kitchen (2)

Multi-Purpose Room (2)

Physical Education, Training (1)

Special Purpose Rooms (1)

Staff Lounge(s) (1)

Staff Locker Room(s) (1)

Teacher and Staff Work Areas (1)

Wires shall be identified with labels at all junction boxes; the labels shall indicate the room at which the wire terminates. Use District labeling standards. Data wire shall use the following color coding.

Blue = Data

Orange = Clock/Bell/Speaker

Red = Fire

Violet = WIFI (this includes lock gate ways)

White = Cameras

Green = EMS

Grey = Irrigation

Yellow = Phones

Black = Reserved

All wires within terminal cabinets shall be neatly formed and laced in such a manner that identifying labels are easily visible.

# Palo Alto Unified School District Technical Standards

## Local Area Network

### Types of Rooms:

Termination Room/Main Distribution Frame (MDF) shall be a securable room that should be dedicated to this purpose with no other building services without prior authorization from the District.

Termination Room/Individual Distribution Frame (IDF) shall be a securable room that should be dedicated to this purpose with no other building services without prior authorization from the District. IDF room may be co-located with the Service Entrance and Termination Room, provided the room is size for both functions.

### Administration/Labeling

Labels, tags, and straps shall be high quality that will endure over the life of the cable plant. The use of hand written labels is unacceptable for permanent installation.

Location Identification shall be clear and orderly so District has a clear understanding of identification and location.

Jack/Cable Labeling: The jack/cables installed in the wall outlet/device should be given a sequential letter starting with A, in addition to a prefixed room number – for example: “Rm22-A”, “Rm-24-B”, Rm-13C”, Admin-22A” etc.

Patch Panel Jack Labeling: The patch panel jack (in the appropriate IT Closet) should be labeled in accordance with the copper cable lines (“Rm22-A”, Rm24-B”, etc.)

Fiber Patch Panel Labeling: The fiber path panels in both MDF and IDF for New and Renovated construction should have a clear labeling for both punch down configuration. These must include:

Total strand count

Type of fiber

Far End Location

Example: 6 Strand Single-Mode 62.5 to MDF

A complete ‘cable plant’ shall be installed throughout the School site. The cable from the data outlet in the classroom to the nearest hub is a Category 6, unshielded twisted pair, capable of handling 1—GBPS of data throughout. Between Individual Distribution Frames (hubs), fiber-optic cables provide a direct connection to the single Main Distribution Frame (router or file server).

A minimum of 3 calendar weeks (21 days) in the schedule is required for the District’s Information Technology personnel to review and install LAN hardware and software before building occupancy.

### Copper Ethernet Cabling

#### Distribution Cabling

- New and Renovated Buildings: New Buildings’ classrooms shall receive a standard of six (6) copper data communications lines. Implementations should be of IEEE CAT 6 quality wire and provision for specifications in the IEEE with respects to size and installation. Placement and height of termination outlets should coincide with District Educational Tech requirements. Computer labs shall receive a minimum of thirty (30) copper data communications lines. Wireless access points need to be placed high on wall out of reasonable reach.
- Cabling shall be provided for a Voice over IP phone situated not closer than four (4’) feet from the main entrance to the classroom.
- Cabling shall provide for a single data drop and 120V convenience electrical power outlet.
- Placement of the electrical/data outlet
- Shall be at a height of nine (9”) inches to the bottom whenever possible.
- Shall have a clearance of any metallic mounted objects within a 360-degree five (5’) foot radius to reduce attenuation from interfering sources as possible.
- Shall not be on walls that contain or bear heating elements or environmental systems to reduce attenuation from interfering sources as possible.

## Palo Alto Unified School District Technical Standards

A minimum of 4 wall data jacks and 1 jack in the ceiling (for WIFI) shall be the minimum amount used in classrooms or other rooms unless noted otherwise.

CAT 6 color coding.

All data cables shall be colored as per the following list that is used to identify the system it supports.

