School Design Guide

Los Angeles Unified School District

January 2010

PREFACE

This **School Design Guide** has been prepared to establish and sustain consistent representation of requirements and standards to all members of the Design Team. It presents design guidelines and criteria for the planning, design and technical development of new schools and modernization, and includes by reference the Facilities Space Program, the Educational Specifications, the Guide Specifications, and the Standard Technical Drawings of the District.

This new edition of the Guide has been updated, edited and designed to present the District's current insights and objectives. It incorporates new systems and environmental criteria, and contains updated requirements of earlier editions of the Guide, with former editions diligently compared and revised.

TABLE OF CONTENTS

Book One Purpose and General Requirements

1.0 TABLE OF CONTENTS
1.1 PURPOSE AND PRINCIPLES
1.2 SUBMITTAL REQUIREMENTS

Book Two General Criteria

2.0 TABLE OF CONTENTS
2.1 SCHOOL BUILDING DESIGN
2.2 SITE DESIGN
2.3 VEHICULAR ACCESS AND PARKING
2.4 ENVIRONMENT AND SUSTAINABILITY

Book Three Technical Criteria

3.0 TABLE OF CONTENTS
3.1 ARCHITECTURAL
3.2 CIVIL ENGINEERING
3.3 STRUCTURAL
3.4 PLUMBING
3.5 FIRE PROTECTION
3.6 HVAC SYSTEMS
3.7 ELECTRICAL POWER & LIGHTING
3.8 ELECTRICAL COMMUNICATIONS & AV SYSTEMS
3.9 PLANTING AND IRRIGATION

Appendix "A"

A.0 TABLE OF CONTENTS
A.1 CHPS SCORE CARD – NEW FACILITIES (SEPARATE VOLUME – NOT INCLUDED)
A.2 CHPS SCORE CARD – EXISTING FACILITIES (SEPARATE VOLUME – NOT INCLUDED)
A.3 SUBMITTAL REQUIREMENTS & CHECKLISTS
A.4 BUILDING ACOUSTICAL REQUIREMENTS
A.5 CHECKLIST OF OFF-SITE WORK, UTILITIES & EASEMENTS

A.6 PLANNING AND DESIGN GUIDELINES FOR SMALL LEARNING COMMUNITIES *(SEPARATE VOLUME – NOT INCLUDED)*

A.7 ESTIMATING GUIDE *(SEPARATE VOLUME – NOT INCLUDED)*

1.1 PURPOSE AND PRINCIPLES

A. PURPOSE

B. ORGANIZATION OF DESIGN REQUIREMENTS

C. DESIGN PRINCIPLES

1.1 PURPOSE AND PRINCIPLES

A. PURPOSE

The Los Angeles Unified School District is committed to creating high-quality educational environments – places that provide well-planned, high-performing, healthy school buildings that foster student achievement and well-being, as well as being centers of community.

The "School Design Guide" has been prepared to establish and sustain consistent representation of requirements and quality standards for those environments to all members of the Design Teams for LAUSD school facilities. It is based on the current curricula, teaching methodologies, student groupings, and site constraints of the District. It reflects the District's experience in building and operating schools to balance the needs for instructional functionality with aesthetics, practical comforts, accessibility, ease of maintenance and operation, and assurance of safety so that all students, staff and community members feel welcome, safe, and proud of their schools – all while reflecting the wise and efficient use of limited land and public resources.

Architects shall follow the requirements and standards presented here for the planning and design of new school construction or reconstruction. These are not intended, to stifle creativity or innovation. If an Architect feels that varying from specific requirements, while still meeting their intent, is desirable for a specific project, the variations may be incorporated into the design with written approval of the District's authorized representative.

The "School Design Guide" incorporates and complements the requirements and standards of other LAUSD documents that direct the design of school facilities (see below), and which are also part of the District's requirements and standards. The requirements and standards are updated on an annual basis. Interim changes will be published periodically.

B. ORGANIZATION OF DESIGN REQUIREMENTS

The content of the **"School Design Guide"** is divided into three sections: **Book One** deals with general items, purpose and principles; **Book Two** deals with functional and relational planning and design criteria, including general environmental and sustainability issues; and **Book Three** presents more detailed information on material choices and system design criteria and requirements, by chapters on each major technical discipline. Additional requirements are in the **Appendix**.

The other requirements and standards that are incorporated as part of the **"School Design Guide"** are:

1. **"Facilities Space Program (Program):"** Governs the capacity, size, and number of functional spaces of each school project.
2. **"Estimating Guide:"** Quantifies the quality levels of space, materials and systems for each school project.
3. **"Educational Specifications" (Ed Specs):** Detailed descriptions of the functional and facilities support requirements for each space defined in the Facilities Space Program, including prototype drawings and equipment lists. Available for High, Middle, and Elementary Schools.
4. **"Guide Specifications:"** These are construction specifications in CSI format that define the materials and systems acceptable to the District, including considerations of economy, performance, and maintenance and operations. The Guide Specifications often include alternative choices. These Guide Specifications must be edited by the Architect to suit the needs of each specific project.
5. **"Standard Technical Drawings" (Std. Dwgs.):** Construction details that provide District-wide consistent operational and safety standards.

The District also has Procedural Requirements that govern the work of the commissioned architects and engineers. Information on these is available from the District's authorized representative.

C. DESIGN PRINCIPLES

1. Learning Environment: Schools should provide instructional spaces that facilitate student-teacher interaction in the educational process, with collaborative learning and working, flexibility to accommodate different teaching styles, and a health-enhancing environmental ambience.
2. Architectural Quality: The appearance and overall character of each school should be both pleasing and stimulating to students, teachers, parents and the surrounding community, providing a welcoming and attractive place to visit or to spend the day.
3. Pride in Ownership: Each school's design should foster a sense of belonging and pride among the students, staff and community.
4. Flexibility: School planning should anticipate future growth on the site as well as provisions for equipment replacement and advances in technology.
5. Small Learning Communities: In planning larger schools, smaller schools must be created within the larger context, to reduce the perceived scale of the school for students and to provide integrated small learning communities with common affinities, such as common curricula, themed educational programs, or age and grade.
6. Accessibility: Schools must accommodate all students, staff and community members including the physically disabled and wheelchair-bound, deaf, visually or emotionally impaired. Design shall allow for construction and material tolerances to accommodate dimensional requirements set by ADA and other codes. Do not design to minimum or maximum requirements, thus risking potential non-compliant designs.
7. Safety and Security: Schools must be safe and secure without appearing prison-like. Structures, fences and site amenities shall be designed to maintain safety, prevent unauthorized access and deter vandalism.

Opportunities to climb to gain access to other floors, roofs, etc. shall be eliminated.

8. Community Focus: The school, as the center of the neighborhood, must be accessible on evenings and weekends for joint use of facilities by the community and provision of extended learning concepts.
9. Land Use and Site Planning: Scarcity of land demands innovative settings of buildings, playgrounds and parking to achieve educational goals on crowded urban sites.
10. Sustainability: Schools must assertively address long-term concerns for environmental impacts and energy conservation.

1.2 SUBMITTAL REQUIREMENTS

A. GENERAL REQUIREMENTS

B. SCHEMATIC DESIGN PHASE SUBMITTAL

C. DESIGN DEVELOPMENT SUBMITTAL

D. CONSTRUCTION DOCUMENTS: 50% SUBMITTAL

E. CONSTRUCTION DOCUMENTS: 100% SUBMITTAL

F. DISTRICT REVIEW AND PLAN CHECK

G. FINAL BID DOCUMENTS

H. ADDENDA

I. GENERAL DRAWING & SPECIFICATION REQUIREMENTS

1.2 SUBMITTAL REQUIREMENTS

A. GENERAL REQUIREMENTS

1. Coordination and Review of the Design

Coordination of all architectural, engineering and other associated design disciplines working on the project – including those provided by District staff or under separate contract to the District – shall take place throughout each design phase and shall be the responsibility of the commissioned Project Architect. Such coordination shall include processing and review of all drawings, specifications, cost estimates and other documentation necessary for the integration of all building trades and systems, equipment and furnishings, and resolution of constructability issues. ***With each design submittal, the Architect shall certify in writing that all required coordination has occurred and shall accept responsibility for all changes in the design and construction work which result from failure to properly coordinate the efforts of the design entities***.

2. Other Contractual Terms

In some cases, the District's A/E Contract may define different design phases and submittal terms. Adjust the requirements described below for submittals to the specific contract and as directed by the District's authorized representative.

3. Jurisdictional Agency Regulatory Code Compliance

Architect shall be responsible for verifying that all design and construction documents submitted provide for compliance with all applicable jurisdictional agency codes and operating requirements.

4. Energy Review

In order for the District to apply for State Allocation Board's energy grants, all new facilities projects and identified new buildings under existing facilities, shall apply for DSA "energy review". Also see section 2.4 "Environment and Sustainability".

B. SCHEMATIC DESIGN PHASE SUBMITTAL

1. Project Start Meeting:

a. The District's authorized representative will establish a project start meeting date with the Architect. At this meeting the Architect will receive the building program, design guidelines, available site and other relevant

information, and directives to allow the Architect to begin work on the assigned project.

b. Starting Date: The District's authorized representative will issue a notice-to-proceed letter to the Architect indicating the start and completion dates of the Schematic Design Phase.

2. Information Gathering:

a. It is important that the public and utility agencies serving the school be involved in the design process from the beginning. During the Schematic Design Phase the Architect shall initiate contact with representatives of the following agencies, to inform them of the school's needs and to establish relationships that will assure coordination of their requirements with the school's design.

1. Division of the State Architect: Structural Safety, Fire Marshal and Access Compliance Sections for Title 24 regulations.
2. Local jurisdiction (City of Los Angeles, County, or other city) for off-site street profiles, curbs and walks, storm drains and utility services.
3. Local jurisdiction Traffic Department for driveway locations and passengers loading area.
4. Local Fire Department (City or County) for site access, dispersal areas, and on-site fire hydrants.
5. Utility agencies or companies for location of existing and proposed domestic water, reclaimed water, sewer, electric, gas, telephone and television cable services.
6. Utilities companies (Southern California Edison or Southern California Gas Company) for "Savings By Design" application.
7. County of Los Angeles Department of Health for kitchens and swimming pools only.
8. Other agencies for specific project conditions – for example, the use of reclaimed water.

b. A "Checklist of Offsite Work, Utilities & Easements" is available and shall be completed and submitted to the District's authorized representative during various phases throughout the project.

c. A "CHPS Scorecard" is available and shall be completed and submitted to the District's authorized representative at various phases throughout the project. See Section 2.4 for additional information.

3. Conceptual / Preliminary Schematic Design

a. The first submittal for the Schematic Design Phase shall present the District with three or more alternative conceptual design solutions to the District's program and community requirements. One scheme will then be further developed and presented for schematic planning approval.

b. Documents submitted by the Architect for each alternative design approval shall include, but not be limited to:

1. Site analysis diagrams showing key influences, such as topographical characteristics, solar orientation, winds, views, traffic, and neighborhood context;
2. Proposed utilization study of each particular project site;
3. Schematic plans of each floor;
4. Simplified elevations indicating the fundamentals of the architectural concept;
5. Comparative cost estimates for each of the three designs.

c. The purpose of the conceptual / preliminary schematic-design review is to evaluate, first, the functional qualities of the proposed design to successfully fulfill the educational program of the school. Additional qualities to be considered include community impacts, energy and environmental issues, physical security, and general aesthetic factors.

d. Include the drawings and information indicated on the form "Submittal Requirements for Preliminary Schematic Design" (See Appendix).

4. Final Schematic Design Submittal

a. Documents submitted for the final schematic design phase shall include more detailed and refined drawings and a written report (Basis of Design) that includes such discussion of design factors, if any, as are pertinent in the opinion of the Architect and outline descriptions of proposed engineered systems, construction types, materials and work to be included in the construction contracts.

b. A Cost Estimate showing compliance with budget requirements and area calculations indicating compliance with the building program shall be included. Cost estimate and area calculations (SP-1A Diagrams) shall comply with the Estimating Guide.

c. Include the drawings and information indicated on the "Submittal Requirements for Schematic Design" (see Appendix). In addition to the boards, provide one set of printable transparencies (right reading) and three sets of prints.

C. DESIGN DEVELOPMENT SUBMITTAL

1. Procedure

a. After selection of the preferred design scheme and approval of the final Schematic Design, the Architect shall prepare and submit Design Development (DD) Documents.

b. Design Development Documents shall include drawings and a written report (Basis of Design) in more detail than the schematic documents and shall incorporate the Owner's comments on the previous submittal.

2. Submittal

a. Include all items previously required in the schematic design, as well as dimensioned site development plan, floor plans, exterior elevations and typical sections indicating proposed construction as may be necessary, as well as all major finishes. Drawings shall also illustrate fundamentals of major engineering systems including civil, landscaping, structural,

mechanical, plumbing, fire protection, electrical systems and kitchen/food service.

b. Include the drawings and information indicated on the form, "Submittal Requirements for Design Development" (see Appendix). (Complete the form's checklist to indicate completion of each item and submit with the other documents.)

c. The DD update of the narrative "Basis of Design" is particularly important at this stage, both to be sure that systems requirements and parameters are consistent with LAUSD goals, and to serve as the statement of design intent for the end-of-job commissioning and performance testing.

3. Architectural Presentation Drawings and Renderings

a. Drawings shall be in color, mounted on 30" x 40" boards, with Project and Architect's name. (Renderings are not required on modernization projects unless extensive changes are made to the exterior).

b. Rendering: Perspective view and technique, 20" x 30" minimum size, that adequately and accurately indicates scope of the project, mounted and matted on board with identification.

c. Site plan, floor plans, building elevations and sections, on boards.

d. Vicinity Plan and Photographs: As described above under "Schematic Design Phase Submittal".

D. CONSTRUCTION DOCUMENTS -- 50 % SUBMITTAL

1. Procedure and Submittals

a. After written approval of the Design Development Phase, the Architect shall further develop and submit Construction Documents to a stage of at least 50% completion.

b. Include the drawings and information indicated on the form "Submittal Requirements for Construction Documents – 50%" (see Appendix). (Complete the form's checklist to indicate completion of each item and submit with the other documents.) See Section 1.2."General Requirements" for deliverables.

E. CONSTRUCTION DOCUMENTS -- 100 % SUBMITTAL

1. Procedure and Submittals

a. The Architect shall continue development of the Construction Documents, incorporating the comments received on the 50% C.D. submittal to a stage of 100% completion.

b. Include the drawings and information indicated on the form, "Submittal Requirements for Construction Documents – 100% -- DSA Submittal" (see Appendix), ready for submittal to the Division of the State Architect. See Section 1.2 "general Requirements" for deliverables. The following are required:

1. Checklist of Offsite Work, Utilities & Easements (1 copy).
2. Final CHPS Scorecard signed by the design principal.

3. Specifications with General Conditions (6 bound sets or 7 sets if project has a kitchen). District furnished "boiler plate" material to complete the project manual need not be included.
4. Structural Calculations, signed by the Structural Engineer (2 sets).
5. Energy Calculations (2 sets).
6. Construction Cost Estimate on State forms 506B or 706B (3 sets).
7. Form SP3A, Area Diagrams and Tabulations (3 sets).

2. Coordination Check

a. The Architect shall have completed an "in-house" interdisciplinary coordination check, dimension check, terminology and spelling check, and detailed technical check of the Construction Documents.

b. Submit the marked up set of prints used in preparing the interdisciplinary coordination* check.

F. DISTRICT REVIEW AND PLAN CHECK

1. DSA Plan Check

a. The District will file Drawings with appropriate State agencies and will inform the Architect when State plan check comments have been received.

b. The Architect shall pick up Drawings and comments from the District and meet with the District's authorized representative to review plan check comments as well as the District review comments, and to establish a written schedule for correcting the documents and meeting with appropriate governmental agencies to obtain their approvals.

2. District Review

a. The District review is not a "plan check", but a general review of the 100% Construction Documents. The Architect is responsible for accuracy and coordination of the work, including work of the Consultants, to avoid conflicts and change orders.

b. Review of 100% C.D.'s by District staff will include:

1. Architectural
2. Civil
3. Structural
4. Electrical
5. Mechanical
6. Landscape
7. Specifications
8. Food Services
9. Other applicable disciplines (Acoustics, Theatre, etc.)

3. Corrections and Back-Check

a. The Architect shall complete corrections indicated by the District and DSA (SSS, FLS and AC) as required to receive clearance and signed approvals from each agency. This includes compliance with Division of Industrial Safety, (Cal/OSHA) Title 8, and Energy Conservation Standards and Regulations.

G. FINAL BID DOCUMENTS

1. Completion Procedures

a. After completing the revisions required by the review comments, the Architect shall return one copy of the review materials with the Architect's acknowledgement on how each District comment was resolved, with a letter of transmittal to the District's authorized representative.

b. The Architect shall deliver the approved 100%-complete Construction Documents to the District's authorized representative with the completed form "Submittal Requirements for Final Construction Documents."

c. Submit one set of revised Structural Calculations, if revisions or additions have been made after the 100% DSA submission, for the District records.

d. Submit 3 copies of Final Construction Cost Estimate. If this final estimate differs from the agreed (or revised agreed) preliminary estimate, itemize and explain reasons and amounts. Submit SP 3A diagram ONLY if changes made after 100% submittal are great enough to require revision. Provide a brief written explanation describing each change and why it is required.

e. Submit a letter of Acknowledgement of the District Corrections. Return one set each of the District review marked up drawings and project manuals indicating resolution of comments.

f. Submit completed DSA Structural Tests and Inspection form.

g. Submit the following:

1. Complete and sign S.A.B. Form 390. Copies available from OAR.
2. Draft of deductive or additive alternates.

2. Printing

a. The District will be responsible for printing Drawings and Specifications for bidding, unless otherwise stated in the Contract.

H. ADDENDA

a. When an addendum is required, submit original copies of addendum material. Addenda cannot be dated later than 14 days prior to bid date.

I. GENERAL DRAWING & SPECIFICATION REQUIREMENTS

(FOR DESIGN DEVELOPMENT AND CONSTRUCTION DOCUMENTS)

a. For all Design Development and Construction Documents include the project name, LAUSD ID number and logo, and 1/8" minimum lettering height, and meet the following additional requirements.

b. All plan drawings shall include scale, graphic scale, north arrow, and key plan when plans are split.

c. Site and floor plan drawings of the same areas by different disciplines shall be the same scale and have the same orientation.

d. Orientation shall be the same for all similar plans.

e. All plans shall be done on or be compatible with the most recent AutoCAD version.

f. Drawings shall be formatted to AIA CADD Layer Guidelines.

g. The District maintains "Guide Specifications" in order to establish a consistent level of quality for its schools. The commissioned architect is to edit these specifications and add sections as may be necessary to cover the entire scope of work for the project. Red-marked (or edited in MS Word while "Track Change" and "High-Lighting" features are on) to reflect the specific work of project, plus additional sections to recognize unique materials or assemblies. Any deviation from "Guide Specifications" shall be high-lighted in Submittal and brought to the attention of District Representative. Review all Divisions 1 through 16 and Division 25. Use of these specifications does not relieve the Architect from responsibility to verify the information contained is, applicable, accurate, and up to date. New materials may be submitted for District approval.

h. Design Deliverables – Submittal Requirements

1. <u>Design Development Submittal.</u>

    a.) **For Existing Facilities Projects:**
    Three sets of prints, and a CD with electronic CAD files (*.dwg, bind all drawings) and PDF files of all drawings.

    b.) **For New School Construction Projects:**
    Provide prints of each drawing bundled and labeled in accordance with Table A, and a CD containing specifications and electronic CAD files.

2. Construction Documents – 50% Submittal

    a.) **For Existing Facilities Projects:**
    Three sets of prints and a CD with electronic CAD files (*.dwg, bind all drawings) and PDF files of all drawings.

    b.) **For New School Construction Projects:**
    Provide prints of each drawing bundled and labeled in accordance with Table A, and a CD containing specifications and electronic CAD files.

3. Construction Documents – 100% Submittal

    a.) **For Existing Facilities Projects:**
    Three sets of prints and a CD with electronic CAD files (*.dwg, bind all drawings) and PDF files of all drawings.

    b.) **For New School Construction Projects:**
    Provide prints of each drawing bundled and labeled in accordance with Table A, and a CD containing specifications and electronic CAD files.

Table A :
Submittal Requirements for New Construction Projects

Each bundle shall be bound separately and clearly labeled on the outside with the project name, bundle number and discipline. Drawings shall be printed full-size, unless noted otherwise for design development. Submit full specification package according to submittal requirements.

Bundle #1 – *Design Manager (all submittals)*
1 Full Drawing Set (½-size)
Off-site Drawings (½-size)
Full Specifications

Bundle #2 – *Architectural Review (all submittals)*
Architectural Drawings (½-size)
General Drawings (including Title Sheet, Drawing Index, General Notes, Code Analysis, Accessibility, etc.)

Bundle #3 – *Civil Review (all submittals)*
Civil Drawings
Off-site Improvement Drawings
Divisions 1 & 2 Specifications

Bundle #4 – *Landscape Review (all submittals)*
Architectural Site Drawings Only
Civil Drawings
Landscape Drawings
Division 2 Specifications

Bundle #5 – *Electrical Review (all submittals)*
Electrical Drawings
Kitchen Drawings
Divisions 11, 16 & 25 Specifications

Bundle #6 – *Low Voltage Review (all submittals)*
Electrical Drawings
Divisions 16 & 25 Specifications

Bundle #7 – *Structural Review (all submittals)*
Structural Drawings (½-size)
Divisions 3, 4 & 5 Specifications

Bundle #8 – *Mechanical Review (all submittals)*
Mechanical Drawings
Plumbing Drawings
Kitchen Drawings
Division 15 Specifications

Bundle #9 – *M & O Review (all submittals)*
Full Specifications
Cut Sheets
2 Full Drawing Sets (½-size) bound by
discipline (i.e. 2 Civil sets, etc.)

Bundle #10 – *QA/QC Team (all submittals)*
1 Full Drawing Set (½-size)
Full Specifications
Geohazards Report
Geotechnical Report
Hydraulic Calculations
Hydrology Report
Lighting Calculations
Lighting Cut Sheets
Structural Calculations
Title 24 Report

Bundle #11 – *Estimating Review (all submittals)*
1 Full Drawing Set (½-size)

Bundle #12 – *Hall & Forman Review (all submittals)*
Civil Drawings
Off-site Drawings

Bundle #13 – *CDE Review (100% CD's only)*
1 full-size & 2 ½-size drawing sets including
General Drawings
Architectural Drawings
Civil Drawings
Landscape Drawings

Bundle #14 – *Constructability Review* (100% CD's only)
2 Full Drawing Sets (full-size)
Full Specifications
Geotechnical Report
Geohazards Report
Hydrology Report
Hydraulic Calculations
Structural Calculations
Title 24 Report

Book Two
General Criteria

General Criteria

2.0 TABLE OF CONTENTS

2.1 SCHOOL BUILDING DESIGN

2.2 SITE DESIGN

2.3 VEHICULAR ACCESS AND PARKING

2.4 ENVIRONMENT AND SUSTAINABILITY

2.1 SCHOOL BUILDING DESIGN

A. INTRODUCTION

B. GENERAL REQUIREMENTS

C. FUNCTIONAL REQUIREMENTS – ADMINISTRATION

D. FUNCTIONAL REQUIREMENTS – CLASSROOM AREAS

E. FUNCTIONAL REQUIREMENTS – SCIENCE LABORATORIES

F. FUNCTIONAL REQUIREMENTS – LIBRARY MEDIA CENTER

G. FUNCTIONAL REQUIREMENTS – PHYSICAL EDUCATION

H. FUNCTIONAL REQUIREMENTS – MULTIPURPOSE AND FOOD SERVICE

I. FUNCTIONAL REQUIREMENTS – RESTROOMS

J. FUNCTIONAL REQUIREMENTS – LOCKERS

K. FUNCTIONAL REQUIREMENTS – CORRIDORS AND STAIRWAYS

L. FUNCTIONAL REQUIREMENTS – SUPPORT

M. FUNCTIONAL REQUIREMENTS - BUILDING SECURITY

2.1 SCHOOL BUILDING DESIGN

A. INTRODUCTION

The following standards complement the Facilities Space Program and the Educational Specifications, and deal with general planning and design issues.

B. GENERAL

1. District Criteria

a. The guidelines and criteria of this chapter must be closely coordinated with those of the **"Educational Specifications."**

2. Referenced Codes and Standards

a. Legislative and regulatory requirements affecting schools in California include:

1. Title 5 of the California Code of Regulations (especially Sections 14001 and 14030)
2. Title 24 of the California Code of Regulations (State Building Code).
3. Title 22 of the California Code of Regulations for Children's Centers.
4. American With Disabilities Act (Public Law 101-336, Title II)
5. Education Code Section 39113.5 for "before and after-school Child Care Programs".

3. General Planning Requirements

a. High Schools and Middle Schools shall be planned and designed in accordance with the "Planning & Design Guidelines for Small Learning Communities" for Los Angeles Unified School District Secondary Schools (Available on LAUSD Website: http://www.laschools.org/employee/design/plan-des-guidelines).

b. Pest Management

1. Review the District's "Integrated Pest Management Practices" manual and refer to Section 2.2, **"Site Design,"** for more specific criteria.
2. Birds (pigeons, gulls, others) are a persistent and provoking maintenance problem for the District, as well as a health and sanitary hazard. Exercise care in the design of all exterior facades and structures to eliminate roosting or nesting of birds. Any

protrusions architectural, structural or otherwise that are greater than 1 ½" shall be protected with bird deterrent devices or be designed to be bird unfriendly.

a. Do not use exposed truss members, flanged beams, cantilevered beams or other elements that provide such roosting. Important everywhere, it is especially so in Lunch Shelters.

b. Where essential building elements may provide such roosts, such as solar shades or light shelves, open ladders where necessary, entry covers, security devices, and similar structures, minimize the risks by sloping the element, providing, open uninviting surfaces, installing edge barriers, and similar measures.

c. This is an important District concern, and must be addressed at both the Schematic Design and Design Development stages, together with the elements of concern described above.

c. Room Access

1. Do not provide entry to any room through another room – for example, a low-voltage electrical room through a power electrical room.

2. Exceptions are teachers' workrooms from classrooms, administrators' private offices from an open work room, or smaller rooms serving a general kitchen area.

d. Building Access

1. At all building entrances and access windows, provide shelter from stormy weather (rain, hail, ice, etc.) by providing overhead cover with appropriate roof drainage.

2. At all such access, provide non-slip floor (walking) surfaces to improve safety when wet or icy.

e. Energy and Sustainability

1. The principles of sustainable design and energy conservation, as embodied in these requirements and in the CHPS criteria, represent important District goals, and shall be applied in all aspects of school planning and design, including building orientation and configuration, envelope and fenestration selection, and selection of building systems and equipment. (See the section 2.4 **"Environment and Sustainability"**.)

C. FUNCTIONAL REQUIREMENTS – ADMINISTRATION

1. Administration Unit

a. The Administration Unit provides core-area space for staff functions; provides spaces for interaction between staff, parents and students; and serves as the main public entry to the school.

b. Spaces and functional needs include:

1. Private offices for principal, assistant principals, and other appropriate staff.

2. Open office for clerical assistants, volunteer workers, computer operators.
3. Public lobby with a waiting/seating area and a counter control center. (Separate the counter area and the back-of-house clerical operations.)
4. Counter heights appropriate to the population age at both standing and wheelchair levels.
5. Seating and writing surfaces for staff or students to fill out forms.
6. Conference space for staff meetings, staff-teacher conferences or visitors.
7. Staff/faculty work room(s) for copying, assembling and binding, and for ample storage of supplies, sized and equipped appropriately for the school size.
8. Spaces for office supplies, reprographics equipment, staff and teachers' mail boxes, LAN central location, radio receiver/transmitter equipment, and additional spaces as programmed, such as police offices, athletic director's office, etc.
9. Public payphones in compliance with accessibility requirements. These phones shall be located in an accessible route, mounted at 48" maximum above finished floor to the highest operable part to accommodate forward reach.
10. Adult toilet rooms for principal, staff and visitors.
11. Mail boxes shall be provided at the rate of 1.5 times the number of classrooms. Size shall be 4"h x 12"w x 15"d each, with an area for larger boxes at each location. In small learning communities provide mail boxes in satellite administration office at the same rate. Total number of mail boxes required may be divided between the satellite administration office(s) and the main administration office, proportional to the number of classrooms each serve (or number of staff for Main Administration).

c. Location:

1. As the main entrance to the school campus, the Administration Unit must be prominently located and directly accessible to the public. This unit, together with Counseling and Health, may need after-hour or weekend accessibility, and should be secured against access to other school areas.

2. Counseling and Attendance Unit

a. The Unit functions as an integral part of counseling and guidance programs, and as a service center for families dealing with enrollment, transfers, transportation and work permits. Counselors confer with students and parents, administer psychological examinations, and maintain files and records for each student. The Attendance Office maintains attendance records and students' files. (The unit functions partly as an accounting department.)

b. Spaces and functional needs for this unit typically include:

1. Counselors' offices with work area, guest seating, computer workstation and window.
2. Student Waiting Area with controlled supervision, shared with Attendance Unit.
3. Work room and guest waiting area for the Psychologist's Office.
4. Interview and Testing Stations.
5. Other workstations as programmed.
6. Enclosed bulletin board outside the unit in a highly visible location.

c. Location: Counseling and Attendance activities are integrated into the Administration Unit adjacent to the main entry. (These functions are reduced and combined in the Administration Unit at elementary schools.)

3. Health Unit

a. A centrally located Health Unit provides health services to students, storage for students' health records, and information for use by teachers, counselors, school administrators and aides. Student privacy and confidentiality are important when accessing health services.

b. Spaces and functional needs for this unit typically include:

1. Nurse's desk within the health office.
2. Cot room or space.
3. Accessible restroom within the health office, provide a space for a changing table (3'X7') for high school and middle school.
4. Student waiting area.
5. Private storage within the health office for medical supplies and students' special medical devices and medications.
6. Exam space for visiting healthcare professionals.
7. Ten-foot long eye exam lane.
8. See LAUSD's Educational Specifications Drawings for typical suggested layout.
9. First aid area with lockable cabinets and space for a refrigerator.

c. Location: Adjacent to the main Administration Unit, with accessibility for the public. At elementary schools there shall be a viewing window from Administration's clerical area to the Cot Room.

4. Faculty and Staff Lounge

a. The Faculty and Staff Lounge provide space for relaxation, private work, meetings, and dining when a separate faculty dining room is not available or convenient.

b. Spaces and functional needs for this unit typically include:

1. Ample seating and table space, sized appropriately for the school.
2. Sink, tack board, payphone, and space/utilities for a refrigerator, coffee station, microwave, and vending machine.

c. Location: Centrally and conveniently located, often near food service in elementary schools, and near the Administration Unit in middle and high schools.

D. FUNCTIONAL REQUIREMENTS – CLASSROOMS

1. General Education Classrooms

a. Classrooms are the most important single element in the school. They must be designed to flexibly accommodate varied activities and future technologies. Designs should reflect concern for the way children work and learn in the room. Adaptability of the room to various grade levels is provided through selection and arrangement of furnishings.

b. Refer to other sections of this Guide and to the Educational Specifications for such items as lighting, acoustics, finishes, air quality and communications.

c. Size: The standard classroom size is 960 square feet unless the Facilities Program provides an alternative size.

d. Location: Classrooms are laid out in groups, in linear form or clusters, accessed either by external walks and balconies or by internal corridors. They need convenient access to the library/ media center especially, as well as to administration, multipurpose/ food service, and physical education or playground areas.

e. Flexibility: Consider measures to allow some classrooms to be easily altered in size or shape at reasonable cost (for example, to accommodate changes in class-size policy).

f. Outdoor study areas: Consider for Elementary School Classroom clusters.

g. Storage units: Provide as shown in Educational Specifications. The top shelf of units shall not exceed 72" in height.

h. All elementary school classrooms must have sinks, soap dispensers and paper towel dispensers.

2. Small-Group Instruction Areas

a. Small group instruction areas are sometimes provided in the vicinity of the classrooms – typically one for each four to six general classrooms, as programmed -- to allow for various collaborative learning opportunities as appropriate within the regular education program.

b. Space and functional needs: Minimum size of 480 sf. Provide tables and chairs for small group activities, tack- and white-boards, computer stations, and extra storage space for special materials.

c. Location: Close to groups of classrooms, with windows into classrooms for supervision.

d. Small group instruction areas are not included in the computation of classroom size unless as integral parts of the classroom, visually supervised by a teacher from the classroom.

3. Year-Round Education Needs:

a. Define specific space for off-track teachers' storage cabinets.

b. Provide additional storage for supplies and projects for off-track students.

c. Provide adequate work surfaces in the space, including a counter.

4. Kindergarten Classrooms

a. The Kindergarten unit is specialized and self-contained so that children may participate in active and varied learning experiences. Space and furnishings should provide flexibility for a variety of indoor and outdoor activities. Special attention should be paid to visual lines of supervision of the classroom and play yards, and provision of a safe, interactive environment.

b. Spaces and functional needs: Minimum Kindergarten Classroom size is 1,350 square feet, including storage, wet and dry areas, and restrooms self-contained within the kindergarten complex.

c. Location: Close to parent drop-off and bus loading areas.

d. Safety: Ensure that electrical outlets are designed as "child-proof" and have safety protection measures integral to the outlet.

5. Kindergarten Outdoor Play Space

a. The Kindergarten Play Space is an extension of the classroom, directly accessible and fenced for exclusive use by Kindergarten students. It accommodates a variety of outdoor activities for the development of large motor skills, including running, climbing, sliding, cycling, and dancing. Innovative design solutions are encouraged, but with maximum safety in mind.

b. Size: Refer to space program requirements.

c. Provide playground safety tile under play equipment as required by play structure design.

d. Provide age appropriate play equipment as programmed and as specified in District Guide Specifications.

e. Provide shade for quiet activities.

6. Special Education Classrooms and Areas

a. Refer to the Facilities Program and the California Education Code, Section 17747(a), for space allowances for classrooms and other spaces to support special education programs. Spaces for the special education program include Special Education Classrooms, a room for the Resource Specialist, specially equipped classrooms where applicable, as well as those in other units such as the speech therapist, psychologist, counseling offices and conference area.

b. Properly equip the classrooms for the students who will occupy them, their age and their disabling conditions, as defined in the Space Program and code.

c. Provide 240 square feet minimum for the Resource Specialist, or as programmed.

d. Provide 200 square feet for individualized instruction in the speech and language program.

e. Distribute Special Education classrooms, when programmed, throughout the campus with age-appropriate regular education programs.

f. Provide access to a conference area to conduct individualized education program meetings for each special education student.

g. Locate medical therapy units, if planned for the site, close to visitor parking areas and with after-school-hour accessibility.

7. Specialized Classrooms

a. Refer to the Educational Specifications for additional criteria and information specific to other classroom types, such as visual and performing arts, technology labs, business or industrial arts.

8. Early Education Center

a. The EEC, Preschool classroom shall provide opportunity for different activities, interaction and resting. This should be located directly adjacent to the outdoor play area, toilet and storage. Provide space for storage of clothing, bedding and personal belongings.

b. Size: There shall be at least 35 square feet of indoor activity space per child. Floor space occupied by shelves, built-in cabinets and office/teacher equipment shall not be included in the indoor calculation of indoor space.

c. Children lavatories shall deliver hot water with controls to automatically regulate hot water temperature to not less than 105° degrees Fahrenheit and not more than 107° degrees Fahrenheit.

d. One flushometer style toilet and one hand washing lavatory shall be provided for every 15 children or fraction there of. Toilets shall be flush valve type. Toilet partitions or screens shall be 3'-0" high.

e. A fixed window shall be provided between classroom and toilet for observation.

9. Early Education – Outdoor Play Space

a. The outdoor activity space shall be situated to provide a shaded rest area for the children. Equipment and activity areas shall be arranged so that there are no hazards from conflicting activities.

b. Size: There shall be at least 75 square feet per child for outdoor activity. Areas around and under play equipment shall have playground safety tile.

c. The playground shall be fenced to protect the children and to keep them in the outdoor play area.

d. All play equipment and materials used by the children shall be age-appropriate.

E. FUNCTIONAL REQUIREMENTS – SCIENCE CLASSROOMS

a. Space and functional needs: Science laboratories typically are 1300 sf or more, with room for students around fixed learning stations and with adequate space for lectures at or adjacent to the lab benches.

b. Location: Cluster science classrooms together and locate away from other rooms. In multi-story buildings, locate on top floors to minimize vent and exhaust plumbing and ducts.

c. Preparation Rooms: Provide separate rooms directly accessible from classrooms, usually one for every two laboratories, for teacher preparation and for storage of supplies and equipment.

d. Hazardous Materials:

1. Provide science laboratory design that is consistent with the requirements for proper hazardous materials management specified in California Department of Education publications:
   a. 1993 "Science Facilities Design for California Public Schools"
   b. Latest edition of "Science Safety Handbook for California High Schools".
2. Provide secure storage areas for volatile, flammable and corrosive chemicals and cleaning agents.
3. Provide work surfaces/countertops with splash guards composed of epoxy resin wherever volatile, flammable or corrosive chemicals or cleaning agents may be utilized.
4. Accommodate necessary safety equipment and supplies, including emergency combination deluge shower/eyewash with direct connection to waste line, and a floor drain centered under shower head , master disconnect valve for gas, fire extinguishers, and first aid kit and eye goggle cabinet. In the Teachers' Preparation Rooms immediately accessible to a science classroom that contains an emergency deluge shower/eyewash, provide a supplemental flip-down eyewash at sink. Emergency deluge shower/eyewash shall be accessible and located on an accessible route.
5. Provide appropriate ventilation for hazardous materials, including exhaust fume hoods, and a high volume purge system in the event of accidental release of toxic substances that may become airborne.
6. Provide special plumbing, including isolated waste lines, for hazardous liquids.
7. Provide floor and ceiling ventilation in secure areas where chemicals are stored.
8. Refer to later sections, to the "Guide Specifications" and the "Standard Technical Drawings," for more detailed information on many of these requirements.

F. FUNCTIONAL REQUIREMENTS --LIBRARY MEDIA CENTER

a. The Library Media Center is an information laboratory serving the instructional needs of the entire school. It should be an aesthetically pleasing environment inviting purposeful activity for the development of positive attitudes toward reading and learning.

b. Space and functional needs: Library space is planned in proportion to the maximum planned enrollment, as programmed, but not less than 960 square feet. Needs include:

1. Space and technology for computer terminals for student use, research and report writing, including electrical outlets and data network connections for each computer terminal.
2. Security for technology and media equipment.
3. In Middle Schools and High Schools, provide book-theft detection system at entrances.
4. Visual supervision from the circulation desk to study areas, stack space and student work centers.
5. Open and closed-circuit television, dedicated phone lines and electrical/data outlets for stand-alone as well as networked computers.
6. Area for multi-media presentations.
7. At Middle Schools and High Schools provide a private office space for the librarian adjacent to circulation desk and staff work area.
8. Staff workroom with counter desk, counter sink, shelving, copy machine, and space for library book carts.
9. Secure storage for special collections, technology and media equipment.
10. Freestanding display case near entry.

c. Location:

1. Central to the academic areas of the school, easily accessible from classrooms.
2. Directly accessible to the public for community use and extended hours of operation. Secure the Library / Media Center from other parts of the campus to allow evening and weekend events without intruding on other school spaces
3. Locate on the first floor unless exceptions for specific reasons are given. Assure adequate floor strength and thickness for book-shelving support and overturning anchorage.

d. Collection storage appropriate to the school, and as shown in Educational Specifications. Considerations include:

1. Bookshelves: appropriate in height for the age of the children served.
2. Kindergarten picture book shelves: 14" high by 12" deep, sectioned with vertical dividers. Angle top shelves as display.
3. End panels for exposed ends of bookshelves (may be tackable surface).

G. FUNCTIONAL REQUIREMENTS –PHYSICAL EDUCATION

1. Gymnasium

a. Physical education provides directed training toward the development of physical and social skills. Activities include individual and team sports, rhythmic instruction, body mechanics, health, first aid, and safety.

b. Space and functional needs include:

1. Spaces in accordance with the Facilities Program, including sports areas, lockers, showers, team rooms, and such spaces as lobby or foyer, ticket booth, sound equipment room, press box, kitchenette, snack bar and laundry spaces.
2. In High Schools and Middle Schools, male and female faculty offices with line of sight to respective locker rooms.
3. Toilets for public use other than in the shower/locker areas.
4. Gyms, aerobics rooms, fitness centers, locker rooms and other activity areas must have durable, abuse resistant walls. Do not use gypsum board unless it is abuse-resistant.
5. For lockers, see Section 2.1 - J. "Functional Requirements - Lockers".

c. Location:

1. Adjacent to play fields.
2. Directly accessible to the public for community use and extended hours of operation, with clearly defined entrance and access control for events. Secure the gymnasium and outdoor sports areas from other parts of the campus to allow evening and weekend events without intruding on other school spaces.