Clock/ Bell / Speaker	=	ORANGE
Data	=	BLUE
Fire	=	RED
WIFI/LOCKS	=	VIOLET
Cameras	=	WHITE
EMS	=	GREEN
EMERGANCEY PHONE	=	YELLOW
Irrigation	=	GREY

### Fiber Optic Cabling:

#### Backbone Cabling

##### New buildings

New buildings shall receive new inter-building fiber optic cabling. Run directly to the MDF

##### Renovated Buildings

If the building that is to be renovated does not have the required single-mode fiber service pre-existent to the renovation, the new building will receive fiber optic cabling per the District's specifications to the campus' main distribution frame (MDF) room.

##### Fiber Types

Each new single-mode Inter-building plant not joined with existing fiber shall be installed with the minimum of six (6) strands of single mode 62.5 from each remote IDF location to the campus' MDF location.

New single-mode fiber that requires connectors or splicing into pre-existing fiber plants shall match the physical and optical properties of existing fiber grade.

##### Fiber Enclosures

Each MDF/IDF cabinet shall incorporate a fiber termination cabinet.

Termination cabinets shall be 4RUs for the MDF locations and 2RUs for IDF locations.

Capacities shall provide for 288 SC Fiber connections in 4RU implementations and 144 SC Fiber Connections for 2RU applications.

Fiber cabinets should have a sealed panel with a transparent front plate for viewing of terminated fiber pairs.

### Main Distribution Frame (MDF) features:

Front doors: Single Point keyed alike; External Latch and Hasp for both front and rear/side of enclosure.

Acrylic window (1/4" thick).

Side covers: full height solid with removable covers that support modification to accept removable fan systems and panels.

Plain top cover. Top Cover must be fully solid with removable mounting points for fan systems.

Rails: #12-24 tapped rails.

## **Palo Alto Unified School District Technical Standards**

Load rating must be sufficient.

Four post construction

Intermediate Distribution Frame (IDF) placement shall be arranged to maximize efficient use of space, and conform to the guidelines specified in the Americans with Disabilities Act (ADA).

Main Distribution Frame (MDF) placement is site specific and shall be coordinated with the Facilities IT Department. Minimum critical dimensions for equipment and clearances for rooms to house floor-standing equipment racks shall be:

- Width: 10'-0"
- Depth: 7'-0" for the first rack and UPS, 30" for each additional rack (recommend two (2) racks).
- Height: 9'-6" from finished floor to the lowest clearance (such as fireproofing on steel beam).

If area is encroached by building elements such as columns, critical dimensions must still be adhered to and the room dimensions appropriately adjusted with a minimum of 3 feet.

### **Location and Adjacencies:**

Data Communication Rooms should be centrally located on the floor plate and every datacom outlet should fall within a 200-foot radius circle centered in the datacom room or that no cable shall run over 300 feet.

In multi-story buildings, Data Communication Rooms should be vertically adjacent/stacked floor-to-floor to assist in backbone pathways and backbone cabling.

### **Door:**

Swing: The door should swing outward to maximize the usable area within the room, where possible. If the door swings into the room, the door shall swing into the clearance space.

Size: The door shall be 36" wide by 84" tall, maximum.

Unique keying (Primus) on door to MDF. DO NOT use site master keying.

### **Floors:**

Floors shall be either sealed concrete or the same resilient floor product (VCT) that is being installed in the contiguous public floor areas, where type/color is specified by the District.

Floors shall not be carpeted.

### **Walls:**

Walls shall be full height – to the structure above.

### **Ceilings:**

The ceilings shall be left open and no ceiling is required.

### **Cooling:**

A cooling system that is dedicated to this room

If the District's IT does not give specific approval for 'no-installation of air-conditioning' all new IDF cabinet systems are required to have an environmental cooling system that has capability to accommodate 900 Btus/hour. IDF should be placed in a conditioned space where possible. If not possible, then the IDF should be located in a space with adequate ventilation.