2. Physical Fitness Center

a. Particularly on small urban sites, specialized P.E. Teaching Stations may be programmed. These may include a specially equipped fitness center or cyberobics lab with integrated computer technologies and physical fitness equipment, together with the necessary multiple electrical and data drops.

H. FUNCTIONAL REQUIREMENTS – MULTIPURPOSE ROOM, AUDITORIA AND FOOD SERVICE

1. Multipurpose Room

a. The Multipurpose Room functions as a combination assembly hall, lecture hall, testing room, indoor dining area, performing arts classroom, physical education classroom, and a general activity room. It may also serve community youth groups, civic organizations or professional events. (In some schools, especially high schools with auditoria, there may be a separate indoor dining area in the cafeteria. See the "Space Program" and "Educational Specifications" for specific requirements.)

b. Space and functional needs include:

1. Accessible Platform or stage serving as performance space or podium, complete with rigging and lighting.
2. Assembly area with acoustical treatment and lighting- and sound-system controls for assemblies and performances.
3. Movable chairs for assemblies or dining, with storage space for carts.

4. Folding tables for dining, with storage space.
5. In-wall tables and benches may be provided in Elementary Schools.
6. Lobby or foyer.
7. Public restrooms.

c. Location:

1. Directly accessible to the public for community use and extended hours of operation. Adjacent to Kitchen/Serving Area if used for indoor food service. Secure the areas from other parts of the campus to allow evening and weekend events without intruding on other school spaces. Ground level locations are preferred.

2. Kitchen

a. Spaces and functional needs for this unit include:

1. Food preparation area.
2. Space for a cafeteria/serving line to accommodate the flow of traffic for each lunch period.
3. Office, changing and restroom areas for food preparation staff, in compliance with local Health Department requirements.
4. Door widths to accommodate large equipment, including a service door of minimum 3'-6" by 7'-0".
5. Insect screens for operable windows.
6. Coiling counter doors (shutters) at serving windows, both interior and exterior.
7. Stainless steel sinks and work surfaces, with adequate pitch to work surfaces and sink bottoms to ensure drainage.
8. Stainless steel counter tops for all serving stations.
9. In secondary schools with dishwashers, a dish shelf on dining room side aligned with soiled dish counter in kitchen.
10. Range hood with filters for combination supply and exhaust air system.
11. Wet chemical fire extinguishing system.
12. Floors in all following rooms should be 6 x 6 quarry title (no grit) with quarry tile base. (Restrooms can be ceramic tile):
    a. Serving/Scramble/Window Service
    b. Kitchen/Prep
    c. Walk-in Refrigeration/Freezer
    d. All storage rooms (If the office is in the storage room, it is a storage room and not an office by law)
    e. Corridors, hallways, etc. in the food service area.
    f. Locker Room(s) (for the Food Service area)
    g. Janitor/Custodian (for specific use of Food Service area only)
13. Walls in Kitchen and Food Preparation Area shall be FRP (Fiberglass Reinforced Plastic) sanitary wall panels or stainless steel.

All other walls in above rooms and restrooms are to be smooth (no texture) washable semi or gloss white 70% LRV (Light Reflectance Value) min.

14. Ceilings in above rooms and restrooms shall have smooth and washable finish. Hard lid (Gypsum Board) ceilings shall be painted semi-gloss or gloss. If ceiling tiles are specified they shall be of the appropriate type for this area and meet all code requirements (See Guide Specifications Section 09500 2.02 Materials, E. ACT 3).

b. Plan the kitchen areas not only for functional efficiency, but also for economical sharing of services such as power, water supply, and floor sinks and drains.

c. Provide convenient access for service and delivery vehicles, separated from student areas.

d. Provide door bell and a view port at service entry door to the kitchen. Buzzer shall sound in the kitchen's office and kitchen's work area.

e. BOS Permit – All school sites must receive, in writing, Bureau of Sanitation's (BOS) approval on necessity and sizing for a Grease Interceptor tank. Architect to initiate and fulfill this requirement early during the design process and forward a copy of BOS approval letter to the OAR. Tank Design shall be based on Drainage Fixture Units (DFU) sizing criteria, with minimum tank size of 750 GPM (when a tank is required).

3. Cafeteria

a. Spaces and functional needs for this unit include:

1. Ample area for the cafeteria waiting line, oriented to provide a smooth traffic flow.
2. Covered rain and sun protection at waiting line and food serving area. Covered access to Lunch Shelter.
3. Serving windows at the appropriate height for grade levels served.
4. Space for trash and recycling receptacles in designated areas throughout the dining areas.
5. Adjacent storage for cleaning supplies.

b. Location: Adjacent to playground with student restrooms easily accessible.

4. Lunch Shelter:

a. Spaces and functional needs for this unit include:

1. Concrete slab sloped to adequate floor drains so that all food products drain to sanitary sewer system.
2. Roof structure providing shelter from rain and sun, designed to prevent birds from perching on rooftop areas in and around the lunch shelter. Shelter's height shall be proportional to its size. Design shall consider side exposure to elements and provide for maximum protection while maintaining an open and airy atmosphere.

3. Conveniently located drinking fountain with multiple bubblers and hose bibb.
4. Provide lighting and P/A speaker system (connected to school's P/A system).

b. Location: Immediately adjacent to cafeteria, playground, and outdoor eating areas.

5. Outdoor Eating Areas:

a. Outdoor eating areas are intended to supplement cafeterias and lunch shelters.

b. Provide space for tables and chairs, low wall seating or benches.

c. Consider ways to reduce heat reflection and glare, especially shading.

d. Consider details that provide protection against birds.

e. Drains shall be provided based on requirements of this Design Guide, see section 3.2 – "**Civil Engineering"**.

6. Outdoor Assembly Area

a. The Outdoor Assembly Area accommodates the student body for informal and instructional presentations and graduation exercises, as well as outdoor dining. (See section 2.2 - **"Site Design"**)

b. Location: Central to campus. Preferably near cafeteria and lunch shelter.

I. FUNCTIONAL REQUIREMENTS – RESTROOMS & DRINKING FOUNTAINS

1. Fixture and General Requirements

a. Restroom stalls shall be sufficient in number to accommodate the maximum planned enrollment, staff and visitors, and located on campus for both convenience and supervision. Follow the requirements of the California Plumbing Code, except where modified below.

b. Restrooms must be designed and equipped to comply with all Title 24 Accessibility Requirements, including access and usability for all fixtures, mirrors, and accessories.

c. CBC and ADA accessibility regulations specify mounting heights for adults (including middle schools), and alternate mounting heights for elementary and kindergarten students. Comply with the age-appropriate CBC mounting height for the project type. Architectural drawing shall clearly identify the specific age group applicable to each restroom, and at each classroom with accessible sink(s).

d. Refer to Guide Specification Section 10810 **"Toilet Accessories"** for additional requirements.

e. In student restrooms (except kindergarten and early education centers), provide electric hand dryers in lieu of paper-towel dispensers and waste receptacles. Locate semi-recessed hand dryers along exit path from restroom that do not protrude more than 4" from the wall. See also Section 3.4 **"Plumbing"** for specific requirements for student restrooms.

f. For other restrooms, surface-mounted paper towel dispensers are standardized throughout the District (see the Guide Specifications Section 10810). Surface mounted paper towel dispensers, if they project more than 4" from the wall, should be located so they do not obstruct the accessible route and clear floor spaces at fixtures. Provide space for free-standing trash containers so they do not obstruct the accessible route and clear floor space at doors.

g. Plans shall include a tabulated Fixture to Occupant load calculation for all fixtures, including Drinking Fountains, Water Closets, Urinals and Lavatories.

h. Mirrors – In lieu of individual mirrors above the lavatories, provide a larger mirror in an adjacent area for use by all. At least one shall be installed with the bottom of reflective surface in accordance with CBC and ADA height standards for access compliance. Be mindful of "Line of Sight" and privacy issues when locating the mirror.

FIXTURE REQUIREMENTS:

Type of Occupancy	**Water Closets (Fixtures per Person)**		**Urinals**	**Lavatories**
	Male	**Female**		**Male or Female**
Kindergarten	1 : 1-20 2 : 21-50 Over 50, add 1 fixture for each add'l 50 persons.	1 : 1-20 2 : 21-50 Over 50, add 1 fixture for each add'l 50 persons.		1 : 1-25 2 : 26-50 Over 50, add 1 fixture for each add'l 50 persons.
Elementary Schools	1 : 30	1 : 25	1 : 75	1 : 35
Secondary Schools	1 : 40	1 : 30	1 : 35	1 : 40
Staff and Visitor Use – All Schools	1 : 1-15 2 : 16-35 3 : 36-55 Over 55, add 1 fixture for each add'l 40 persons.	1 : 1-15 2 : 16-35 3 : 36-55 Over 55, add 1 fixture for each add'l 40 persons.	1 : 50	1 : 40

The total number of water closets for females shall be at least equal to the total number of water closets and urinals required for males in each location. Where the above ratios do not match this requirement, increase the number of fixtures for females to achieve equity.
Provide one drinking fountain per each 150 occupants, with a minimum of one per floor.

- The total number of fixtures required for students shall not include dressing room toilets, health unit toilet and public restrooms to be located in gymnasium's lobby and multi-purpose room lobby. Provide restrooms in these areas as indicated in the space program.
- For student restrooms provide a minimum of 3 fixtures
  Boys – Two (2) toilets and one urinal.
  Girls – Three (3) toilets.
- Toilets in the elementary school multi-purpose room shall be designed for adults.
- Toilet room for the health unit shall be designed for elementary school age group.

OCCUPANT LOAD FOR FIXTURE COUNT:

Type of Occupancy	Type of Space	Person/ Space
Students, Elementary Schools	Classrooms, including Kindergarten, Special Day Classrooms, Set-Aside Rooms (for total school fixture count)	25
Students, Secondary Schools	Classrooms, including Special Day Classrooms, Set-Aside Rooms (for total school fixture count)	30
Staff (and Visitors)	Classrooms, including Kindergarten, Special Day Classrooms, Set-Aside Rooms (for total school fixture count)	2

2. Location Criteria

a. Provide separate restrooms for students and faculty. Student restrooms may be used by the public for public events.

b. Locate restrooms and at least one drinking fountain on each floor as a minimum for each building with classrooms for students and faculty. Number of fixtures per floor shall be per code and recommendation in this Design Guide. Restroom facilities shall be within 200 feet of all classrooms.

c. Provide a custodial room adjacent to each student restroom.

d. Distribute staff restrooms to locations proximate to their work stations, with maximum walking distance for any employee of 200 feet or less.

e. Locate restrooms and drinking fountains appropriately to serve such areas as multi-purpose and dining areas, media center, auditoria, lunch shelters, and athletic facilities and playfields. Make provisions for them to be fully accessible to students and staff during the day, and to the public after school and for special events without violating school security. Size restrooms to handle the anticipated capacity of each facility area.

f. Restrooms should not be visible through openings or materials selected for walls. Selected materials in the restrooms should be extremely vandal resistant, since they are high vandalism areas. Selected materials should also be repairable.

g. Provide drinking fountains in the following locations:

1. Adjacent to all student restroom entries, both interior and exterior.
2. Interior, as well as exterior, adjacent to each Gymnasium.
3. Adjacent to exterior play areas, including courts, play yards, and athletic fields.
4. Adjacent to lunch shelters and outdoor eating areas where students have their lunch or breaks.
5. Other public areas where students will congregate.

h. Drinking fountains subject to direct sunlight exposure shall not be Stainless Steel due to heat build-up on the unit.

i. Entries to restrooms shall be only from public spaces, corridors, lobbies, or vestibules, and not through other rooms or functional spaces. All restroom entries shall have doors and screen walls or vestibules to prevent visibility of interior areas from the exterior when doors are open.

j. Restroom entrances shall be visibly prominent for ease of supervision.

k. Restrooms having direct access from the exterior shall have entries that are visible from the playground and easily supervised.

l. All drinking fountains adjacent to an accessible route, especially in corridors or along busy sidewalks shall be located in alcoves at least 18 inches deep, 32 inches minimum width; if alcove is deeper than 24 inches, then the alcove width must be 36 inches minimum. Alcove walls shall be surfaced with water-resistant material such as Ceramic Tile. Dimensions on drawings shall account for thickness of finish material to assure compliant construction of clean inside accessible alcove dimensions. Provide water-resistant and slip-resistant flooring in alcove that extends minimum of 3 feet into the passageway.'

J. FUNCTIONAL REQUIREMENTS – LOCKERS

1. Book Lockers

a. In secondary schools provide one book locker for each student enrolled, with enrollment based on 32 students per classroom

b. Locate lockers in locker recesses in corridors, covered walks, or in special covered kiosks within secured areas and in highly visible and supervisable places.

c. Lockers shall be 18" high by 12" wide by 15" deep, four high with a sloped top, mounted on a 4" minimum concrete curb.

d. Construction shall be sheet steel, without vent openings, factory-applied enamel or powder-coat finish.

e. Locks shall have built-in combination locks with options for multiple combinations and openable with a master-key.

2. Physical Education Lockers

a. In secondary schools provide student lockers for the percent of enrolled students listed below, with enrollment based on 32 students

per classroom – 50% in boys' locker room and 50% in girls' locker room.

1. Middle Schools: 100% of enrollment.
2. Senior High Schools 60% of enrollment.

b. In Senior High Schools provide two team locker areas with additional team lockers in each of the boys' and girls' locker rooms.

1. Team Room: 100 team lockers.
2. Team Secure Caged Area: 60 team lockers.

c. Provide faculty lockers for PE instructors and coaches.

d. Locker sizes:

1. See Technical Specification - Section 10501 for sizes.

e. Verify the PE and athletic program planned for each project to confirm these allotments.

f. Construction shall be sheet steel, with vent openings, factory-applied enamel or powder-coat finish.

g. Locks shall have built-in combination locks with options for multiple combinations and openable with a master-key.

h. Lockers shall be installed on a 4" high concrete base. Base shall be flush with the face of the lockers.

K. FUNCTIONAL REQUIREMENTS – CORRIDORS , STAIRWAYS AND EXTERIOR WALKWAYS

a. Width: Corridors and stairways shall be designed to accommodate peak student traffic flows between classes, but with a minimum width face-to-face of wall finishes or closed locker doors of 12 feet in secondary schools and 9 feet in elementary schools.

b. Finishes: Corridor and stairway walls shall have durable finishes – minimum finish construction of "abuse and impact resistant" gypsum wall board. (Not required behind or above lockers.)

c. Provide full height corner guards to protect corner edges of interior corridors, stairways and high abuse areas. Corner guards shall meet flame spread requirements and be vandal resistant.

d. Exterior walkways shall be designed to be hosed down. On upper floor exterior walkways provide recessed hose bibs and floor/area drains. Upper floor exterior walkways shall have a concrete walking surface with waterproofing system underlayment. Elastomeric walking surface coating systems shall only be used with Districts approval, due to high maintenance issues.

L. FUNCTIONAL REQUIREMENTS – SUPPORT

1. General

a. The Support Unit serves the operational and maintenance needs of the school. It includes the Central Support Unit (Plant Manager's office, central custodial receiving room, and central custodial supplies storage

room), Gardening and Exterior Maintenance Equipment Room, Trash and Dumpster Enclosed Area, and the Custodial Closets.

b. See "Educational Specifications" for space criteria for each school level.

2. Central Support Unit

a. Plant Manager's Office

1. Elementary Schools: Must accommodate one desk with computer, three chairs, file cabinet, wall and base storage cabinets and a hopper (laundry tub) sink with drench hose/emergency eye wash.
2. Secondary Schools: Must accommodate two desks with computer, six chairs, three file cabinets, wall and base storage cabinets.
3. Locate adjacent to storage rooms and to provide visual oversight of the receiving area.

b. Central Custodial Receiving and Storage

1. In Elementary Schools and Early Education Center's (EEC's), custodial receiving and storage may be combined as one space.
2. In secondary schools, provide separate receiving and storage rooms. Receiving must have space for receiving, inspecting and breaking down shipments, adjacent to the loading dock or exterior receiving area. Cleaning chemicals may be mixed or repackaged in this room, so it must have non-recirculated ventilation. Provide a hopper sink in this room, and a deluge shower/eyewash combination unit. Provide an area for washer and dryer and electrical requirements.
3. Storage Room must have adjustable metal shelving and a lockable metal cabinet for custodial supplies.
4. Provide six-foot wide door openings into both rooms, with pairs of three-foot doors.
5. Provide secure facilities for flammable liquid storage. In secondary schools where gasoline drums are stored (quantities greater than 55 gallons), this must be a separate building area with required fire-resistive separation and with direct truck access for refilling drums. This structure shall be completely separated from buildings used by students. For small quantities see OEHS recommendations.
6. Fueled Equipment Storage – Storage for Gardner's fueled equipment and other fueled equipment shall be in a structure completely separated from buildings used by students. This storage could be part of gardener's equipment building if it is an independent building or it could be a separate structure. Truck access must be provided. Storage shall be located away from transformer, trash area, and a minimum of 25 feet from any spark generating source. Provide grounding as required by code. If any electrical devices, such as lights, switches and power outlets, are to be installed in any of these areas where fuel is stored, all electrical installation shall be installed per Division 1 Class 1 of the National Electrical Code.
7. For additional On-Site storage requirements see sections 2.2.- B and C.

c. Locate the Central Support Unit away from the general classroom and food-service areas, to avoid material and staff congestion, reduce misdirected deliveries, and keep custodial chemicals and odors well separated from students and food preparation.

d. Provide access from a street entrance, separate from student areas, with adequate yard space for deliveries and truck turnaround.

e. At secondary schools, provide toilet facilities and lockers.

f. Provide an outside area adjacent to Receiving for the future placement of 8' x 40' containers for future storage: one for elementary schools (about 500 sf) and two for secondary schools (about 800 sf).

3. Gardening and Exterior Maintenance Equipment Room

a. Gardener's Storage shall include workspace, equipment storage area, and equipment (shelving, cabinets, and racks).

b. Exterior Equipment Storage space shall be adequate for equipment (mowers, sweepers, vacuums, etc.) with an overhead rolling door

c. Locate adjacent to or near the Central Support Unit where feasible, but it must be easily accessible to areas to be maintained.

d. When gardening unit is removed from Central Support Unit provide a hopper sink.

4. Trash and Dumpster Enclosure

a. Provide trash enclosures that are secured by walls that screen the area from public view.

b. Provide:

1. Hose bibb and dual-mode drainage (see Section 3.4 **"Plumbing"**).
2. Electrical outlet and exterior lighting.
3. Trash compactor with container, concrete slab floor, and electrical power (all to be included in the Construction Documents).
4. Direct truck access to all containers and dumpster.
5. Enclosures shall be freestanding, with minimum 5'-0" distance from any occupied structure.

c. Location:

1. Remote from student activities and food service areas.
2. Accessible to street for truck pick up with truck entirely on District's property.
3. Convenient to trash-generating activities.
4. Adjacent to freight elevator in a multi-story facility.
5. Trash enclosure area shall be located with direct access from outside the campus/parking area for easy pick-up and without interfering with school activities. Direct access from the campus shall be provided and shall not require passing through any building space. Trash pick-up area shall be level to prevent bins from rolling.

d. Details:

1. For additional information for trash area with trash compactor see "Standard Technical Drawings".

e. Trash Area Calculation:

1. Avoid placing the dumpster storage area near kitchen, cafeteria, and/or lunch area for more effective pest management. Where no trash compactor is provided, provide storage for one 3 cubic yard dumpster, for each 140 enrolled Elementary students or 125 enrolled Middle or High School students. This quantity may be distributed between one, two or more locations on the site if direct truck access is provided to each storage area. The number of bins may be as follows if a trash compactor is provided:

2. Primary Centers & Elementary Schools: 4 trash bins (2cy each)

   Middle Schools: 6 trash bins (2cy each)

   High Schools: 8 trash bins (2cy each)

3. Recycling trash bins –. Provide bins specifically for recycling; however, where trash compactors are to be provided, there is no need for 2 cubic yard front loading recycling bin painted white.

5. Custodial Closet/ Hopper Room

a. See **"Educational Specifications"** for space and equipment criteria. Custodial Closets are not to be used for supplemental uses (water heaters, access ladders, other building services) without enlarging the space and assuring the full function of the custodial activity.

b. Provide:

1. Floor sink with hot and cold water and custodial faucet with standard garden-hose threads on the spigot.
2. Electrical GFCI receptacle.
3. Light fixture with guard to prevent lamp breakage.
4. Outswinging door.
5. Exhaust air to outside (non-recirculated)
6. Tool / mop rack and metal storage with adjustable shelves and space for custodial carts.

c. Provide custodial closets in the following locations:

1. Adjacent to all Student Restrooms; one per floor minimum.
2. One per each 15 classrooms.
3. One in each Boys and Girls Locker Rooms at Gyms
4. Multi-Purpose Room/Auditorium
5. Kitchen food preparation area only.
6. Other locations when necessary to assure adequate custodial coverage of building areas (Administration, Library, Cafeteria, etc.).

M. BUILDING SECURITY

1. Windows

a. The following security measures must be addressed in the initial design concepts, and shall be integrated with the overall building design.

b. All windows accessible from the exterior shall have security measures as described in Section 3.1, **"Architectural"**, to prevent breaking, entering and vandalism. Accessible windows include any windows with:

1. Bottom sills less than ten feet above grade.
2. Bottom sills less than ten feet above balconies, stairs, or other circulation means.
3. Bottom sills less than ten feet above roofs that have any portion less than ten feet above grade, adjacent walls, or other access points.

c. Do not locate windows within 48 inches of exterior doors unless protective security screens have been utilized to prevent an intruder from gaining access to door hardware.

2. Doors

a. Do not locate exterior doors in recesses or alcoves that would provide cover for an intruder attempting to enter the door.

b. Provide exterior security lighting that illuminates all exterior doors.

c. Provide overhead rain protection overhangs for all unprotected exterior doors.

d. Glass on exterior doors shall be protected against vandalism and to deter breaking and entering by use of security grilles. Laminated glass is not sufficient.

2.2 SITE DESIGN

A. INTRODUCTION

B. BUILDING PLACEMENT AND CIRCULATION

C. OUTDOOR SPACE AND FUNCTIONAL REQUIREMENTS

D. LANDSCAPING

E. SECURITY

F. SIGNAGE

2.2 SITE DESIGN

A. INTRODUCTION

1. General Requirements

a. The site design process must balance many diverse requirements including convenient circulation, accessibility, security, ease of supervision, and community image. Context, adjacencies, aesthetics as well as the physical and geotechnical characteristics of the site must be considered.

b. Sites are to be designed to conform to the requirements of the **"Guide to School Site Analysis and Development,"** to the **"Small School Site Policy"**, both published by the California Department of Education, and to the Rodriguez Consent Decree.

c. Playgrounds, playfields, and outdoor instructional spaces are essential to the instructional program, and must be carefully integrated into the site plan.

d. The circulation system, both on- and off-site, must safely separate pedestrians, bicycles, cars, buses and delivery vehicles while providing immediate access for emergency vehicles.

e. Plan pedestrian circulation carefully to reduce opportunities for short cuts over planting areas, which greatly increase maintenance.

f. Skating or skateboarding is not allowed on school property. Paving and other site structures such as raised planters, benchers, and low walls shall be designed, or have skate deterrent devices installed to discourage such use.

g. Careful consideration should be given to consolidating building program elements into a compact, space-conserving floor plate in order to maximize open space and enable a more energy-efficient building shell.

h. LAUSD has a "Greening Program" that recommends lawn and other planting on at least 30% of the outdoor space on each school site. On tight urban sites, this is not always achievable, but space for planting must nevertheless be given high priority in site planning. Opportunities exist at school entries and perimeters, kindergarten play spaces, instructional gardens, and other strategic planting areas.

i. See Section 2.4, **"Environment and Sustainability,"** for additional site design criteria. The reduction of storm-water runoff is an important component of sustainable design, and is greatly improved by more planting and water absorption areas.

j. Site Signage: See section 2.2, F "Signage" for the requirements for site perimeter and other building signs and integrate them into the site design.

Signs must be reviewed, through the District's authorized representative, with the school principal or other local district staff to assure the correct content.

2. Future Expansion

a. Site layouts shall have the capacity for future expansion without substantial alterations to existing structures or playgrounds. Indicate future building locations on site plans.

b. Make provisions in utilities systems to accommodate future growth without rework of installed components.

c. Exits, walkways, stairs, and elevators must be sized and located to accommodate capacity of future growth, particularly in multipurpose, cafeteria, gymnasium and auditorium facilities.

3. Site Plan Information

a. Plans shall clearly identify and reference the limits of all project related contract work including site lighting, landscaping, paving, utility system connections and improvements, etc., to specific benchmarks, property lines and/or existing significant site improvements (buildings, street center-lines, etc.) with easily understood and straightforward dimensioning.

b. Locations of buildings, site improvements (including shoring needed to develop structures or features), underground/sub-surface structures, etc., shall be referenced to specific benchmarks, property lines and/or existing significant site improvements (buildings, street center-lines, etc.) with easily understood and straightforward dimensioning.

c. All grades, slopes, required cuts/fills shall be appropriately depicted dimensioned, and quantified. Over-excavation requirements shall be defined with both horizontal and vertical dimensions sufficient for accurately calculating cut and fill quantities.

d. Plans shall clearly identify locations for staging of construction materials, site access for the contractor's workforce and delivery of materials, and temporary fencing and barricades for site security and safety. On sites with existing school functions/facilities, construction staging and work areas shall be separated from the school functions/facilities by temporary fencing and/or barricades. The location of this area shall be coordinated with District staff.

B. BUILDING PLACEMENT AND CIRCULATION

1. Building Location

a. Site layout of buildings, parking, driveways and physical education areas shall be planned to meet the instructional, security and service needs of the Facilities Program prepared by the District.

b. Place buildings to be compatible with adjacent functions. (For example, do not place the band room adjacent to the library.)

c. Physical relationships of classrooms, auxiliary and support areas must allow unobstructed movement of staff and students around the campus, and provide optimum patterns for pedestrian traffic flow around and

within buildings. (For example, students should not have to pass through one building to get to another.)

d. Place buildings to have favorable relationships to wind, sun, and natural light and to optimize the effects of sun light and solar loads. Provide an analysis of sun effects on energy consumption and on interior day lighting.

e. Provide a system of covered walkways between all buildings.

f. Consider location of buildings relative to parking areas and other paving to minimize solar reflectance and dust impacts on the buildings.

g. Locate restrooms to provide easy access from playgrounds and classrooms with a minimum of supervision.

h. Locate buildings in ways that improve campus security.

i. Exit doors and stairways from buildings shall be located so there is no direct exit from the building to the street. Students must be able to circulate to an emergency assembly area without exiting the school grounds

C. OUTDOOR SPACE AND FUNCTIONAL REQUIREMENTS

1. Playground and Field Areas

a. The Facilities Program governs the number, types and sizes of outdoor Physical Education spaces, which includes a variety of physical education teaching stations, including hard courts, fields and apparatus areas.

b. Plan outdoor play areas and fields to accommodate public access and joint use with other public agencies.

c. Locate buildings (including relocatable buildings) so they do not impair observation or obstruct play field supervision.

d. Minimize potential for distraction or harm to occupants of lunch shelters, outdoor classrooms and assembly areas, by Physical Education spaces and related activities, including balls, noise, incidents, etc.

e. Provide playground safety tile surfacing at playground structures as shown in District Standard Details.

f. Athletic competitive facilities are regulated by the National Federation of High Schools (NFHS). These facilities should also comply with CDE and California Interscholastic Federation (CIF) standards. Support facilities such as spectators seating, lighting, etc. shall be provided per program.

g. Turf areas should be located and graded to accommodate drainage of on-site surface runoff.

h. Athletic Equipment Storage – At High School fields provide space for a 40' container for storage of athletic equipments.

2. Outdoor Assembly Area:

a. The Outdoor Assembly Area is the heart of the campus. It may serve as a theatre area for outdoor programs, assembly for graduation ceremonies, an informal gathering space, and outdoor dining.

b. Locate it near the cafeteria and lunch shelter, preferably.

c. Provide a central lawn area large enough to accommodate the enrollment wherever site size permits. Create compact alternatives for smaller urban sites.

d. Minimize walks crossing grass area.

e. Plan a raised stage considering solar orientation, preferably facing away from morning sun. Accessible route of the travel to the stage shall be provided.

f. Slope ground toward stage for amphitheater-style seating. Identify and disperse accessible seating positions.

3. Outdoor Classroom Patio:

a. The Outdoor Classroom Patio is an intimate cost effective space for outdoor teaching, as well as a good meeting place for parent-teacher meetings and student groups. It serves multiple occupants and is intended to grow into a place of outdoor beauty that offers an enhanced environment for instructional activities.

b. As space permits provide paving, grass and seating (benches or low walls).

c. Locate near classroom clusters.

4. Outdoor Eating Spaces:

a. Outdoor eating spaces supplement cafeterias and lunch shelters. See section 2.1 "**School Building Design**" – Multipurpose and Food Service.

b. Integrate with lunch shelter and outdoor assembly area.

5. Emergency Assembly Area:

a. Designate an "Emergency Assembly Area" (EAA) on the site with a net area of six square feet for each programmed student (6 sf/occ.) or 3 SF per calculated exiting load, which ever is greater.

b. Edge of EAA shall not be less than 50 feet from the face of the nearest structure.

c. EAA shall have a gate that discharges directly to the sidewalk. Use a single 4'-0" gate to swing in the direction of egress. Gate shall not project into sidewalk.

d. Gates shall not be closer than 15'-0" from the edge of a vehicular drive gate unless separated by a perpendicular fence or wall.

e. Grades to, and within the EAA shall conform to accessibility requirements.

f. Provide additional space for emergency supply containers (standard 20-ft. or 40-ft. shipping containers.). The primary unit stored is emergency water supply for three days for the entire site population (students, teachers and staff). The requirement is one barrel of water for each 35 people. A 20-ft. container will hold 30 water barrels. A 40-ft. container will hold 60 barrels. Calculate the size and number of containers and provide a flat, smooth-graded area for the containers, containers will be provided by the District. This area shall be accessible and comply with ADA path of travel requirements.

g. Access to EAA shall be designed in such a way that would not require students to go off campus, or into the public right of way to get to EAA.

6. Bicycle Parking Area:

a. Identify a designated area for bicycle and skate board storage. Location and number of bike racks and skate board storage for employees and students are at the discretion of the local districts. Coordinate requirements with Design Manager.

b. Bike racks and skate board storage shall be installed on hard-surfaces.

c. Location shall be visible for security and designed for minimized vehicular and pedestrian traffic conflicts.

D. LANDSCAPING

1. Planning

a. Because schools represent important visual elements in the community, a well-conceived landscape design is essential – one that provides a naturally beautiful campus that enhances its neighborhood yet still is physically secure and economically maintainable.

b. Landscape and planting standards must be adapted to the specific site, with designs scaled to fit the ecological, cultural and economic requirements of the project.

c. In addition to the aesthetic considerations, an important role of trees and large shrubs is providing shade – for buildings, for play areas, and for paved heat islands. Use trees to provide:

1. Year-round shading of outdoor teaching, dining, gathering and play areas.
2. Seasonal shading of buildings to reduce cooling energy requirements, while allowing winter warming of buildings in the cooler climatic areas.

d. Use trees and shrubs to provide wind-breaks on those sites exposed to strong winds, but without disrupting favorable summer wind patterns.

e. Identify existing trees and plant structures that should be saved, and, so far as possible, incorporate them in site planning.

2. Planting

a. Based on long experience with landscaping maintenance, the District has prepared a list of plants that are appropriate to the region, are not hazardous to students or staff, and require relatively little maintenance. Select plants appropriate to the site from the LAUSD Approved Plant List. Refer to Section 3.9 for additional information.

b. The District is committed to a long-term program to conserve water. Therefore, select drought-tolerant planting, with durable, long-lived plants requiring the least amount of maintenance and water.

c. The District's "Integrated Pest Management Program" has requirements for plant locations to be not closer to buildings than:

1. Mature canopy of trees: 5 feet.
2. Mature canopy of shrubs: 3 feet.
3. Ground cover or jute matting: 3 feet.

d. Use low spreading shrubs and vine-type plants on slopes.

e. Avoid all poisonous plants and shrubs with dangerous thorns.

f. Allow space for normal growth of plants.

g. Do not locate large shrubs in front of windows or so they hide the school sign.

h. In front of graffiti-prone walls, provide trees, shrubs and ground treatments that will deter taggers and reduce visibility of applied graffiti.

3. Trees

a. Provide for fast-growing shade trees on perimeter of Elementary School Playgrounds, surrounding Outdoor Assembly Areas, in Outdoor Eating Areas, in Kindergarten Play Areas, and in selected areas for outdoor instruction and small group gatherings.

b. Provide trees to shade buildings, where other conditions permit, as follows:

1. On south exposure, tall deciduous trees to provide shade for high summer sun and warming from low winter sun.
2. On east exposure, deciduous trees for morning shading in summer and warming in winter.
3. On west exposure, evergreen trees for year-round shading.

c. Provide at least one mulberry tree on each Primary Center or Elementary School Campus, in the Kindergarten or Primary Grade Play Areas.

d. Provide trees to shade parking and other large paved areas to reduce the heat-island effect.

e. Keep trees out of drainage flow lines and 20'-0" feet away from vitrified clay sewers.

f. Avoid trees that drop excessive fruit, leaves, or pods.

g. Space trees to have a maximum of 5-feet overlap of full canopies.

h. Location of trees shall be designed to avoid providing access to upper floors, roof and impacting building foundation and sidewalks.

i. No tree box smaller than 24 inches is to be specified.

j. Trees provided by the Los Angeles Department of Water and Power (15 gallon) shall be located in areas away from student activities and access to maximize their survival.

4. Mowing Strips and Paving:

a. Separate lawn and planting areas with concrete mow strips per LAUSD standard technical drawings.

b. Provide a continuous concrete mowing strip, 12" wide, on each side of a fence which separates two adjacent lawn areas, and for lawns next to raised planters, buildings, fences, walls or curbs.

c. Provide a continuous mow strip, 8”wide, for lawn or turf areas next to fences by extending concrete or asphaltic paving outside fence into lawn or turf areas.

d. Pave corners of planting areas at walk intersections to reduce pedestrian traffic thru planting areas.

e. Adjacent to buildings, provide a separating strip from plant areas that is 6"-thick concrete and not less than 24" wide.

f. All covered and main circulation walks shall be of concrete or similar durable surface.

5. Middle and High School Physical Education Fields and Exterior Courts:

a. Provide turf fields for Middle and High School Physical Education Areas that may include space for football, soccer, baseball and track and field. Where programmed, these facilities may be used for interscholastic athletics as well as physical education.

b. Coordinate location of backstops, pitching mounds and skinned areas with sprinkler layouts.

c. Design grading so that surface drainage from sprinklers will not channel across skinned infield area of baseball and softball diamonds.

d. Pave small areas behind back stops where large mowers cannot operate efficiently. Provide mow strips if planted with turf.

e. When possible, turf area shall be located and graded to accommodate drainage of on-site surface runoff.

f. Provide a scoreboard outside of the playing field and track.

g. Provide an area to place a storage bin for athletic equipment.

h. Exterior volleyball courts and basketball courts should be separate when ever possible. If volleyball courts are being combined with basketball courts due to site constraints, provide ground sleeves and removable volleyball posts and nets.

6. Synthetic Turf Field

a. As programmed and directed by the District, design and specify a complete synthetic turf field to meet the District's minimum requirements.

b. Synthetic turf is recommended for high use/Multi-Purpose fields and joint use.

c. If shot put is part of the program, it shall be located in such a way to avoid damaging the field.

d. Drainage System:

1. The drainage system should provide sufficient drainage of the entire playing surface to meet local conditions.
2. Design shall comply with the District's requirements and state storm water arrangement.
3. The drainage systems may include the synthetic turf, pad, base materials and collector pipes that collect and remove storm water from the playing field.
4. Design shall consider existing surrounding conditions, location and soil type.

e. Based on the location of the school and it's annual average temperature, design a cooling system per turf manufacturer's recommendations and District's standards.

7. High School Running Track:

a. Track Length: The running track shall be not less than 400 meters (1,312.34 feet) in length.

b. Track Width: A track width of 28 feet (8.53 meters) / 8 lanes is required for Synthetic and D.G. (decomposed granite) track surfaces unless approval is obtained by the District's Athletic Department.

1. Overall Track Width: Outside dimensions of track shall not be less than 262.86 feet (80.12m): 2 x 104.43' (track radius) + 2 x [28' (track width) – 1' (distance to measurement line)] = 262.86'.
2. There shall be a 4'-0" high fence between the track and the bleacher areas. This fence should not encroach into the track and shall be located a minimum of 18" from the outer lane of the track. The public viewing area shall not be blocked by the fence.
3. Distance to Bleachers and Fences: A minimum clear distance of 18 inches (45.7cm) shall be provided from the track edge to any vertical obstacle, such as the fence or light standard. Ground level bleachers shall be provided a minimum 5 foot distance from the front row of the bleacher to the fence.

c. Lane Width: Lanes shall have the same width including the white line to the right. A minimum lane width of 42 inches (1.07 m) is required unless approval is obtained by the District's Athletic Department.

1. Track Lane Measurement: Distance which are run in lanes and which involve a curve shall be separately measured for each lane. The measurement shall be based upon a line 8 inches (20cm) from the nearer edge of the lane line which is on the runner's left, except the lane next to the inside raised curb shall be measured 12 inches (30cm) into the lane from the raised curb.
2. Inside Curb: The track may be bordered on the inside by a concrete curb. If exposed the edges of the curb shall be rounded.
3. Lane Edge Lines: Lanes shall be marked on both sides by white lines 2 inches (5.08cm) wide. The lanes shall be numbered with lane one on the left when facing the finish line.

d. In Field Surface: The playing field area and radius ends within the track should be natural grass or synthetic turf. A synthetic track surface is recommended when synthetic turf is used. The minimum distance from the curb to the active soccer / football playfield is 10ft. Runways for long jump and pole-vaults should be placed in the radius ends of the field and have synthetic surface when synthetic turf is used. For natural grass fields, runways may be either decomposed granite or synthetic surface.

e. A separate decomposed granite or natural grass fenced area should be provided for shot put.

f. Wind: Prevailing wind conditions should be considered when planning running tracks.

g. Minimum Considerations: On very small sites and with District approval practice and local competition meets may be run on 6 lanes of 42".

8. Outdoor Assembly Area:

a. Provide lawn at the Outdoor Assembly Area amphitheatre area.

b. Plant perimeter trees for shade while maintaining interior line of sight toward stage.

c. Plant screening foliage behind stage as a visual backdrop.

d. Plant shade trees on either side of stage to cast protective shadows.

E. SECURITY

1. Gates and Fencing

a. See section 3.2 **"Civil Engineering"** for heights and details of walls, fencing and gates.

b. Provide full perimeter fence or wall (8' 0" height) enclosure for school campus. Buildings may be used in lieu of a fence when located within 5'-0" of the sidewalk or entry plaza if classroom windows are not positioned so that pedestrians are a distraction to classroom students.

c. At adjoining residential areas, provide CMU walls.

d. Provide full perimeter fence enclosure for all parking areas.

e. Design special gates for main entry to school with direct line of site from main office.

f. In general, provide swinging gates rather than sliding. Emergency gates shall be swing gates. Use sliding gates for large openings where normally open swinging gates would cause obstructions. Ensure that sliding gates are designed to open with minimal effort and that the track will not deteriorate under normal use and traffic.

g. Enclose the Trash Yard with solid walls or fencing on three sides. Locate it for easy access and trash pick-up, away from student areas, and out of direct view of neighboring property owners. Trash yard gate shall be located to accommodate trash pick-up. See District's Standards for additional details.

h. All perimeter gates exiting campus are typically locked during school hours. These gates and their location should be designed in such a way so they are not considered legal exits; thus not requiring panic hardware that compromises security to school site.

2. Utilities Protection

a. Wherever pipe-and-valve assemblies are exposed above grade, provide a secure locked enclosure to protect them from unauthorized use or vandalism. These may be walls, fences, or manufactured enclosures that are made for this purpose.

3. Site Lighting

a. Provide exterior lighting to enhance site security, including area lighting, walkway lights, and building perimeter illumination. See section 3.7 **"Electrical Power and Lighting"** for illumination levels.

b. Eliminate direct-beam projection off-site or glare off buildings into adjoining residential areas or other occupancies.

F. SIGNAGE

1. Identity

a. Provide metal letter signs at the main entry of school to identify the name of the school and street address. Signs shall be visible by both pedestrian and vehicular traffic.

b. Identify an area on site plan for locating a future electronic marquee near the main entry. Marquee to be visible by pedestrian and vehicular traffic. Contract documents shall include a stub out at this location and installation of conduit only for future power requirements. Another conduit shall be provided for data from this location to MDF room and shall be identified accordingly. If marquee is wireless, conduit to MDF room shall not be provided. Make provisions for marquee according to the following criteria:

1. Location Considerations:
    a. Available space for support.
    b. Maximum exposure for message display and school name.
    c. Proximity to power and location of computer for wireless system to work.
2. Design:
    a. Local ordinance restriction for square feet area, setback and minimum distance from roadway or sidewalk, internal/external illumination limitations, and moving message restrictions.
    b. Speed of traffic on the street that the sign will be located.
    c. Minimum 8'-0" clear to the bottom of the sign.
    d. Verify logo and exact name of school with school administrator.
    e. Coordinate cabinet color(s) with the school.
    f. Coordinate location of computer and other equipment with the school.
3. Hours of Operation:
    a. New schools shall comply with CEQA study. If any was done it was addressed in the study.
    b. Existing schools shall comply with local ordinances and the location of school. (residential/commercial street)
    c. Address message deactivation time.