All computer wiring to be routed in conduit to its own terminal panel, which will be connected to the data patch panel for that location.

### **Spatial Placement concerns:**

All wall mounted IDF's should be mounted with a minimum of three (3') clearance on either side of the cabinet when fully opened. Fully open widths shall be taken into account for clearance calculation. Minimum heights for the cabinet should be at least four (4') from the bottom of the cabinet to the sealed flooring. The height of the top portion of the cabinet should not exceed ten (10') feet. No item should be placed between bottom of cabinet and floor.

## **Palo Alto Unified School District Technical Standards**

### **Rack Bay Service (IDF)**

#### **Electrical**

Convenience outlets should be 120V. Convenience outlets shall be circuited from a normal power panel. The UPS system requires electrical service to be provisioned with a minimum of two (2) 120V 20A circuits to 5-20R quadplex receptacles.

The rack/IDF enclosure will receive power from a UPS system and power strips that will be provided by the District.

**UPS Service:** A dedicated electrical outlet shall be provided for the UPS system. The service shall consist of one 120V 20A circuit to an L5-30R receptacle and one 120V 30A circuit to an L5-30R receptacle located behind the rack bay in close proximity to the intended location of the UPS system. Both branch circuits' wiring shall be 10 AWG. The Electrical Designer shall coordinate the electrical service with the equipment layout.

UPS systems must be able to comply and be managed via the District's management system. All vendors shall obtain approval from the District's IT department regarding model prior to purchase and installation.

Cabinet installations must include a Power Distribution Unit (PDU) that incorporates horizontal mounting and with a height of a standard 1RU (1.75") that fits in a standard nineteen (19") inch rack.

LED display for amperage (units to increment display in half ampere units).

PDU must support management and integration with District monitoring systems via SNMP.

PDU must have a minimum of six (6) 120V outlets.

Network connectivity for the PDU for remote management and maintenance must be incorporated in the design of the unit.

#### **Cable Termination:**

110-type termination devices will be used as IDF terminal devices in all new building construction and renovation. All terminations must be of a modular design. The IDF must be wall-mounted as previously specified and equipped with components adhering to Category-6 standards for connector and terminal blocks.

Connections intended for voice use shall be terminated on 110-type terminal blocks, from the riser and the terminal side, appropriately labeled to match the number on the terminating wall jack.

Connections intended for data use shall be terminated on 110-type, RJ45 jack panels, appropriately labeled to match the number on the terminating wall jack.

Single mode fibers shall be terminated via single mode SC connectors. SC connectors shall be 568SC type, and shall meet all requirements of TIA/EIS-568-B.1,2,3.

If existing multimode 50/125µm fiber is to be terminated via multimode SC connectors.

The patch panels shall be horizontally oriented for a rack-mounted configuration and shall be installed into an equipment rack, preferable in the top RMU. Provide one patch panel for multimode termination and one patch panel for single mode termination – as applicable.

Use of 66-type connector blocks is not acceptable unless required to repair existing systems.

### **Clock and Public Address System**

Master clock should be synchronous wired, six- (6) circuit program unit with hourly and twelve 12-hour corrections.

Up to 350 events, 100 holidays and eight (8) schedules are possible. An interface module allows paging by zone from any telephone handset by using the appropriate entry code and zone code. Up to eight (8) zones are available including an emergency "all call" feature that overrides all other functions.

The Public Address system does not support paging or open communication by individual rooms through the speaker system. Intercommunication is accomplished through the telephone system by using the telephone handsets located in every room.

Analog clocks must be used at Elementary sites, Digital clocks may be used at secondary sites.

Exterior speakers shall be located so that entire property has coverage.

Provide secondary clocks/speakers in all areas including, without limitation:

Classrooms

## **Palo Alto Unified School District Technical Standards**

Offices and teacher work areas

Student gathering areas

Stage and Platform

Auditorium(s)

Kitchen and Food Service areas.

### **Computer Systems:**

All computer drops shall be CATEGORY six (6) wire, maximum of ninety (90) meters of cable run from patch panel in IDF to receptacle drop.

Use four 4S box with 2 (two) double gang trip at computer outlets.

All computer wiring to be routed to the Intermediate Data Frame (IDF) or Main Distribution Frame (MDF) Room.

MDF / IDF Identical features: Front, Rear and Side doors: Latch and Hasp mechanism for large padlock; Acrylic window (1/4" thick). Side covers: full height solid. Plain top cover. Rails: #12-24 tapped rails.

Provide adequate sized room to house equipment in the MDF rooms plus 25% including three (3) foot clearance front back and side to side for equipment.

Provide enclosures with fans in IDF rooms. Provide door vent in room with confined space. Fans are not required for enclosures in the MDF rooms.

Additional terminal panels that must be installed shall leave one (1) rack unit's space for cable management enclosures and/or networking devices.

All data routes to universal patch panel with snap in RJ45 jacks is mandatory.

### **Audio / Visual Systems: - In Development**

Apple TV  
Controls  
Audio Systems  
Video Systems  
Other

## **Division 28 — Electronic Safety and Security**

### **Alarm and Detection Equipment:**

The Fire Alarm system shall be an automatic detection system using heat detectors and smoke detectors though out the project (including relocatable classrooms and daycare). By utilizing an automatic detection system, the goal to eliminate manual pull stations is eliminated, as is the potential for nuisance fire alarm tripping.

Fire alarm horns shall utilize a Temporal Code 3 signal as required by DSA. Strobe lights, strobe/horn combinations units, both standard size and mini-size, on the interior of the buildings shall meet the requirements of the Fire Codes.

## **Palo Alto Unified School District Technical Standards**

Heat detectors, smoke detectors, horns and strobe/horn units are “addressable” by individual addresses rather than addressable by zone. The location of an activated or failed device is displayed on the Remote Enunciator panel usually located in the Lobby. The location shall provide easy access by the local Fire Department. An enunciator is also located at this location. The Fire Alarm Control Panel and the Remote Enunciator are connected via a supervised network-wiring scheme.

The entire Fire Alarm system, consisting of conduit, cable, equipment and installation shall be included in the electrical bid documents.

Acceptable Manufacturer: Depending on head in equipment (sole source)

Silent Knight by Honeywell

The specifics of an Alarm System shall be verified with the District.

Confirm compatibility with the District-wide system.

Installations made to existing Fire Alarm equipment shall have the entire system verified and fully operational.

Intrusion Alarm System installation shall confirm tie-in to District’s alarm reporting system.

Pre-wire detectors and door switches by contractor/security vendor.

Fire alarm system is to be separate from the clock and paging system on a digital controlled system.

Manual pull stations shall be minimized whenever possible. All boxes shall be an integral part of a supervised loop.

### **Division 31 — Earthwork – Not Used**

### **Division 32 — Exterior Improvements**

#### **Hardscape:**

#### **Flagpoles:**

Required at every school site. Rope shall be completely secured.

#### **Parking/Vehicular:**

General: The bus drop-off area should be separate from the parent/visitor drop-off area and parking areas.

#### **Parking Requirements:**

Buses: Consult with District for project specific numbers.

Staff Parking: Consult with District for project specific numbers.

Visitor Parking: Consult with District for project specific numbers.

Charging station 1-20 parking stalls. Consult with District for locations and number for each site.

#### **Bicycle Rack Requirements:**

Consult with District for project specific numbers and type of rack

## **Palo Alto Unified School District Technical Standards**

Bicycle parking area should be fenced and visually accessible from the Administration Area at secondary level, unless otherwise directed by District.

Bicycle enclosure shall be 6'-0" high, chain link fence and gates, at secondary level.

District standard bike rack is the "inverted U" with spacing of 2' 6" between racks.