2. Vehicular Directional

a. Provide signage and striping as necessary to provide rational and safe vehicle flow in parking and vehicular traffic area.

3. Pedestrian Directional

a. Provide sufficient directional signs to accommodate way finding of joint-use facilities. Special signage may be required.

4. Regulatory

a. Provide signage identifying ADA accessible routes, exits, stairwells, room occupancy, evacuation plan, Assistive Listening Device availability, and other code-required signage.

5. Perimeter

a. Identify location of "WELCOME TO OUR SCHOOL SIGNS" on plans at the main entry and all vehicular and pedestrian entry points to the school. Signs are approximately 2'-0" by 3'-0" and are owner furnished/contractor installed.

6. Room Numbering

a. Architect shall follow LAUSD room numbering guidelines to identify each room on the construction documents. A copy of the guidelines can be found on the web at the following link: http://www.laschools.org/employee/design/fs-studies-and-reports/

b. Provide room number and room identification signs per LAUSD Specification Section 10400.

7. Roof Address

a. Provide school's street address numbers in contrasting color roofing material on the roof of main administration building. See specification Section 07552 – "Roofing" for additional information.

2.3 VEHICULAR ACCESS AND PARKING

A. PARKING SPACE REQUIREMENTS

B. GENERAL PARKING GUIDELINES

C. VEHICULAR ACCESS AND PEDESTRIAN SAFETY

D. PARKING STRUCTURE SECURITY

2.3 VEHICULAR ACCESS AND PARKING

A. PARKING SPACE REQUIREMENTS

1. School sites vary greatly in terms of size and configuration. In order to accommodate staff and student parking the District uses a variety of site-specific parking solutions, including:

- **a.** Surface Parking
- **b.** Free Standing Structures
- **c.** Underground Structures
- **d.** Rooftop Parking
- **e.** Leased Parking on Adjacent Sites

2. Because of limited site space for recreational use, high-intensity parking solutions are encouraged

3. Provide parking spaces based on the following ratios to programmed classrooms.

a.	Elementary School	2.25 per Classroom
b.	Middle School Classroom	2.25 per Classroom
c.	High School Classroom	2.50 per Classroom

4. Provide Accessible Parking in the following ratios:

a.	1-25 Spaces	1 Accessible Space
b.	26-50 Spaces	2 Accessible Spaces
c.	51-75 Spaces	3 Accessible Spaces
d.	76-100 Spaces	4 Accessible Spaces
e.	101-150 Spaces	5 Accessible Spaces
f.	151-200 Spaces	6 Accessible Spaces
g.	201-300 Spaces	7 Accessible Spaces
h.	301-400 Spaces	8 Accessible Spaces
i.	401-500 Spaces	9 Accessible Spaces
j.	501-1000 Spaces	2% of total
k.	1001 or More	20 plus 1 for each 100 or fraction over 1001

5. Visitor parking: Allocate surface parking spaces for visitors adjacent to the Administration Unit.

6. Provide secure Bicycle Parking. Also see section 2.2.**"Site Design"** - C.2.6

B. GENERAL PARKING GUIDELINES

1. On small urban sites, seek creative parking solutions to maximize usable land for educational and recreational functions.

2. Parking layouts shall conform to good design practices. Los Angeles City requirements shall be used as minimum criteria. See Parking Standards drawings in the District's "Typical Standard Drawings."

3. Avoid placing student parking in remote areas where there is little supervision. In general, locate student parking near the classrooms.

4. Parent's student drop-off and pick-up, bus loading areas, and parking areas shall be separated to allow students to enter and exit the school grounds safely.

5. Driveways shall not be located in a bus-loading area or a student drop-off or pick-up area.

6. Parking stalls shall not be located, or parking patterns so designed, so that a vehicle must back into a public street, a bus-loading area, or a student drop-off or pick-up area.

7. Avoid herringbone-pattern parking layouts and tandem parking. (Tandem parking may be used in special circumstances with District permission.)

8. Requirements for accessible parking shall conform to Title 24.

    a. When one stall for accessible parking is provided the space shall be 17'-0" wide and striped to provide 9'-0" wide van accessible parking space and 8'-0" wide access aisle on the passenger side. Accessible parking stalls and access aisles shall have a maximum slope of 2% in any direction.

    b. When more than one stall for accessible parking is provided, 2 parking spaces can be provided within a 24'-0" (26'-0" at van spaces) wide area striped to provide a 9'-0" wide accessible parking space on each side and a 6'-0" wide access aisle (8'-0" at van spaces) in between. Accessible parking stalls and access aisles shall have a maximum slope of 2% in any direction.

    c. Minimum length of each parking stall shall be 18'-0".

    d. A CBC compliant Tow-Away sign with contact information.

    e. Slope for parking stalls, aisles, and path of travel shall be designed for less than maximum slope allowed by code.

    f. Coordinate location of ducts, piping and equipment to avoid overhead obstructions into the minimum vertical clearance (8'-0") along the vehicular route connecting the parking garage entrance to the accessible spaces, and at the accessible spaces themselves. Coordinate location of ducts, piping and equipment to avoid obstructing the accessible route, and to avoid protrusions >4" into the protected zone that are not cane detectable by visually impaired persons.

9. Percentage of Compact Cars shall conform to Los Angeles City, Department of Building and Safety Requirements in parking areas or garages containing 10 or more spaces, up to 40% of the total required parking spaces and 100% of

the non-required parking spaces may be compact. Compact-car stalls shall be clearly marked and appropriate signs installed at all entrances to parking areas.

10. Provide a wheel stop for each parking stall wherever stalls are head-on to fencing, wall, building, and planting area or other obstructions.

- **a.** Wheel stops shall be reinforced precast concrete, 6'-0" long.
- **b.** Locate wheel stops with a minimum setback of 3'-0" from fences, walls, and buildings.
- **c.** Straight-line arrangement of wheel stops is preferred.

11. Placement of speed bumps in parking areas is allowed only in long driveways where it is necessary to protect pedestrians crossing the aisles.

12. Secure surface parking areas with an 8'-0" high fence or wall.

13. Provide aesthetically pleasing perimeter walls, fencing and planting.

14. Provide lighting levels for surface parking areas that will create a secure environment for nighttime users of school facilities.

C. VEHICULAR ACCESS AND PEDESTRIAN SAFETY

1. Ensure adequate and safe access for students, staff and visitors, walking, entering and circulating on the campus. Vehicle traffic patterns shall not interfere with major pedestrian traffic patterns. Foot traffic shall not pass through entrance driveways. Crosswalks must be clearly marked.

2. In general, orient the primary site and building entrance toward the street with the least traffic volume and activity.

3. To optimize the traffic flow to and from the school site and to minimize traffic hazards to pedestrians, meet with representatives of the Los Angeles Department of Transportation (or other local traffic authority) early in the design process to review the schematic site design.

4. Provide safe and clearly indicated student drop-off and pick-up provisions by car or bus.

- **a.** For new schools, provide on-site drive lanes or curb inset lanes for parent and bus drop-off and pick-up wherever space permits. Comply with ADA requirements for curb drop-off and site access as well as LAUSD's Office of Environmental Health and Safety's (OEHS) "Traffic and Pedestrian Safety Requirements for New School" requirements.
- **b.** Provide the parent's student drop-off area adjacent to the main entry gate.
- **c.** Locate the main gate in the farthest forward position along the curb to maximize curb space for stacking vehicles and to allow visual supervision of the greatest number of vehicles.
- **d.** Provide adequate curb length for expected drop-off and pick-up traffic, with a minimum of 160 feet for Elementary Schools and 200 feet for Secondary Schools. Use curb cuts and inset drop-off lanes when site space permits.

e. Separate parent's student drop-off and bus loading areas to minimize traffic conflicts and to allow more effective supervision of waiting areas.

f. Locate bus drop-off space at a separate secondary entry or from a perpendicular street wherever possible. Provide adequate safe waiting space for students.

g. Provide adequate curb length for expected bus parking for drop-off and pick-up, with a minimum of 100 feet for Elementary Schools and 200 feet for Secondary Schools.

h. Locate bus drop-off areas for special education students in the same area as regular education students to provide equal access and the least restrictive environment.

i. Provide curb cuts for accessibility at both bus and automobile loading zones.

j. Provide appropriate "Passenger Loading" signs at all passenger loading zones.

5. Delivery and Utility Areas

a. Provide vehicular access that does not jeopardize staff and student safety. Separate access from bus and parent loading areas and parking areas.

b. Delivery and utility vehicles shall have direct access from the street without crossing playgrounds or fields.

c. Isolate trash pick-up from student activities.

d. Design the trash pick-up area for maneuverability to accommodate 35 foot trash trucks. See Standard Technical Drawings for minimum requirements.

e. Delivery trucks are approximately 50 feet and need approximately 60 feet of turn radius. Design the Service Area to accommodate turn around, backing and forward movement of truck.

D. PARKING STRUCTURE SECURITY

a. Provide automatic Overhead Coiling Shutters for all parking structure entrances to prevent any unauthorized access once gates have been closed. Provide Separate Entrance and Exit Shutters with minimum 3'-0" space in between. Minimum width for each gate shall be 11'-0". The location of card readers in relation to shutters shall be designed to provide maximum security and proper gate operations. Adequate room for vehicles should be allowed for off street access to card reader.

b. Provide gates that shut immediately following the entrance of each car or pedestrian.

c. Entrance gate into parking structures shall be activated by Proxy Card Reader pads. Connect entry to Administration Clerical Offices, Adult School Office, and/or security personnel by 2-way speaking/listening device (see Section 3.8 "Electrical Communications and AV Systems").

d. Locate gate enclosure, motor, safety edge cords, and electrical power supply lines inside the secure garage structure and so that they are protected from access or vandalism.

e. Provide bollards to protect garage ventilation ducts, as well as other features, such as doors, gates, card readers, elevator lobby, etc.

f. Protect garage electrical, mechanical rooms and elevator lobby by raising 6 inches above garage floor (See Section 3.7.C.1.c for additional requirements).

g. Parking structures, whenever possible shall be designed to allow maximum degree of visual surveillance from outside the structure.

h. Parking structure design shall avoid creating dark corners or other spaces where assailants may conceal their presence.

i. Provide closed circuit television cameras encased for protection against vandalism, to link parking areas to a monitor in the Administration Clerical Office and in Adult School Office (see Section 3.8 **"Electrical Communications and AV Systems"**).

j. Provide microphones throughout the structure linked to the Administration Clerical Office to monitor noises in the parking areas.

k. Provide lighting levels to create a safe environment for users at all times. Photoelectric devices in conjunction with the lighting control system controller shall control outdoor lighting. Subterranean and covered parking lighting shall be controlled via the lighting control system.

l. Provide adequate night lighting throughout the site, especially to and from parking areas.

2.4 ENVIRONMENT AND SUSTAINABILITY

A. GENERAL

B. NEW CONSTRUCTION

C. EXISTING FACILITIES

2.4 ENVIRONMENT AND SUSTAINABILITY

A. GENERAL

1. LAUSD is committed to sustainable or "high performance" design in all of its schools. A well-designed high performance school enhances student and teacher performance, reduces operating costs, and protects the environment. The LAUSD Board of Education recognized these advantages in its October 2003 High Performance Schools Resolution. The Resolution directs staff to **"continue its effort to ensure that every District new school and modernization project, from the beginning of the design process, incorporate high performance school criteria to the extent feasible."**

2. The District endorses the high performance school strategies defined in the Collaborative for High Performance School (CHPS) Best Practices Manuals, in particular "Volume II, Design," and "Volume III, Criteria" (available at www.chps.net).

3. High performance schools have the following characteristics:

   a. **Optimal Lighting & Daylighting:** Research has repeatedly shown that students learn 20 to 30% faster in classrooms that take full advantage of daylight and optimum electric lighting. Daylight and electric light should be integrated and glare eliminated. Lighting should be "designed," not simply specified.

   b. **Healthy Indoor Environment:** A healthy indoor environment is essential. According to the Environmental Protection Agency, indoor air is frequently up to five times more polluted than outside air. Children are particularly susceptible to indoor pollutants. The key factors are proper ventilation using outside and filtered air and low-emitting materials such as flooring, ceiling tiles and paint.

   c. **Comfort:** Classroom comfort includes thermal, visual, and acoustic comfort. Thermal comfort ensures that students and staff are neither hot nor cold. Visual comfort means lighting that makes visual tasks easier and visual stimulation and a connection to the out-of-doors through the use of eye level windows. Acoustic comfort means teachers and students can hear one another because ventilation system and outdoor and indoor noise are minimized.

   d. **Energy Efficiency:** Energy efficiency saves money while conserving nonrenewable resources and reducing pollution. Space conditioning systems should use high efficiency equipment, be "right sized" for the estimated demand, and include controls that boost system performance. Lighting systems should use high efficiency lamps and ballasts, optimize the number of light fixtures, incorporate controls that ensure peak system performance, and successfully integrate electric lighting and daylighting. Building shells must integrate and optimize insulation, glazing, shading, thermal mass, air leakage, and light-colored exterior surfaces.

e. **Water Efficiency:** Reducing indoor and landscaping water use minimizes the use of this scarce resource and saves money. Indoor strategies include water efficient toilets, non-water urinals, faucets, showerheads and appliances. Landscaping strategies include drought tolerant plants and water efficient irrigation systems.

f. **Storm Water Management:** Minimizing and cleaning stormwater runoff can further reduce water demand and help clean the Pacific Ocean.

g. **Environmental Materials:** Schools should incorporate materials and products that are durable, nontoxic, grown sustainably, have a high-recycled content, and can easily be recycled. Properly specified materials that can meet these goals include flooring (linoleum, carpet), ceiling tiles, insulation and concrete containing fly ash.

h. **Waste Management:** Schools should be designed with appropriate spaces for the storage and collection of recyclables. Construction and demolition waste should be recycled to the maximum extent feasible.

i. **Easy to Maintain & Operate:** Schools should be easy to use and maintain. Surfaces and equipment should be durable. Teachers should have control over classroom temperature and lighting, and, along with Maintenance and Operations staff, be trained in their effective use.

j. **Commissioned:** Commissioning helps ensure that schools operate as designed. Commissioning tests, verifies, and fine-tunes key building system performance so that it reaches the highest levels of efficiency.

k. **Schools That Teach:** Permanent educational displays that describe the school's high performance features further enhance learning. Schools can be tools that illustrate a wide spectrum of scientific, mathematic, and social issues. For example, mechanical and lighting systems can illustrate energy use and conservation, and daylighting systems can help students understand the sun's daily and yearly movements.

l. **Community Resource:** The most successful schools have a high level of parent and community involvement. Involvement can be enhanced by designs that facilitate the school's use for neighborhood meetings and other community needs.

B. NEW CONSTRUCTION (NEW SCHOOLS AND NEW BUILDINGS ON EXISTING CAMPUSES)

1. High Performance School (CHPS) Requirement

   a. All new schools and new occupiable and conditioned buildings on existing campuses shall, at a minimum qualify as a CHPS project as defined in the version of CHPS "Best Practices Manual Volume III, Criteria", applicable at the time the project is submitted to the Division of State Architect (DSA). (CHPS Volume III is available at www.chps.net) All projects submitted to DSA after January 1,

2010 shall be either self certified or CHPS verified. Coordinate with Design Manager.

b. The District seeks to meet as many CHPS criteria as economically feasible. Defining characteristics are listed in Section A.3, above. Some are referenced in this "School Design Guide" as specific LAUSD requirements for new schools. Others are included in the CHPS Best Practices Manual, "Volume II, Design" and "Volume III, Criteria."

c. To achieve these goals, the District advocates an integrated "whole building" design approach to maximize the interactive affects of good practice and the District's criteria and requirements. Key systems and technologies must be considered together from the beginning of the design process, at preliminary schematic design and optimized for long-term performance.

d. Architect shall coordinate with District to maximize the high performance points from school's operation policy, and facilities standards. Architects shall submit a CHPS Scorecard at the following milestones:

1. **Schematic Design:** Forecast of CHPS points anticipated to be achievable supported by project Basis of Design and preliminary plans.
2. **Design Development:** Detailed account of CHPS points achieved in the school design with supporting references to specific narratives, plans, specifications and cut sheets in the submittal.
3. **Construction Drawings (50%):** Detailed account of CHPS points to be achieved in the school design with supporting references to specific narratives, plans, specifications and cut sheets in the submittal.
4. **Final Design (100% Construction Drawings):** Final accounting of CHPS points achieved with the signature of the registered project architect.
5. **Construction Completion:** Final accounting of CHPS points achieved with the signature of the registered project architect.

2. CHPS Specifics

1. CHPS Best Practices Manual "Volume III, Criteria" defines many prerequisites and optional credits that address a wide range of high performance design opportunities. The following topics address key areas of priority to the District.

a. Lighting and Daylighting

1. Electric lighting standards and control requirements are described in the Electrical Power and Lighting section of this "School Design Guide."
2. Adequate daylighting, integrated with electric lighting and controls, is required in all classrooms.

3. Lighting and daylighting shall be designed and calculated in accordance with the criteria and examples included in the Southern California Edison "Classroom Lighting Guidelines." For daylighting, this approach requires computer analysis – utilizing a CHPS-approved methodology (see CHPS "Volume III, Criteria, IEQ Credit Daylighting")

b. Energy Performance

1. By integrating the design of all building components to increase energy efficiency, the source energy requirement of each proposed new school shall be a minimum of 15% better than required by the California Energy Efficiency Standards (Title 24) in force at the time the project is submitted to DSA, unless compelling justification is provided to the District for a lower efficiency. Under no circumstances shall any new school perform less than 10% better than Title 24.
2. The Design Team shall also study the use of renewable energy for all new schools and new buildings on existing campuses. The goal is for 50% - 100% of each new school's electricity or new building on existing campus to be provided by renewable energy. A feasibility study shall be submitted by the end of schematic design and shall determine the most cost effective renewable energy technology or combination of technologies, such as solar (photovoltaic), wind and solar hot water systems. A percentage weighted value of the school annual electrical energy consumption calculated for the Title-24 performance compliance approach may be used as the basis of this study. The percentage value will vary for each building type and will be provided by the District. The study shall include the following as a minimum:
   - **a.** The description of technologies considered.
   - **b.** A discussion on the feasibility of each technology.
   - **c.** Supporting facts and figures.
   - **d.** Impact on the architecture, structure of the building(s), and site.
3. The renewable energy system shall be OFOI (Owner Furnished Owner Installed). However, A&E shall design the infrastructure required to support the selected system.
   - **a.** Photovoltaic: Grid interactive only (no battery backup) system with the following considerations.
     1. Building Considerations: It is recommended that mechanical PV panels be located on taller buildings with less equipment such as Multi-Purpose, Gym, Lunch Shelter and Classroom Buildings, (if the equipment allows enough space), other structures such as stair case shelter or covered walkways shall be

considered as well. Another consideration may be displacement of some of the conventional roofing product with building integrated PV modules, such as roof slates and standing seam metal roofing products.

i. Building orientation to maximize system efficiency.

ii. Ensure the roof area or other installation site is capable of handling the desired system size.

iii. Locate the array to minimize shading from foliage, vent pipes, and adjacent structures.

iv. If roof mounted, verify that the roof is capable of handling additional weight of PV system. Augment roof structure as necessary.

v. Roof mounted system shall include considerations for roof maintenance and access.

vi. System to be installed on taller buildings or areas where it is not accessible to students to prevent vandalism.

2. System Design Consideration:

i. Specify sunlight and weather resistant materials for all outdoor equipment.

ii. Design the system in compliance with all applicable building and electrical codes.

iii. Design the system with a minimum of electrical losses due to wiring, fuses, switches and inverters.

iv. Ensure the design meets local utility interconnection requirements.

v. Properly ground the system parts to reduce the threat of

shock hazards and induced surges.

b. Wind Technology.

1. Small Building mounted wind turbines may be a viable option depending on site location.

c. Solar Hot Water Systems. (not OFOI, Preferably as par of construction stage)

1. Solar Hot Water Systems should be considered for pool heating as supplement to natural gas or Heat Pump Heating Systems.

c. Acoustics

1. Analyze the acoustical environment of the site (such as traffic) and the characteristics of planned building components (such as HVAC), and design to minimally achieve a classroom acoustical performance of 45 dBA background noise level (unoccupied with HVAC system on) or better (see CHPS "Volume III, Criteria," IEQ Prerequisite Minimal Acoustical Performance and Credit Improved Acoustical Performance).
2. While the desired performance target of 35 dBA may not be practicably achievable, the Architect shall explore innovative design options for obtaining its speech cognition goal with wall and ceiling reflective surfaces, strategically placed absorptive surfaces, and voice reinforcement systems.
3. For additional criteria, refer to the District's "Acoustical Requirements" (in Appendix "A.3").

d. Indoor Air Quality

1. Appropriate design strategies shall be utilized to ensure healthy indoor air quality (see CHPS "volume III, Criteria," IEQ Prerequisite *Indoor Air Quality Minimum Requirements*).The issues that shall be addressed include minimum outside air ventilation, HVAC design and air filtration, and moisture control.
2. During construction, steps must be taken to provide CHPS-mandated temporary construction ventilation; dust protection; product preconditioning; sequencing; vacuuming and duct cleaning; building flush-out; and post-occupancy ventilation (see CHPS "Volume III, Criteria," IEQ Prerequisite Indoor *Air Quality Minimum Requirements*).

e. Commissioning

1. The District will provide CHPS-compliant commissioning services for all new school building construction(see CHPS "Volume III, Criteria, Energy Prerequisite *Fundamental Building Systems Testing and Training* and Credit *Enhanced Commissioning*). The Architect shall assist the District-appointed Commissioning Agent as required, and incorporate in the

Contract Documents the necessary provisions specifying the General Contractor commissioning-related tasks, including Division 1 to 16 Specification Section(s), Commissioning Plans, and other documents. Contact the District representative for further information.

2. The required "Basis for Design" must be complete with all design parameters, assumptions and criteria (not simply a reference to LAUSD design guidelines) so it intent is fully available to the Commissioning Authority.

f. Water Efficiency

1. To the maximum extent feasible, incorporate landscaping and interior water efficiency strategies as listed in Section A3e, above. Develop a water use budget for exterior and ornamental water use as specified in design Guide Section 3.9.D.1 Planting and Irrigation, Irrigation Design Requirements (see CHPS "Volume III, Criteria," Water Prerequisite *Create Water Use Budget*)

g. Storm Water Management

1. Utilize the LAUSD "Post-Construction Storm Water Management Plan" ("BMP Selection White Paper") and accompanying Check List for site planning for enhanced water quality and for the selection of appropriate Best Management Practices. (See also CHPS "Volume III, Criteria," Credits Limit Stormwater Runoff and Treat Stormwater Runoff.

h. Construction Waste Management

1. Establish a minimum non-hazardous construction and demolition debris recycling requirement of 75% by weight as defined in Specification 01340, Construction & Demolition Waste Management (see also CHPS "Volume III, Criteria," Materials Prerequisite *Construction Site Waste Management*).

i. Materials

1. To the maximum extent feasible, specify CHPS-compliant low emitting materials (see CHPS Best Practices Manual "Volume III, Criteria," IEQ Credit *Low-Emitting Materials*). On its website, CHPS maintains a list of low emitting materials.

j. Educational Displays

1. Provide at least one permanent education display on the school site that describes the high performance features that are part of the school's design (see CHPS "Volume III, Criteria, Prerequisite *Educational Display*).

k. Showcase Schools

1. For specific schools or buildings, the District may elect to increase the utilization of CHPS "Best Practices" – especially those in "Volume III, Criteria" – to improve "green" performance and obtain incentive funding.

3. Incentive Programs

1. As directed, the Architect shall submit each project to the applicable high performance related incentive programs. Savings by Design, LADWP Energy Program, State Energy grant and High Performance School grant, etc. may be available.

C. EXISTING FACILITIES (MODERNIZATION PROJECTS)

1. Overview

a. High performance strategies shall be integrated into all appropriate school modernization and addition projects. Defining characteristics are listed in Section A.3, above. The strategies detailed in CHPS "Best Practices Manual Volume II Design" shall be followed. Where appropriate, the CHPS "Best Practices Manual Volume III Criteria" prerequisites and credits shall be followed. Major modernization projects as defined in CHPS "Best Practices Manual Volume III Criteria," shall qualify as CHPS projects under the CHPS Volume III minimum standards and as defined in section B.

2. Specifics

a. Lighting and Daylighting

1. When designing classroom lighting and daylighting systems, seek opportunities to incorporate the criteria and examples included in the Southern California Edison "Classroom Lighting Guidelines."

b. Energy Performance

1. To the maximum extent feasible, all relevant projects shall incorporate energy efficiency measures. Whenever the building envelope (roofs, walls), electrical system, space conditioning or water heating system is upgraded, opportunities for improving energy efficiency shall be identified and implemented.

2. As required by the District, the Design Team shall study the use of renewable energy sources, ad feasibility of application to the project(s). Unless required otherwise by the District, the goal is for 50%-100% electricity on existing campus to be provided by renewable energy. A feasibility study shall be submitted by the end of schematic design and shall determine the most cost effective renewable energy technology or combination of technologies, such as solar (photovoltaic), wind and solar hot water systems. A percentage weighted value of the school annual electrical energy consumption calculated for the Title-24 performance compliance approach may be used as the basis of this study. The percentage value will vary for each building type and will be provided by the District. The study shall include the following as a minimum:

   a. The description of technologies considered.

   b. A discussion on the feasibility of each technology.

c. Supporting facts and figures.

d. Impact on the architecture, structure of the building(s), roofs, and site.

3. The renewable energy system shall be design to meet all state requirements, codes, utility company incentive programs requirements, and industry standards.

a. Photovoltaic (PV): Grid interactive only (no battery backup) system with the following considerations.

1. Building Considerations: It is recommended that mechanical PV panels be located on buildings with less equipment such as Multi-Purpose, Gym, Lunch Shelter and Classroom Buildings, (if the equipment allows enough space), other structures such as stair case shelter or covered walkways shall be considered as well. Another consideration may be displacement of some of the conventional roofing product with building integrated PV modules, such as roof slates and standing seam metal roofing products.

a. Building orientation to maximize system efficiency.

b. Ensure the roof area or other installation site is capable of handling the desired system size.

c. Locate the array to minimize shading from foliage, vent pipes, and adjacent structures.

d. If roof mounted, verify that the roof is capable of handling additional weight of PV system. Augment roof structure as necessary. Address any necessary modifications and alterations to the roof.

i. Roof mounted systems shall include considerations for roof maintenance and access.

2. System Design Consideration:

a. Specify sunlight and weather resistant materials for all outdoor equipment.

b. Design the system in compliance with all applicable building and electrical codes, and industry standards.

c. Investigate the existing structural conditions to determine feasibility of structure to receive the PV panels; reinforce structure as needed. Provide

structural analysis, calculations and construction details for DSA submittal and approval.

d. Locate Inverters and other equipment in appropriate locations. Take into consideration the room's conditions, including necessity for air conditioning.

   i. Avoid roof installation of inverters as much as possible.

e. Design the system with a minimum of electrical losses due to wiring, fuses, switches and inverters.

f. Ensure the design meets local utility interconnection requirements.

g. Properly ground the system parts to reduce the threat of shock hazards and induced surges.

h. Demand, KWh, KW, VAR, VARS meters shall utilize BACNET communication protocols. Provide connections between this the PV system and the Energy Management System.

i. Specify equipment that has been approved by the California Energy Commission and listed in LAUSD standard specifications.

j. Refer to 3.7.E for additional requirements.

c. Acoustics

1. Incorporate strategies to maximize classroom acoustics in all projects that impact classroom acoustics, such as space conditioning systems, exterior and interior walls, and floor, ceiling and wall finishes.

d. Water Efficiency

To the maximum extent feasible, incorporate interior and landscaping water efficiency strategies as identified in Section A3e, above.

e. Storm Water Management

1. Utilize the LAUSD "Post-Construction Storm Water Management Plan" ("BMP Selection White Paper") and accompanying Check List for site planning for enhanced water quality and for the selection of appropriate Best Management Practices.

f. Construction Waste Management

1. Establish a minimum non-hazardous construction and demolition debris recycling requirements of 75% by weight as defined in Specification 01340, Construction & Demolition Waste Management (see also CHPS "Volume III, Criteria, Materials Prerequisite

g. Materials

1. To the maximum extent feasible, specify CHPS-compliant low emitting materials (see CHPS Best Practices Manual "Volume III, Criteria," IEQ Credit *Low-Emitting Materials*). On its website, CHPS maintains a Low Emitting Materials Table listing compliant materials.

3. Incentive Programs

As directed, the Architect shall submit each project to the applicable high performance related incentive programs. Savings by Design, LADWP Energy Program, State Energy grant and High Performance School grant, etc. may be available.

Book Three
Technical Criteria

Technical Criteria

3.0 TABLE OF CONTENTS

3.1 ARCHITECTURAL

3.2 CIVIL ENGINEERING

3.3 STRUCTURAL

3.4 PLUMBING

3.5 FIRE PROTECTION

3.6 HVAC SYSTEMS

3.7 ELECTRICAL POWER AND LIGHTING

3.8 ELECTRICAL COMMUNICATIONS AND AV SYSTEMS

3.9 PLANTING AND IRRIGATION

3.1 ARCHITECTURAL

A. GENERAL REQUIREMENTS

B. MATERIALS AND FINISHES

C. MODERNIZATION AND ALTERATIONS

D. HISTORIC PRESERVATION

3.1 ARCHITECTURAL

A. GENERAL REQUIREMENTS

1. Architectural Discipline

There is some overlap of requirements in this section and the sections of Book Two of the "School Design Guide." The architectural personnel must review all sections for all disciplines and coordinate the requirements. If discrepancies are found, bring them to the attention of the District's authorized representative for resolution.

Refer to the District "Guide Specifications" for materials and installations approved by the District. Unless approved in writing by the District, project specifications shall utilize the District "Guide Specifications" provided and approved by the District to specify materials, equipment and installations. The District "Guide Specifications" shall be edited to reflect the conditions and requirements of each specific project. Variances from the District "Guide Specifications" must be approved by the District in writing.

a. Specify at least three manufacturers. Where the "Guide Specifications" identify less than three manufacturers, identify additional manufacturers' products to provide a minimum of three manufacturers for each item. Inform the District's authorized representative of any such additions and of any difficulties in identifying equivalent products.

b. Where optional material or equipment choices are presented in the "Guide Specifications," select the items to be used in the project and edit the specification sections appropriately.

c. If requirements in this "School Design Guide" do not match those in the "Guide Specifications," the most stringent shall apply.

d. The final Project Specifications and Drawings that are submitted shall be specific and dimensions quantitative. Use of generalities or ambiguous descriptions, directions or dimensions, e.g., "as required", "per manufactures recommendations", "install to meet all codes" and "squish to fit", is not acceptable.

2. Other Design Disciplines

a. There are requirements in this section that affect the requirements for the other design disciplines. Because the architectural discipline is responsible for the compliance and coordination of all work, the architectural personnel must assure the full communication of design conditions and requirements to the other disciplines and be certain the other disciplines are in compliance. (Examples include requirements

for insulation, monolithic single glazing, and room-surface reflectances.) In return, the architectural personnel must be familiar with the requirements for the other disciplines to be certain their needs are incorporated into the design. (Examples include amply sized relief air openings at each classroom, fire-protection measures where ducts or raceways penetrate fire-resistive walls, protective enclosures for exposed valve assemblies or control devices, and location of large noise-generating equipment remotely from classrooms.)

3. Seismic Bracing and Anchorage

a. Assure provision of seismic restraints, anchorage or bracing, for all casework, display cases, equipment, signage, or special finish materials (e.g., suspended ceilings), including Owner Furnished items, in accordance with requirements of the California Building Code.

B. MATERIALS AND FINISHES

1. General

a. Materials shall be sustainable, affordable, durable, aesthetically pleasing, and require minimal cleaning and maintenance.

b. Avoid complicated special details.

c. Use standard systems and materials in standard sizes produced and readily available from manufacturers based in the United States.

d. Use vandal-resistant and graffiti-resistant materials and finishes.

e. Provide non-slip surfaces for all exterior paths of travel and for interior floor areas specifically subject to wetting.

f. Treat exposed and visibly prominent building features (such as grilles, pipes, ducts, or similar elements) and accessible to vandalism to blend with the building exterior to avoid creating an attractive target.

g. When more than one item of material or equipment are specified (as in "three or more manufacturers"), provide adequate facilities and coordination to assure that all spaces are sized to accommodate any item specified and that structural, mechanical and electrical elements will provide adequate support to any of the items.

h. Avoid materials and details with sharp and jagged edges, especially near entrances and circulation pathways.

i. Intumescent paint may not be used unless approved by the District. Do not use Intumescent paint where it is accessible or susceptible to vandalism. Vandalism such as scraping, graffiti, etc. can compromise integrity of Intumescent paint and become a maintenance problem.

j. EIFS (Exterior Insulation and Finish Systems) may not be used unless approved by the District. If approved, high impact products must be used where accessible or susceptible to vandalism.

2. Site Elements

a. Provide one 35'-0" high flagpole at each school, with one-story buildings or 50'-0" high flagpole at each school with two-story buildings or higher.

b. Show location and provide details for school signage. Keep signs above Students' reach.

c. If flag pole is located in the landscaped area, a concrete pad around the pole and access to it shall be provided.

3. Concrete

a. Provide proper moisture barriers for slab on grade.

b. No exposed painted or stained concrete is allowed as floor finish in classroom and or kitchen area.

c. Provide adequate controls and expansion joints.

4. Metals

a. Typical handrails are constructed of 1-1/2 inch diameter metal pipe. Exterior handrails are to be unpainted galvanized steel pipe. Handrails may be powder coated provided they are designed in a manner that will not require field welding installation. Interior handrails may be powder coated steel. Handrails shall be designed in such a way or have skate deterrent devices installed to deter skateboarders or students from sliding down them while maintaining ADA handrail requirements.

b. Use 12- to 14- gage galvanized steel or extruded aluminum for exterior louvers, 16-gage for interior.

c. Use galvanized chain link fencing and gates for all fencing except for main entries, or special public exposures where more decorative fencing would be appropriate (with District approval).

d. Do not use metal siding in areas less than ten feet above grade where it might be vandalized by graffiti, damaged by impact, or subject to heat gain that could cause injury to students or staff.

e. Guards

1. The California Building Code requires guards at unenclosed floor and roof openings, open and glazed sides of stairways and ramps, balconies or porches, which are more than 30 inches above grade or floor below. Roofs used for other than service of the building shall be protected by guards.
2. The Code states that the top of the guardrails shall not be less than 42 inches in height. However, the architect should determine the appropriate height necessary to provide security for the students particularly in high traffic areas such as stair landings that serve a large volume of students or where a turn in direction is required.
3. Roof areas, service areas or other buildings areas that would be accessible to students by climbing over a guard, must be protected by an appropriate barrier that will prevent students from accessing these areas.
4. Typical guardrails are constructed of 1-1/2 inch diameter galvanized metal pipe (as describe in the CBC). Flat top rails wider than 2 inches that might encourage sitting or placement of books or other objects should not be used. Guardrails that are placed on curbs must be designed so that the curb cannot be used as a step by students.

5. Guardrails must be designed to resist kicking and other abuse. Open guardrails shall have intermediate rails or an ornamental pattern such that a sphere 4 inches in diameter cannot pass through. Intermediate rails and ornamental patterns should be designed so that they do not provide a "ladder" for students to climb on. Vertical pickets spaced 4 inches on center, a metal mesh material that complies with the CBC, or a low wall should be installed.

f. All exterior exposed metals shall be galvanized.

5. Wood

a. Do not use wood trims, fascias, moldings, etc. except for Existing Facilities projects where it is necessary to match existing.

b. Specify grade and finish for all exposed wood to minimize maintenance where wood is being specified.

c. For additional information on finish carpentry and architectural woodwork, see, Guide Specifications.

6. Thermal & Moisture Protection

a. Slope roofs at a minimum of 1/2" per foot to roof drains. Clearly show drainage patterns and elevations on roof and discharge areas.

b. Use roofing material meeting UL requirements for Class "A" fire rating and FM 1-90 wind uplift rating

c. The roof system shall meet the FM 1-90 wind uplifting rating.

d. Roof system shall meet the "Cool Roof" criteria, as outlined in the California Energy Code Section 118.

e. Avoid the use of pitch pans for roof penetration flashing. All roof types have specific details for all types of roof penetrations. Consult with manufacturer for specific details.

f. All roof penetrations including, but not limited to; equipment platforms plumbing vents and base flashings are to be a minimum of 8" above the finished roof level.

g. It is recommended that a Weather Resistant Barrier of polyethylene or polypropylene, be used instead of building paper. This is to provide greater assurance of resisting moisture intrusion, and to remove a nutrition source for mold. Provide details and installation instructions per manufacture's recommendations. When plywood is used for exterior sheathing, comply with the code requirements by providing two layers of appropriate materials.

h. At concrete floor slabs on grade that support interior finish materials, provide, as a minimum quality standard, a vapor barrier of Polyolefin based 15 mils minimum thickness, meeting or exceeding ASTM E1745, 10 feet minimum width with taped or sealed joints, 2 inches of sand below, over 4" of select gravel drainage fill.

i. Do not use interior downspouts and gutters without District authorization.

j. Do not project downspouts into pedestrian areas.

k. Direct downspouts into planting areas or other site elements that will reduce or slow storm-water runoff from the site. Special attention shall be given to planter details to divert the water away from the building and the building's foundation.

l. On structures with sloped roofs, provide gutters, downspouts and other associated accessories as required to facilitate efficient water runoff and ensure adequate drainage.

m. Avoid running conduit and piping on the roof. Where it is unavoidable, the length shall be minimized and shall be detailed appropriately to accommodate roof replacement. All conduits on roof should be braced on lightweight blocks. Do not use wood blocks since they hold moisture, which will seep to roof membrane.

7. Doors and Entryways

a. Door swings shall not overlap, conflict or otherwise interfere with use of adjacent doors or other areas requiring access.

b. Door stops shall be provided for all doors. Doors and stops (within 4" of wall face) shall be located at least half of the door width away from the hinges in order to prevent racking of the door frame.

c. Locate doors to accommodate swing, however, if the door swing is less than 180°, a wing wall or other architectural element shall be designed to eliminate trip hazards created by the door stop.

d. Exterior doors shall be out-swinging and protected by a covered walk or canopy with appropriate roof drainage.

e. All exterior entrances shall be designed to allow safe access during stormy weather (rain, hail, ice, etc.) by providing a non-slip, code-compliant, sloped-for-drainage walking surface.

f. Exterior balcony entryways:

1. Provide security at entries to balconies to prevent unauthorized access when school is closed.
2. Provide slopes and drainage means for washing down of balconies.

g. At all major or frequently used entries, including doorways directly from the outdoors to any habitable school room, provide walk-off mats to reduce the amount of dirt, dust, pollen and other particles entering the building. Walk-off mats shall be securely adhered to the floor.

h. Configure major entry approaches to channel foot traffic away from dirt and grass areas for at least the last fifteen to twenty feet prior to entering the building.

i. Do not provide glazed openings in exterior doors, unless glass light is adequately protected with a security screen.

j. Provide concrete slab or equivalent surfacing outside of all exterior doors, of width sufficient to take doorstop when door is opened 180 degrees against building wall.

k. Door frames and cased openings shall be hollow metal.

l. Use solid-core wood doors at interior and overhead-protected exterior openings, except where fire-ratings require hollow-metal doors. Do

not use hollow-metal doors for classroom doors in one-hour fire-rated walls.

m. Use insulated hollow-metal steel doors at unprotected or minimally protected exterior openings, and where fire-protection rating requires them.

n. Use paint-grade doors, except in areas of low abuse with special design conditions (administration areas, for example) where stain-grade may be used.

o. Double doors at building exteriors shall have a removable center jamb for more secure engagement of the locking mechanism.

p. Interior double doors should not have a removable center jamb.

q. Panic hardware on wood doors shall be surface mounted with no bottom rod.

r. Plan doors to avoid interference with drinking fountains, downspouts, light fixtures, walk ramps, and other components or equipment.

s. Do not locate exterior doors adjacent to windows or window areas that can be broken to provide access to door hardware.

t. Provide bug sweeps on doors to food preparation areas.

u. Do not use electric door openers for ADA accessibility without prior District approval in writing.

v. The District "Guide Specification" for finish hardware is extremely comprehensive and must be edited carefully by an experienced hardware specifier for each project. Contact the District authorized representative to obtain the manufacturer of the lockset cylinder that will be furnished by the District for each project.

w. For parking structure doors see Section 2.3 - D "Parking Structure Security".