Fencing and Gates shall be polyvinyl covered galvanized chain link or ornamental metal black in color 6' high. Barbed wire shall never be used on the Palo Alto Unified School sites.

### **Playground/Outdoor Gathering:**

Ease of visibility will be a prime design directive in play areas

Hardscape play area should be directly accessible from the shower and locker areas

The playground areas, both hard court and soft fields should consider the enclosed recommendations from the California Education Specification.

### **Landscape Irrigation:**

Provide separate water meters from the school site for irrigation of play fields. The design cost shall be shared equally between the District and the City of Palo Alto. The District shall be responsible for obtaining payment from the City.

All new turf and lawn valves shall be centrally located at the edge of the turf closest to the irrigation timer. In large turn areas and / or new landscape installations, it may not be practical or cost effective to centrally locate valves near the timer. In this case the valves shall be grouped together where practical at turf edges or outside turf areas in adjacent planting areas on grade.

### **Sustainability:**

Reduce portable water consumption for irrigation by 50% over landscape budget baseline with the use of water-efficient native (or adapted) climate-tolerant plantings, high-efficiency irrigation technologies, or using captured rain or municipally provided reclaimed water.

Reduce potable water for site irrigation by additional 50% (100% total reduction) OR do not install permanent landscape irrigation systems.

Sprinkler heads and timers shall be standardized. There shall be one tree bubbler installed for each shrub where practical.

Acceptable Manufacturers:  
Hunter  
Rainbird

Timers shall be placed in a central location and wires for telephone modem shall be installed prior to installation of timers. Check with District for location and type of timer installation such as installed interior in a mechanical or electrical room or exterior on a wall or exterior inside an irrigation pedestal enclosure. District to approve manufacturer.

Acceptable Manufacturers:  
Rainbird Maxicom  
Toro Sentinel  
Irritrol – Total Control

Centrally controlled irrigation systems shall have a weather station, evapotranspiration gauge, or ET based clock with subscription to local ET rates for water efficiency control and automatic rain shut-offs, automatic shut-down

## Palo Alto Unified School District Technical Standards

due to leaks and automatic climatic adjustments in water needs and remote access to timers from one central computer.

Provide polyvinyl chloride (PVC) schedule 40, grey electrical conduit pipe sleeves for controller wires where they cross under hard surfaces, such as concrete, asphalt concrete paving, etc. Electrical conduit shall be placed no less than 36" under grade. Irrigation pipe shall be sleeved with schedule 40 PVC at same crossings.

Provide one (1) empty, two- (2) inch diameter, conduit chase pipe and pull string for future use at all locations where pipe sleeves for controller wires have been installed. Additionally, add the installation of five (5) spare irrigation control wires for each timer that shall be run in the irrigation mainline trench through the entire system and shall be a different color than the control wires (control wires shall be red and spare wires shall be yellow).

All irrigation systems shall be equipped with backflow preventers. Backflow preventers shall be installed with a concrete pedestal and cage or require a blanket as required.

Installing contractor shall record irrigation as-built conditions, variations between drawing design and installed layout, record dimensions to mainlines and buried wires, etc.

Installing contractor shall install valve identification tags onto remote control valves or engrave on the valve box lids indications of the valve station number and timer.

Install standardized quick coupling valves at each remote-control valve cluster and / or a maximum spacing of 150' o.c. Install quick coupling valve below grade in a valve box.

Acceptable Manufacturers:  
Rainbird 44 LRC

Valves shall be added in green valve boxes, plastic in turf areas and concrete in planting and paved areas, flush with grade. Install 6' depth drain rock below valve and wire mesh screen around box to prevent gopher intrusion.

Acceptable Manufacturers:  
Weathermatic (plastic)  
Griswald (brass)  
Christy (concrete)

Piping shall be Schedule 40 and installed at a depth not less than 24" deep. Backfill trench with 6" of sand and install tracer tape with mainline pipe. For reclaimed water, use purple reclaimed pipe.