8. Windows and Openings

a. Windows shall be aluminum or steel.

b. Use of Hollow-Metal (HM) windows is not acceptable for exterior use due to districts experience with HM window leaks. HM windows are acceptable in interior applications only.

c. Windows preferably shall be double-hung, single-hung, or projection type.

d. Projection windows shall **not** intrude into circulation areas to cause a hazard.

e. Provide a minimum of one operable 30"-wide window in each classroom that can be used both for emergency ventilation and for emergency egress. This window shall have a minimum clearance opening of 6 square feet. Maximum sill height for egress window shall be 44 inches above interior finish floor. Emergency exit windows shall not be projecting type.

f. Provide roof-top anchors to support window-washing equipment for washing of windows above the second floor, unless it can be demonstrated that windows can be safely washed from inside or via an

extension ladder. They **must** be provided for buildings higher than four stories or 48 feet above exterior grade (Title 8, General Industrial Safety Order).

g. In all schools, the minimum window sill height shall be 3'-0" above floor for classrooms located above first floor.

h. Do not use large glazed openings. Whenever glazed openings are used the maximum thickness shall be ¼" insulation glass and shall not exceed 48"x72", and 150 pounds for a single piece of glass.

i. Security: All windows accessible from the exterior shall have special security measures to prevent building access by breaking glass and entering through the window or by reaching door or window hardware. Accessible windows include any windows with bottom sills less than ten feet above grade, balconies, roofs with any portion lower than ten feet, or other access points.

1. All panels of security screen shall be operable to allow window cleaning. One of the security screen panels should coincide with the window emergency egress.
2. Operable windows with latching mechanism shall be protected to prevent vandalism and entering.
3. Avoid use of storefront type window systems where they are susceptible to vandalism. Where used, coordinate the storefront mullions next to doors requiring room identification. Signage so that mullions do not interfere with the required accessible sign mounting location.

j. Do not locate windows or sidelights within reach of door hardware.

k. Glazing: To optimize both daylighting and energy conservation, use monolithic ¼ -inch glass with a Visible Light Transmittance (VLT) of approximately 65% and a Solar Heat Gain Coefficient (SHGC) of approximately 0.50. (These glasses typically have a blue-green tint.) Other glazing combinations may be considered by the District if they can be justified with life-cycle cost and energy savings. Glass color is limited to: arctic blue, solex, light gray 14, light gray 31, solar cool bronze, and standard gray.

l. Storefronts: Avoid the use of storefront type window systems where they are susceptible to vandalism. Same as i.3.

m. Do **not** use insulating glass (dual- or triple-glazed) without life-cycle-cost and energy-saving justification and District approval. The maintenance cost for replacement is excessive.

n. If justified by acoustic considerations, laminated glass may be used. Do not use thermal insulating dual glazing for noise abatement – it doesn't work. Special acoustical glazing may be used where needed and must be designed by an Acoustical Consultant.

o. For daylight factor required in classrooms see Section 2.4, **"Environment and Sustainability"** of this guide. To achieve specified daylight factor, it may require both high windows and interior and/or exterior light shelves (to reflect daylight onto the ceiling and to block direct sunlight on desktops). Exterior light shelves must be designed to prevent bird roosting.

p. Stops shall be removable only from interior using vandal proof screws. Exterior stops shall be integral with frame.

q. Screens shall be mounted to the inside of windows.

r. Insect screens must be installed on all operable windows in food preparation areas.

s. For light control, provide room-darkening venetian blinds on all classroom windows, multi-purpose, library and other spaces with windows to be used for video presentations Provide motor operated blinds for high windows and clerestory windows.

t. For most classroom HVAC systems, a large, louvered air-relief opening must be provided in the exterior wall of each classroom (and sometimes a smaller outside air intake opening). These openings must be recognized, and incorporated into the design of the façade. (Ducting classroom air relief to exhaust fans is not acceptable, both for energy efficiency and acoustical reasons.)

9. Acoustical Ceilings

a. Sound absorption provided by ceilings is the major provider of reverberation control in classrooms and other spaces. In addition, ceilings provide a major part of the illumination in classrooms and other spaces with indirect lighting. These factors influenced the selection of the following criteria, and must be recognized in the design of instructional spaces.

b. In most classrooms, 90% to 100% of the area has a suspended acoustical ceiling. The ceiling tiles in classroom ceilings shall have the following characteristics:

1. Noise Reduction Coefficient (NRC): **0.70**
2. Light Reflectance: **0.84**

c. In classrooms that do not have suspended acoustical ceilings, provide equivalent sound absorption by other means.

d. Suspended Ceiling Construction:

1. Provide seismic bracing for all suspended ceiling grid components and lighting fixtures.
2. Provide adequate clearance for all beams, piping, cable trays, ducts, and fixtures located above suspended ceilings.
3. Provide adequate clearance for maintenance and repair of utility system components and support elements located above suspended ceilings.
4. Ceiling tiles that provide access to serviceable equipment shall be appropriately marked with a tab or other indicator.
5. All wiring above ceilings must be in raceways, except that low-voltage wiring may be supported by hangers in an organized manner – not on the ceiling grid.

10. Finishes

a. Exterior stucco or similar finishes that are accessible from grade or are otherwise graffiti-susceptible shall be painted to match integrally colored stucco and separated by control joints so that each area does not exceed 144 s.f., per Plaster Institute's recommendation. Also, so that each area can be easily repainted to cover graffiti and that slight differences in paint color will not look patched. Plaster finish shall not be heavily textured. Light to medium dash or fine sand float are preferred. Very smooth, steel troweled finish is not permitted. CBC accessibility regulations require that wall surface adjacent to handrails be free of sharp or abrasive elements.

b. The basic flooring material shall be vinyl composition tile (VCT).

c. Provide carpet appropriately only at administration and kindergarten areas.

d. Provide ceramic tile floors and wainscots at major restrooms. Ceramic tiles shall be extended up to the ceiling in Middle School and High School boys and girls restrooms. In Elementary Schools the wainscot shall be extended to the top of partitions.

e. Provide quarry tile floors and base throughout food service areas

f. In corridors finished with drywall, provide abuse and impact resistant gypsum board.

g. For ceilings over 10'-0" in height, lay-in acoustical panels shall be limited in size to 4 square feet.

h. Provide clips for acoustical ceiling panels. Do not use acoustical tile in toilets and stairways.

i. For VCT flooring in instructional areas and corridors, use medium color and tone (light colors are difficult to maintain).

j. To comply with the District's lighting standards, provide reflectance values of 85% for ceilings, 60% for walls, and 20% for floors.

k. Provide gypsum panel sheathing substrate for installation of exterior Portland Cement Plaster, except where plywood sheathing is being used for structural reason.

l. Provide 4'-0" high ceramic tile wainscot on walls adjacent to the sink in the hopper room.

m. Ceramic floor tiles shall be set on mortar bed. Ceramic tiles in restroom walls may be installed on cementicious backer board, however, in wet areas (such as showers) the ceramic tile walls shall be installed on mortar bed.

n. Shower Rooms – Walls shall be ceramic tile over full grout bed. Ceiling shall be ceramic tile or cement plaster with smooth finish.

o. Locker Rooms – Walls shall be CMU, cement plaster, ceramic tile or high impact / abuse resistant gypsum board. High impact / abuse resistant gypsum board only needs to be in exposed areas and not behind lockers.

p. Locker Rooms - Floor shall be concrete with non-slip, non abrasive finish with sealer coat.

11. Colors

a. Because the classroom becomes a background for the display of students' work, color schemes should be simple and minimal.

b. In general, limit the number of interior paint colors to six for smaller schools. In individual classrooms, limit the number of different paint colors to two, and the number of different classroom color schemes to two or three.

c. When using bold colors, limit them to trim or accent features.

d. In selecting colors of factory-finished items, such as folding partitions, use reasonably neutral colors to allow flexibility for future color-scheme changes.

e. Ceilings, in general, shall be white, and especially in classrooms, restrooms, and similar rooms.

12. Specialties

a. Casework shall conform to the Architectural Woodwork Standards adopted by Woodwork Institute (WI).

b. In display cases, avoid large glass sizes at hazardous locations, or glass below 3'-0". Display case doors shall be laminated glass without frames and provided with locks. Provide illumination of display cases.

c. Ensure that mirror heights are proper height for various areas and grade levels.

d. Provide a large directory board with map at or near main entry. Show layout of buildings, offices and special facilities in order to orient school visitors.

e. At all building entries provide walk-off mats as Indoor Air Quality (IAQ) measure to reduce source pollution. Walk-off mats shall be securely adhered to the floor.

f. Provide full height corner guards to protect corner edges of interior corridors, stairways and high abuse areas. Corner guards shall meet flame spread requirements.

g. Dimensions for knee clearance in counter-mounted sinks with cabinet doors concealing the accessible knee space must account for protrusions of surface mounted hinges and cabinet latches, where they occur.

13. Special Construction

a. Gates that require panic hardware shall be at least 7'-0" in height and shall have coverings to prevent easy access to panic device from locked side of gate.

b. Roof access shall be provided from interior spaces, not by exterior ladders.

14. Conveying Systems

a. Elevators shall comply with Access Compliance requirements usually adjacent to all required stairways.

b. Except as required for the elevator itself, no electrical, plumbing, or mechanical items shall be housed in elevator shaft, pit, or machine room.

c. Design pit to prevent water from entering through walls or floor.

d. In pits over 36" in depth, a permanently installed galvanized steel ladder is required.

15. Fall Protection

a. Design fall protection systems as required by code and CAL OSHA to eliminate fall hazard.

b. Protection system shall include but not limited to stair floor openings, ladder floor opening, roof hatch, skylights, etc.

c. Consider solutions for normal maintenance tasks on canopies, lunch shelters, covered walks, and the like.

C. MODERNIZATIONS AND ALTERATIONS

1. General:

a. In all work at existing facilities, it is critical to visit the Site and to assess existing conditions. Field verify accuracy of any Record Documents or As-Built Documents, to the extent possible, prior to commencing the work.

b. Existing wood door frames may remain in corridors with automatic fire sprinkler systems. If fire sprinklers are not used, replace wood frames with hollow metal frames designed so that rough opening does not have to be reframed. Door opening may have to be widened to meet ADA requirements.

2. One Hour Corridor Requirements:

a. In major alteration projects to existing schools, exit corridors must be brought into compliance with current code requirements for one-hour construction.

b. Existing wood door frames may remain in corridors with automatic fire sprinkler systems. If fire sprinklers are not used, replace wood frames with hollow metal frames designed so that rough opening does not have to be reframed

3. Exit Stairs

a. Interior stairways serving three or more floors shall be enclosed in one-hour fire rated construction.

b. Existing open exterior stairs shall be reviewed with DSA to develop acceptable methods of compliance.

c. Fire sprinkler systems for the entire building may be an acceptable substitute for stair enclosure.

4. New Suspended Ceilings

a. Where new suspended ceilings are provided in existing corridors or classrooms, the method of installation must be clearly detailed and acceptable to DSA.

b. If the existing ceiling is part of one-hour fire resistive construction, penetrations or partial removal must maintain one-hour construction.

c. Verify that existing construction will support new ceiling and lighting fixtures.

d. Provide structural support for all new ducts, piping and air conditioning equipment.

5. Coring or Saw-Cutting Existing Concrete and Masonry

Responsible structural engineer shall approve locations of core holes or saw-cut openings in walls or floors of existing concrete or masonry structures for alteration work, air conditioning ducts, fire sprinkler piping, or other work.

6. Air Conditioning Units Above New Ceilings

a. Where air conditioning units are concealed above new ceilings, provide service access.

b. Coordinate size, location and type of access panel with location and requirements of air conditioning unit specified.

c. Access for filter replacement or other frequent service, should be hinged panels or lay-in material less subject to damage than acoustical ceiling panels, such as perforated metal panels. (Occasional access may be through acoustical lay-in panels in a suspended T-bar grid ceiling.)

D. HISTORIC PRESERVATION

a. Retain and preserve the historic character of a building, structure or site.

b. Distinctive architectural features or examples of skilled craftsmanship that characterize a building shall be treated with sensitivity.

c. Reinforcement required for structural stability or the installation of life safety or mechanical systems shall be concealed.

d. Surface cleaning of historic structures shall be undertaken with the gentlest means possible. Avoid sandblasting and chemical treatments.

3.2 CIVIL ENGINEERING

A. GENERAL REQUIREMENTS

B. DEMOLITION

C. GRADING

D. PAVING

E. STORM AND SANITARY DRAINAGE

F. WATER DISTRIBUTION

G. FENCING, WALLS AND GATES

H. OFF-SITE CHECKLIST

CIVIL ENGINEERING

A. GENERAL REQUIREMENTS

1. The civil-engineering site design and documents must realistically implement the provisions of the overall site design, integrating the requirements of buildings, walls and fences; grading and paving; storm-water management; utilities (including gas, electrical and communication network distribution locations); earth and soil requirements (including compaction, modification, topsoil, and mitigation of hazardous ground conditions); as well as all offsite work related to the project, including streets, driveways, walks, utilities connections, and other off-site development.
2. All such work shall be clearly delineated, located and dimensioned (horizontally and vertically) to the appropriate site reference, as part of the work of this discipline, and all utilities points-of-connection (POC) clearly shown and located..
3. Work shall be performed and systems installed in accordance with the current California Building Code (CBC – part of California Code of Regulations, Title 24), California Plumbing Code, District "Guide Specifications," other chapters of this "School Design Guide," and District Standard Technical Drawings. Coordinate especially with utilities criteria of chapter "3.4 Plumbing."
4. The District will provide the Architect-Engineer with a current site boundary and topographic survey, with encroachments, and including adjoining streets and properties and on-site and public utilities line locations, sizes and elevations. Other site plans or site information that may exist is available in the District office for consultants' research. The Architect must visit the site to verify the indicated information and to obtain information not indicated on the drawings.
5. Off-site work or work within easements shall be designed in accordance with the requirements of the agency having jurisdiction. The work shall be shown as part of the construction documentation and shall include all project-related off-site improvements, such as curb cuts, turnout lanes, signage, utilities connections, and all other such work.
6. Refer also to sections of this "School Design Guide" on Plumbing, Fire Protection, and Planting and Irrigation.

B. DEMOLITION

1. Demolition work must be documented as a separate contract item, with a separate and complete package of bidding and contract documents.

2. Coordinate any demolition or relocation of existing improvements, such as fences, walls, structures, etc., that are encroaching into the District property, with the District representative who will request the Real Estate Section to obtain necessary permits from adjacent property owners.
3. Provide temporary fencing to secure property boundaries wherever work might breach closure of adjacent property.
4. Investigate existing conditions to assure that full extent of demolition work is included, especially with regard to sub-surface conditions such as concrete paving overlain with asphalt, building basements, foundations of demolished buildings, and utilities lines. If existing data is insufficient, request pot-holing or other investigation from the District.
5. Clearly identify and define in the demolition documents all existing site features (structures, walls, fencing, walks, pavements, site utilities, plants, terrain, etc.) that are (1) to remain, with defined protection measures, and (2) to be removed, with the required disposition and responsibilities for removal and/or relocation.

C. GRADING

1. For ease in staking and construction, grade with uniform planes (not warped surfaces) and minimize grade changes.
2. Slope all areas for drainage. Slope walks, stairways, ramps, and other surfaces away from buildings.
3. Slope planes for drainage typically between 1% and 2% with 1.5% considered optimum.
4. Other slope standards are:
   a. Within building areas, 1.5% - 2.0%.
   b. Within play areas, 2% maximum, with 1% considered optimum.
   c. Entrance walks and ramps (along accessible route): shall be between 5% and 8.33%. However, if the space allows, reduce slope as much as possible, or design grading and slope to avoid the need for ramp.
      1. Handrails with landing extensions are required at ramps.
   d. Driveways: 15%, with vertical curves of 10 feet at top and 5 feet at bottom of ramp.
   e. Slope along sliding gate: 2% maximum, for chain link gates. Steel and wrought iron gates shall be set no more than 1/2% slope.
   f. Walks, porches, study terraces, etc.: Crossfall of 1% to 2% maximum.
   g. Door landings, paved lunch areas, and similar areas: ½% to 2% maximum. Shape planes to accommodate tables and benches.
   h. Agricultural Areas: 1/2 % minimum.
   i. Asphalt paving flow lines: 0.75%. If less, use concrete gutter flow line with minimum slope of 0.4% (do not use in striped play areas).
5. Slope play fields and play areas as follows (see also District standards for playfields):
   a. Turf or lawn areas: 1/2% minimum, 2% maximum, 3/4% optimum.

b. Concrete tennis courts: 0.83% to 1% maximum, in one plane only, preferably from side to side.

c. Handball courts: 0.5% to 1% maximum, in one plane only (when necessary).

d. Infield of High School baseball and softball diamonds: 1/2% maximum. Baseball pitcher's mound: 10" above home plate. (Locate drainage structures to minimize hazards to players.)

e. Track and Field Areas: Maximum inclination for tracks, runways, circles, and landing areas for throwing events: not over 1:100 in a lateral direction and 1:1000 in the running or throwing direction. For high jump: not over 1:250 in the direction of the center of the crossbar. See IAAF Rules for other track dimensions and information.

6. Slope banks as follows:

a. Planted banks 2H to 1V (50%) maximum.

b. Paved and gunite banks 2 to 1 (50%) maximum with special exceptions permitted.

c. Lawn areas 15% maximum.

7. Provide protective fencing and an 18-inch minimum shoulder at tops of banks sloping steeper than 10%.

D. PAVING

1. Provide paving, base and sub-base preparation as recommended by the Geotechnical Engineer. Refer to District "Technical Standard Drawings."

2. Paving minimum standards include:

a. Playgrounds (new construction): 2 inches asphaltic concrete over 4 inches select base course.

b. Playgrounds (resurfacing): 2 inches asphaltic concrete over 3 inches select base.

c. Service Roads: 4 inches asphaltic concrete over 4 inches select base.

d. Parking Area: 3 inches asphaltic concrete over 4 inches select base.

e. Trash Pick-up Area: 6 inches reinforced concrete over 4 inches select base.

f. Sidewalks: 4 inches unreinforced concrete.

g. Banks: 2 inches asphaltic concrete over compacted sub-grade.

3. Provide for the special paving requirements of bus-loading zones, truck loading and dock areas, trash pick-up areas, and fire lanes.

4. Pave parkways and narrow strips adjacent to sidewalks at property lines as concrete sidewalks.

5. Separate asphalt paving from planting or turf areas with a reinforced concrete mowing strip minimum 6" by 8."

6. Provide driveway approaches in accordance with commercial driveway requirements of the local governing jurisdiction, with minimum width of 20 feet.

7. Provide integral curb and 2'-0" gutter on service roads within bus unloading area.
8. Provide paving of full width and turning area needed for all delivery trucks and trash pick-up vehicles. Also, check width of drive aprons providing access to these areas. Provide turn around area for vehicles, if required.
9. Provide 4-inch wide striping for parking stalls and other roadway markings. Mark fire lanes in accordance with the local Fire Marshal's requirements. See District's "Standard Technical Drawings" for parking layouts.
10. Provide ramps for sweepers and mowers to reach raised areas.
11. Lunch shelter area, arcade and all lowered walkways shall be concrete.

E. STORM AND SANITARY DRAINAGE

1. Design site for maximum retention of storm water run-off, within the general limits of other design guidelines and code requirements. Use surface drainage to the maximum extent reasonable. See District's Post Construction Storm Water Management Plan (BMP Selection White Paper) and accompanying Check List for guidance. See **"Section 3.4, Plumbing"** of this School Design Guide for additional criteria.
2. Areas with disturbed soil over 1 acre, parking lots of 5,000 square feet or more, or with 25 or more parking spaces, and exposed to storm water runoff, shall be designed to meet the intent of the Standard Urban Storm Water Mitigation Plan (SUSMP) for Los Angeles County. SUSMP mitigation measures include infiltration of runoff before it reaches the storm drain system, treatment of runoff to remove oil and petroleum hydrocarbons before it enters the storm drain system, and control of peak flow discharge to provide stream channel protection. For provision of these measures plans, calculations, maintenance requirements must be included in the Design Development phase, and details of the mitigation facilities included in the Construction Documents including the documents needed for SWPPP sections (e.g. section 500.6)..
3. For sanitary sewers show fixture units at building and street points of connection. Size sewer lines per code prescriptions, or provide hydraulic calculations.
4. Surface Drainage:
   a. Direct sheet flow from paved areas onto planted areas.
   b. Direct roof downspouts into planting areas (via splash blocks) where feasible, onto paved surfaces only when the flow does not adversely affect pedestrian traffic.
   c. Locate flow lines to avoid concentrations on pedestrian walks.
   d. Locate flow lines to avoid sand boxes, tree wells, playground equipment and other objects that might obstruct drainage flow and cause ponding.
   e. Do not drain from planting areas across paved areas.
   f. Do not drain over public sidewalks. Avoid concentrated flow over driveways and pedestrian walkways.
   g. Do not drain over planted or unpaved banks.

h. Do not drain through or over roofed areas, electric or communication vaults, walk-off mats, or other similar functional areas.

i. Intercept off-site drainage to prevent it from flowing across site.

j. At interior courts or sump areas near buildings, provide for surface overflow from the court that is 3 inches or more below finished floor elevations to avoid flooding if catch basins are blocked.

5. Catch Basins, Floor Drains and Culverts:

a. Select catch basin grate to withstand the load to which it will be subjected; otherwise use lightweight grates and frames. Grate openings: ½ inch maximum.

b. Offset a catch basin from main storm drain line to minimize its size and depth, and to minimize blockage of system (i.e., no in-line "flow-thru" type catch basins).

c. Use cast-in-place or precast concrete catch basins.

d. Maximum depth of catch basin: 30 inches, unless specific project approval given in writing by the District.

e. Use rectangular cast-iron or fiber-cement pipe culverts under walks in place of formed concrete structures. Provide minimum 4-inch thick concrete encasement, but with 2 ½ inch cover under walks. Calculate size for flow.

f. Do not locate catch basins in the middle of play yards, pedestrian pathways, or close to playground equipment.

g. Use trench drains only when required; for example, at parking structure entrances.

h. In trash-disposal areas and open lunch areas, provide floor drain and sediment buckets to collect storm and wash-down water. Locate drain next to hose bibb and provide dual drainage, with a diverter valve to flush wash-down water to sanitary drain and storm water to storm drain. (See District "Standard Technical Drawing.")

i. In covered lunch shelters, provide floor drains with no trap primers.

j. Avoid locating drains and swales in the accessible parking areas and path of travel. If this is unavoidable, the grates shall be oriented 90 degrees to the direction of travel, or should be multi-directional if there is no predominant direction of travel.

6. Underground Drainage:

a. Storm drain pipe shall be concrete (CP), reinforced concrete (RCP), ductile iron (DIP), cast iron (CIP), or high-density polyethylene (HDPEP).

b. Design drainage structures and piping systems based on hydrologic and hydraulic calculations, with minimum flow velocity of 3 feet per second.

c. Provide capped stub-outs for drains in new construction to accommodate future construction based on the Master Plan.

d. With less than 1'-0" of cover over top of pipe, encase pipe in concrete or use iron pipe.

e. With less than 1'-0" of cover over top of pipe in vehicular traffic areas and in asphalt paved areas, encase pipe in concrete, reinforced as necessary to support imposed loads.

f. Food waste drainage from wash-down in lunch shelters must flow into sanitary sewer. Rainwater from roof covering lunch shelter must flow into storm drain system. Site drainage shall be designed such that, the flowing site drainage water does not run through the lunch shelter and the outdoor eating areas.

g. Drain trash enclosure through pipe to storm drain system and to sanitary sewer (using dual drainage valve system described above).

h. Install cleanouts at maximum spacing of 100 feet in straight runs and at each aggregate change of direction exceeding 135 degrees. A catch basin may substitute. Install cleanouts in yard boxes.

i. Where transition is made from round pipe to rectangular pipe, provide cleanout hand hole or manhole for maintenance purposes.

j. Depths of sanitary sewer lines below finished grade shall be not less than 12 inches and not less than 6 feet at property lines. (Use greater depth if service to future buildings should require it.)

F. WATER DISTRIBUTION

1. Meter Protection

a. An approved reduced pressure principal backflow assembly shall be installed at service connection to any domestic, fire, or irrigation services.

b. All schools located in Los Angeles Water & Power service area shall comply with the requirements of water service rule 16-D.

2. Water Service:

a. At new facilities, provide one meter each for domestic water, fire-protection water, and irrigation water service. (See **"Plumbing"** and **"Planting and Irrigation"** sections of this guide book for gas piping and other related criteria.)

b. Contact water supplier for main, pressure and flow information.

c. Meter locations must be approved by the District and the water supplier. Indicate meter locations at curb.

d. For domestic water services that require any of the following component devices: Service Control (shut off) valve, strainers, pressure reducing valves, backflow prevention assemblies, etc., said devices shall be installed as follows: Group component devices into a dual (parallel) configuration to avoid service interruptions during testing and servicing of devices. Devices shall be designed and installed in an above ground, compact, low profile and serviceable valve station.

e. Meter assembly and details must conform to District "Standard Technical Drawings."

3. Piping and Design

a. Provide a water-load schedule for each meter including existing, new and future load in fixture units and gpm. Coordinate with the plumbing engineer.

b. Provide hydraulic calculations for water distribution system. Show water demand and residual pressure at building and street point of connection.

c. Where pressure-reducing valves are required, coordinate location with plumbing engineer and with the District.

d. On domestic water service provide tandem installations of pressure regulators, backflow preventers and strainers, to avoid shut-down during testing and servicing of equipment. See Standard Technical Drawings.

e. Provide thrust blocks and ties for bell-and-spigot piping.

f. Before specifying piping, review corrosivity of soil with the District's soils report to verify appropriate pipe material selection.

g. Wherever pipe-and-valve assemblies are exposed above grade, provide a secure locked enclosure to protect them from unauthorized use or vandalism. These may be walls, fences, or manufactured enclosures that are made for this purpose.

G. FENCING, WALLS AND GATES

1. Provide full perimeter fence enclosure for school campus.

2. Provide full perimeter fence enclosure for all parking areas.

3. At adjoining residential areas, provide CMU walls.

4. All CMU walls, shall be painted.

5. Fence, wall and gate dimensions:

a. Perimeter and parking area walls and fences: 8'-0" height.

b. Interior security fences: 8'-0" height.

c. Interior playground fences: 4'-0" height

d. Pedestrian gates: 4'-0" width in 6-foot or higher fences.

1. All accessible gates on an accessible route shall have required level landings on each side of the gate with 2% maximum slope in any direction.
2. Gates shall conform to CBC accessibility regulations.

e. Drive gates: 20'-0" wide.

f. Tennis court gates: 6'-0" wide (to accommodate sweepers). If this is the only access, it shall meet CBC accessibility requirements.

g. Clearances for all gates and doors shall be according to good industry practice and in no case large enough to permit entry or bypassing security measures.

h. Pool Area: The fence shall be designed and constructed so that it cannot be readily climbed by small children. Horizontal and diagonal member designs, which might serve as a ladder for small children, are prohibited. Horizontal members shall be spaced at least 48 inches apart.

Planters or other structures shall not be permitted to encroach upon the clear span area. Chain link may be used provided that openings are not greater than 1 ¾ inches measured horizontally. The fence minimum effective perpendicular height shall be 8'-0" measured from each side.

6. Design special gates and fencing for main entry to school.

a. Entry Gates and Security Fences shall be designed to maximize security while at the same time enhancing the appearance of the school.

1. If concrete planters or other climbable elements are adjacent to an entry fence or gate, the fence height must be adjusted accordingly.
2. The design of the entry gates and security fences should minimize horizontal bars and low curbs so that they do not provide a "ladder" that allow the gate or fence to be easily scaled.
3. When gates are required to have emergency push bars for exiting, the gates and adjacent fencing must be designed to prevent activation of the push bar from the outside.

7. In general, provide swinging gates rather than sliding. Emergency gates shall be swinging gates. Use sliding gates at drives and for large openings where normally open swinging gates would cause obstructions. Rolling gates must be designed with gate stops to prevent gates from rolling past the mid-closure point and clear of vertical supports. Provide one stop on the track and another welded to the top rail.

8. Provide sliding gates to control pedestrian traffic into field bleacher areas.

9. At tops of banks, set fence line back 18" minimum if bank is paved, and 24" minimum if bank is not paved.

10. Fence service yards. Provide sliding drive gate where possible.

11. Enclose the Trash Yard with solid walls or fencing and gates. Locate it for easy access and trash pick-up, away from student areas, and out of direct view of neighboring property owners.

12. Because of safety and maintenance concerns, motorized gates at perimeter fences are not allowed without prior written approval from the District. Sides of ramps leading to subterranean garages shall be fenced off to prevent access to the rest of campus when the perimeter gate is open.

13. Rolling metal gates shall be engineered to account for its weight, in order to provide safe and smooth operation.

H. OFF-SITE CHECKLIST

1. "Checklist of Off-Site Work, Utilities & Easements" – See Appendix for the list. This list is comprehensive; however, there might be other site specific issues that have to be addressed, such as "specific community plan", landscaping, etc.

3.3 STRUCTURAL

A. GENERAL REQUIREMENTS

B. DESIGN CRITERIA

C. BUILDING SYSTEMS

D. CONCRETE AND MASONRY STRUCTURES

E. FOUNDATIONS AND CONCRETE OR MASONRY ON EARTH

F. STEEL STRUCTURES

G. WOOD FRAMED STRUCTURES

3.3 STRUCTURAL

A. General Requirements

1. The design for structural safety of school buildings in California is governed by the requirements of the Field Act beginning in Section 17280 of the Education Code and the California Building Code, Title 24.

2. The structural engineer shall be responsible for the design, or review of designs, of connections to the basic structure of such building elements as veneer materials, window walls and steel-stud assemblies, decorative block screens, mechanical and electrical equipment and components, library shelving, and similar items.

3. Testing and Inspection (T&I) shall meet the requirements of Title 24. After plans are approved by DSA, submit one copy of the DSA Tests and Inspection List to the District's authorized representative.

4. Assure that provisions are made for seismic anchorage or bracing of all building elements and equipment, including Owner Furnished equipment.

B. DESIGN CRITERIA

1. Codes:

a. The governing building code for structural design is the current edition of the California Building Code (CBC -- part of the CCR, Title 24, California Building Standards Code), with modifications by the Division of the State Architect/ Structural Safety Section (DSA/SS) for school design and construction.

2. Design Criteria:

a. The requirements of the California Building Code and DSA shall govern except where specifically defined below.

b. Deflection: Maximum allowable deflection for structural members shall be that defined in the CBC, except as follows:

1. To reduce long-term deflection and cracking of finished surfaces, where floor members of engineered-wood support floor finishes of ceramic tile, terrazzo, or similar materials, maximum deflection shall be limited to l/540.

c. Roof design loads shall provide for the weight of one re-roofing if the roofing designed can be re-roofed without removing the original roofing.

d. Indicate on plans key design criteria used, including Code edition, seismic design factors, and soil profile type.

C. BUILDING SYSTEMS

1. The following criteria and suggestions reflect policies and preferences of the District derived from experience with economy and durability. Exceptions may be made with justification and specific authorization of the District's Project Manager.

2. The structures of all buildings, including non-bearing partitions, shall be of incombustible materials. Wood structures may be acceptable for one-and two-story primary and elementary schools and additions, but with special permission in writing from the District.

3. Three-story and higher school buildings, and all middle and high school buildings, shall be steel framed with floors of concrete on metal deck supported by composite beams, or of reinforced concrete. The lateral force resisting system should be the most effective structural systems allowed by code.

4. Gyms and auditoriums preferably should have masonry or concrete walls and steel-framed roofs with steel decking without concrete fill.

D. CONCRETE AND MASONRY STRUCTURES

1. Use a minimum concrete ultimate compressive strength of 3000 psi at 28 days.

2. Concrete mix design must comply with CBC Section 1905A.2.3; Method B is commonly used for typical school building projects.

3. Specify size of aggregate and slump. Use 1-inch or ¾-inch minimum aggregate size, with smaller sizes only in very special cases.

4. Control cracks in concrete by joints, construction joint separations, and other means.

5. Avoid thin sections or projections that may crack off when forms are removed. Chamfer column corners, exposed corners and edges.

6. Provide typical construction joint locations for concrete beams, joists, and slabs.

7. Provide expansion joints, control joints and seismic-movement joints as required by the design, indicate their locations and details on drawings, and coordinate with architectural enclosures and finishes.

8. Joints must be weather tight and provide lateral stability across the joint.

9. Where a concrete beam is monolithic with a concrete wall and negative beam reinforcing steel is embedded in the wall, include a detail that shows the preferred pour line and alerts the contractor not to pour wall without negative reinforcing in place.

10. Indicate openings, depressions and curbs on structural floor and roof plans. Curbs must be a minimum of 5" wide if located under walls. Coordinate depressions in slab for wheelchair lifts, if in the scope of project.

11. Maintain a full depth of slab under depressions for ceramic tile, electric ducts, or other construction.

12. Provide a typical column drawing indicating bar maximum slopes, locations of splices, and reglets for shear-wall reinforcing.

13. When setting a rail post use non-shrink grout or equivalent ("Por-Rok" but not sulfur). Provide a #4 bar on each side of post in concrete.

14. If wood or steel studs are used in concrete buildings, indicate clear relationship between "face of concrete" and "face of studs".

15. In masonry walls, base dimensions on modular size of the unit.

16. In concrete masonry walls, fill all cells except on free-standing site walls retaining no earth. Avoid bars larger than #8.

17. Clearly show the minimum concrete cover required for the intended fire protection rating.

E. Foundations and Concrete or Masonry On Earth

1. The structural engineer shall visit the site and visually confirm the existing conditions as represented on the survey and geotechnical report. (Include the geotechnical engineer's name and report date on drawings.)-

2. Provide special recommendations for dealing with expansive soils beneath the structure.

3. Foundations of buildings must not be partly on fill and partly on natural grade. Make clear on drawings all areas of fill.

4. Show bottom of footing elevations on foundation plan, including building walls, columns, flagpoles, lighting structures, retaining walls, etc.

5. Provide structural elevations and details of all retaining walls and site walls over 3'-6" high showing bottoms of footings, steps, joints, sleeves and drainage. Footings may be sloped 5% maximum to avoid steps.

6. For building walls that retain earth, use a minimum thickness of 10 inches and provide waterproofing and drainage outside the walls. Coordinate

structural design with waterproofing and sub-drain design to assure water resistance.

7. Retaining walls higher than 12 feet as measured from the top of the foundation shall be designed to resist the additional earth pressure caused by seismic ground shaking.

8. Floor slabs on grade shall be 5-inch thick minimum reinforced with #4 bars @ 24" o.c. each way.

9. For floor slabs on grade that will carry interior floor finishes, provide a vapor barrier. See "Architectural" section for requirements.

10. Utilities trenches that impact foundations shall be recognized in design and shown on structural drawings. Backfill trenches below footings with controlled compacted fill or, if not more than three-feet deep, with lean concrete.

11. Requirements of the paragraphs on "Concrete and Masonry Structures" also apply.

F. STEEL STRUCTURES

1. Provide top-of-steel elevations at each column and change of level on structural drawings for ease of reference by steel detailers and erectors.

2. For exterior steel work specify sections with a thickness of ¼" or greater.

3. Indicate required camber on all tapered steel girders and steel trusses.

4. Keep steel floor beams to L/d equal to or less than 24.

5. Provide erection bracing for tapered girders. Web thickness for all built-up sections shall be at least 3/16". Provide flange to web welds to comply with AISC Specification. Use stiffener plate welded to top flange and to web where ridge occurs.

6. Comply with maximum width-to-thickness ratio requirements of AISC for projecting elements under compression. Apply requirements to railing parts.

7. Field weld or use cadmium plated counter-sunk flat head machine screws, to prevent warping in galvanizing bath.

8. Specify cost effective size, length and type of welds. Use standard weld symbols and consider fillet welds where adequate.

9. Make groove welds "full penetration" on structural welds such as tapered girder flanges.

10. On welded assemblies to be hot-dip galvanized, avoid shop welding large areas, such as stair platforms, to prevent warping in galvanizing bath. Field

weld and retouch galvanizing, or use cadmium plated counter-sunk flat head machine screws for field assembly.

11. Do not support steel members with wood columns.

12. Provide means of leveling for base plates, such as double nuts on anchor bolts.

13. Avoid steel joists. (Because of DSA's special testing and inspection requirements, most steel joist fabricators will not bid DSA jobs.)

G. WOOD-FRAMED STRUCTURES

1. Provide camber in structural members in accordance with DSA requirements. Use a stiffer member in preference to using excessive camber.

2. No horizontal member depth to thickness ratio shall exceed 7.

3. Bottoms of sills on exterior foundation walls shall be not less than 12" above finished grade.

4. Standardize hold down bolt sizes.

5. Structural I plywood is preferred. Use at least CD Grade with exterior-type glue.

6. Provide drawings of wall elevations to indicate typical framing. Provide special framing elevations where large openings occur, where columns pass through wall plates, or where framing is otherwise complex.

7. Provide complete roof framing plans showing walls. Clearly indicate corner framing and slope of roof.

8. Stud walls or partitions around shower or toilet rooms with more than two fixtures, and stud walls adjacent to exterior ground or paved areas, shall bear on concrete curbs extending at least 6" above finished floor or paving level. (Curbs and sills must meet DSA's special curb requirements.)

9. On wood-joist floors, provide 2"-thick concrete fill, 6" curbs, and a floor drain on the floor of heater rooms using gas-fired boilers.

10. Use nominal 6" wide studs for walls with the exception of non-bearing walls with no piping.

11. Clearly indicate connection of vertical shear elements to diaphragms. Be sure these shear elements do not produce a high concentration of stress over a small length.

12. Where pipes pass through top plates, provide a detail on both structural and plumbing drawings.

13. Use minimum 1/2" thick plywood for roof sheathing. Indicate stagger of panels required for horizontal diaphragms.

14. Standardize on one or a few bolt sizes. Do not permit a mixture of several tie-down bolts because they can be too easily mixed on the job.

3.4 PLUMBING

A. GENERAL REQUIREMENTS

B. SEWER SYSTEMS

C. WATER SYSTEMS

D. HOT WATER SYSTEMS

E. WATER VALVES AND OTHER DEVICES

F. GAS DISTRIBUTION SYSTEMS

G. COMPRESSED AIR SYSTEMS

H. CATHODIC PROTECTION

I. SEISMIC RESTRAINTS

3.4 PLUMBING

A. General Requirements

1. Plumbing systems shall be installed in accordance with the current California Building Code and Plumbing Code (CBC – part of California Code of Regulations, Title 24), as well as CCR Titles 19 and 8, District Guide Specifications; other chapters of this School Design Guide, and District Standard Technical Drawings.

2. Design systems to be simple, durable, easy to operate and maintain, with ready accessibility for servicing, maintenance and replacement, all in a manner that will avoid interruption of educational schedules during working hours.

3. Contact each utility supplier to determine the requirements for the most cost effective service connection. Provide separate meters for domestic, fire and irrigation water supplies. See **Section 3.2 - "Civil Engineering"** of this Design Guide for additional information relevant to the work of this section.

4. Fixtures must comply with State water conservation guidelines and standards, including maximum flow as follows:

- **a.** Water Closets:1.28 gpf
- **b.** Urinals: 1/8 gpf
- **c.** Lavatory Faucets: 1.5 gpm, or non-water.
- **d.** Showers: 2.0 gpm
- **e.** Kitchen Sink Faucets: 2.0 gpm

5. Student Restrooms:

- **a.** Provide in all student restrooms the following features to reduce maintenance, conserve water and minimize student tampering:
  1. Shut-off valve for all fixtures in each restroom, located above the upper terminal water closet and behind a locked access panel.
  2. Water-saving battery-operated infrared-sensored flush valves, with manual override on all water closets. Infrared sensors must be mounted and adjusted at heights and distances appropriate to the grade level and student height to insure automatic actuation.
  3. Push-button, ADA-metered, self-closing faucets on lavatories.
  4. Hose-bibb with vacuum breaker in recessed box with locking cover.
  5. Floor drains with trap primers with floors sloped to drain.

6. Clean-outs above all urinals, lavatories, and water closets (above upper terminal water closet when there is more than one).

b. Verify that the following are provided and coordinated with plumbing work.

1. Electric hand dryers in lieu of paper-towel dispensers (except in kindergartens and early education centers).
2. A dual GFCI outlet behind a locked access panel.

c. Architectural drawings shall clearly identify the specific age group applicable to each restroom, and at each classroom with accessible sink(s).

1. Accessible features shown on plumbing drawings shall be coordinated with age appropriate areas shown on the architectural drawings.

6. Faculty and Visitor Restrooms:

a. Provide in all faculty / adult restrooms the following features to reduce maintenance and conserve water:

1. Shut-off valve for all fixtures in each restroom, located above the upper terminal water closet and behind a locked access panel.
2. Floor drains with trap primers sloped to drain.
3. Clean-outs above all urinals, lavatories, and water closets (above upper terminal water closet when there is more than one).