Install gate valves to isolate the irrigation mainline and add isolation valves at each cluster of remote control valves.

Acceptable Manufacturers:  
Nibco T-113 bronze gate valve  
Watts FBV bronze ball valve

Install an 18" concrete band at building edge in planting and lawn areas to minimize over-spray onto building walls and glass.

### **Tree, Plants and Ground Cover:**

Shrubs shall be established in five (5) gallon containers at a nursery at least one year before purchase (exception for flats). For fast growing plants such as daylilies, cotoneaster ground covers, star jasmine ground covers, etc. one (1) gallon containers are acceptable. Plants shall be well rooted in container, not root-bound, and sizes shall conform to the American Standards for Nursery Stock, ANSI Z60.1, 1980.

Before planting existing site soil shall be tested prior to amending and then amended per soil testing laboratory recommendations. District will inspect to verify recommended amendments were installed, tilling depths are adequate, and that rocks and debris have been removed from planting soil.

## **Palo Alto Unified School District Technical Standards**

Fertilizer and/or soil amendments shall be placed prior to planting. Planting shall not commence until District Maintenance personnel have verified and approved soil amending in writing.

Planting pit for shrubs shall be twice the root ball size in width and one and one half the root ball in depth. Planting pit for trees shall be equal to the root ball in depth and twice the root ball in width. Plant trees 1" above grade to allow for settling. May also add creation of 3" high temporary berm around each shrub or tree in non-turf areas and to hold sod or seed turf 12" clear of tree trunks.

Trees shall be well rooted in container, not root-bound, and sizes shall conform to the American Standards for Nursery Stock, ANSI Z60.1 1980.

Trees shall not be planted within ten (10) horizontal feet of sewer drain lines, or under overhead utilities, shall not be planted within driplines of other trees, spaced at 75% of their mature size and shall be planted a minimum of eight (8) feet of building structures.

All trees shall have deep rooting planter boxes for trees within ten (10) horizontal feet of a building structure of paved surface.

All tree sizes shall be a minimum of fifteen (15) gallons.

Tanbark shall not be used anywhere. Recycled bark mulch shall be used instead at 2" minimum depth.

Acceptable Manufacturers:  
BFI Recycled Bark Mulch

Outdoor play structure areas shall have resilient surface(s).

Acceptable Manufacturers:  
Tot Turf

Provide shade (within 5 years) on at least 30% of non-roof, impervious surfaces on site, including parking lots, walkways, plazas, etc. OR use light-colored / high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof, impervious surfaces, OR use an open-grid pavement system (net impervious area of less than 50%) for a minimum of 50% of the parking lot area.

Trees shall be staked using heavy-duty staking with four wood stakes and horizontal wood bracing.

Grass shall be fescue variety or rye grass / blue grass mixture depending on situation. District will advise.

Lawn edgings shall be recycled plastic.

Acceptable Manufacturers:  
Tyrex

Synthetic Turf:

Used in large athletic fields (baseball, football, soccer lacrosse)

Acceptable Manufactures:  
Field Turf Tarket (Sole Source)

**Palo Alto Unified School District  
Technical Standards**

The following species palette has been developed through previous landscape projects. It lists both historic plants and new plants. This list should be considered preliminary, and the design professional shall work with the District Facilities, Maintenance and Grounds team to finalize the list prior to the design development phase of the project. It is the role of the design professional to select plants which are compatible with this palette. Not every species listed is located in every section of the campus and care should be taken to select a project palette which is visually and functionally balanced.

TREES	Common Name	Scientific Name	Comments
Other Varieties (Large Scale)	Alleppo Pine	Pinus Halepensis	
	American Ash	Fraxinus Americana 'Autumn Purple'	
	Canary Island Pine	Pinus Canariensis	
	Coast Live Oak	Quercus Agrifolia	in dry sites
	California Sycamore	Plantanus Racemosa	
	Camphor	Cinnamomum Camphora	
	Chinese Elm	Ulmus Parvifolia	
	Chinese Fringe Tree	Chinonanthus Retusus	
	Chinese Pistosh	Pistacia Chinensis	
	Deodar Cedar	Cedrus Deodara	
	Frontier Elm	Ulmus 'Frontier'	
	Fruitless Sweetgum	Liquidambar Styriciflua 'Rotundiloba'	
	Ginkgo Biloba Tree	Ginkgo Biloba	
	Green Ash	Fraxinus Pennsylvanica	
	Horsechestnut	Aesculus Carnea 'Briotii' or Hippocastum 'Baumanni'	
	Incense Cedar	Calocedrus Decurrens	
	London Plane	Platanus Acerifolia	
	Olive	Olea Europea	Specify non-fruting variety such as Wilsoni and Majestic Beauty
	Ponderosa Pine	Pinus Ponderosa	
	Red Oak	Quercus Rubra	
Silver Linden	Tilia Tomentosa		
Southern Live Oak	Quercus Virginiana		
Trident Maple	Acer Buergeranum		
Tristania	Tristaniopsis Laurina 'Elegant'		
Tupelo	Nyssa Sylvatica	in wet sites	
Valley Oak	Quercus Lobata	in dry sites	
Other Varieties (Small Scale)	California Buckeye	Aesculus Californica	
	Catalina Cherry	Prunus Lyonii	
	Crepe Myrtle	Lagerstroemia 'Natchea'	in small sites
	Flowering Pear	Pyrus Calleryana	
	Japanese Persimmon	Diospyros Kaki 'Hachiya'	
	Mock Orange	Pittosporum Tobira	
	Strawberry Tree	Arbutus Unedo	
	Western Redbud	Cercis Occidentalis	

**Palo Alto Unified School District  
Technical Standards**

SHRUBS and PERENNIALS			
SHRUBS and PERENNIALS	Type		Comments
	Dwarf Weeping Bottle Brush	Callistemon Viminalis 'Little John'	
	English Lavendar	Lavandula angustifolia	
	Grevillea	Grevillea Noellii	
	Dwarf English Lavendar	Lavendula Angustifolia 'Munstead'	
	Spanish Lavendar	Lavendula Stoechas	
	Wax Leaf Privot	Ligustrum Japonicum	
	Heavenly Bamboo	Nandina Domestica	
	Dwarf Heavenly Bamboo	Nandina 'Gulf Stream'	
	Fountain Grass (Green)	Pennisetum Setaceum	
	Fountain Grass (Red)	Pennisetum Setaceum (Red)	
	Dwarf Flax (Bronze Leaf)	Phorium 'Jack Sprat'	
	Red Flax	Phorium Tenax 'Rubrum'	
	Salvia	Salvia Gregi (Red)	
	Salvia	Salvia Leucantha	
	Dwarf Oleander	Nerium Oleander	
	Guava	Myrtacea	
	Agapanthus	Amaryllidaceae	
	Xylosma	Flacourtiaceae	
	Chinese Fringe	Loropetalum	
	Camellia	Theaceae	
	English Laurel	Prunus Laurocerasus	
	Pittosporum	Pittosporaceae	
	Indian Hawthorn	Rhaphilepis Indica	
	Euonymus	Calastraceae	
	Cotoneaster	Rosaceae	
	Rockrose	Cistaceae	
GROUND COVER			
GROUND COVER	Type		Comments
	Jasmine	Jasminum	
	Gazania	Asteraceae (Composite)	
	Verbena	Verbenaceae	
	Vinca	Apocynaceae	
	Myoporum	Myoporaceae	
	Isotoma	Campanulaceae	
	Carpet Rose	Rosa	
	Ivy	Araliaceae	
	Apetenia	Aizoaceae	
	Festuca	Poaceae	
	Hemerocallis (Daylilly)	Liliaceae	

Division 33 – Utilities – Not Used

Division 34 – Transportation – Not Used