7. Conceal and properly secure all piping behind building finishes. Exception may be made in equipment and custodial rooms and CMU or concrete construction. Where necessarily exposed in renovation projects, paint all piping and insulate hot water and condensate piping.

8. All lavatories shall be Cast Iron with acid resistant backed on enamel finish. Vitreous China units are prohibited.

9. All lavatories shall have three (3) holes 4 inches center set faucets. Single-hole configuration is not allowed.

10. Access Panel – Plumbing access panels shall have the same fire rating as the wall, ceiling, or surface they are installed upon. Identify and call out rated panels as such on construction documents.

11. Underground Cleanouts – Underground waste piping with 90 degrees or greater change in direction, shall provide a cleanout to grade.

12. Hopper Sinks – All service and custodial sinks shall be Cast Iron with baked on enamel finish. No other type will be accepted.

13. All urinals shall be non-water type and be equipped with a water supply insert rough-in to the urinal location that would allow a subsequent replacement of the non-water urinal with a water supplied type. Make

provisions for water distribution and fixture supply piping sized to accommodate the water supplied urinal(s). The supply shall be stubbed out of wall with a chrome brass flange and chrome brass IP.S. cap.

B. Sewer Systems

1. Industrial Wastewater Permits must be obtained from the City of Los Angeles Department of Public Works, Bureau of Sanitation, Industrial Waste Management Division, in accordance with the Los Angeles Industrial Waste Control Ordinance for all schools. A permit is required for each point of discharge to the City's sewer system. (For other jurisdictions the local ordinances must be addressed, but the standards required by Los Angeles shall be the minimum standard for all LAUSD schools.

2. Sewer Lines

a. Specify cast iron soil pipe at all following locations:

1. Within the building and 5'-0" outside the building line.
2. Running parallel to and within 2'-0" of any building or structure.
3. Within 20'-0" of any tree centerline.
4. Not less than 1'-0" below finished grade.

b. Provide clean-outs above all urinals, lavatories, upper terminal water closets, and sinks.

c. Provide cleanouts to grade in yard box at:

1. Upper terminal cleanout within 5 feet of building line connection.
2. Every 100 feet or change of direction over 22.5 degrees.
3. At property line connection.
4. Do not provide cleanouts overhead in subterranean parking lots. They are neither manageable nor accessible for use.

d. Provide uniform slope of 1/4" fall per foot whenever possible, but never less than 1/8" per foot.

e. Indicate invert elevations of new sewer lines at buildings, changes in direction, locations where sewer lines join and at property lines. Indicate sizes of existing utility lines on the plans.

3. Private Disposal Systems

a. When private disposal systems are required and programmed, verify requirements with the local health authorities and obtain written approval.

b. Clearly define the extent and locations of system elements.

4. Science Classrooms, Flexible Classrooms and Prep Room/Work Room Wastes:

a. All science, chemistry, flexible science classrooms and science prep/workrooms shall have chemical waste piping.

b. These are defined as chemical or industrial liquid wastes that are likely to damage the public sanitary sewer system or increase its maintenance cost, or detrimentally affect sewage treatment, or contaminate surface or subsurface waters. They shall be pre-treated to render them innocuous prior to discharge to the sewer system unless an approved Best Management Practices program is in effect at the school.

c. Provide an independent waste drainage system to the building exterior for plumbing fixtures in laboratories and associated workrooms which could receive corrosive chemical waste.

d. Piping for this system shall be of corrosion-resistant material as specified in the Guide Specifications – either Type 316L stainless steel or Los Angeles City Test Laboratory-approved CPVC that does not require wrapping pipe in plenums or Polypropylene.

e. Based on science teachers following an approved Best Management Practice (BMP). Do not provide a pretreatment neutralizing tank for Science Laboratory waste. However, provide an easily accessible exterior sampling box, together with accommodations for future addition of a neutralization system, before connection to the public sewer.

f. No chemical vent shall interconnect with vents of other services.

g. Details shall meet the requirements of the Los Angeles City Bureau of Sanitation (see "Industrial Waste Permits" above).

5. Food Service Establishments (FSE's) Waste:

a. Cafeterias shall comply with the City of Los Angeles' Fats, Oil and Grease (FOG) Control Program. Consult and obtain approval of Bureau of Sanitation's (BOS) approval.

b. Grease interceptors shall comply with the City of Los Angeles' Plumbing Code, and must be provided for all grease-producing equipment. (Three (3) compartment sinks, all hand sinks, floor drains, floor sinks, prep sinks and mop sinks within the kitchen preparation area are to be tied to the grease interceptor.)

c. Do not provide garbage disposals in school cafeterias (which are classified as FSE's).

6. Other Special Wastewater Provisions:

a. Other areas requiring special pretreatment of wastewater before discharge into the City sewer system include:

1. Auto Shop floor drains, sinks and cleaning tanks: Oil Interceptor and Clarifier.

2. Auto Wash Rack: Grease Interceptor.
3. Ceramics Room sinks: Solids Interceptor.
4. Film Processing: Neutralization, Silver Electrolytic Recovery Unit, Sample Box.
5. Potting Room sinks: Solids Interceptor.
6. Agricultural Classroom demo table drains: Solids Interceptor.
7. Subterranean Parking Garage Drains to sump pumps: Provide oil and solids interceptors, when required by Los Angeles Sanitation Bureau. Interceptors are not required in garages where hose bibs are not installed. Roof drain lines and downspouts shall not be connected to drains in subterranean structures and sump pump system.

b. Interceptors and separators must be located and installed so they are easily accessible for inspection, cleaning, and removal of intercepted material.

7. Floor Drains, Area Drains and Floor Sinks:

a. Where drains or sinks are required, slope floor to drain at 1/8" per foot.

b. Floor drains with trap primers are required at:

1. Student and Staff Restrooms. One floor drain shall be provided front and center for two or more urinals. One floor drain is required for water closets in all restrooms with an additional floor drain when a total of four or more water closets are provided.
2. Shower and locker rooms and adjacent drying rooms.
3. Custodian closet – locate floor drain near hopper sink.
4. Mechanical Room.
5. Electrical Room.
6. Lunch Shelters. Cast iron with removable basket and hinged self-closing grate. Trap primer is not required since area is washed daily.
7. Uncovered Trash Areas. These areas are required to be provided with a special floor drain system that normally drains the storm water to the storm system, but diverts the drainage to the sewer system when the trash containers are being washed, using a special valve system. See **Storm and Sanitary Drainage** in the **Civil Engineering** section**.**
8. Where deluge showers are installed.

c. Floor sinks with trap primers are required at:

1. Boiler Rooms.
2. Kitchens, at cooking areas and where preparation sinks have an indirect waste drain rather than a direct connection.

3. Coffee urns.
4. Food preparation sinks (minimum 3").
5. Milk-shake machines.
6. Refrigerators of 30-cubic-foot capacity or over.
7. Walk-in cooler and freezer-box drains.
8. Water heater relief valves and hot water storage tank drains. (All water heaters shall be installed with drip pans.).
9. Wherever required by the California Plumbing Code or the Los Angeles City Plumbing Code.

d. Elevator pit drains are not required.

e. Primary condensate drains from HVAC units shall be discharged into a receptor that is approved by code and the local jurisdiction in a manner that is in compliance with the code requirements. The preferred receptors by LAUSD are floor sinks, custodial sinks and lavatory tail pieces. Drywells may be used when the above receptors do not exist in the vicinity. Draining directly into the sewer with air gap fittings is prohibited. Secondary drain pans are required under all indoor HVAC units that are installed above finished ceilings or suspended exposed above occupied spaces. These drains are required to discharge at locations where the discharge will be noticed so that service personnel could be notified to fix the clogged primary drains. The point of discharge should be above a sink if available and if not, direct the discharge away from locations where it may cause harm to students and damage to electronic equipment, and books. Also, provide high condensate level unit shut-off switches to prevent or minimize drainage from secondary pans. In addition provide freeze stats for DX equipment.

f. Provide brass union with 6" brass nipple at condensate drain pipe connection, if steel meets copper.

g. In the subterranean parking garage, provide an adequately sized emergency drain for every 4000 square feet. Within ten feet around each floor drain provide 1/8"/ foot slope of drain.

8. Combination waste and vent systems shall be used only where structural conditions preclude installation of conventional systems and when permitted by the District.

a. Use only with clear liquids and not on kitchen sinks, lunch shelter floor drains, or for any contaminated wastes.

b. Provided adequate vents to ensure free circulation of air. Any branch more than 15'-0" in length shall be separately vented.

c. Waste and vent pipes shall be oversized to assure full venting.

d. Vent connection shall be downstream of last fixture.

e. No water closet or urinal shall be installed on any combination waste and vent system.

9. Waste Piping Traps – All parts of traps shall be Cast Brass with polished Chromium plated finish. Tubular traps are not allowed.

Exception: Concealed traps and 17 gauge tailpieces may have rough brass finish, unless noted otherwise.

C. WATER SYSTEMS

1. Water Service:

a. Coordinate with civil engineer to define and request water service from the utility supplier. See **Section 3.2, Civil Engineering** of this Design Guide.

2. Design Criteria:

a. Provide water service to all fixtures and outlets, designed in accordance with National Bureau of Standards Reports 66 and 79 with not less than 25 psi at farthest and highest fixture or the pressure required for the highest and farthest flushometer-operated water closet to operate properly.

b. Allowable water velocity shall be 5 feet per second for hot water and 5 feet per second for cold water in copper and non-metallic piping.

c. Size pipe based on the number of fixture units and demand load curves in the California Plumbing Code.

d. Outside Stem and Yoke (OS & Y) are only to be used for Fire Protection Systems. Exception: OS & Y valves may be used in equipment rooms, at seven (7) feet or higher for visual identification of Open or Closed conditions. In such cases provide a chain operator to allow for operating the valve with out a ladder.

3. Use Type L hard copper pipe inside buildings.

4. Do not run water lines under slab if at all possible.

5. Provide a shut-off valve to isolate all fixtures in each restroom, laboratory, cafeteria and any other room with multiple fixtures. Valves shall be in recessed boxes with locking covers, located above the upper terminal water closet for restrooms and above fixtures in other areas.

6. Run water lines to outside drinking fountains underground and to interior drinking fountains isolated from hot-water lines to provide cool water at the fountains. Provide separate isolation valves at each fountain.

7. Provide thrust blocks and ties for bell-and-spigot water pipe at fittings for sizes 2 ½" and larger.

8. Slope pipes up in direction of water flow to air-elimination devices, or up to a nearby expansion tank, to provide for air elimination from water lines.

9. Water hammer arrestors are required for lavatories, sinks, fountains, water closets, urinal headers, and other fixtures or devices with quick-closing valves, such as clothes washers.

10. Fixture Supply Lines – Water supply to faucets shall be via Iron Pipe Size (IPS) with brass nipples and brass escutcheons with polished chromium finish. No braided stainless steel or flexible supply lines shall be used to connect water supplies to faucets.

11. Each faucet shall have its own angle stop. No angle stop should serve more than one faucet at a time.

12. Victaulic type mechanical butterfly valves for copper are considered a reliable method for shut off above ground and inside buildings.

D. Hot Water Systems

1. Hot water or tempered water is required (as indicated, in addition to cold water) for the following areas, but not limited to these areas:
   a. Administration and Health Offices -- Hot.
   b. Cafeteria, Kitchen, Lunch Units, and other food service facilities – Hot (No tempered water)
   c. Collaboration Faculty Workrooms – Hot.
   d. Science Prep Room – Hot.
   e. Art Instruction Rooms, Consumer Home Economics, and Automotive Labs – Hot.
   f. Custodial Room Service Sink – Hot.
   g. Shower Rooms for Students – Tempered for students, hot and cold for faculty, plus one therapeutic station with hot and cold.
   h. Shower Rooms for Faculty plus Therapeutic Station – Hot
   i. Handicapped-Accessible Showers – Tempered.
   j. Restrooms adjacent to eating facilities – Tempered.
   k. Faculty Restrooms – Hot

2. Provide cold water only at:
   a. Student Restrooms.
   b. General Classrooms.
   c. Kindergarten Rooms.

3. Hot water temperature regulation:

a. To reduce the potential for bacterial contamination (see ASHRAE Standard 12-2000 – Minimizing the Risk of Legionellosis Associated with Building Water Systems) provide the following temperatures and control devices:

1. General Hot Water Outlets: 120°F at the heater and 115°F at the furthest outlet from water heater.

2. Tempered Water Outlets: 95° to 100°F mixed from 115°F to 120°F hot water from the storage tank and cold water through a tempered regulator valve. Locate the regulating valves as close to the outlet as possible. This is especially important for Special Education, Elementary Schools and Children's Centers. Locate the valves in Custodians Rooms or similar rooms, not readily exposed in restrooms or shower rooms.

3. Cafeteria Sink Outlets: 120°F.

b. Provide a circulating pump and insulated hot-water circulation loop (supply and return) to the furthest fixture on the following:

1. Provide circulating pump for faculty restrooms with metered faucets and nurse offices, when they are farther than 15 feet from water heater.

2. Provide pumps for runs longer than 50 feet for food service areas, Custodial sinks and other areas with high flow faucets.

3. Indicate aquastat to control pumps and to make at 100 ° F and break at 108 ° F.

4. Hot Water Heaters And Tanks:

a. Water heaters shall be certified by the California Energy Commission and meet Title24, AQMD Low NOx Rule 1121, and 1146.2. Water heating boilers 1,000,000 BTU and larger shall be registered with South Coast Air Quality Management District (SCAQMD) per rule 222 to meet 114 6.2 requirements.

b. Do not use multi-flue water heaters, nor booster or instantaneous type water heaters.

c. Water heaters shall heat with gas. Electric water heaters may be used as a last resort for isolated locations and in small sizes. All gas fired water heaters shall meet the flammable vapors ignition resistance requirements (FVIR).

d. Use 100-gallon, or smaller, high-recovery gas-fired domestic-type water heaters. Use in series with manifold to avoid the use of separate storage tanks.

e. Use hot water storage tank with external heater only where storage requirements exceed 200 gallons and where central-plant capacity or other conditions indicate.

f. Provide ball valve with plug at water heater drain outlet.

g. Provide seismic anchorage for all equipment. Do not bolt down the water heater legs.

h. Provide drip pans at all water heaters and drain the pan to an approved receptor.

i. Instantaneous tank-less water heaters of any kind or size are prohibited.

5. Hot-Water Circulating Pumps:

a. Circulating hot water pumps shall be time controlled so they will operate only when building is occupied.

b. Hot water circulating pumps over 1.5 hp shall have cast iron bodies. Pumps 1.5 hp and less shall have hard bronze water chambers and impellers.

c. Size hot-water circulating pump and piping for water velocity not to exceed 5 feet per second for hot and 8 feet per second for cold .

6. Hot-Water Piping And Utilization:

a. Provide tempered water to student showers piped in series and connected with an insulated circulating supply manifold.

1. Provide isolation valves for each battery of showers.
2. Provide push-button metered-type shower valves.
3. Specify showerheads with a maximum discharge rate of 2.0 gpm.

b. Reduction in lines connected to pumps shall be made as close as possible to the pumps.

c. Install straight length of pipe without bends or restrictions at least 10 diameters long on the suction side of all pumps unless inlet diffusers are used.

d. Insulated Return lines are required for domestic hot water systems when the length of run is over 15 feet to the furthest fixture.

e. Provide a check valve after the pump, for the hot water return line.

f. Avoid running dead-leg piping.

E. Water Valves and Other Devices

1. Uninterrupted Service:

a. All domestic water supply mains shall be designed in an above-ground valve station with a minimum of two parallel branch lines – a primary and secondary – to provide for uninterrupted service to the site during maintenance of a Reduced pressure principal backflow preventor or a pressure regulating valve. Each branch shall include a Reduced pressure principal backflow preventor with strainer and when the street pressure exceeds 80 psig, a pressure regulator with strainer.

b. A separate service shall be provided for landscape irrigation, with an above-ground valve station that includes a Reduced pressure principal backflow preventor and a pressure regulator with strainer when the street pressure exceeds manufacturer's or design suggested range but never exceed 80 psi. Two parallel branch lines are not required, but may be used to incorporate the use of two backflow assemblies and pressure reducing valves in parallel for more cost effective design. Comply with requirements of water service rule 16-D for schools located in Los Angeles Water & Power District.

c. Coordinate this design with the **Civil Engineering** and **Planting and Irrigation** sections of this "School Design Guide."

2. Pressure Regulating Valves:

a. Install pressure-regulating valves with strainers when street line pressure is over 80 psig to reduce pressure to approximately 80 psig.

b. Pressure regulating valve (PRV) stations shall include a minimum of two District-approved pilot/diaphragm actuated control valves with strainers (in lieu of a series of 2" direct acting regulators). Valves shall be flanged and sized to provide uninterrupted service to school site when valves are being serviced. Wafer-lug type butterfly valves and pre-assembled valve stations may be used to minimize space needs. (Services over 6 inches may require a third, smaller PRV for constant low-flow demands.)

c. Provide removable gages with ball valves for isolation stops on both inlet and outlet of valve stations (for inlet pressure and reduced pressure).

d. Provide an epoxy-coated wye strainer ahead of regulators.

e. Locate pressure regulating assemblies and strainer assemblies above grade in a shielded enclosure and in a service area. Where exposed to students, enclosure shall be a secure structure or cage.

3. Backflow Preventors and Vacuum Breakers:

a. Use backflow prevention valves having the lowest possible friction loss.

b. Use reduced-pressure principle backflow assemblies for domestic, irrigation, and fire services for meter service protection.

c. Provide an epoxy-coated wye strainer ahead of regulators.

d. Vacuum breakers or other required backflow prevention valves which are required, but not limited to, the following locations:

1. All flush valves and urinals.
2. Direct connections to boilers and tanks.
3. Water-cooled refrigerator condensers.
4. Soft drink dispensers.
5. Hose bibbs and sill cocks.

6. Demonstration tables.
7. All laboratory equipment.
8. Dark room equipment.
9. Hose bibbs for uncovered combination storm-and-sewer area drain diverter valves require a Reduced Pressure back-flow assembly.
10. Blueprint equipment.
11. Silver soak sinks.
12. Garbage can washers.
13. Most types of animal drinking water devices.
14. Various types of processing equipment (check with City).
15. Cooling towers and evaporative coolers (or provide air gap).
16. Sewage pumps.
17. Fire sprinkler systems.
18. Irrigation systems.

4. Hose Bibbs and Sill Cocks (Loose key):

a. Provide loose key sill cocks under exterior drinking fountains with isolation valves. (Sill cocks are faucets with a hose connection installed approximately at the sill line of buildings.)

b. Provide loose key hose bibbs or sill cocks at approximately 75'-0" spacing around buildings, and within 25 feet of entrances with walk-off mats. Install in recessed boxes without covers. (Coordinate desired locations with Landscape Architect.)

c. Provide sill cocks (with isolation valves) in Shower and Locker Rooms so that a 50'-0" long hose can be used to wash down entire area.

d. Hose bibbs are not recommended in kitchens or other interior areas except as noted above.

e. Provide loose key hose bibbs or sill cocks, with isolation valves, at outside eating areas, all student restrooms, in boiler rooms, on rooftops with skylights or air-cooling equipment for washdown of equipment and pads, and on rooftops for washdown of bird droppings and debris on ladders and façade projections.

5. Isolation and Shut-Off Valves:

a. All shut-off valves shall be accessible from the room in which fixtures are installed, and shall be located at approximately 3'-0", but not more than 7'0", from the floor. These valves shall control only fixtures in the room in which they are installed.

b. Provide shut-off valves for:

1. Each group of fixtures.
2. Each science laboratory or preparation room.

3. Each restroom.
4. Each floor of each building.
5. Each building, located at the entering point of building with yard box.

c. Provide a remote-control solenoid shutoff valve for gang-shower tempered-water; located down stream of manual shutoff valve. Locate remote control at coach's office

d. Use gate or ball valves for plumbing isolation shut-off.

6. Emergency Shower and Eye Wash:

a. Emergency shower and eye wash equipment shall be installed in the following areas where eye or skin irritants exist and must comply with California Code of Regulations(CCR),Title 8, Section 5162

1. Science and teacher's chemistry/laboratory workrooms..
2. Pool mechanical equipment rooms.
3. Central Custodial supplies storage area. In middle and high schools install in receiving area.

b. A flip-down eye wash at sink shall be installed in the Teachers' Science Rooms Preparation Area Workroom, but only as a supplement to an approved Emergency Shower and Eyewash in the classroom, as stated in Title 8 Section 5162.

7. Drinking Fountains:

a. Drinking fountains are required by the California Plumbing Code on every floor, as well as in other specific locations.

b. Install fountains in locations, and above floor surfaces, where water falling from the fountain on to the floor does not cause a slipping hazard. (See Section **2.1 School Building Design** for specific location and design requirements.)

c. Provide shut-off valve, cleanout and hammer arrestor for drinking fountains per District's standard details. If drinking fountains are located on the outside of the building, a hose bibb shall be installed underneath the fountain.

F. GAS DISTRIBUTION SYSTEMS

1. Gas Service:

a. In general, Elementary School systems are low pressure, (8" of water column), and Secondary School systems are medium pressure (3 psi at the meter and 1 psi maximum drop to most remote outlet) but medium pressure systems are allowable for site gas distribution for elementary schools with multiple buildings when the gas company permits A

properly vented pressure regulator with approved accessible gas shut-off valve must be provided.

b. Locate gas meters:

1. Where a straight service run from the street can be made by the gas company.
2. Where it is accessible by truck for service and replacement.
3. As central as possible to the major gas loads (main boiler rooms, relocatable classrooms groups, etc.) to minimize size and length of main pipe runs.

c. Meter locations must be approved by the District and the gas company.

d. Meter enclosure and assembly must conform to District Standard Drawing and should have asphalt or gravel flooring (not concrete) with meter, valves and PRV above grade.

e. Use of medium-pressure gas requires design with "Polyflo Calculator" for gas-company approval.

f. Provide on plans a gas-load schedule for each meter including existing, new and future load in cfh.

2. Gas Piping:

a. Gas pipe:

1. In buildings or above ground at least 6 inches: Steel
2. Underground (30" minimum cover): Polyethlene, fusion welded, embedded in 6 inches of sand all around (per District Standard Drawings). Include tracer wire (yellow insulated No. 18 AWG). Connect to steel pipe with Central Plastics Company prefabricated transition fitting or equivalent.

b. Gas line locations:

1. Above grade within the building and underground to each building whenever possible.
2. Through attic spaces, within covered walkways, and in ventilated crawl spaces.
3. Avoid lengthy horizontal rooftop mounted piping wherever possible.
4. Avoid running gas lines through one building to serve another.
5. In isolated cases such as Kitchens and Science Rooms where gas branch lines must penetrate a concrete slab, run pipes in a concrete trench with steel checkered plate cover and frame.

c. Provide a gas service stop in an accessible location outside each building at the point where a gas line enters the building.

1. For permanent buildings, locate on the riser with swing joint at point of entry.

2. For portable buildings, locate in yard boxes.
3. Provide only one entry per building unless unusual circumstances exist.

d. Gas Valves:

1. Provide an accessible shut-off valve for each gas outlet or group of outlets within a room.
    a. Use an approved gas cock when valve is readily accessible.
    b. An approved ball valve may be used when it is not accessible to students.
2. Provide individual check valves for gas outlets or turrets adjacent to air or water outlets, such as for laboratory stations.
3. Provide a master shut-off valve for science labs in a secure area not accessible by students.
4. All laboratory gas valves shall be protected by an "accessible"/Serviceable electrically operated, normally closed gas solenoid valve and remotely operated by emergency push button controller. Locate as close as possible to the teachers work station, at 48" height (ADA reach height).
5. Provide an isolation valve for each floor in each building.
6. Provide isolation valves at each regulator.
7. Provide DSA-approved seismic gas shut-off valves properly strapped to avoid student tampering.
8. Provide a shutoff valve on each gas line entering a building immediately outside point it enters the building.
9. All shut-off valves must be secured from student or public tampering.

e. Provide DSA approved Earthquake Shut-Off valve for each gas meter.

G. Compressed Air Systems

1. Provide air compressors as follows:

a. Shop Areas: 3 HP minimum.

b. Senior High Schools Shops with car hoists: 7 ½ to 10 HP. (Two or more car hoists require at least a 5 HP compressor.)

c. Other areas requiring air: 1 ½ HP.

2. Air pressure:

a. Hose connection for paint spray gun: 20 psi.

b. Other locations: 124 to 175 psi.

3. Paint Spray Facilities:
   a. Provide an electrically controlled valve in the air line to paint spray booths so that no air is supplied to the spray gun when door is open.
   b. Spray guns, pressure-reducing valves, gages, strainers, hose and hose racks are furnished by the District.

H. Cathodic Protection:

1. For a site where cathodic protection is indicated, use non-metallic piping, unless unusual conditions and District directions indicate otherwise.
2. Check to ascertain if cathodic protection is in use when designing for existing sites.

I. SEISMIC RESTRAINTS

1. Provide seismic restraints for mechanical equipment and piping systems in accordance with applicable codes and guidelines.
2. For liquid filled steel pipe, use the following guidelines:
   a. SMACNA "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping" latest edition.
   b. Hanger spacing as specified in **"Guide Specifications".**

3.5 FIRE PROTECTION

A. GENERAL REQUIREMENTS

B. LOCAL FIRE AUTHORITY REVIEW

C. FIRE SPRINKLER SYSTEMS

D. STANDPIPES

E. FIRE EXTINGUISHERS

F. KEY SAFES OR KNOX BOXES

3.5 FIRE PROTECTION

A. GENERAL REQUIREMENTS

1. This section contains criteria and information for local fire authorities' review procedures, fire-sprinkler systems, fire extinguishers, and related fire- and life-safety requirements. Other criteria and guidelines include applicable portions of the California Fire Code, NFPA Standards, and the District Guide Specifications and Standard Details.

2. Fire protection for range hoods is provided by a fire suppression system that is integral with the hoods.

3. All Fire Department connections shall face the street and be free of any obstructions.

4. Hydraulic calculations for fire flow by a California Licensed Professional Fire Protection Engineer shall be provided as part of the 50% CD Submittal. If a fire sprinkler pump is required, provisions for pump housing, tank and electrical requirements shall be provided.

B. LOCAL FIRE AUTHORITY REVIEW

1. The Division of the State Architect (DSA) requires that local fire jurisdictions review and approve all new construction projects prior to DSA final approval. The local approval includes:

- **a.** Access from the public street to each new building within the site (CCR Title 19, Section 3.05, "Access Roads").
- **b.** Perimeter fencing and gated entrances (CCR Title 19, Section 3.16, "Gate Entrances to School Grounds").
- **c.** Fire hydrants, if required.
- **d.** Standpipe locations.
- **e.** Emergency Assembly Area (EAA) and Evacuation Plan.
- **f.** Fire Department connections to automatic fire sprinkler systems.

2. For local review, provide a full site plan indicating all buildings, both existing and proposed, fences, drive gates, retaining walls, EAA, and other

construction affecting Fire Department access. Indicate approved unobstructed fire lanes for access to buildings on the site plan.

3. The local Fire Department must signify approval on drawings and sign a standard approval form furnished by DSA.

4. Principal agencies for Los Angeles schools are:

a. Los Angeles City Fire Department
Fire Prevention Bureau, Access & Hydrants Unit
213-485-5964

b. Los Angeles County Fire Department
Fire Prevention Engineering
213-720-5141

C. FIRE SPRINKLER SYSTEMS

1. An automatic system shall be installed in every new school building in accordance with the current California Building Code (CBC – part of California Code of Regulations, Title 24), NFPA 72, NFPA 13, LAUSD's Guide Specifications Section 15300, and requirements of the Division of the State Architect (DSA).

2. The fire sprinkler system must be interconnected with the school fire alarm system.

3. On fire mains, provide a reduced pressure principle backflow assembly upstream of the fire-department connection.

4. All valves controlling the water supply to automatic sprinkler systems and water flow switches for automatic sprinkler systems shall be electrically supervised.

5. Fire sprinkler systems shall be designed and installed so that they are readily serviceable. Every building shall have a fire sprinkler control valve located 5'-0" above the floor. Every riser assembly shall have a check valve. In multi-story buildings, every floor shall have a separate shut-off valve, check valve, tamper switch, and flow switch at an accessible location, with an Inspector's Test Valve at the opposite end of the building.

Exception: If each floor has an independent shut-off valve located at the riser assembly, then a main building shut-off valve will not be required.

6. Fire sprinkler main drain valve discharge line shall be piped into a sump pit or to a storm drain. Main drain lines shall never discharge into a sanitary plumbing fixture, not even into a floor sink or floor drain.

7. The Fire Department Connection (FDC) shall be located upstream of the fire sprinkler riser assembly, not downstream of the riser assembly. A secondary FDC may be located on the address side of the building, down

stream of the riser assembly provided it is only a secondary FDC provision, with a sign above it clearly stating what FDC serves.

8. A shut-off valve on a fire main backflow prevention assembly shall not be considered the building's main shut-off valve. Each building shall have its own separate shut-off valve as part of the riser assembly.

9. Post indicator valves are not required to be provided along with backflow prevention assemblies on fire mains. Fire mains are required to have sectional controlling valves at appropriate points per latest edition of NFPA 13, 8.16.1.5. The shut-off valve on the backflow preventor provides a reliable method of system shut-off. The Outside Stem and Yoke (OS & Y) valves provide a visual indication of those valves being in the open or closed position.

10. Post indicator valves (PIV) are required, outside the building, where a fire sprinkler main passes through the building foundation.

11. If a fire pump is required. Provide calculations on drawings and specifications.

12. Stages: All stages greater than 1,000 square feet in area shall be equipped with 1 ½ -inch hose connections located in recessed valve cabinets on each side of the stage per latest edition of CFC 905.3.4. Hose connections shall be installed in accordance with the latest edition of NFPA 13 and shall not require hose.

D. STANDPIPES

1. Standpipe systems shall be provided in buildings and areas per latest edition CFC Section 905 and installed in accordance with latest edition of NFPA 14, summarized as follows:

a. Class I Wet Manual Standpipes without hoses and without hose cabinets shall be installed in buildings where the floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access.

b. Class I Wet Automatic Standpipes without hose and without hose cabinets shall be installed in buildings where the floor of an occupiable story is greater than 75 feet above the lowest level of fire department vehicle access.

2. Standpipe hose connections shall be unobstructed and readily accessible to the Fire Department, and all connections shall conform to Code and fire authority's requirements. All hose valve connections shall be in recessed cabinets wherever possible.

E. FIRE EXTINGUISHERS

1. All areas of all buildings must have portable fire extinguishers within 75 feet of any point. Provide fire extinguishers in accordance with CCR Title 19 and the District Guide Specifications.

2. Extinguishers shall not be located on the exterior of buildings. Extinguishers in corridors, stairs or other unsupervised areas shall be avoided. All extinguishers shall be secured in a recessed, locked, UL listed fire extinguisher cabinet.

3. Portable fire extinguishers and notification signs shall be supplied as part of the contract for construction. They shall meet minimum requirements for acceptance by the State Fire Marshal and local fire authority.

F. Key Safes or Knox Boxes

1. For installation of all key safe (Knox Boxes), follow City of Los Angeles Fire Department Requirement 75. To standardize District's procedures, Requirement 75 shall be followed for Los Angeles County Fire Department sites with the exception that the box must be ordered for the Authority Having Jurisdiction (AHJ), so that the factory installed lock matches the Master Key of the appropriate jurisdiction. Typical mounting height shall be 8'-0" min. to 10'-0" above ground.

2. A key safe Knox Box is only to be provided and installed for Central Station Monitored site. Architect/Engineer to confirm the need for Knox Box with local Fire Authority and to identify a mounting location and mounting height as required. Mounting height could be min. 8'-0" above finished floor (AF F), preferred mounting height shall be 10'-0" AFF.

3.6 HVAC SYSTEMS

A. GENERAL REQUIREMENTS

B. SYSTEM DESIGN CRITERIA

C. HVAC SYSTEM SELECTION

D. CONTROLS AND ZONING

E. AIR DISTRIBUTION

F. COILS AND PIPING

G. COOLING SOURCES

H. HEATING SOURCES

I. SOUND AND VIBRATION CONTROL

J. SPECIAL CONSIDERATIONS

3.6 HVAC SYSTEMS

A. GENERAL REQUIREMENTS

a. The HVAC system shall comply with the current California Code of Regulations, Title 24, the standards of ASHRAE, SMACNA, and NFPA, as well as the requirements of the local authorities having jurisdiction and LAUSD's Design Guide.

b. All interior spaces shall be air conditioned unless specifically excluded in this Guide or in writing by the District.

a. HVAC design shall comply with Title-24 energy efficiency requirements for all construction and exceed Title-24 energy efficiency requirements by a minimum of 15% or more, in conjunction with envelope and lighting design for new construction. Consult with utility suppliers to take full advantage of incentives for higher energy efficiency such as the Savings by Design Program of Southern California Edison and The Gas Company. Indicate the required equipment energy efficiencies clearly in the equipment schedules in a separate column.

b. Refer to The Collaborative for High Performance Schools "Best Practices Manual" (available at http://www.chps.net) for additional criteria that may be appropriate to the project. Appropriateness of the criteria will be as determined by the District.

c. Refer to chapter 2.4, **"Environment and Sustainability,"** for additional requirements and specific requirements for commissioning.

d. Systems and equipment shall conform to District's Guide Specifications, Division 15.

e. Assure maintenance and accessibility provisions for servicing and replacement.

1. Where practical, all equipment shall be housed on the roof or in Mechanical Rooms within the building.
2. Provide adequate working area around equipment for service.

f. Where HVAC units are roof mounted or require roof openings, verify that all structural provisions are made to assure adequate capacity for load bearing and diaphragm capacity.

B. SYSTEM DESIGN CRITERIA

1. Calculations and Load Criteria

a. Provide design criteria and calculations as follows:

1. Heating and cooling load calculations shall be performed on an industrially recognized computer program such as Trace 700, HAP or Energy Pro that will demonstrate compliance with Title 24. The calculations shall be done for each room and each system.
2. Indoor and outdoor design conditions and other relevant data shall be in accordance with current ASHRAE publications.
3. Provisions for internal heat gain from occupants and equipment within a space shall be as determined by LAUSD.
4. A field survey of actual field conditions and assessment of current demand is required for existing facility projects such as modernization and equipment replacement. Submittal of an existing condition assessment report is required.

b. When requested by the District, also submit calculations for equipment and system selection criteria such as life-cycle cost and energy analysis, duct friction and pipe friction loss calculations, fan and pump selection curves, heating and cooling coil selection data, chiller and cooling tower selection data, etc...

c. The California Energy Commission's (CEC) Certificate of Compliance for Non-Residential Buildings with the necessary backup forms shall be completed for submittal to the Division of the State Architect (DSA) and for review by the District The Title-24 Compliance calculations shall be performed on the performance basis using the whole building approach, and integrating the building envelope, mechanical and electrical systems as designed, on a CEC approved program such as Energy Pro or Perform.

2. Ventilation and Outside Air Control

a. Provide outside air to each room through the HVAC system in compliance with current CEC Standards and ASHRAE recommendations.

b. Clearly indicate how outside-air is provided and how much for each HVAC unit. Also indicate with calculations how air is relieved from the building, on regular cycle and economizer cycle, to balance the fresh outside air make-up and maintain building pressures to assure compliance with CBC door closer settings for accessibility.

c. Provide ventilation for electrical rooms with transformers.

3. Air filtration

a. Provide air filters with a minimum efficiency of Merv 8. New schools constructed in areas with low outdoor air quality such as near freeways shall be provided with air filters as per OEHS CEQA report.

C. HVAC SYSTEM SELECTION

1. Criteria

a. HVAC systems shall be selected based on the following considerations:

1. Project Characteristics that includes but not limited to the following:
    a. New building vs. modernization project.
    b. Construction Materials: Wood frame, concrete, steel or masonry construction.
    c. Single story vs. multi-story.
    d. Roof type: Flat vs. pitched.
    e. Building size and configuration.
    f. Building a new plant vs. building on an existing school site.
    g. Single building projects vs. multiple building projects.
    h. Operating Schedules.
    i. Location on site with regard to adjacent buildings and uses.
2. Easy to install.
3. Easy to operate and maintain.
4. Most efficient.
5. Proven reliability.
6. Designed upon well established principles, explicit approval shall be obtained from the district for experimental designs before commencement.
7. Constructed of standard, use-proven materials.
8. Acceptable procurement lead time.
9. As low an initial cost as practical.
10. Low Operating cost.
11. Low Maintenance cost.
12. Lowest life cycle cost for highly energy efficient installations that incur a higher initial cost. The life cycle cost calculations shall be performed on an industrial standard program such as Trace 700 or DOE-2. The calculations complete with all input and supporting data shall be submitted to the district for review. The life cycle cost shall consider the incremental cost of building enclosure, structure, electrical service and other utilities as well as the HVAC systems. Cost estimates shall be made in an industry-recognized format and using manufacturer's cost data or data from a nationally recognized source such as Means. Utility costs shall be as obtained from the

utility providers and shall include historical cost escalation trends. Maintenance cost shall include a breakdown of labor and materials for each piece of equipment or system component based on nationally recognized references.

13. Environmentally friendly.
14. Acoustically compatible with occupied spaces.
15. Susceptibility to vandalism.
16. Degree of disruption of occupants during modernization.

b. Submit a system selection report (Design Intent Narrative) that addresses all the considerations above, based on the guidelines of Chapter 1, HVAC System Analysis and Selection, of the 2004 ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) Handbook.

2. Overview of HVAC Systems

a. Decentralized Systems

Decentralized systems are systems where the primary source of cooling, heating or supply air is provided from independent sources scattered throughout a building or a campus. Decentralized systems may consist of the following:

1. Small Single Zone Type Unitary Systems:

   a. Packaged Rooftop Heat Pumps, Packaged Rooftop Air conditioning Units with gas heating, split system heat pumps, split system air conditioning units and wall mounted heat pumps or air conditioning units of less than 25 Tons capacity normally fall under the category of Small Single Zone Type unitary systems. Small Single Zone Type Unitary systems are usually controlled by a dedicated thermostat, but means of providing multiple zone controls for unitary systems, such as Carrier's VVT controls systems, are available. Such systems are categorized under Small Single Zone Type Unitary Systems because they cannot heat and cool simultaneously.

   b. When single zone type unitary systems are provided for classrooms, one dedicated unit shall be provided for each classroom.

   c. Positive means for fresh air make-up and sufficient means of relief to maintain door opening and closing pressures that comply with CBC accessibility requirements must be provided for classroom units.

   d. VVT type controls may be used for administrative and support areas. With VVT type controls, rooms of dissimilar thermal profiles such as interior and exterior zones, north and south exposures, etc. shall not be served by a common unit.

e. Window- or wall-mounted units shall not be used for classrooms.

f. Rooftop packaged units are preferred over split systems, except for small unoccupied spaces like electrical, data, or phone rooms.

h. Gas heating is preferred over air-cooled heat pumps.

i. Do not use heat pumps where 24 hours operation is required or where the ASHRAE Bin weather data indicates heating design temperatures below 40 degrees for more than an hour at a time during the normal hours of school operation.

2. Multi-Zone Type Unitary Systems:

a. Roof-mounted, self-contained triple-deck multi-zone unit systems are categorized under Multi-Zone Type Unitary Systems.

b. These systems are normally provided only for replacements.

b. Centralized Systems

Centralized systems are systems where the primary source of cooling and heating is provided from a central source for a building or a campus. Centralized systems may consist of the following:

1. Central chilled water plants:

a. Central chilled water plants may be air cooled or water cooled.

b. Water cooled systems are preferred over air cooled systems due to higher energy efficiency.

c. Air cooled systems shall be used only where practical limitations exist for a cooling tower.

d. Evaporative condensers are not allowed due to the tendency to lose efficiency rapidly from scale formation on the wetted tubes from hard water.

e. Modular chillers are not allowed.

f. A minimum of two independent chillers, working on lead lag, and associated accessories shall be provided for a campus wide central chilled water system. When only two chillers are provided, each chiller shall be sized to carry 75% of the load.

g. Campus wide central chilled water system shall be designed as variable flow constant temperature systems for energy savings and dehumidification effectiveness.

h. The location of the central plant shall not be so remote that the energy savings of the water cooled chiller system is offset by the additional energy consumption of the pumps.

i. Cooling towers shall be located away from HVAC outdoor air intakes, openings into buildings and areas normally occupied by students.

j. The air delivery energy consumption can also offset the energy savings of the water cooled chiller system. Air delivery energy consumption is usually the largest energy consumption component of the building air conditioning system. Design the air delivery systems to limit energy consumption due to excessive duct friction. Also analyze the feasibility of using low temperature supply air systems to reduce energy consumption.

k. Do not use variable air volume systems for classrooms unless a means for ensuring that each classroom is adequately ventilated and that indoor air quality is maintained -- for example, by use of carbon dioxide monitors that are interfaced with the air-handling-unit controls to modulate the outdoor air intake dampers. (VAV boxes should be located outside the classroom area to reduce noise.)

2. Central boiler plants that provide heating hot water or steam.

a. Hot water boilers are preferred over steam boilers. Steam boilers are normally provided only for replacements.

b. A minimum of two independent boilers and associated accessories shall be provided for a campus wide central hot water system for redundancy. `

c. Hybrid Systems:

Hybrid systems are systems where a common water loop for heating, condensing or heat exchange is provided from a central source for a building or a campus whereas primary cold or heat generators may be scattered throughout. Hybrid systems may consist of the following:

1. Water source heat pumps

a. Follow guidelines regarding location of cooling towers.

b. A minimum of two independent cooling towers, two boilers and associated accessories shall be provided for a campus wide central condenser water system for redundancy.

2. Geothermal heat pumps

a. Obtain approval from the LAUSD's Office of Environmental Health and Safety before using geothermal heat pumps.

3. Large packaged roof top variable-air-volume units with heating hot water from a central boiler plant.

a. In general, VAV units shall be limited to administrative or support areas and preferably not used for classrooms. If needed, review application with the District.

3. Unitary vs. Central Systems Comparison

a. Although central systems frequently offer many advantages over unitary systems, when all factors have been weighted and evaluated, unitary systems are usually chosen for schools because of their lower initial cost.

b. Advantages of a Central System include:

1. Central system equipment often has more technical advantages and capabilities
2. The total installed cooling or heating capacity of a central plant is normally less than that of unitary equipment.
3. The central cooling equipment offers better operating efficiency than unitary equipment.
4. Longer life.
5. Better temperature control.
6. Lower noise levels.
7. Better indoor air quality due to better air filtration flexibility.

c. Disadvantages of a Central System include:

1. High initial cost.
2. Need for more highly skilled maintenance and repair personnel.
3. Larger space requirements.
4. Entire system would be affected by the failure of one component. Larger areas would be shut down due to the failure of one large air handling unit. The failure of one chiller or boiler could reduce the cooling and heating capacity by half.
5. Multiple source responsibilities for installation.
6. Long lead times for obtaining equipment and replacement parts.
7. After-hour or off-schedule operation is not usually convenient or efficient. The energy consumption and cost operating a cooling tower, a chiller and associated pumps to service a few hours of the after hours or holiday operation of a few classrooms could offset the annual energy and cost savings of the entire system.
8. Even though the cooling (refrigeration) energy of a central plant is more efficient, the air moving energy is usually twice that of cooling energy in a typical school building. Some central systems are less efficient than unitary systems because the air distribution systems are not designed to be energy efficient.

d. For modernization or expansion of existing school plants, the addition of central systems is rarely cost effective. And, in modernization projects, carefully chosen and designed unitary systems can be installed with minimum disruption to the ongoing educational process.

D. CONTROLS AND ZONING

1. General

a. Provide an automatic system of temperature control for all systems.

b. Each classroom shall be a separate air-conditioned zone.

c. Small rooms such as adjacent offices on the same exposure and other small spaces of similar thermal profile may be combined under one control zone. Zone control shall be located at the most representative space temperature location.

d. A common air handling system shall not serve areas that are not on similar operating schedules.

e. Thermostats shall not be located in areas that are accessible to unsupervised students after schools hours such as classroom building hallways, corridors and lobbies.

f. Thermostats in Gymnasiums shall be protected from possible damage from the impact of balls etc. or provide remotely located thermostats with temperature sensors in the conditioned space or return air ducts.

g. All thermostats shall be provided with lockable vandal -resistant covers.

h. Wireless controls are not allowed.

i. For existing facility projects such as modernization and equipment replacement, replace existing pneumatic control systems with direct digital controls.

j. Kitchen MAU Sequence of Operations:

1. When kitchen is occupied, supply fan shall be turned on to low speed, return air dampers open to 100% and outside air dampers open to minimum set position.
2. Thermostats shall determine heating and cooling mode depending on indoor temperature and set points. This will activate heating and mechanical cooling. Evaporative cooling shall be locked out on this mode.
3. Exhaust fan shall be energized when kitchen hood venting is required. The supply fan shall be turned on to high speed, return air damper closed to 0%, and outside air damper open to 100%. Mechanical cooling shall be locked out on this mode.
4. Kitchen MAU shall be stand alone and not part of ECEMS.

2. Environmental Control and Energy Management System

a. Provide a fully automated, integrated and programmable Direct Digital Environmental Control and Energy Management System (ECEMS) for HVAC systems (Central and/or Unitary) control and energy management functions.

b. Integrate the ECEMS system with the Information Technology System when it is beneficial in cost or security measures. The ECEMS system shall be designed to be monitored and controlled from a remote location.

c. The specified ECEMS shall be open protocol BACNET system that is capable of interfacing with systems by other manufacturers.

d. Control system and equipment shall be fully presented in the contract documents. The ECEMS manufacturer shall furnish and install the complete system.

e. An override must be provided to by-pass the system in order to provide continuous service, if service on the system is required during school hours.

f. The ECEMS shall provide the following controls, diagnostic, or trending points:

1. General:

   a. Indicate a system that utilizes a screen display for control operations.

   b. The system shall be accessible remotely. Indicate that the system shall be provided with all necessary software and configuration for remote users to open, read, and revise the screen display data.

   c. Digital data shall be stored and saved at 4 hour intervals and analog data at appropriate intervals for an effective operation. Analog power inputs shall be stored at 15 minutes intervals.

   d. The system shall be able to offload historical data onto a DVDs yearly. A user alert shall sound at this time. Reset shall be done manually.

   e. Historical data stored in DVD shall be accessible via a display screen instantaneously by date and time, and in trends and graphs.

   f. Indicate that the system shall be equipped with a UPS capable of providing power to the ECEMS for at least 30 minutes during power downtimes.

   g. Coordinate with Mechanical Engineer to specify AC units or dampers with end limit switches, or analog position feedback for connection to unitary controller.

h. Design shall provide for continuous network operation.

i. Design shall indicate but not be limited to pathways and conduit routing, equipment location, component parts, and cables. Provide catalog numbers for all components.

j. All exterior mounted system components shall be NEMA 3R rated.

2. Air Conditioning Units (2 Tons – 25 Tons):

a. Supply air temperature.

b. Return air temperature.

c. Space temperature.

d. Outdoor air temperature. (one per site)

e. Filter status.

f. Fan status.

g. Compressor status.

h. Economizer damper current position.

i. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).

3. Fan Coil Units and Condensing Units:

a. Supply air temperature.

b. Return air temperature.

c. Space temperature.

d. Filter status.

e. Fan status.

f. Compressor Status

g. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).

4. Heat Pump and Fan Coil Units:

a. Supply air temperature.

b. Return air temperature.

c. Space temperature.

d. Filter status.

e. Fan status.

f. Compressor status.

g. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).

5. Lighting: Provide monitoring for the lighting control system. The EMS shall communicate with the lighting control system via BACnet protocol.

6. Power System: Provide for the monitoring of power consumption as follows:

   a. Monitor KWh, KW, KVA, KVAR, Power Factor, Amps at the main electrical service.

   b. Monitor KWh, KW, KVA, KVAR, and Power Factor at each permanent building, and bungalow clusters.

   c. Design shall indicate a unitary controller for connection to the main electrical service power meter.

   d. The system shall be able to integrate analog signals form power meters. Power meter outputs shall be totalized for each building, designated area(s), or power panels. Each output shall be treated as one item

E. AIR DISTRIBUTION

1. Ventilation and Outside Air

a. Provide outside air to each room through the HVAC system in compliance with current CEC Standards.

b. Clearly indicate outside-air provisions and flow rates for each HVAC unit, and relief provisions to balance the fresh outside air make-up and to relieve exhaust air in all operating cycles.

c. Fresh Air Intakes:

1. Locate fresh air intakes to prevent contamination from kitchen exhaust, garage exhaust, or any process exhaust by locating the intakes on the upstream (prevailing wind) side of exhaust openings, as distant as possible.

2. Limit intake velocity to 750 FPM through net free louver area at 100 percent fresh air quantities to keep noise, pressure drop and rain carryover to a minimum.

3. Provide a floor drain at the fresh air intake into larger air handling unit rooms.

2. Ducts

a. Comply with current code and SMACNA Guidelines for duct construction. Thicker metal gauges for ducts and hanger straps, as specified in the Guide Specifications, must be used for exposed ductwork and other special considerations.

b. Size ductwork for conditioned air on equal-friction method based on 0.08" WC per 100 feet with a high velocity limit of 1,000 FPM above occupied areas (850 FPM for unitary equipment above classrooms) and 1,500 FPM inside shafts, or as directed otherwise by the Project Acoustical Consultant. Changes in sizes at every branch or every interval are not warranted economically unless branch represents a substantial percentage.

c. Size return-air and exhaust air ducts on equal-friction method based on 0.08" WC per 100 feet with a high velocity limit of 1,000 FPM above occupied areas (850 FPM for unitary equipment above classrooms) and 1,500 FPM inside shafts or as directed otherwise by the Project Acoustical Consultant.

d. Allowable air velocities for ducts above acoustically sensitive areas shall be determined by an Acoustical Engineer.

e. Duct return air, Ceiling-plenum return is not allowed, in order to improve indoor air quality.

f. Ducts shall be designed to achieve required sound attenuation without the use of sound attenuators; when this is not feasible, sound attenuators or lined ducts should be installed on inlet.

g. Fire dampers or combination smoke-fire dampers must be installed in all ductwork as required by the State Fire Marshal. Indicate damper locations clearly on drawings. Provide disconnect switches for automatic fire dampers.

h. If used Indicate the location of duct smoke detectors used for shut down of larger HVAC units and combination smoke-fire dampers clearly on the floor plans. Coordinate with the project Electrical Engineer to take advantage of total coverage smoke detection systems and save the duplicate cost of installing smoke detectors separately for the HVAC system.

3. Air Inlets and Outlets

a. Select and layout supply-air outlets and exhaust and return-air inlets in accordance with current ASHRAE Guidelines and acoustical requirements.

4. Fans

a. Select fans to minimize noise and to meet noise level criteria in occupied spaces.

b. Provide direct drive centrifugal roof exhaust fans, ceiling, inline or cabinet type on design below 3500CFM.

c. Special Exhaust Fans: Exhaust from kitchen hoods, fume hoods, kiln hoods, spray booths, and dust and sawdust collection systems require special attention to construction details, explosion hazards, noise and location.

1. Roof fans handling exhaust from kitchen hoods require a shaft seal and a special insulated plate to separate fan from motor compartment.
2. Fans exhausting fume hoods require spark resistant construction, and special coatings to prevent chemical action on fan and housing. The motor shall be explosion proof and located outside of the air stream.
3. Fans exhausting paint spray booths require spark resistant construction. The motor shall be explosion proof and located outside of the air stream.

d. Pre-fabricated duct collection systems shall be used for removal of saw dust in wood shops.

e. Exhaust from kiln hoods requires special fans with force-vented motor compartment and special construction to withstand high temperature.

5. Economizers for Outside Air

a. General:

1. The California Energy Commission prescribes 100% outside-air economizers for equipment with supply-air capacities over 2,500 cfm or 6.25 tons cooling capacity. That is the usual low limit for satisfactory payback at locations where weather conditions are least conducive to 100% outdoor air economizer operation with fan-assisted relief. For units of 7 ½ tons capacity and higher, which are usually used for administrative areas, multi-purpose rooms and gymnasiums, the District requires outside-air economizers and recommends power-exhaust systems.
2. Provide 100% outdoor-air economizers for classroom small rooftop unitary systems (3, 4 & 5 Ton capacities) to achieve energy savings and to comply with CHPS Energy Prerequisite 1 and IEQ Credit 4.2 (both for the ability to more effectively flush out the building prior to occupancy and for the increase in fresh air during the economizer cycle). Compliance with CHPS is mandatory, but the use of economizers shall be considered only if the cost is justified by benefits and school location. When economizers are utilized they are to be used with gravity relief of exhaust air, not with power exhaust systems. Small split systems are not required to be provided with 100% outdoor air economizer systems. Do not provide 100% outdoor air economizers when the outdoor air quality is low.

b. Design Criteria for Economizers and Gravity Relief Systems:

1. For small rooftop unitary systems, provide units with downward duct discharge, and with manufacturer-installed and warranted economizer equipment.
2. The total pressure drop through the relief system shall not exceed 0.075" water gauge.

3. Relief Louver size: The pressure loss through the louvers should not exceed 0.02" water gauge static pressure. Catalog data indicates that the majority of the commercially available louvers will have about 0.02" water gauge static pressure drop at about 250 feet per minute free area velocity.

4. Ceiling Grille size: The pressure loss through the grilles should not exceed 0.02" water gauge static pressure. Catalog data indicates that the majority of the commercially available registers will have about 0.02" water gauge static pressure drop at about 300 feet per minute free area velocity.

5. Duct size: The relief duct should be sized for 0.01" water gauge static pressure loss per 100' of ductwork maximum for 100% of the unit capacity. The relief duct pressure loss should not exceed 0.01" water gauge static pressure.

6. Backdraft dampers. Provide the counter-balanced type that opens at about 0.01" water gauge static pressure. Check if they are opening properly and not stuck in the closed position. The total pressure loss through the damper should not exceed 0.02" static pressure.

7. The pressure loss through each component of the system is required to be adjusted so that the total does not exceed 0.075" water gauge static pressure.

c. Commissioning Measures

1. Air Balance: Systems must be balanced for both the regular and economizer modes.

   a. Most unitary systems are specified with a safety factor in the static pressure. The Contractor must be required by the specifications to replace the drive sheaves and slow the fan down to achieve the required air balance and prevent energy waste and noise. If this is not done, the air flow is left higher creating higher static pressure and noise levels, as well as excessive pressure on doors and door closers.

   b. If the system is not also balanced for the economizer mode, when the outdoor air dampers open fully much more air is delivered than the design capacity.

2. Corridor pressure: If the corridor HVAC unit is off, or the corridor unit is not in the 100% economizer mode when the classroom is operating on the economizer cycle, the corridor pressure will be lower than normal operating conditions, further contributing to the door-closing difficulty. Design system to prevent this occurrence.

3. Door closer pressure: During testing and balancing, door closer pressures must be set properly and not too low just to more easily achieve access compliance.

4. Remedial Measures for Incorrect Design:

a. If gravity relief is not sufficient during the 100% outdoor air economizer operation after the above commissioning is done, the maximum operation of the return and relief dampers in the economizer system should be adjusted to reduce the amount of outdoor air and return some air to the unit. An 80% outdoor air system is still more energy efficient and conducive to fresher indoor air than a minimum outdoor air system with 30% outdoor air. If this is not possible, the economizer operation is required to be deactivated.

F. COILS AND PIPING

1. Cooling Coils and Piping

a. Use maximum 550- FPM face velocity for the calculated quantity of air passing through direct-expansion cooling coils and chilled-water cooling coils.

b. Pipe all cooling coils for counter flow of refrigerant against direction of airflow for most effective heat transfer. Chilled water or refrigerant shall enter on the airflow downstream side of coil and work through rows opposite the airflow. Design for water to enter at bottom and exit through top connection of the coil to relieve possible air binding. Install air vents at top of return riser.

c. Use 2-way control valves to provide a variable-flow chilled water system. Provide variable-speed drives at the pumps to save energy where economically feasible. Provide 3-way valves at the end of each pipe loop for continuous water circulation. Provide a sufficient number of 3-way valves to maintain the minimum flow requirements of chillers. Provide multiple chillers so that they may be staged.

d. Variable speed drives must be provided for the secondary pumps in primary - secondary chilled water systems.

e. Provide all coil sections with thermometers, a 3/4" globe drain valve piped to floor drain at system low point, a water strainer ahead of control valve, and gate valves in main chilled water supply and return for shutoff and repair of control valves.

f. All valves, fittings, strainers and pipes (up to the coil) shall be the same size, except for control valves which shall have reducers at valve inlets and outlets. Provide flexible connections at inlets and outlets to coils.

g. Provide Griswold Flow Control valves or equivalent at the inlet side all cooling coils downstream of the shut-off valves. Clearly emboss flow rating on a metal plate fixed on valve housing.

h. Provide a venturi flow measurement device, Barco-aeroquip or equivalent, on main chilled water line. Clearly emboss flow requirement on a metal plate fixed to venturi housing. Show direction of air flow through coils on diagrams.

i. Size chilled water coils on a basis of 12°F to 16°F water temperature rise.

j. Use direct expansion (DX) coils where close temperature control is not required; otherwise, use chilled water coils. DX coils make control of cold plenum temperature erratic and present operational difficulties.

1. Provide as many steps of capacity with solenoid valves as possible and use individual suction risers with oil traps.
2. Pipe liquid lines with stop valves, strainers, solenoid valves, and external equalizing thermal expansion valves.
3. Install sight glasses ahead of thermal expansion valve to observe a premature flashing condition.

2. Heating Coils and Piping

a. Size heating coils at 700 FPM maximum.

b. Use hot water as the preferred heating medium rather than steam because of relatively poor heat distribution across face of a steam coil, particularly on low heat demand.

c. Use 2-way control valves to provide a variable-flow hot water system. Provide variable-speed drives at the pumps to save energy where economically feasible. Provide 3-way valves at the end of each pipe loop for continuous water circulation. Provide a sufficient number of 3-way valves to maintain the minimum flow requirements of boilers. Provide multiple boilers so that they may be staged.

d. Arrange heating coils for counter flow and upward flow for best heat transfer and natural venting. Tailor coils for each project with sufficient allowance for warm-up and fresh-air load.

e. Size water coils for 20°F minimum water temperature difference, and entering water temperature of 180° F. Piping to hot water coils shall be the same as that required for the chilled water coils.

G. COOLING SOURCES

1. Refrigeration Systems

a. Direct Expansion (DX) Systems, because it is difficult to obtain modulating control of capacity, should be used only for single-zone units and other applications where modulation is not necessary.

b. Chilled Water Systems should be used for most multi-zone units and larger systems, where more precise control and better modulating capacity control is needed.

c. Package-type units with compressor, chiller, condenser, and controls all provided as a unit should be used when possible to simplify installation.

d. An absorption type machine may be considered only if steam is available from a central plant that will be operating during summer or special gas incentives are available.

e. Machines should be piped for parallel flow.

f. Size piping at a friction loss of 5 feet of water per 100 feet of pipe maximum with maximum velocity not to exceed 8 feet per second.

g. Select evaporators and condensers so water velocity through tubes is 9 feet per second maximum.

h. Thermal energy storage systems and co-generation systems shall be considered only when substantial incentives are offered by the utility providers to offset the additional cost.

2. Chilled Water Pumps:

a. Size pumps for the total pressure drop through the system, including piping, chiller evaporator, coil, three-way control valve and "Griswold" flow control valve.

b. For primary secondary system, provide two redundant secondary system pumps. Size each pump for 100% of system capacity, so one functions as 100% standby. Both pumps shall be designed with variable speed drives and automatic alternating controls. Where primary secondary system is not used, provide a dedicated pump for each chiller that is sized for full capacity of the chiller.

c. Use end-suction, pedestal-mounted pumps with mechanical seals and flexible couplings for all except very large systems, where it may be necessary to use double suction pumps.

d. Install a gate valve and strainer on the suction side and a balancing cock on the discharge side of each pump, and a chemical feeder from the supply to return line.

e. Bolt pumps directly to a concrete base unless located over or under a critical occupied space, when they should be mounted on inertia anti-vibration bases. Install flexible connections in piping to pumps.

3. Cooling Towers

a. Size cooling towers at minimum of 2ºF above current ASHRAE design wet bulb temperature to get 120% to 150% of required capacity, to guarantee full capacity from chiller at any wet bulb conditions and to allow for fouling of tower.

b. Provide a bleed-off system and a chemical feeder to prevent mineral build-up and to maintain water quality.

c. Provide for make-up water to replace evaporation and bleed.

d. Locate cooling towers to avoid unsightly conditions and so that noise generated by fan will not be objectionable in adjoining buildings. Provide louvered screens, masonry walls, or planting for concealment.

e. Locate cooling towers so that the discharge air from the cooling towers will not contaminate air handling unit outdoor air intakes, openings into the building and pedestrian or student occupied areas to minimize the possibility of Legionnaires' Disease.

4. Condenser Water Pumps:

a. Use two system pumps with variable speed drives. Size each pump for 100% of system capacity so one pump can function as 100% standby. Provide automatic alternating controls.

b. Size pumps for the actual capacity of the chiller requirements -- approximately 3 gpm per ton of refrigeration.

c. Design condenser water piping the same as for chilled-water piping. Make sure that cooling tower elevation or suction pipe sizes are adequate to provide a positive suction head at the pump.

H. HEATING SOURCES

1. Boilers

a. Use Low Nox hot-water boilers to avoid expense of heat exchangers.

b. Use two or more gas fired package-type boilers, cast-iron or steel water-tube with burner and controls all mounted as a unit, for larger systems and one for smaller systems.

c. Operate at 180°F to 200°F minimum with a temperature drop of 30°F maximum to prevent condensation of flue gases in breeching and stack.

d. Provide a combination low-water-cutoff and boiler-feed control with alarm mounted above centerline of boiler relief valve discharge. Connect boiler feed to full domestic cold water line pressure, taking care to see that CW pressure is greater than boiler operating pressure.

e. Pipe blowdown from low-water control and feeder to a hopper drain located adjacent to boiler.

2. Central Boiler Plant

a. Hot water from a Central Plant should be used if available.

3. Hot Water Heating System

a. Pumps:

1. Use two system pumps in parallel provide one system pump as standby. Size boiler primary recirculating pump as recommended by boiler manufacturer.

2. If close temperature control is required, select circulating pumps first and size piping to fit available pump head. In most cases, this will permit use of pipeline-mounted pumps for all secondary circuits. Close temperature control is usually not required and secondary circuit pumps are usually not necessary.

3. Use end-suction, pedestal-mounted pumps with mechanical seals and flexible couplings for all except very large systems, where it may be necessary to use double suction pumps.
4. Bolt pumps directly to a concrete base unless located over or under a critical occupied space, when they should be mounted on inertia anti-vibration bases. Install flexible connections in piping to pumps.

b. Piping:

1. Design for water velocity of 8 feet per second maximum, with pressure drop 5 feet per 100 feet of pipe maximum.
2. Arrange piping so heat source, expansion tank and cold-water make-up are on suction side of pump as indicated in latest ASHRAE handbook, Systems Volume.
3. Install a small chemical feeder on each system.

c. Expansion Tanks:

1. Size expansion tanks in accordance ASHRAE Guidelines, for 100 psi ASME Code working pressure. Expansion tanks shall be of the bladder or diaphragm type.

d. Relief Valves:

1. Provide ASME Code-rated relief for maximum heat input to hot water boiler.
2. Relief setting is limited to boiler working pressure or working pressure of weakest component in system.
3. Pipe discharge to 12" maximum above floor.

e. Air-Vent Valves:

1. Provide auto air vent valves at all high points in system or wherever air might be trapped in system. Locate valves on drawings.

4. Cold Water Make-Up

a. Cold water make-up to boilers, hot-water, chilled-water, and condenser-water systems should be made from a common line which has a reduced pressure backflow-prevention device installed under plumbing work.

b. Install a gate valve, strainer and check valve at make-up connections to closed systems, except that make-up to combination boiler-water feeder and low water cut-off on boilers should be full line pressure.

c. Provide water treatment for all closed heating and cooling systems and at all cooling towers.

I. SOUND AND VIBRATION CONTROL

1. Criteria

a. Because mechanical systems and equipment are a major source of disturbing noise within buildings, sound and vibration control measures must be incorporated to the maximum extent economically practical. In general, refer to current ASHRAE guidelines, District Guide Specifications, chapter 2.4 **"Environment and Sustainability"** of this Guide, and the following recommendations.

b. Since the District desires to achieve noise levels from HVAC systems better than 45 dBA, especially in instructional spaces, plan and describe in the "Basis of Design" narrative how this improved acoustical quality will be achieved together with the associated cost impacts.

2. Equipment Sound Levels

a. Schedule the sound level of the design base HVAC equipment on the drawings. These sound levels must be at the design conditions and tested per applicable current standards such as ARI Standards 260, 270, 370 and AMCA 300.

3. Duct and Fan Noise

a. Ductwork:

1. Use ducts of thicker sheet metal gauge with sufficient bends to reduce fan and equipment noise. Lined ductwork and/or attenuators may be used when recommended by the Project Acoustical Engineer. Duct lining, acoustical panels in ductwork and sound attenuator media when used shall be of the type that inhibits the growth of mold, mildew and fungi and shall not contain harmful VOC's or contain glass fiber.
2. Provide flexible connectors for ducts at fan connections
3. Do not locate sound attenuators above spaces where the self generated noise of the attenuator will increase the space sound level above requirements.

b. Fans:

1. Fan-noise in occupied spaces is typically caused by poorly constructed roof fans, roof fans operating at too great a tip speed, fan noise traveling through air intake louvers and then into adjoining spaces, and fan noise traveling to occupied spaces through inadequately treated return systems. Fan noise also comes from rooms without sound-attenuating walls or from roof-top units with inadequate sealing of roof openings and duct chases.
2. Locate fan and equipment rooms away from classrooms and other noise-sensitive spaces.

3. Make fan and equipment room walls of dense material, poured concrete or concrete block with all voids filled where feasible – or sound-attenuating walls of studs and gypsum board.
4. Provide details to assure adequate sealing of duct penetrations through roof or mechanical equipment room walls.
5. At roof fans exhausting from ceiling plenums over occupied areas, provide a sound attenuator installed at fan inlet.

4. Equipment Mounting and Isolation

a. For roof-top HVAC units, no roof penetrations are allowed except the minimum necessary for ducts and electrical conduit. All such openings shall be acoustically sealed with acoustical sealant. In addition, beneath the units provide a sound-isolation barrier of a close-fitting layer of ¾" waterproof plywood or cement board, sealed with acoustical tape to the curb.

b. For fans over 24" provide inertia type concrete bases with spring isolators. For smaller fans provide spring-type vibration isolator rails under fan and motor.

c. Floor-mounted pumps shall be bolted directly to concrete bases and shall have flexible pipe connections, except when located over or under an occupied area where noise could be transmitted by piping or building structure to occupied space. In this case, they shall be mounted on inertia type concrete bases with spring-type vibration isolators and shall have flexible connections rigidly anchored and braced to prevent elongation of the flexible connections.

d. Air compressors shall be mounted on spring-type vibration isolators, except larger sizes shall also have concrete inertia bases and flexible pipe connections.

5. Pipe, Conduit and Duct Connections to HVAC Equipment

a. Pipe, duct and electrical conduit connections to HVAC equipment with rotating or reciprocating components shall be provided with flexible connectors.

b. Provide spring, neoprene or rubber in shear type hangers as required for pipes and ducts near connections to HVAC equipment that are located near or serve acoustically sensitive spaces as directed by an acoustical engineer.

6. Classroom HVAC Sound Control:

a. To meet District standards, HVAC systems must be designed so that noise from the system does not cause the ambient noise in a classroom to exceed the level of 45 dBA as measured in accordance with ANSI Standard 12-60. Make design recommendations to the District to achieve a lower sound level, within reasonable economic limits

b. ASHRAE recommended design criteria for classroom HVAC sound control is Noise Criteria (NC) Curve NC-35. An HVAC system will probably meet the District 45 dBA criteria when no portion of octave-band spectrum of noise lies above NC-35 curve. (This is approximately equivalent to a sound level of 45 dBA from a standard sound level meter reading.)

c. Refer also to chapter 2.4 **"Environment and Sustainability"** of this Design Guide for additional standards and reference to CHPS Best Practices.

J. SPECIAL CONSIDERATIONS

1. HVAC and Refrigeration for Food Service:

a. Kitchen ventilation systems shall comply with the current CMC requirements.

b. The basic design concept of the Kitchen Ventilation Systems shall be in accordance with the District Standard Design. Drawings for these standards are available from the Design Manager upon request.

c. The kitchen ventilation system shall be capable of maintaining the kitchen temperature above 68 degrees F during heating and below 80 degrees F during cooling.

d. The kitchen ventilation system shall operate at a lower speed to deliver less air (only the amount necessary to maintain the room temperature) in order to conserve energy when the kitchen hood exhaust fans are off.

e. Locate control switches for HVAC equipment to prevent unauthorized use.

f. Kitchen Hoods:

1. Provide U.L. listed stainless steel hoods of the 100% exhaust type. Short circuit hoods where make up air is introduced directly into the hood are not allowed.
2. Provide a State Fire Marshal approved fire protection system inside hood.

g. Refrigeration Equipment For Walk-In Refrigerators:

1. The District does not provide standby refrigeration equipment for walk-in boxes, so accessibility is critical for repairs.
2. Do not locate in areas difficult to reach or service. Best location is a shaded area outside at grade level.

2. HVAC for Science Classrooms

a. Science classrooms include chemistry, physics, biology, physiology, physical earth, and earth science study facilities, flexible science labs, preparation/workrooms next to labs.

b. Where hazardous or toxic substances are used in the classrooms, special precautions must be taken, including the following:

1. Direction of airflow must be controlled to prevent spread of airborne contaminants and to protect personnel from exposure to toxic and hazardous substances.
2. Exhaust 100% of air supplied with no re-circulation.
3. Maintain constant airflow volume with exhaust operating at full capacity.
4. Air supply system must satisfy thermal requirements and provide necessary air balance.

c. Exhaust system:

1. Exhaust fans must remove a fixed air quantity from each hood. Hoods that have doors must have individual bypasses for air volume and face velocity regulation.
2. Exhaust system may consist of an individual fan for each hood or a fan serving a group of hoods.
3. Determine if there is a need for off-hour operation of hood exhaust system, and design the system accordingly.
4. Locate exhaust fans near the point of discharge to atmosphere so ducts will be under negative pressure and any leakage will be into duct.
5. Locate discharge openings with respect to fresh air intakes to avoid re-circulation.
6. Exhaust ducts for fume hoods and fans must be of non-corrosive construction. Motor shall be explosion proof. In all cases, follow the hood manufacturer's recommendations for exhaust fan sizing and system design.
7. Provide fire rated enclosure or fire wrap around fume hood duct, as required by applicable codes, when duct crosses other areas.

3. HVAC for Computer Rooms:

a. Provide HVAC to MDF, IDF, and any other computer rooms having special requirements for temperature and air-quality control.

b. The computer room HVAC units shall be for 24 hours operation, independent from the central system.

4. HVAC for Arts Classrooms:

a. Photography Classrooms: Supply dark rooms with 100% outdoor air for control of odor. Since air must be extremely clean to avoid spotty film, use high-efficiency filters. Duct systems into dark rooms must be light tight.

b. Art Classrooms: Provide 100% exhaust system, minimum six air changes to remove fumes from solvents, etc.

c. Ceramic Classrooms: For kiln, products of combustion must be removed, and a source of combustion air provided for indoor, gas-fired models. Since they emit large quantities of heat, that load must be considered in HVAC design. Provide 100% exhaust system, with a minimum of six air changes.

5. HVAC for Industrial Arts Classrooms:

a. General:

1. Industrial Arts Classrooms are spaces provided for instruction in construction, maintenance, and repair of industrial products. In addition to California Code of Regulations, Title 24, refer to CCR, Title 8 - "Industrial Relations" for additional design criteria.

b. Power Energy Technology:

1. Power Energy Technology shops require large amounts of heat to replace losses through large and frequently opened doors.
2. Since work is often done underneath the automobile or other equipment, floors should be kept warm by radiant heaters or other devices.
3. Provide an under-floor carbon monoxide exhaust system to remove engine exhaust gases.
4. If a paint spray booth is installed, it must be exhausted in a safe manner. Makeup air to spray booth must be tempered for best painting results.
5. If a steam cleaning area is provided, it must be exhausted.

c. Construction Technology Shops:

1. Dust produced in wood working operations is both a health and fire hazard. In smaller installations, a packaged dust collector using a vacuum cleaner principle may be provided. Large groups of wood working machines will require a ducted, central collection system with a centrifugal separator. In either case, collection equipment must be located so that disposal of collected dust is easy and economical. Dust collection system should include the following:
    a. Exhaust pipe system including dust collector and skimmer are covered in Guide Specifications for use in Senior and Junior High Schools.
    b. Avoid under-floor piping, if possible.
    c. Keep flexible exhaust piping to a minimum. Where flexible piping is used, a non-collapsible type of piping should be installed.
    d. Drop exhaust piping along columns or walls.
    e. Note minimum height of hopper outlet for placement of 55-gallon drums.

f. Note maximum height of exhaust piping inlet to dust collector on existing building where exhaust piping may penetrate existing building window.

g. Coordinate exhaust piping with suspended light fixtures which are free to swing a minimum of 45 degrees from vertical in all directions.

h. Provide seismic restraints for exhaust piping per provisions of NFPA pamphlet 13.

i. Refer to standards and requirements of ACGIH Industrial Ventilation - A Manual of Recommended Practices -- AMCA, and SCAQMD, as applicable.

2. If spray painting is to be done, a bench type or floor type spray booth should be installed.

3. Heating system must be large enough to accommodate outdoor air introduced to equal exhaust.

d. General Manufacturing Shops:

1. General manufacturing shops may contain high-heat producing equipment such as furnaces and ovens. These must be shielded or ventilation must be provided to control local environment.

2. Welding and soldering operations produce toxic fumes which must be removed through hoods or other local exhaust.

3. Dip tanks and plating tanks must be hooded to prevent spread of toxic vapors.

6. Underground Parking Ventilation

a. Ventilate underground parking areas continuously by forced air exhaust systems in compliance with current codes.

b. Provide carbon monoxide monitors to control the exhaust fans and to annunciate an alarm on high CO levels as required by code.

c. Do not provide exhaust ducts outside garage fan room, unless garage is very large and odd in shape, thus requiring some ducts. Locate fan in fan room or enclose fan with chain link fence for vandal protection.

d. Assure that exposed ducts or equipment are protected by bollards or other enclosure.

e. Coordinate location of ducts, piping and equipment to avoid overhead obstructions into the minimum vertical clearance (8'-0") along the vehicular route connecting the parking garage entrance to the accessible spaces, and at the accessible spaces themselves. Coordinate location of ducts, piping, and equipment to avoid obstructing the accessible route, and to avoid protrusions >4" into the protected zones that are not cane detectable by visually impaired persons.

7. Restroom Ventilation

a. Provide a minimum of 10 air exchanges per hour in restrooms.

b. Provide conditioned air to multi-occupant restrooms utilizing relief air from large adjacent classrooms with backdraft damper.

c. Toilet exhaust duct shall be routed to the roof. Sidewall toilet exhaust is prohibited.

d. Toilet exhaust fans smaller than 3500 CFM are to be direct drive.

3.7 ELECTRICAL POWER AND LIGHTING

A. GENERAL REQUIREMENTS

B. LIGHTING SYSTEMS

C. ELECTRICAL POWER SYSTEMS

D. EMERGENCY POWER SYSTEM

E. PHOTOVOLTAIC SYSTEM

3.7 ELECTRICAL POWER & LIGHTING

A. General Requirements

a. Life safety and preservation of property are two critical factors in the design of the Electrical System. Safety to personnel cannot be compromised and only the safest systems must be considered.

b. For existing facilities the Architect-Engineer shall procure from District all available electrical drawings and underground utility plans. Other site plans or site information that may exist are available in the District office for consultants' research. The Architect-Engineer must visit the site to verify plan information against site conditions to obtain information not indicated on the drawings. New designs shall reflect existing conditions and applicable modifications made to address the project's requirements.

c. Off-site work or work within easements shall be designed in accordance with the requirements of the agency having jurisdiction.

d. All power wiring shall be in conduit or raceways. Low-voltage communication or signal wiring shall be continuous without splices between devices, and shall be in conduits or raceways.

e. Electrical receptacles and light switches shall be located to allow easy access by users, reflect probable area(s) usage, and equipment locations. Receptacles or switches serving equipment must be accessible, and located in compliance with CEC and California Administrative Code -Title 24 requirements.

f. Provisions shall be made for wire management of power cords accessing the receptacles and shall be coordinated with the work surfaces, counters, cabinetry, storage units, etc.

g. All panels and control equipment must be readily accessible.

h. The District "Guide Specifications" complement the "Design Guide" and must be reviewed concurrently with these criteria.

i. Avoid running conduit on the roof unless it is absolutely necessary, the length of conduit run shall be minimized and installation shall be detailed appropriately to accommodate roof replacement. Prior to designing a system with roof mounted conduits the Architect-Engineer shall obtain approval from the OAR or Design Manager.

B. Lighting Systems

1. General Guidelines

a. Lighting design shall conform to California Energy Commission Energy Efficiency Standards for nonresidential buildings, and shall achieve greater efficiency in accordance with the requirements described below.

b. Lighting design shall comply with guidelines and follow recommendations and procedures of the Illuminating Engineering Society of North America (IESNA) in its "Lighting Handbook" and "Recommended Practice on Lighting for Educational Facilities, ANSI/IESNA RP-3-00," as well as other documents referenced herein.

c. Refer also to alternative design approaches and daylighting requirements presented in the **"Environment and Sustainability"** section of the "School Design Guide."

d. For other guidelines, refer to The Collaborative for High Performance Schools "CHPS Best Practices Manual, Volume II," sections on "Electric Lighting and Controls" and "Appendix" (available at http://www.chps.net/).

e. Provide uniform light distribution in all learning and working spaces. Interior lighting systems shall provide illumination without discomfort caused by glare. Consider reflectance of room surfaces and coordinate with architectural finishes.

f. Avoid harsh or extremely bright lighting. Minimize veiling reflections in task details.

g. Utilize daylight harvesting to the maximum extent feasible in all spaces, integrated with electric lighting, photo sensors, and dimmer controls to reduce electricity use.

h. Utilize high color-rendering source in which appearance of people and spaces is enhanced.

i. Consider maintainability of lighting system, including susceptibility to dirt collection, ease of cleaning and relamping.

j. Provide in all display cases lighting to illuminate each shelf and back individually.

k. All lighting circuits shall have a power factor equal or greater than 0.95.

l. The lighting controls in Theatrical applications shall be interfaced with the Fire Alarm System to cause house lighting to be forced on during alarm conditions, regardless of manual control settings. In addition the the lighting control system shall also interface with the central public address and autonomous public address system.

m. Wall mounted light fixtures shall be located in compliance with ADA requirements.

2. Illumination Criteria

In general, design to achieve the following maintained average foot-candle levels on the task plane at levels not lower than those indicated below, unless alternative lighting designs are submitted and approved by the District that demonstrate compliance with these criteria.

Interior Spaces:	**Foot Candles**	**Light Source**
a. General Classrooms (See special section covering all classrooms.):	30-50	Linear Susp. Fluorescent
b. Science and Technology Classrooms:	30-50	Linear Susp. Fluorescent
c. Shops and Drafting Classrooms:	50	Linear Susp. Fluorescent
d. Library:	30	Linear Susp. Fluorescent
e. Auditorium (higher level is for lecture/testing uses):	30	Halogen/ Fluorescent
f. Multi-Purpose Room:	30-50	Fluorescent
g. Gymnasium (see special section):	50	Fluorescent
h. Locker, Exercise and Weight Rooms:	10	Fluorescent
i. Dining Areas (on dimmers):	30	Fluorescent
j. Food Preparation Area:	50	Fluorescent
k. Custodial Rooms:	20	Fluorescent
l. Offices:	30-50	Fluorescent
m. Corridor/Stairways (1 FC min. Emergency Exit Lighting):	10	Fluorescent
n. Restrooms:	10	Fluorescent
o. Parking Garage:	5	Fluorescent
p. Parking Garage Entry Zone (Daytime Only):	50	Fluorescent
q. Machinery and Equipment Rooms:	50	Fluorescent
Exterior Spaces:		
a. Building Exterior (Walks, General Areas):	2	
b. Exterior Corridors (Covered Walks):	10	
c. Parking Lots:	1 min.	
d. Athletic Fields:		

Refer to "Illumination Engineering Society of North America-IESNA standards" for specific requirements for each sport activity..

3. Specific Lighting Criteria

a. Classroom Lighting Systems

1. Follow the recommendations of the Southern California Edison's "Classroom Lighting Guidelines," except as modified herein.

2. Classroom lighting shall be an integrated combination of daylighting and electric lighting providing energy conservation through lighting controls. (See also the **"Environmental and Sustainability"** section of these guidelines.)

3. The typical classroom model to meet or exceed the criteria will consist of two rows of continuous suspended indirect or indirect/direct fluorescent luminaires parallel to the window wall. (Do not use three rows.)

   Each row 20 feet long, plus a 12-foot white board luminaire. (preferred system in order to provide greater illuminance of the white board area)

4. Lamps in each row for general illumination shall be two high-output T8 lamps or one dimmable T5HO lamp with matching ballasts. Ballasts will usually have a normal ballast factor and characteristics in compliance with specifications section 16500-2.02. (Refer to "Controls" for switching or dimming.)

5. Align suspended rows and supporting cables with the ceiling grid. In a typical classroom rows will be spaced 14 feet apart; however, vary the length and spacing of the two continuous rows of luminaires to suit the size and shape of the classrooms and their specific functional needs.

6. For larger science, technical and art classrooms, use a similar model, but use longer rows. Since these rooms sometimes have perimeter work counters, and the illuminance should be greater over the counters, adjust the spacing to adequately illuminate the counters. Use a higher ballast factor if necessary to increase the illumination.

7. In High and Middle School Science Classrooms use the suspended dual-mode fixture with two high-output T8 indirect lamps for general illumination and one dimmable T8 downlight for AV presentations, switched so that both lamp sets cannot be on at the same time. Use a whiteboard luminaire in these classrooms.

8. Luminaires must illuminate the ceilings and walls as well as the task plane (desktop).

9. Uniformity of illuminance on the desktop is important – especially on the core desk space, beginning four feet from walls. Generally, a max: min ratio of 2.5: 1.0 should not be exceeded.

10. Provide ceiling illuminance equal to or greater than the desktop illuminance. Uniformity of ceiling illuminance is important, and the maximum to

minimum ratio should not exceed 12:1. Provide wall illuminance (opposite the window wall) approximately 50% or more of ceiling illuminance.

11. Provide teaching wall and white board illuminance at 20 fc minimum. When using wall-washing whiteboard luminaires, illumination of the instructional wall (whiteboards, maps, etc.) should be 30 fc minimum to 40 fc maximum.

12. Wall-washing whiteboard luminaries shall be provided in accordance with IESNA recommendations, to avoid reflections in the board to the nearest viewer, to avoid a bright patch above the board, and to evenly illuminate the board without a steep fall-off toward the bottom.

13. During the design development phase provide point to point lighting calculations to graphically demonstrate the light levels on all room surfaces. Use the input data presented in the SCE "Classroom Lighting Guidelines," except for any modifications in this Guide. (Note that the **"Architecture"** section of this Guide calls for the following minimum surface reflectances: Ceilings – 85%; Walls – 60%; Floors – 30 %.)

14. Lighting power density (LPD) in the classroom shall not exceed 0.85 watts per square foot (w/sf) connected load.

b. Gymnasium Lighting

1. Illuminate gyms with top daylighting for daytime use (not side lighting through windows), using skylights or tubular daylighting devices.

2. Using average lumen output of the daylight device for the brightest 2,400 hours of the year (based on TMY2 weather data), design daylighting to provide 30 to 35 fc average on the floor with a max./min. ratio of 2:1 (all within reasonable tolerances).

3. Provide electric lighting for nighttime use and daytime supplementary lighting using high-bay or high-output fluorescent luminaires (T5HO lamps), accompanied by daylight sensors to selectively switch or dim the lamps in response to the daylight illuminance. Lamps shall be switchable to four (or three minimum) different levels (including "OFF"). The Architect/Engineer of Record may propose fixtures with alternative light sources, justification and approval in writing from the District will be required.

c. Site Lighting

1. Campus and parking areas and building perimeters must be lighted to provide for the safety of people and the security of property. Provide adequate light, properly distributed to reveal such hazards as curbs and steps, and to illuminate dark and potentially dangerous

areas. Preferred light sources are Metal Halide and High Pressure Sodium.

2. Provide safety and security lighting on exterior walls of buildings, building entrances, parking lots, covered walks, and where needed to meet specific project requirements.

3. Provide lighting for parking lots using pole-mounted full cut-off light fixtures.

4. Luminaires must be installed in such a manner as to minimize glare for pedestrians and drivers, and to avoid light spilling onto adjacent properties.

5. Exterior luminaires and controls, including those located in stairwells open to the exterior, shall be weather and vandal resistant. Locate luminaires and sensors at 10 feet or more above grade wherever feasible, or otherwise as high and out-of-reach as possible.

d. Sports Fields

1. For sports fields the luminance must satisfy the requirements of players and spectators. Uniformity of horizontal and vertical illumination over the entire playing field is especially important for such high-speed sports as baseball, football, and tennis.

2. Important factors include glare, luminance contrast, color contrast, flicker and spill light.

3. Luminaires must provide spill and glare controls to minimize offsite illuminance and glare and sky glare.

4. Refer to IESNA standards for specific requirements of each sport activity.

e. Stages, Auditorium, and Multi-Purpose Rooms in Middle Schools and High Schools

1. A Theatrical Lighting and Sound Consultant must be engaged for the design of these systems; particularly for Middle Schools and High Schools.

2. Lighting and controls are required for stages and platforms, house lights, work lights, and orchestra pit lights.

3. All stage, auditorium, and multi-purpose rooms lighting must be easily and safely accessible for relamping and servicing. Such provisions must be clearly indicated on the drawings. For elementary schools multi-purpose room stage lighting requirements refer to f below.

4. Proscenium stages and platforms require lighting from the front, side and back.

5. Stage lighting equipment should not be visible to the audience; however, in cases where existing conditions makes it necessary the Architect/Engineer shall obtain approval from Design Manager prior to proceeding with the

design. If the equipment is mounted in visible locations, consider instrument spill light, glare and nearby reflective surfaces in the design.

6. The most common stage front lighting in the auditorium and multi-purpose room ceiling is commonly referred to as the ceiling cove or beam position. This is plotted on a 45-degree angle from head height at approximately 5 feet of an actor standing at the proscenium line to the auditorium or multi-purpose ceiling. Lights located in this position provide the basic illumination for the downstage acting area. In a large auditorium or multi-purpose room, several ceiling slots may be required to provide adequate lighting on the forestage or apron, and the area immediately behind the front curtain.

7. Side lighting supplements the front lighting to give three-dimensional properties to the performers and setting. This lighting equipment consists of ellipsoidal spotlights mounted on a pipe frame secured to the wall, at each side of the auditorium or multi-purpose room. These positions are called box booms and the lighting is intended for the apron area only or cross lighting for deeper into the stage.

8. Side light for the remaining acting area (behind the proscenium arch) can either be from positions on the end of electrical battens in the air or on separate movable boom poles in between each wing (this low side light is most commonly utilized in dance).

9. On-stage lighting provides front, upstage, top, high side, back lighting, scenery and cyclorama lighting. The lighting equipment for on stage lighting consists of rows of PARs, ellipsoidal spotlights, fresnels, and cyclorama lighting on overhead electric battens. The number of rows and lighting equipment depends on the size of the stage. Typically, one electric batten is supplied for each 8 feet of acting area depth for front lighting fixtures. At a minimum one additional electric batten is needed for the last row of acting area back and side light fixtures. If there is a cyclorama, or background scenery, another electric batten will be needed for those light fixtures.

10. In the on-stage area, 2 and 3 circuit wall pockets need to be provided for low side lighting. Typically, for a medium size stage, provide approximately 8 wall pockets distributed along the side and backstage areas. In addition, floor plates or movable booms with weighted bases and side arms should be provided.

11. Coordinate stage lighting with curtains, draperies, grid beams, counter-weight suspension, and light battens to assure that border lights and cables are concealed and properly supported.

12. In addition to the stage lights, dimmable house lights and switchable stage work lights must be provided for general illumination during rehearsals and other activities outside performance.
    a. Auditorium and Multi-Purpose Room lighting controls shall be interfaced with the Fire Alarm System to cause house lighting to be forced on regardless of manual settings.

13. Every space with a stage should include front lighting with dimming controls. The following elements can be included as the program and budget allows, in order of priority as follows:
    a. Back light
    b. Background scenery light
    c. High side light
    d. Box boom
    e. Low side light

14. For a larger auditorium or multi-purpose room, every effort should be taken to include as many elements above as possible, working down the list to insure that the highest priority takes precedent. The smaller the space gets (along with the budget), the more elements can be taken off the list.

15. For auditoria and multi-purpose rooms to be also used for lectures and testing, provide supplemental fluorescent lighting. (Pulse-start metal halide may be considered.) The supplemental lighting shall be turned off automatically by dimmer bank controls during performance.

16. Provide orchestra-pit lighting and receptacles for pit lights when pits are provided.

17. If campus does not have an emergency generator, provide normally off emergency lighting that will automatically be forced on without human intervention during a power failure, the power could be supplied from central battery/inverter system to provide a minimum one foot candle throughout the area. The designer can utilize a portion of the normal lighting luminaires or separetelly normally off luminaries for the emergency lighting functions. In existing facilities, perform emergency power load analysis to make sure the existing generator or central battery inverter system is capable of handling the emergency lighting load addition.
    a. Provide overhead fixtures (some of the non-dimmed house or supplemental fixtures), which are normally off, and only turned on automatically in case of loss of power.
    b. Provide LED aisle lighting at stairs and aisles in Auditoria.

18. Each theatrical fixture should be hung by theatrical c-clamp onto a schedule 40 black pipe. This shall allow the re-location of each fixture depending on the performance or designer's needs.

19. Provide each hanging fixture with a theatrical safety cable.

20. Provide each fixture with a cord and theatrical plug. (NEMA L5-20 twistlock connectors)

21. Provide each fixture with gel frame for color.

22. Provide a variety of accessories such as barn doors or pattern holders.

23. Near each position pipe or attached to each pipe, provide distributed electrically housed outlets provided by the supplier of the theatrical lighting and control system. Each theatrical raceway should house enough circuits and receptacles to plug in each fixture located there separately, with a minimum of 1 or 2 spares. Raceways can be provided with pigtails (if not seen by the audience) or with flush receptacles.

24. All circuits should be clearly labeled. Circuit numbers for stage lighting should begin at the front of the stage and increase sequentially as they progress from stage left to stage right. The next row moving towards the rear of the stage again must be numbered from left to right, and so on to the rear of the stage. Next should be the anteproscenium luminaires from house right to house left, then the side wall mounted luminaires, start numbering them from the right side from top to bottom, and proceed to the left side, again from top to bottom. Next should be the wall packets which should be numbered from stage left to stage right; then the ceiling mounted orchestra pit luminaires from house right to left, and then the house luminaires from the front to the rear of the house. Circuit numbers should correlate one –to-one with the dimmer that they are connected to.

25. Provide at least a single dimmer for each circuit. Common dimmer rack sizes are 96, 48, 24 and 12, or any combination thereof. Typically, they consist of 3-phase power and accept a 40-200amp feed depending on size and load.

26. To control the operation of the lighting equipment, a dimming system and control system must be provided. The dimming system typically consists of dimmer racks that include dimmer modules and control modules; a lighting control console, and stage manager's panels.

    a. Locate dimmer racks in a locked, well ventilated room with thermostatically controlled ventilation where the ambient temperature does not exceed 30°C (86°F).

    b. Locate the control console receptacles in a control room at the rear of the auditorium seating area.

c. Locate a stage manager's panel in a lockable enclosure that can control the stage related luminaires, and independently with momentary switches mounted adjacent to the enclosure the on/off control of the orchestra and house lighting; these controls shall be preferably located within the stage area, hidden from view of the audience, and in the control booth.

d. Provide a portable lighting control console with flat screen monitor to set up and control cues and lighting scenes. Provide control receptacles located in the house and on the stage so that the lighting console can be moved to those areas if needed.

e. In addition to the control receptacles, a 120V, 20-amp duplex receptacle must be provided near the control receptacles.

f. Provide momentary non-propriatary key operated switches as part of the entrance stations at auditorium main entrances for the on-off controls of the orchestra and house luminaires.

27. The dimming system must be interlocked with the fire alarm system. In the event of a fire emergency the house lightsshall be forced on at full brightness automatically.

28. If there is an attic over Multi-Purpose Rooms and Auditoria, provide top access lighting fixtures, catwalks and attic lighting.

f. Elementary schools Auditorium or Multi-purpose Room (MPR) stage lighting shall consist of:

1. A minimum of 12 feet two circuits power track consisting of (3) 4 feet power track segments, with a minimum of two light fixtures with (1) 200 watts PAR lamps in each four feet power track segment. Locate power tracks on stage ceiling area two feet away from main curtain. In addition, provide (1) two feet single circuit power track with (1) 200 watts PAR lamps on each side of the stage.

2. A minimum of (5) 500 watts Fresnel theatrical lights. Provide one electrical 20 amp, 120 volts receptacle for each fixture, place receptacle directly above fixture location. Fixtures shall be clamped on a pendant mounted pipe batten; locate pipe batten approximately 12'-15' from proscenium opening over MPR seating area to illuminate forestage and curtain. Each fixture shall be dimmed individually.

3. Provide a dimmer panel and relay cabinet with a minimum of twelve 1000 watts dimmer circuits. Panel shall be recessed mounted in new construction, and surface mounted in existing facilities renovation projects.

4. Provide interface between theatrical lighting and fire alarm systems. In case of fire alarm, the lighting controls must automatically force on the house lighting regardless of manual settings.

5. Refer to Elementary School Multi-Purpose Room Educational Specifications for additional information.

4. Lighting Controls

a. Refer to Specifications Section 16515 for technical requirements. Provide a Central Lighting Control System that covers all areas designated and/or rooms in the school. Provide a pathway from the "main" lighting control panel to the site's local area network (LAN) for remote management, and a pathway between all lighting control panels for interconnections.

1. The lighting control system shall "sweep off" all controlled interior lights and selected exterior lights that are not controlled with an occupancy sensor at pre-determined programmable intervals during unoccupied times.

2. Time-clock programs shall allow seven-day programming functions, summer and holiday schedules and special events.

3. Lighting control equipment shall be locked, located, or otherwise made secure against vandalism.

4. Provide lock type, vandal resistant key operated switches that are part of the lighting control system in public areas such as, but not limited to hallways, restrooms, audience spaces and entry areas of gumnasiums, auditoriums, and similar locations.

5. Lighting control panels shall be equipped with control relays for normal and emergency circuits as needed.

6. The centralized lighting control system shall be connected to the site's LAN system to allow remote access fro programming and maintenance.

7. Interior photosensors for daylighting control shall be located and wired per manufacturer recommendations. The Designer is required to coordinate with the manufacturer to determine the best location for the sensors and the most appropriate wiring approach, which could be open or close loop.
    a. Open loop wiring: utilize open loop photosensor placement for large open areas, areas where people are moving through, and in areas where precise lighting levels are not critical; these areas include but are not limited to large open office spaces with several occupants, lecture halls, auditorium and multipurpose rooms, and similar spaces.
    b. Close Loop Wiring: Utilize close loop photosensor placement for areas where precise task-based lighting levels are required, and in areas where occupants remain in the space for talking; these areas include but are not limited to classrooms, laboratories, small offices and conference rooms, and similar spaces.

8. The lighting control system shall cause the lights to "blink" at pre-determined but programmable intervals prior to sweeping the lights off.

b. The centralized lighting control system shall include but not be limited to the following areas:

1. Corridors and Stairs. Refer to 4.d below.

2. Locker Rooms. Provide ceiling-mounted occupancy sensor(s) as required for full coverage. Occupancy sensors shall turn off all lights in the room via a pre-set but programmable interval after the room is vacated.

3. Gymnasium. Provide lock type, vandal resistant key operated switches for general lighting On/Off.

4. Auditoria and Multi-Purpose Rooms. Provide lock type, vandal resistant key operated switches for On/Off control of general lighting. If this or any other area or room is intended for general assembly, and utilized in a manner that requires dimming or turning off the lighting, the house lighting shall be interfaced with the Fire Alarm System, which in case of a fire emergency will force the lighting fully on regardless of the manual control settings. (standalone control)

5. Cafeteria/ Kitchen. Provide ceiling mounted occupancy sensor(s) with automatic on-off switch as well as by-pass lock type, vandal resistance key operated switches. Motion sensor(s) shall turn off all lights in the room after a pre-set but programmable interval after the room has been vacated. Quantity and placement of occupancy sensors shall allow detection of persons located throughout the room.

6. Laboratories and Shops with controls similar to classrooms.

7. Staff restrooms lights and exhaust fans (fans interlocked with lights). Restroom lights and fans shall be controlled from the lighting control panel via assigned relays. Provide ceiling mounted occupancy sensors, and by-pass toggle switches for system override adjacent to the door. The sensor shall turn off the lights in the room via a pre-set but programmable interval after the room has been vacated.

8. Student's restrooms lights and exhaust fans (fans interlocked with lights). Restroom lights and fans shall be controlled from the lighting control panel via assigned relays. Provide by-pass lock type, vandal resistance key operated switche adjacent to the door, and ceiling mounted occupancy sensors for on/off controls. The sensor shall turn off the lights in the room via a pre-set but programmable interval after the room has been vacated.

9. Main Office, Attendance Office, and other offices where clerks are always present. Provide non-locking local switching for manual operation. In addition, use light sensor(s) to reduce electric lighting levels in areas where natural lighting contribution is significant.

10. Private Offices and conference rooms. Provide a wall-mounted occupancy sensor with automatic on-off capability in addition to manual switches. Provide a daylight sensor to reduce the electric lighting levels in larger windowed offices. The lighting level reduction shall be commensurate to the natural lighting entering the room to maintain predetermined foot-candle levels uniformly throught the room.

11. Custodial and Equipment Rooms, and unsupervised rooms. Provide occupancy sensor with automatic on-off capability in addition to manual switches. The sensor shall turn off the lights in the room via a pre-set but programmable interval after the room has been vacated.

12. Covered walks. Luminaires that are part of the security lighting shall be controlled via photo-sensor, and combination photo-sensor and time clock for luminaires that are not part of the security lighting. Provide labeled zoned key operated override switches with indicator lights at Main Office clerical area to turn lights either on or off for non-recurring, or off schedule events.

13. Parking lot and parking garage lights. Controls for these areas shall be equipped with labeled zoned key operated override switches with indicator lights at the garage area and Main Office clerical area to turn lights either on or off during off scheduled hours.

14. Attic lights, and roof lights: provide two hours local toggle switches with pilot lights at access points to this areas.

c. Classroom Lighting Controls

1. Provide low-voltage lighting controls for each classroom as prescribed in the Southern California Edison "Classroom Lighting Guidelines." Include the following switches at the teaching wall: white board light(s), quiet time, and AV switches, and dimming or selective-switching controls. Lighting shall be configured for on/off/dimming-day light harvesting control with occupancy sensors turn off the lights after the room has been vacated.

    a. Wall-mounted dimmer switches shall provide for manual light reduction when daylighting is adequate, or for darkening of the room for AV presentations. Locate dimmer switches as part of the teacher's switch bank at the teaching wall, easily accessible to the teacher.

2. Provide dual technology occupancy sensors (infrared and passive sonic) with auto-on-off capability. Occupancy sensor(s) shall turn off all lights in the room after a pre-set but programmable interval after room has been vacated. Occupancy sensors shall be wired in closed loop format.

3. Provide photo sensor(s) with necessary interconnections to the classroom lighting dimming controls. Amperage changes in light fixtures shall be proportional to external light changes. In addition to manual dimming the fixtures shall automatically dim at a rate that is slow enough to not bother occupants. Locate photo sensors in an optimal place for the lights to be controlled. Photo sensors shall not be positioned where the device will be affected by direct sun light, room luminaires or obstructions.

4. Light fixtures within 15'-0" of windows shall be separately dimmed and shall also be controlled by a ceiling-mounted daylight photo sensor to adjust the light intensity in the classroom to a uniform level.

5. Provide for classroom lighting controls to be connected to the Central Lighting Control System in the future, or initially if specifically authorized by the District.

6. Provide a separate switch to control the white board light. Locate switch together with other switches on teaching wall.

d. Corridor and Stairs lighting

1. Corridor and Stairs lighting shall be controlled by dual technology occupancy sensors. Emergency lighting in corridors and Stairs shall be switched together with normal lighting via appropriate emergency lighting control. Upon failure of normal power, emergency lighting fixtures shall automatically operate from the emergency power source.

2. One third of corridor and stairway luminaires shall be controlled by key operated switches located in the vicinity of the controlled luminaires, and as described above in 4.b.12. The remainder two thirds of the corridor and stairs luminaires shall be controlled on/off by multiple occupancy sensors positioned to provide complete coverage within the controlled area. Occupancy sensors shall control the on function only when the one third non-occupancy sensor controlled luminaires are activated.

3. Emergency lights shall turn-on in case of power failure. Upon return of normal power all emergency fixtures shall return to their prior state.

e. Building Exteriors and outdoors lighting

1. Building exterior luminaires that are part of the security lighting shall be controlled via photo-sensor, or combination photo-sensor and time clock for luminaires that are not part of the security lighting.

2. Provide labeled zoned key operated switches with indicator lights at Main Office clerical area to turn lights either on or off schedule events.

f. Emergency Lighting

1. Emergency lighting controls shall be equipped with by pass circuitry that will bypass all manually operated switches, lighting control systems, dimmers and occupancy sensors during power failure situations, design shall comply with applicable codes and regulations. Each area of luminaries or groups of luminaries shall be equipped with and controlled by a UL924 listed emergency lighting control units to allow the detection of localized power failures.

2. LED exit sign luminaries shall operate continuously. All other emergency lighting luminaries shall either be switched with its associated general lighting luminaries or be normally off and only operate during a power failure. Continuously operating luminaries other than LED exit luminaries is not permitted.

3. All emergency lights shall be powered by the emergency power source, and may be controlled by the lighting control panel.

4. Emergency lights that will also be used for general lighting shall be switched together with the general lighting for the same area, but shall turn on (at full brightness for dimmable fixtures) upon loss of general power.

5. Areas such as Gymnasiums that utilize HID lighting and also require emergency lighting shall be equipped with normally off emergency luminaries. These luminaries shall remain on after the restoration of utility power for a period long enough to allow a majority of the HID luminaries to cool down and restrike (20 to 30 minutes). The use of the quartz restrike option within the HID luminaries shall not be specified or used.

6. All emergency system luminaries shall be labeled as being part of the emergency lighting system with labeling similar

7. Provide connection details for each style of control for the emergency lighting on the drawings. Also indicate on the drawings adjacent to the luminaries or groups of luminaries the style of control that is required for the luminary.

g. Outdoor Security Lighting

1. Outdoor security lighting shall operate from dusk until dawn, seven days per week.

2. All lights designated for security shall be labeled "SL".

3. Outdoor non-security night lights shall operate from dusk until pre-determined but programmable time to accommodate night staff and special school functions. Provide override switches as described in 4.b.12 above.

4. All lights designated for night lighting shall be labeled "NL".

5. Lighting Power

a. Lighting branch circuits shall be 20 ampere, unless otherwise required by the system.

b. Provide a distributed balanced load on all phases for panels and branch circuits.

c. Lighting panel boards shall be 480/277-volt, 3-phase, and 4-wire, with thermal-magnetic bolt-on type branch circuit breakers. (Small sites or smaller buildings at large sites may use 208/120-volt, 3-phase, and 4-wire panels.)

d. Provide approximately 30% spare capacity in all new panels installations.

e. The energy budget for all connected lighting loads in all buildings shall not exceed California Energy Commission maximum lighting power density allowance.

6. Luminaires

a. Selection of luminaires shall be made on the basis of lighting characteristics (including uniform distribution and glare), appearance, cost, maintainability, energy efficiency, and resistance to vandalism.

b. Each luminaire shall be fully specified and correlated with the Fixture Schedule. Provide not fewer than three manufacturers' products for each application. On the Schedule, provide full data for each luminaire on lamps, ballasts, input wattage, and mounting type.

c. All installed luminaires shall meet the requirements of the CBC for seismic anchorage.

d. Applications.

1. Classrooms, Science and Technology Classrooms, Libraries: Linear Suspended Indirect or Indirect/Direct Fluorescent Luminaire.

2. Shops: Same as classrooms, or industrial surface-mounted, or suspended open fluorescent luminaire if appropriate to the architectural design. Specify appropriate fixtures to eliminate dust collection in high dust concentration areas; such areas may include wood and metal shops.

3. Wall-Washer (Whiteboard Light): Single-tube linear fluorescent luminaire, with characteristics described above.

4. Offices: Same as classrooms, or recessed 2'x4' recessed troffer fluorescent luminaire.

5. Teachers Workrooms: Same as classrooms, or recessed 2'x4' recessed troffer fluorescent luminaire.

6. Gymnasium: Suspended or ceiling-mounted fluorescent troffer with protective cage and six T8, or T5HO lamps, switched in pairs. (Luminaires with alternative light sources will be considered.)

7. Shower Rooms, Locker Rooms, Other Damp Locations: Fluorescent luminaire with acrylic lens, vandal-resistant, with IP ("Ingress Prevention") Rating of IP 64.

8. Multi-purpose Room: Suspended indirect/direct fluorescent luminaire or recessed fluorescent luminaire with lens, as appropriate to architectural design.

9. Auditorium House Lights: Fluorescent luminaire for general illumination, plus dimmable halogen house lights for performances.

10. Corridors/Stairways: Wall or ceiling-mounted fluorescent luminaire with polycarbonate lens.

11. Lobbies: Wall or ceiling-mounted fluorescent luminaire with polycarbonate lens.

12. Student Restrooms: Fluorescent luminaire with polycarbonate lens, vandal-resistant, with IP ("Ingress Prevention") Rating of IP 64.

13. Equipment Rooms, Custodial Closets: Fluorescent luminaire, with occupancy sensor.

14. Elevator Pits: Fluorescent luminaire with guard, and with IP ("Ingress Prevention") Rating of IP 64.

15. Display Cases: LED strip lighting.

16. Darkrooms: Darkroom Lights.

17. Hazardous Classified Areas (flammable liquids, others): Luminaire with suitable classification.

18. Exterior Canopies, Arcades, Overhangs: Recessed or surface-mounted fluorescent luminaire with polycarbonate lens, vandal-resistant, with IP ("Ingress Prevention") Rating of IP 64.

19. Lunch Shelter: Vandal-proof recessed or surface-mounted ceiling- or wall-mounted compact fluorescent luminaire with lens and two 13-watt twin-tube lamps.

20. Parking Garages: Ceiling-mounted Parking Garage fluorescent luminaire with wireguard.

21. Building Exterior: Surface-mounted or recessed vandal-resistant metal halide luminaire with polycarbonate lens.

22. Exterior Stair and Wall Lighting: Low-mount step light fluorescent luminaire with clear tempered glass lens.

23. Parking Areas: Pole-mounted full cut-off metal halide luminarie (maximum 30' high poles).

24. Swimming Pools: Recessed Swimming Pool Luminaire.

25. Exit Signs: LED type. Due to the high rate of vandalism, specify only wall mount vandal resistant exit sign luminaries. Canopy or pendant mount exit luminaries are not acceptable. When a wall is not available and a sign is needed at a particular location, utilize a flag mount luminary with additional support from the ceiling or wall.

26. Low-level Exit Signs: Remote vandal resistant LED low level exit sign.

27. Low-level directional markers: provide as required by code.

28. Sign Fixtures: Fluorescent sign.

C. Electrical Power Systems

1. Design Principles

a. Basic design concerns include life safety, protection of property, reliability, voltage regulation, maintainability, and flexibility for future expansion (including changes in service voltage).

b. Preventive maintenance requirements must include accessibility and availability for inspection and repair with safety. Provide clean, well-lighted, temperature-controlled space with working spaces and access doors in front of all electrical equipment.

c. All electrical equipment and components shall be designed for exposure to the elements, or protected from them, including flooding. Floor standing electrical distribution equipment and control panels shall not be located in subterranean areas. Where design constraints do not allow for this equipment to be installed outside subterranean areas, the designer shall obtain approval from design management to locate equipment in subterranean areas; in such cases, sump pumps shall be equipped with normal and emergency power sources (only transfer switch and generator will be acceptable as the emergency power source). Refer to article 2.3.D.f for additional requirements.

d. All electrical equipment and components shall meet requirements for seismic anchorage and bracing.

e. Each building shall include a main power distribution panel.

f. Should concentration of electrical load in administration building office area exceed 50% of the administration building power panel capacity, a dedicated panel for that area should be included in the design.

g. The use of K-rated transformers shall be substantiated with a harmonic content study of the designed system.

h. In areas where computers and similar electronic loads exceed nominal 20%, computer and non-computer loads shall be fed from separate circuit breaker panelboards. The computer panelboard shall be equipped with integral Transient Voltage Surge Suppression (TVSS) protection and double capacity neutral at panel and feeder if necessary.

i. In areas where computer and similar electronic loads are less than nominal 20% of the total load in the area, TVSS protection may be provided via outlets equipped with integral transient voltage surge suppression.

j. If computer and similar electronic loads connected to a distribution transformer exceed nominal 20% of the load, consider the use of a K-4 rated transformer, and double capacity neutrals.

k. Computer equipment design loads shall be based on codes and industry standard practices. A 20 amp branch circuit feeding computer loads shall be limited to a maximum of 5 computers.

2. Electrical Service

a. The Architect shall consult and coordinate with the electric utility provider in requesting electrical service, and shall include in the contract documents the drawings

and specifications provided by the utility. Requests must be made early in design, to allow sufficient time for obtaining the utility engineers' input.

b. When designing the electrical service for existing facilities, the Architect/Engineer shall coordinate with their project management to determine current and future power needs requirements for the site.

c. Removal of utility poles and their guywire may be necessary whenever new property is acquired. If poles serve other private properties then utilities must be re-routed. Coordinate the relocation of all utilities on the poles (power, telephone, cable television) and provide for the relocation of power poles from the school site as directed by the utility. (Rerouting will be designed by the utility provider.)

d. Provide electrical meters in compliance with utility company requirements.

1. Meters shall be capable of communicating with building energy management system via BACKnet protocols.
2. Meters shall be provided at each permanent building and bungalows power distribution centers, and areas designated by LAUSD Project Desing Manager.

3. Electromagnetic Fields

a. The design of new school facilities, and modernization projects must include measures to minimize the building occupants' exposure to high electromagnetic fields emitted by electrical equipment such as transformers, switchboards, panel boards, and building wiring. The following guidelines can help minimize electromagnetic field exposure and interference.

1. Locate equipment in dedicated spaces that are not normally occupied: equipment rooms, storage rooms, and supply rooms.
2. Locate the service transformer and main switchboard as close as possible and practical to the main service street connection.
3. Locate transformers, switchgear, and large panels remote from occupied spaces in outdoors or in parking structures, be sure they are separated with walls or fences and are well drained to prevent flooding. Provide required clearances and work space according to code and utility company requirements.
4. Transformers specified shall comply with the Department of Energy Policy Act of 2005.
5. Locate equipment and equipment rooms so not to be adjacent to, or directly above or below, classrooms, offices, libraries, and similar spaces.
6. Designs incorporating branch circuits with double neutrals shall be provided with a harmonic content study to substantiate the need for double neutrals.

7. Do not install underground feeders beneath occupied spaces; where underground feeder(s) has to pass underneath the concrete slab to terminate at the distribution panel inside the building, install conduits 24 inches below finished floor.

8. Reduce current by using higher voltages where practical.

9. Utilize balanced three-phase systems.

4. Planning Criteria

a. The preferred main power distribution system is 480/277-volt, 3-phase, 4-wire grounded WYE.

1. In very large campuses two 480/277-volt, 3-phase, 4-wire grounded WYE services may be installed if approved by the serving utility company.

2. In very large campuses with the buildings spread over 1000ft apart, and requiring a total design load of over 2000 amps, a 5 KV medium voltage switchgear and power distribution may be used.

3. In campuses requiring no more than 600 amps, a 208/120-Volt, 3-phase, 4-wire, grounded WYE service and power distribution may be used.

b. All loads (in KVA) must be identified during design, such as lighting, HVAC equipment, kitchen equipment, shop equipment, computer equipment, and general receptacle load. For preliminary system design, when the loads have not been identified, use the following loads for estimating purposes only:

1. Lighting (California Building Codes, Title 24, Energy Efficiency standards limit power density to much lower levels. The power allocation is based on National/California Electrical Code, or LAUSD requirements. The differential between allocated and connected load may be calculated toward required spare capacity, to reduce the service size if possible).

Classrooms and Offices	3.0 VA/ft²
Cafeteria	2.0 VA/ft²
Auditorium/Multi-Purpose RM	6.0 VA/ft²
Kitchen	2.2 VA/ft²
Gymnasiums	2.5 VA/ft²
Toilets, Storage, Equipment	1.0 VA/ft²
Corridors	1.0 VA/ft²
Locker Rooms	1.0 VA/ft²
Laboratories	3.0 VA/ft²
Shops	3.0 VA/ft²

2. Air Conditioning.

HVAC Refrigeration Tons x 2.5	= KVA
Ventilation Fans	1.0 W/ft²

3. Small Appliance/Computer/General Purpose Receptacle

Auditorium	1.0 VA/ft²
Cafeteria	1.0 VA/ft²
Gymnasiums	1.0 VA/ft²
Offices	5.0 VA/ft²
Classrooms	6.0 VA/ft²
Shops	6.0 VA/ft²

4. Food Preparation.

Kitchen	20 VA/ft²
Cafeteria	10 VA/ft²

5. Shop Buildings (Machines) 20 VA/ft²

6. In existing facilities, the demand load calculations shall comply with CEC requirements. Architect/Engineer shall include all necessary information to evaluate the existing system and its suitability to handle the proposed load addition.

c. Distribution Concept:

1. For most schools, a radial distribution system is adequate.

2. Depending on critical load requirements, other system types may be considered, such as primary selective or secondary selective.

d. The maximum voltage drop in each power feeder shall be no more than 3%, and the total drop including feeders and branch circuits shall be no more than 5% overall.

1. Length and voltage drop percentages must be indicated for all feeders on the single line diagram, or in a feeder schedule.

e. Short circuit calculations shall be made for all system components. Indicate results on the single line diagram, or in a feeder schedule.

f. Design distribution to minimize the generation of, and exposure to, magnetic fields. Appropriate magnetic field management techniques shall be considered for all new and/or retrofit installations.

g. Load Calculations: Provide calculations for the main electrical service, and all distribution boards and panelboards.

1. Load calculation shall take into consideration code permitted demand and diversity factors, and non-coincident loads.

2. Identify KVA values for each factors taken into consideration.

h. Plan future system expansion during design. Do not design the system so that it is difficult or impossible to expand its capacity. Be sure future capacity is clearly identified on diagrams, plans, and in the narrative "Basis of Design."

1. Architect shall provide electrical room layouts depicting equipment foot prints, working clearances around equipment, and space for future expansion.

2. For new campuses allocate minimum 30% spare capacity over calculated demand and diversified connected load to size main service equipment.

3. Provide 20% minimum spare space and spare ampacity above calculated loads for distribution boards and panelboards.

5. Computer Network Power Requirements

a. Provide electronic grade panelboards to supply power for computer loads as indicated on section C.1. The panelboard can be either supplied from a general-purpose panelboard, which may be fed from a K-4 rated transformer. In new construction utilize justifiable and properly sized K-4 rated transformer to feed all the 120/208V in the school or building.

1. Provide a duplex receptacle within 12 inches of each LAN Outlet. A double duplex receptacle shall serve two workstations where installed side by side.

2. Provide a dedicated 120-volt, 20 amp circuit and receptacle for each network or stand alone printer, this circuit shall originate in an electronic grade panelboard if feasible.

3. For each branch circuit serving computers, use a dedicated neutral. Refer to item 3.f above for additional requirements.

b. In MDF and IDF rooms, as well as LDF locations, the number and type of electrical outlets will depend upon and must be designed to the specific size, type of equipment, and UPS equipment required. The following criteria are applicable to most cases: A minimum of one dedicated, 20 ampere, 120 Volt circuit and a rack mounted receptacle outlet of the same rating is required for in each IDF and LDF cabinet for the rack mounted UPS system. Additionally, a dedicated 208 Volt, 1 phase, 30A circuit terminated in a NEMA L6-30P rack mounted receptacle is required in each MDF for the rack mounted UPS system.

c. Provide a double duplex receptacle in every classroom Limited Distribution Cabinet (LDC).

d. All receptacles for computers and electronic equipment shall be standard type, and **blue** in color. Except for outlets serving computer loads that are not fed from an electronic grade panel board with integral TVSS protection, in these cases the outlet shall be blue in color and be equipped with integral TVSS protection.

6. Grounding

a. Cold water or other utility piping systems shall not be used as grounding electrodes; Grounding electrodes shall be "made" electrodes, either concrete-enclosed-electrode type (UFER) or ground rod type.

1. UFER ground system as described in the Guide Specification shall be the primary grounding electrode for new campuses. Architect/Engineer shall provide a complete grounding block diagram of the facility including but not

limited to peripheral systems such as Public Address, Computer Network, Television, etc.

2. Ground rod(s) installed in concrete box (es) as described in the guide specification shall be the primary grounding electrode for existing campuses that do not have a UFER system.

b. All metallic objects that enclose electrical conductors or that might be energized by electrical currents, including all metal equipment parts such as enclosures, raceways, building metal structure, and equipment grounding conductors, must be effectively grounded.

1. Short sections of metal enclosures or raceways used to provide support or protection of low voltage (less than 70V) cable assemblies from physical damage shall not be required to be grounded. Provide ground continuity when and as required by current applicable codes.

c. All earth grounding electrodes must be solidly joined together into a continuous electrically conductive system connected to the main grounding electrode system. Individual building grounding systems must be interconnected to the campus grounding system.

d. Provide "made" electrodes (as described in paragraph "a." above) at each individual building. The grounding systems of remote buildings must be interconnected to main campus grounding system thru the equipment grounding conductor(s) of the feeders serving the remote buildings. Bond all enclosure and metallic objects to the building ground system (as described in paragraph "b" above).

e. Bond the grounded conductor (Neutral) of the main service and the secondary of all step-down transformers to the building ground system. The bonding of the neutral conductor to ground must ONLY BE DONE AT ONE LOCATION at each voltage level to avoid creating grounding loops.

f. All electrical conducting surfaces must be effectively grounded.

7. Conductors

a. Select conductors based on the ampacity tables in the California Electrical Code for low and medium voltage cables. Consider the temperature rating of the conductor, future load growth, voltage drop, short-circuit heating, number of conductors within the raceway and ambient conditions.

b. Ambient temperature ratings for conductor selection:

1. Indoors, within air-conditioned spaces, 30° C. ambient temperature may be used without temperature derating the conductor.

2. Indoor areas, such as equipment rooms, where the ambient temperature will exceed 30° C., conductors must be derated to the worst possible ambient temperature condition.

3. Outdoors, for low voltage conductors in metallic raceways in the shade, use a derating factor for an ambient temperature of 45° C; in the sun, use a derating factor for an ambient temperature of 50° C.

4. For Medium Voltage Power Distribution underground applications, the ambient temperature used for conductors within a raceway shall be 30° C. This means the appropriate ampacity from the tables in the California Electrical Code must be derated to this temperature. The thermal characteristics of the medium surrounding the conductors are important to determine the current carrying capacity of the conductors. Factors that will affect the current carrying capacity of the conductor include the following:
   a. The type of soil in which the duct bank is buried and its thermal resistivity.
   b. The moisture content of the soil. In dry sections the conductors must be derated to compensate for the increase in thermal resistance that is due to the lack of moisture.
   c. The type and number of raceways and number of conductors per raceway within an overall concrete duct bank.

c. Derating of the conductors may be necessary under high fault currents. Thermal and mechanical stresses can result in permanent damage to the insulation and undesirable cable movement. The minimum conductor size requirement shall be determined based on the maximum available short-circuit current and the type of overcurrent protective device used.

8. Conduit

a. Install conductors in metallic conduit above ground and in schedule 40 PVC underground, and comply with the following additional requirements:

1. Use rigid steel conduit at all exterior locations and where conduit may be exposed and subjected to damage or water intrusion, including parking garages.

2. EMT is allowed for all interior concealed applications. Exposed EMT may be used in the following areas:
   a. In mechanical, electrical and elevator machine rooms.
   b. Above 8 feet in spaces other than offices, classrooms, libraries, and similar spaces with District approval.
   c. Above 8 feet in enclosed parking garages.

3. Use flexible steel conduit only indoors and where concealed.

4. Metal Clad (MC) cable system is not allowed.

5. Use liquid-tight flexible steel conduit for final connections to motors, devices that require adjustment of locations, or equipment that require frequent interchange. Liquid-tight flexible steel conduit may not be used in place of thermal, expansion, or expansion/deflection fittings.

6. Underground conduits must be encased in concrete 3 inch thick on all sides with multiple conduits spaced 3 inch apart. Bury conduit banks not less than 24" below finished grade to top of the concrete envelope.

7. The minimum underground conduit size shall be 2 inches; except for conduits feeding a single dedicated device where future growth is not expected.

8. Conduits on arcades or roofs are not allowed without prior District approval; if approved, Architect/Engineer shall provide structural calculations and installation details.

9. Distribution Equipment

a. In selecting distribution equipment, electrical ratings must have adequate capacity to serve the connected load, and future expansion.

b. Equipment short-circuit ratings must be selected to withstand the maximum fault current at the equipment terminals or busses. In existing facilities perform complete fault current level calculations to determine amperes interrupting capacity for new equipment. The calculation shall be based on utility company available fault current at the main service.

c. Series rated distribution switchboards and panel boards are not permitted. Specify only fully rated equipment.

d. Locate all power equipment and panels in equipment rooms that are completely separate from signal and communication equipment.

e. Review physical dimensions of the equipment to determine adequate space allocation requirements to serve connected loads and future expansion. Provide working clearances around the equipment to comply with code and working requirements.

f. Consider and plan to mitigate appropriately environmental conditions surrounding the equipment. Adequate ventilation must be provided in all cases. Locate Central Battery/Inverter systems in a thermostatically controlled fan ventilated room. Calculate and submit the heat load created by the electrical equipment to the mechanical engineer to properly size vwentilating equipment serving the electrical rooms

g. Indicate infrastructure for electric utility facilities including transformer pad, underground vaults, customer stations, pull sections and metering compartments in main switchboard, underground conduits, pull boxes and grounding, as required by electric utility.

h. All equipment must be secured from unauthorized access and from vandalism, and must be protected from harmful environmental conditions, including flooding.

i. Do not install equipment in hostile/corrosive environments such as pool equipment, boiler rooms, and the like; unless it is properly listed for the application.

j. Provide floor drains within 10 feet of floor mounted equipment in subterranean locations subject to flooding.

k. Provide 4 inches high concrete house keeping pads for floor mounted equipment in below grade or exterior installations, unless noted otherwise by the structural engineer; the pad is to extend 4 inches all around equipment. Pads for electrical services and power company equipment shall conform to the requirements of the serving utility company.

l. Electrical power service to each building shall be achieved through one feed point to a panel, or distribution panel located in the building.

10. Capacity Criteria

a. All new main and distribution switchboards, panelboards and motor control centers shall have minimum 30% spare capacity above connected load and physical spaces for additional protective devices to be added in future.

11. Circuit Protection and Motor Controls

a. All switchboards, motor control centers, and power panel boards shall include a main circuit protective device.

b. Panel boards serving each floor in a building shall be equipped with a main circuit breaker.

c. Subpanels located in the same electrical room and within sight of its power source do not need to be provided with a main circuit breaker.

d. Provide a heavy duty fused disconnect switch at all HVAC units, including heat pumps, condensing units, chillers, package units, etc.

e. Provide combination fused switch-starters for all pump-motors, fan-motors, cooling towers, and dust collectors. Provide a control-circuit transformer with 120-volt secondary, hand-off-auto selector switch and on-off indicating lights in each starter.

f. Provide control wiring and interlocking for operation of motor loads, as required by each motor circuit.

12. General Requirements & General-purpose Receptacles and Circuits

a. All receptacles shall be wall-mounted at 15 inches above floor level unless otherwise indicated for specific purposes.

b. Do not use floor receptacles except where expressly approved in writing by the District's authorized representative. Where used, they shall be recessed.

c. Do not locate receptacles behind appliances or other equipment that must be served.

d. Corridors: At intervals of 50 feet maximum and switched with a lock-type switch in a custodial closet or workroom.

e. Building exterior walls and parking garage interior: Weather-proof GFI receptacles at 50 feet intervals on each wall; install receptacles within a lockable box or cabinet, and switched with a lock-type switch in a custodial closet or workroom. Do not provide receptacles in Kindergarten play areas.

f. Restrooms: One GFI receptacle mounted 80 inches above finished floor near the door in each student restroom. In faculty restrooms, provide a GFI receptacle next to the sink, locate receptacle 48 inches above finished floor.

g. Any room with a light fixture shall be provided with at least one receptacle.

h. Science Classrooms: General-purpose duplex receptacles (computer receptacles and circuits are already separate.) every six feet over the counter on the wall on a separate 20-amp branch circuit per counter. Use GFI receptacle within six feet of the sink(s).

i. Auditorium/Multi-Purpose Room: On walls spaced at 20 feet on center maximum.

j. Gymnasium: Eight minimum, two in each wall minimum.

k. Music, Instrumental Practice, and Choral Rooms: On walls same as classrooms.

l. In Photographic Darkrooms, provide separate circuits for special darkroom lights and for room lights, with room lights on a lock-type switch.

m. Cafeteria Window Service Area, Scramble Area, and Faculty Service Area: One, minimum.

n. Within 72 inches of a sink or in any similar conditions (such as custodial closets), use GFI receptacles.

o. Make provisions for two 1 inch conduits for marquee sign power and data, extend one conduit from nearest electrical panel, and one from MDF to the designated location for the future marquee sign. Label conduits power and data respectively. Coordinate marquee location with Architect.

13. Receptacles in Classrooms

a. Provide a separate branch circuit for general-purpose duplex receptacles in each classroom, with a minimum of five general-purpose duplex receptacles in each classroom, one in each wall and one at the teacher's desk location.

b. Provide separate receptacles or connections on a separate circuit for other electrical equipment.

c. For new construction do not use floor outlets without approval in writing from the district. (Wiremold should only be used in existing facilities, except where indicated in educational specifications)

d. Do not locate receptacles or switches in bulletin boards, tackboards, or markerboards.

14. Special-Purpose Receptacles And Separate Circuits

a. See **"Electrical Communications and AV Systems,"** "Computer Networks and Power Systems," for power provisions for computer systems. Provide receptacles and circuits as follows:

b. Copier equipment in staff/faculty work rooms require provision of a dedicated 220-VAC circuit with 3#10 AWG and a code sized ground wire,

unless advised otherwise in writing by the District Design Manager. Locate receptacle next to copier data outlet.

c. Gymnasium scoreboards. Provide for remotely controlling scoreboards from side lines with 3/4 inch empty conduit from scoreboards to floor boxes located 5 feet out from sidelines near midcourt. Provide 120V receptacle in floor box.

d. Domestic cooking electric ranges (for gas ranges provide 120-volt circuit for ignition).

e. Science Classrooms exhaust fume hoods.

f. Science Preparation/Storage Room refrigerator and freezer.

g. Industrial Education Classrooms and Shops: Conduit drops from overhead wireways to a receptacle at each workbench and to each electrically driven machine.

h. First Aid Room: refrigerator, and receptacle and switch for eye chart.

i. DH Storage and Laundry Room washer and dryer.

j. Special Education Therapy Unit refrigerator and cooktop.

k. Kitchen equipment and exhaust hoods. All electrical equipment under kitchen hoods shall be automatically disconnected upon activation of the fire suppression systems.

l. Provide a separate branch circuit for the fire suppression Ansul System installed in kitchen hoods. If Ansul System is activated, power to all electrical appliances under kitchen hood shall be automatically disconnected. Appliance circuits shall be wired thru shunt trip circuit breakers or contactors that are interlocked with the Ansul System.

m. Automatic lawn sprinkler controllers, one each as shown by the Landscape Architect.

n. Electric drinking fountains: one each.

o. Rooftop: Provide exterior convenience outlet with lock-on cover on a pedestal approximately 18 inches above roof within 25 feet of HVAC equipment, and adjacent to any other rooftop equipment that might need servicing or repair.

p. All other appliances and special equipment where necessary.

q. Provide power and remote controls for athletic field score boards.

D. Emergency Power Systems

1. General

a. Emergency power systems must be part of the design of the electrical system for egress illumination and signage, fire alarm, security, public address and telephone systems, and computer networking system, and must provide continuity of operation for specifically identified systems or equipment.

b. Provide emergency exit illumination of one foot-candle minimum in the following areas:

1. Corridors, stairs, lobbies, and exterior paths of travel for exiting the building.

2. Administration Unit.

3. Classrooms larger than 1000 square feet.
4. Multi-Purpose/Auditorium Buildings.
5. Gymnasiums.
6. Cafeteria/Kitchen.
7. Any rooms with an occupant load of 50 or more.
8. Other occupancies required by code.

c. Exit signs connected to the emergency power system shall be provided in compliance with applicable codes. Master-Slave exit signs are required. Low level exit signs for existing facilities where master-slave is impractical shall be self-luminous type. If self luminous type is used, Architect/Engineer shall obtain approval from the District. Exit signs shall be vandal/high impact resistant.

2. Emergency Systems Requirements

a. For emergency lighting and exit illumination, in each building provide a central inverter system consisting of AC sensing equipment, automatic transfer switch, battery charger, batteries and DC to AC inverter to provide a minimum of 90 minutes continuous emergency operation. Provide a pathway to interface the inverter to the site's LAN for remote reporting and management of inverter equipment.

b. For PA/Intercom/PABX system, provide an UPS with a minimum of 90 minutes continuous emergency operation. A generator should be used where it is more cost effective than installing an inverter system. Provide a pathway to interface the generator controller to the site's LAN for remote reporting and management of emergency generator equipment.

1. Also see **"Electrical Communications and AV Systems"** for UPS requirements for PA systems.

c. For Fire Alarm System, provide integral emergency power supply for 24 hours minimum continuous operation.

d. For Security Alarm System, provide integral emergency power supply for 4 hours continuous operation.

e. For computer networking system, See **"Electrical Communications and AV Systems"** for requirements of rack mounted UPS units for Computer Networking Systems.

f. In Modernization Projects at Existing School Sites; if the building(s) that are part of the project are not currently served by an inverter or generator system, then the areas illuminated by fluorescent fixtures shall be provided with emergency exit illumination powered via power packs installed in channel of lighting fixtures. The power packs shall be sized to provide power per applicable current code requirements. If there is an inverter or generator system on site, then utilize existing inverter emergency power or generator in

lieu of battery packs. Perform load analysis to make sure the existing system is adequate to support the new emergency lighting loads. UPS capabilities for PA/Intercom/PABX, Fire Alarm, Security and Computer Systems shall be same as for new school construction.

3. Emergency Generator System

a. An emergency diesel generator system is required in multi-story buildings higher than 75 feet in height and in sites as described in this design guide.In such cases:

1. Eliminate central battery/inverters and use the generator for emergency lighting.
2. Provide emergency power for all elevator cab lighting and power for selected elevator(s).
3. Provide emergency power for subterranean sump pumps (garage areas).
4. Provide emergency power for all signal headend equipment.
5. Provide emergency power for fire/ life safety systems such as fire pumps and other systems as required by codes.
6. UPS systems as described in previous paragraphs for various systems still will be required.
7. Clearly mark all equipment being served from emergency power, Identify the power source.
8. Provide calculations for emergency power; demand calculations shall include a minimum of 20% spare capacity. Size equipment accordingly.
9. Provide diesel engine generator set(s) with battery chargers.
10. Provide a common trouble annunciator in the Plant Manager's office. Do not provide an annunciator that indicates what is wrong; only one that indicates that something is wrong with the generator.
11. Provide an emergency stop button at a location close to the main service disconnect; locate stop button in a place such as an electrical room, or similarly controlled access location. Provide a tamper cover similar to the covers required for fire alarm pull stations.
12. Provide all components, accessories, necessary parts needed to meet system expected performance.

E. Photovoltaic Systems

a. The design of infrastructure for photovoltaic (PV) systems shall include the following requirements in addition to those indicated in section 2.4-Sustainability:

1. Note on the construction documents the area of PV installation; indicate the roof area to be kept clear of vent stacks, electrical stub-outs, and other roof penetrations as much as possible.

2. Areas determined to receive photovoltaic panels shall be structurally augmented to receive an additional dead load of 7 lbs. per sq-ft. unless noted otherwise.

3. Provide a minimum of six feet (6') wide clear perimeter around the edges of the roof. If either axis of the building is 250 feet or less; provide a minimum of four feet (4') wide clear perimeter around the edges of the roof.

4. Coordinate with the mechanical engineer to locate HVAC equipment to maximize available un-shaded roof areas for future installation of PV arrays.

5. Determine size of PV invertes assuming PV arrays will generate 10 watts/sf-ft. of PV power. Inverters shall be selected form approved manufacturers listed in LAUSD technical specifications.

6. Locate inverters in building's electrical room. Provide and indicate PV inverter space in electrical room layouts.

7. Provide two empty sections in main switchboard. One section is for future schools electrical loads, the other for the PV system.

8. Provide power and data conduits for the PV system as follows:
    a. Provide power conduits from roof-mounted PV array(s) to locations of future PV inverters. Size conduits based on sizes required by conductors required by PV inverters. Take voltage drop into consideration when sizing conductors.
    b. Provide a minimum three inch (3") power conduit from each PV inverter to the Main Electrical Room. Do not stub up conduits within the footprint of main electrical switchboard, or the footprint of possible future sections that could be added to the switchboard. Provide clear space on wall above or bellow the conduit(s) stubs for the installation of a future pull box and conduit that will be extended to future PV system disconnects, and from utility accessible disconnect switches to main switchboard.
    c. Provide one two inch (2") data conduit from each PV inverter to the Main Electrical Room. Do not stub up conduits within the footprint of main electrical switchboard. Note onplans that extrensions from data conduit stub-ups to future PV meters shall be provided by the PV system installer.
    d. Provide one two inch (2") data/telephone conduit from Main Electrical Room to MDF and Telephone MPOE. Arrange this and the above data conduit in the Main Electrical Room along an

adjacent or opposite wall from the main service switchboard in a manner that will allow the installation of a plywood backboard for mounting of the PV data collection and control equipment.

9. Ensure PV inverters are properly ventilated. Verify with mechanical engineer to provide ventilation of electrical rooms accordingly.

3.8 ELECTRICAL COMMUNICATION & AV SYSTEMS

A. GENERAL REQUIREMENTS

B. FIRE ALARM SYSTEM

C. CLOCK AND PROGRAM SYSTEM

D. COMPUTER AND NETWORKING SYSTEM DESIGN

E. TELEPHONE SYSTEM

F. PUBLIC ADDRESS/INTERCOM/CLASS CHANGE SIGNALING SYSTEM

G. SECURITY INTRUSION ALARM SYSTEM

H. CLOSED CIRCUIT TELEVISION AND AUDIO SURVEILLANCE SYSTEMS

I. GARAGE AND MAIN DOOR ENTRY SYSTEMS

J. TELEVISION DISTRIBUTION SYSTEM

K. DIGITAL OVERHEAD PROJECTORS

L. SOUND ENHANCEMENT SYSTEM

M. SCHOOL RADIO COMMUNICATION SYSTEM

N. SIGNAL SYSTEMS RACEWAYS AND TERMINAL CABINETS

O. PROXIMITY CARD ACCESS CONTROL SYSTEM

3.8 ELECTRICAL COMMUNICATIONS & AV SYSTEMS

A. GENERAL REQUIREMENTS

a. Refer also to Section **3.7, Electrical Power and Lighting**.

b. The District "Guide Specifications" complements the "Design Guide" and must be reviewed concurrently with these criteria.

c. All signal wiring and related power shall be in conduit or raceways except as indicated below. Conduits and raceways shall be metallic, except in underground applications where PVC conduits are encased in concrete. Low-voltage communication or signal wiring shall be continuous without splices between devices, and shall be in conduits or raceways. Refer to section B.4.F for fire alarm system raceway requirements.

d. When adding new buildings and systems to an existing campus, the Architect must, from a site visit, determine the types of existing systems on the campus, and then include in the construction documents details of the appropriate interfaces necessary to integrate the operation of the new and existing systems.

e. All panels and control equipment must be accessible from floor level, without the need for ladders or other access equipment

B. FIRE ALARM SYSTEM

1. General

a. Fire alarm system shall be an automatic local fire detection, and addressable signaling system with central station reporting with electrically supervised signal-initiating circuits and alarm circuits, including control panel(s), remote power supplies, remote annunciator panel, manual pull stations, bells or horns, visual alarm units, sprinkler flow and tamper switches, smoke detectors, heat detectors, beam detectors, terminal cabinets and wiring. Refer to fire alarm technical specifications section 16715 Appendix A for a sample of the fire alarm system sequence of operations; modify or revise it according to the particular project requirements.

b. Refer to technical specifications section 16715 for a complete list of pre-approved fire alarm systems manufacturers. When multiple panels are specified in a single site, one of them shall serve as master; and the others will serve as network nodes. Designs shall be based on the least number of panels needed to meet all requirements.

1. Whenever more than one panel is introduced in a design, these shall be synchronized in accordance with LAUSD standard details.
2. A site under one administration shall have one fire alarm system only; the system shall be of a single manufacturer.
3. Additional buildings added to an existing site shall be provided with a fire alarm system, which shall be incorporated into the existing fire alarm system.
    a. For system expansions or building additions modify specifications to reflect designs that take into consideration the existing conditions; for example, if in a school the original system was manufactured by Notifier; then, any additional panels shall also be specified to be Notifier. Panels manufactured by different companies are not acceptable.

c. Areas or additional District sites that are located on the same or adjacent property, but fenced off, adequately separated, and independently administered, such as Early Education Centers or YMCA buildings, shall be equipped with separate fire alarm systems.

d. Alarm indicating device's UL maximum current draw must be utilize in the design.

e. Facilities and classrooms designated for Autism or severely handicapped students shall be equipped with chimes or similar sounding appliances.

f. Provide 20% spare capacity per loop for future growth.

g. Where the capacity of the control panel will be exceeded including spare capacity, two or more panels must be provided. These panels must be connected in a network configuration as one complete system.

h. Fire alarm systems shall comply with NFPA, DSA Fire and Life Safety requirements, and Education Code Section, and be UL and CSFM listed, power-limited, battery backed, electrically supervised systems.

i. Fire alarm system shall be designed with addressable initiating and electrically supervised indicating (audio/visual) devices.

1. Buffer relays powered by the fire alarm system shall be supervised as indicated in District standard detail.

j. The fire alarm system shall be interfaced with the clock program controller, Central PA and Autonomous PA system(s) to deactivate program/classroom change signals during fire alarm condition. All manual, autonomous PA and automatic program signals shall be deactivated during fire alarm condition. In addition, provide interconnection and required control features between fire alarm system and chemical fire extinguishing system, Theatrical Lighting Systems (for minimum egress lighting actuation), water based fire sprinkler system, damper control or smoke management systems, ventilation systems where required for the purpose of fan shutdown, class passing signaling system, door release electromagnets power supply controls, elevator controllers, and any other systems required by code.

1. In existing facilities the Designer shall investigate the conditions and compatibility of the existing elevator controller(s), and make

any provisions to up-grade, or replace the controller to properly interface with the fire alarm system.

k. Fire alarm system shall not be interfaced to any of the following:

1. Sump warning systems.
2. Carbon monoxide detection systems.
3. Methane gas detection systems.
4. Elevator car alarm bell circuit.
5. Any other unrelated system.

l. Provide a 120-volt, 20 amps dedicated circuit and terminate in each of the following cabinets: Fire alarm control panel(s) and remote power supply (ies). Circuit breaker at panelboard shall be equipped with a handle lock-on device. Provide surge suppressor at input of control panel.

1. Provide a permanent label in all fire alarm panel(s), transponder(s), or remote power supply(ies) indicating the electrical panel and circuit designation as well as a description of the physical location of the electrical panel. All labels shall be affixed to the inside of the panel door.

m. A remote annunciator panel with LCD Display shall be provided in the Administration Building main office, and in satellite administration areas, such as Adult School Offices where they shall be accessible by office personnel only. The annunciator(s) shall be provided with an integral keyed locking switch to disable/enable the annunciator controls.

n. When replacing and existing fire alarm system, a new fully addressable system must be installed.

1. Indicate on drawings the extent of existing work to be demolished.

o. Provide automatic detection devices in accordance with codes and applicable regulations.

p. Provide a California State Fire Marshal approved voice evacuation system in assembly areas (Gymnasium, Multi-Purpose Rooms, etc.) with an occupant load of 1000 or more.

q. The fire alarm system shall incorporate the controls and interface requirements between FACP and elevator controller as required by the ASME code for elevators:

1. Show a programmable addressable relay module which will be activated by the elevator machine room and hoistway detectors. If activated, this relay module shall cause the following actions:
   a. Provide a button which will signal Fire Fighters that the operation of the elevator may be compromised due to a possible fire.

2. Initiating Devices

a. Smoke detectors shall be the primary means of automatic alarm initiation. Smoke detectors shall be specifically designed for the installation area expected environmental conditions. Heat detectors shall

be used in spaces where smoke detectors would not be suitable. Spaces that require fire protection where heat detectors may be utilized include areas where any of the following conditions may exist:

1. Temperature below 32° Fahrenheit (0° Centigrade).
2. Temperature above 100° Fahrenheit (38° Centigrade).
3. Relative humidity above 90 percent.
4. Air velocity greater than 300 ft/min (1.5 m/sec).

These areas may include but are not limited to: parking garages (auto exhaust), mechanical rooms (dust), Industrial Arts areas such as Metal Shops (smoke from welders), Wood Shops (saw dust), and Auto Shops (auto exhaust), custodial/hopper rooms, kitchens/food preparation and serving areas, restrooms, and shower areas.

b. Do not provide smoke detectors in areas that are exposed to the weather.

1. Smoke detectors placement shall comply with manufacturer's recommendations. Do not install smoke detectors within 3 feet of HVAC registers, or within 24" to any sources of electro magnetic interference (EMI); such as fluorescent fixtures.

c. Provide heat detectors above suspended ceilings of every room and in accessible attics that contain combustible materials; such as building structure, flexible ducts, exposed cables, etc. (Refer to currently enforced NFPA 72 Section 2-1.4.2.1**)**. Heat detectors are not required when sprinklers will be provided in these areas.

1. In existing facilities non-accessible attics spaces that contain combustible materials shall be made accessible and be protected by heat detector(s).

2. Provide identification tags for devices not in field of view or above ceilings, and for devices containing end of line resistors. Tags shall conform to specification section 16715-3.03-k.

d. Design and installation of automatic fire detectors shall conform to NFPA 72, as amended in Article 91 of the California Fire Code section 1006.2.4.2.2.1.1 and ADAAG.

e. Design a system that utilizes linear heat detectors in concealed or controlled access areas. The detection wire shall be indicated to be installed within 20 inches of the ceiling or underside of the building roof, or as recommended by the manufacturer. In shallow areas show the detection wire to be mounted within the upper part of the space to be protected.

1. One circuit of linear heat detection shall be utilized for areas not exceeding 4000 square feet above multiple rooms.

2. Areas above gymnasiums and Auditoriums exceeding 4000 square feet shall be considered one zone.

3. Any areas divided by a fire rated walls shall be protected separately and considered independent zones.

4. Design shall indicate all equipment necessary for a complete installation in accordance with manufacturer's recommendations.

f. Provide smoke detectors at each interior elevator lobby and elevator machine room. Smoke detectors are used to recall elevator cars to pre-assigned floor levels and to initiate a general alarm. Each elevator lobby smoke detector must report as one address to the fire alarm system. A machine room smoke/heat detector is always required.

1. A rate-of-rise/fixed temperature heat detector shall be provided in the elevator machine room and be installed within two feet of the sprinkler head to shut off power to elevator equipment. Provide an addressable relay module to interface with shunt trip circuit breaker providing power to elevator equipment. By activation of heat detector, power to elevator equipment shall be shut down. The activation temperature of the heat detector shall be lower than that of the sprinkler head. Activation of smoke detector(s) in the machine room shall cause elevator to recall to specified floor if required.

2. When required provide automatic detection device(s) in elevator hoist-way. Indicate all requirements and necessary provisions to make the detector(s) accessible without entering the elevator hoist-way. Access shall be provided through an approved enclosure with self-locking fire rated door. The detector(s) shall be so placed as to allow service to them without service personnel having to reach into the hoist-way in the path of travel of the elevator.

3. When required provide a fire alarm initiating device in the elevator pit.

4. When there is a fire sprinkler installed at the top of an elevator hoistway, a heat detector is required at the top of the elevator hoistway; in such cases an external hatch must be provided to safely access the detector and an UL approved cage must be provided. If there is no fire sprinkler at the top of the hoistway, then a detector is not required. Activation of the detector shall recall elevator and cause a general alarm. If a sprinkler head exists at the top of the hoistway, a heat detector must shut down the elevator's power. A smoke detector is always recommended for elevator recall whenever possible when a heat detector is present for shunt trip service.

5. In the sequence of operation chart, clearly indicate the alarm/recall/ power shut down requirements. All Fire Alarm detectors report to the Fire Alarm System. The Fire Alarm System shall be interfaced with the elevator controller.

g. If combinations smoke/fire dampers or duct smoke detectors are required, this work shall be part of the fire alarm system and all components and wiring shall be indicated on Electrical Drawings. Smoke detectors may be used in lieu of duct detectors to shut down HVAC systems or to control combination smoke/fire dampers if ALL areas served by the HVAC system are protected with smoke detectors. The Fire Alarm System shall be programmed to shut

down the HVAC system or close the smoke/fire damper if one or more of the area smoke detectors are activated. All detectors must be accessible for yearly testing. Provide addressable relay modules to interface with HVAC or smoke/fire damper controls in order to shut down the HVAC unit or close the smoke damper. *(Coordinate this work with that of the HVAC system to avoid duplication of systems.)*

h. In Existing Facilities renovation projects remove existing duct detectors; provide controls to shut down Air Conditioning units with a CFM rating of 2000 or more. Shut down of units shall be accomplished via smoke detector(s) in the area(s) being served by the air conditioning unit(s).

i. Provide flow and tamper switches at each sprinkler riser assembly. Flow and tamper switches shall be addressed individually per building and per floor level. Provide a separately addressed tamper switch at each post indicating valve (P.I.V.).

1. Provide a red outdoor 24 volt DC 10 inch bell on the street side of the building for the each sprinkler riser flow switch or groups of flow switches within each building. The sprinkler water flow bell shall be controlled by dry contacts within the flow switch and powered by 24 volts directly from an FACP or a remote NAC power supply. Proper signage should be provided adjacent to the bell indicating what action should be taken when the bell sounds.

j. Since automatic initiating devices are provided in all rooms and attics as part of Automatic Fire Alarm System, avoid installing pull stations, except in areas classified as places of assembly in accordance with applicable codes. Areas requiring manual pull stations include assembly areas such as gymnasia, auditoria, kitchen/dining areas used for assembly, and multi-purpose rooms. Install one manual pull station within five feet of each exit door.

1. Provide one manual pull station within five feet of the fire-alarm annunciator in the main office of the Administrative Unit.

2. All manual pull stations, except the manual pull station in the office by the FA annunciator, shall be provided with a protective cover.

k. Connect automatically/manually activated dry chemical fire extinguishing system such as is provided in prefabricated kitchen hood to fire alarm control panel as a separate fire alarm point/zone.

l. Provide protective covers for pull stations, smoke and heat detectors, and audible and visual devices located in areas that can be subjected to vandalism such as gyms, restrooms, locker and shower rooms, and all hallways and corridors associated with these spaces.

m. Beam smoke detectors shall be utilized in large areas with high ceilings such as auditoriums and gymnasiums in lieu of multiple smoke detectors. Do not use beam smoke detectors in small confined areas such as classrooms that have large beams that will require multiple smoke detectors to provide proper coverage.

n. When heat detectors are mounted in attics with catwalks or tall dimensions to the bottom side of the roof structure, accessibility shall be provided for testing and servicing of the detectors.

o. Smoke or heat detectors are not required in attic spaces and parking areas protected by fire sprinklers. Provide fire alarm detection in all garage(s) adjacent areas, such as hallways and corridors, elevator lobbies, equipment rooms, offices, etc.

3. Alarm (Indicating) Devices

a. Provide sufficient alarm sounding device coverage for entire plant including interior and yard areas. Avoid exterior of school site except near entrances to buildings to minimize disturbance of neighborhood.

b. Alarm sounding devices at each facility shall be of the same type. All audible alarm signals connected to an FACP shall be synchronized by an internal to the FACP coder and within the notification zone in which they are located. The use of coders within a remote NAC power supply or within an individual audible appliance shall not be acceptable. In facilities not receiving a complete new fire alarm system, the existing type of coded sounding devices if currently bells shall be changed to horns.

c. Alarm sounding devices shall be capable of sounding alarm at a level of 15 decibels above ambient noise or 75 decibel minimum, whichever is higher; measured 4 feet above floor and in the center of the room or space.

d. Provide strobes and horns as required in classrooms to meet visual and audibility requirements. When both audible and visual devices are required use combination type devices unless the audible device is a speaker used in an EVAC system.

e. In areas requiring speakers for voice evacuation systems provide a sufficient quantity of speakers to minimize reverberation and the distance between the speakers and the occupants. A gymnasium or auditorium would typically have 9 to 12 ceiling mounted 8 inch speakers and other areas such as associated lobbies, restrooms, dressing rooms etc. shall be equipped with one or more 4 inch wall mount speakers. The speaker circuitry in the main seating area shall be configured in an alternating checkerboard pattern to split the speakers between the two amplifier outputs.

f. A sixty-second silence inhibit shall be imposed on audible and visual alarm circuits to insure that the building occupants perceive any alarm. There shall be an audible and visual fire and trouble indication at annunciator panel.

1. Provide visual alarm devices in classrooms, toilets, rooms with high ambient noise, special education rooms such as classrooms for deaf and hard of hearing, dining areas, locker rooms, shower rooms, gymnasia, auditoria, assembly areas, corridors and hallways, public areas of main office, band and music rooms, shops, and any room where ambient noise exceeds 105 decibels. Visual alarm devices

belonging to different circuits, but within a single plane of view or flashes from more than two devices on different circuits shall be synchronized.

g. Install bells and horns 8'-0" above finished floor. Visual appliances shall be mounted 80" above the finished floor to the bottom of the lens or six inches below the ceiling, whichever is lower.

h. Provide magnetic door holders and dedicated 24 volt DC power supplies with addressable relay modules to close normally open fire doors upon detection of smoke in the area of the door. The wiring between the door holder power supplies and the door magnets is not power limited and shall be in separate raceway not containing the power limited fire alarm wiring. The door holder power supplies shall be controlled directly by the associated FACP or with an addressable relay module. Connections to the trigger circuit of the door holder power supply shall be configured in the fail safe mode.

i. Strobes shall be synchronized via main fire alarm control panel. Refer to standard technical detail SD-10 for additional requirements.

4. Zoning, Panels and Wiring

a. In addressable systems, each initiating device shall be one point. For example, smoke detector in Building B, Classroom No. 213, shall be considered as one point.

b. Provide a note on drawings: "The fire alarm system shall pass tests required by local fire department, including CHIEF'S REGULATION NO. 4 PROGRAM required by City of Los Angeles Department of Fire and administered by LAUSD."

c. Provide a digital Communicator at Main Fire Alarm Control Panel to report alarm conditions to a UL approved 24-hour manned certified central monitoring station. Use District UTILTY ORDER REQUEST FORM to determine Central Monitoring Station that will be used. Instruct the contractor to coordinate with the owner to arrange for the monitoring. Provide a DACT and two dedicated telephone lines for central station service. Terminate the telephone lines to the DACT. Indicate all wiring and raceway routing from Main Telephone Terminal, or telephone closet data distribution point to DACT.

d. Provide at least one terminal cabinet inside each building for termination of all fire alarm system wiring. Buildings with a walkway or arcade that divides footings of the buildings shall have a terminal cabinet in each of the buildings. Provide a main terminal cabinet in main building, near fire alarm controller, for routing all fire alarm system wiring for entire school site.

e. Fire alarm system control panel and main fire alarm terminal cabinet shall be located in LAN equipment room as first choice, other suitable locations are temperature controlled rooms, work rooms, and similar areas. Do not locate fire alarm control panel in mechanical or electrical equipment rooms. Remote power supplies shall not be located in restrooms, multi-purpose rooms, gymnasia, auditoria, or similar areas. Installation of power supplies in classrooms shall be avoided.

f. All wiring shall be in conduit or approved raceways. Wiring shall be continuous between devices or terminal cabinets. Splicing of fire alarm system wiring is not allowed.

5. Construction Documentation Requirements:

a. Construction Drawings shall include the following information at a minimum:

1. Applicable code information, DSA, and LAUSD project numbers.

2. Site plans, floor plans and complete riser diagrams indicating all components, and required raceways and wiring. Block diagrams, in addition to the complete riser diagram are recommended but not required.

3. Show all necessary components for PIV, flow and tamper switches monitoring. Indicate all related work for a complete installation in construction documents.

4. On each floor plan, indicate the type of ceiling construction and all accessible and inaccessible ceilings and attic spaces. Provide adequate information to evaluate design conformance with applicable codes and regulations.

5. Location of required access panels and reference to construction details.

6. Complete symbol list of all components with devices' CSFM listings numbers. LAUSD standard fire alarm symbols shall be used.

7. Complete sequence of operations.

8. Required power connections for all control panels and remote power supplies.

9. Voltage drop calculations for each visual and audible circuit. Voltage drop cannot exceed 6.0% for each circuit to allow addition of future devices.

10. Mounting details for control panel(s), power supplies, terminal cabinets, and peripheral devices such as horns, strobes, detectors, and pull stations, including backing details for protective covers.

11. Provide point to point wiring diagrams and construction details for smoke detectors, heat detectors, pull stations, audible and visual devices, duct smoke detectors (both addressable and non-addressable), HVAC interface details; projected beam detectors, elevator shunt trip, recall and control, power monitoring, ansul system interface, flow and tamper switches, remote power supplies, control and annunciator panels, PA system interface, elevator recall, and other automatic extinguishing system monitoring.

12. HVAC system shut-down provisions when required by code.

13. Detail of through-penetration of fire stop systems.

14. At existing schools, disconnection and removal of existing fire alarm components and wiring that is not to be part of the new system.

15. Plans shall be stamped and signed by the responsible electrical engineer.

16. Battery calculations for each control panel and remote power supply. 30% spare capacity is required for future growth.

17. Prior to DSA approval, the Architect/Engineer shall obtain District's designated QA/QC group approval.

C. CLOCK AND PROGRAM SYSTEM

a. Clock and Program System shall be an hourly supervised, minute impulse, 24-volt direct current, multiple-wire connected system, with a master time control which controls and once each hour, automatically and individually, corrects each secondary clock and program time circuit.

b. In new school construction, and in new building additions to existing school sites and modernization projects, Program/Classroom Change will be announced using the P.A. speakers. Provide connections from clock system terminal cabinet to main P.A. Rack.

c. Provide a remote schedule selector switch panel (LTR_RSS) for the master clock (Lathem LTR8-512-M only). Locate remote selector in Main Office or in front panel of PA rack. See Specification 16730.

d. Provide connection to Fire Alarm Control Panel. Provide lock out for both manual and automatic tone when fire alarm system is in alarm.

e. Eight separate Program/Classroom Change zones shall be provided.

f. Provide a dedicated 120-volt, 20-amp circuit to clock controller.

g. Interior clocks shall be 12" diameter, round, semi-flush and mounted at 8'-0" above floor unless shown otherwise.

h. Provide interior clocks in all Classrooms, Administrative Unit offices, Cafeteria, Kitchen, Locker Rooms, Teacher's Lounge, Library, Auditorium and Gymnasium.

i. Exterior clocks shall be 15", round, with weatherproof housing with polycarbonate protective cover.

j. Wiring shall be in conduit, separate from network cabling. Clock circuit wiring shall consist of 3 #14 AWG typically.

k. Provide visual units, which are substantially different in appearance from a fire strobe indicating appliance to indicate Program/Classroom Change in Classrooms for the deaf and hard of hearing, and rooms with high ambient noise. The applicability of this requirement must be

approved by the district. If required, the engineer must develop specification for appliances and power supplies.

l. Master clock controller shall be located in LAN/ Signal Equipment Room of Administrative Unit (new schools only).

m. Provide a terminal cabinet, complete with required terminal blocks, in each building, to be used for incoming and distributing cable terminations.

n. See public address/intercom/telephone and class-change signaling system design guide for coordination with clock system.

o. At existing school sites with an existing master clock system, new clocks shall be same make as existing master time control or clocks that are compatible with existing system.

p. Clocks shall be provided with hangers designed to ensure that they remain in place during earthquakes.

q. Provide block riser diagram of clock system, indicating all components and wiring.

r. When adding new clocks to an existing system confirm with clock manufacture if new clocks will work with existing clock system; then provide the appropriate design for a single comprehensive system.

s. Clock system at new sites shall be 2 wire reverse polarity, 12 hour and 59th minute correction impulse controlled.

D. COMPUTER AND NETWORKING SYSTEMS DESIGN

1. General

a. A complete Local Area Network and Computer System shall be provided for all new school projects, new building additions, and modernization projects.

b. Electrical power with surge protection and filtration must be provided for all computer equipment, as well as an owner furnished rack mounted uninterruptible power supply for data frames and servers.

c. Refer to Guide Construction Specifications, Sections 25568 and 25569 – Premise Wiring Systems, for additional specific requirements..

d. The Commissioned Architect/Engineer shall consult with the District prior to design of system to determine specific project-related requirements.

e. Sites with more than one school, such as a continuation high school co-located on a high school campus shall be equipped with one (1) Main Distribution Frame to serve both schools wherever feasible.

f. The following acronyms are used in this section:

MDF = Main Distribution Frame
IDF = Intermediate Distribution Frame
LDF = Local Distribution Frame
LDC = Limited Distribution Cabinet

LAN = Local Area Network

2. Local Area Network

a. For existing facilities the Architect/Engineer shall visit the site, fully familiarized himself/herself with the existing infrastructure design approach, and extend it to the new building(s) addition, area to be modernized or building(s) expansion. Provide an infrastructure with horizontal and vertical cabling to match existing conditions.

b. For new facilities the network-cabling infrastructure at each school will utilize a star topology design consisting of horizontal cabling, backbone cabling, and various telecommunications cabling pathways and spaces. The Engineer of Record shall determine the best route and method for cable conveyance throughout the school in accordance with project requirements and applicable design and industry standards.

1. The Local Area Network shall consist of the following:

Backbone and horizontal cable plant with the following characteristics:

a. Backbone fiber design consists of a hybrid cable with both single mode and multimode cable in minimum group counts of six each. For new or existing 50 uM MM sites, any added multimode fibers shall be based on a laser optimized, 50 micron multi-mode solution which includes 10 GbE operation (ten gigabit Ethernet) up to 500 meters.

b. Fiber Termination Units are to be indicated on drawings to cross-connect backbone fiber at both the main equipment (MDF) and secondary cross-connect points (IDFs, LDF, and LDC). Utilize figure A-1 of TIA 568-C.1 annex A to indicate interconnection method. Note on plans that pull through and splice methods will not be acceptable.

c. Design shall indicate an installation of optical fiber backbones in strand counts adequate to cross-connect all active classrooms, and instructional support locations.

d. Design shall indicate horizontal fiber with a minimum of 10% spare strands, in multiples of 6 strands, in each backbone cable.

2. Horizontal wiring extends from the work area outlet to the wiring closet. The horizontal wiring includes the work area outlet, the physical termination for the cables, and the patch panels and/or data switches located in the wiring closet. The horizontal wiring is the star topology where each work area outlet is connected to a wiring closet. The horizontal distance from the termination in the wiring closet to the work area outlet must not be greater than 90 meters (295'). The horizontal wiring consists of Category 6, 100 ohm, 4-pair unshielded twisted pair cable; and a 4-strand multi-mode fiber cable to the Limited Distribution Cabinet (LDC).

3. LAN equipment design shall incorporate no more than 20 outlets wired to a 24-port switch. This requirement shall be in addition to

any growth factors for future wiring requirements as set forth in the District LAN specifications.

4. LAN Equipment Room, IDF Rooms, and Wiring Closets must be centrally located. Each closet must contain the terminations and devices for the horizontal wiring system. The closet must have sufficient space to accommodate all the components and servicing space. A typical wiring closet can have the following components:
   a. Equipment, 19" rack for mounting patch panels, and switches.
   b. Raceways for routing cables to work area outlets.
   c. Raceways/cable tray for routing backbone wiring.
   d. Rack-mounted UPS for active components in MDF/Server Racks in LAN Room and in all IDF and LDF racks. All UPS devices are to be located at the bottom of the rack space.
   e. Cabinets, Racks, Patch Panels and Wire Management equipment and cabling are Contractor Furnished Contractor installed.
   f. File servers, network switches, routers and UPS units are generally Owner furnished, Contractor installed.
   g. All MDF, IDF, and LDF Racks shall have 50% physical space for future expansion. Provide rack elevation details showing all Owner and Contractor furnished components.
   h. All other signal headend equipment shall be located in the LAN Equipment Room.
   i. All other signal systems shall share the wiring closets with LAN IDF equipment
   j. LAN Equipment Room and all IDF Rooms shall be air conditioned, 24 hours a day and 365 days a year. Coordinate with Mechanical Engineer.
   k. In Secondary Schools for all grade levels, General Classrooms, Science and Shop Classrooms shall be equipped with one (1) 4-strand fiber drop to be terminated at a limited distribution cabinet (LDC) located in the classroom, and a minimum of six (6) student Category 6 drops, one (1) Category 6 drop for network printer, and one (1) Category 6 drops at the teacher's location. The category 6 data drops shall be run from the LDC inside the classroom. All empty openings on each of the faceplates shall be effectively closed using factory made blank inserts. All classroom drops should terminate on two port faceplates. Student two position outlets containing two Category 6 drops shall be located per educational specification requirements. Printer outlet shall be located near teacher's desk.
   l. In Elementary Schools for all grade levels, General Classrooms, Science and Shop Classrooms shall be equipped with one (1) 4-strand fiber drop to be terminate at a limited distribution cabinet (LDC) located in the classroom, and a minimum of five (5) student Category 6 drops, one (1)

Category 6 drop for network printers, and one (1) Category 6 drops at the teacher's location. The Category 6 drops shall be run from the LDC inside the classroom. All empty openings on each of the faceplates shall be effectively closed using factory made blank inserts. All classroom drops should terminate on two port faceplates. Student two position outlets containing two Category 6 drops shall be located per educational specification requirements. Printer outlet shall be located near teacher's desk. All drops shall be located on a single wall.

m. Kindergarten classrooms shall be equipped with one (1) 4-strand fiber drop to be terminated at a Limited Distribution Cabinet (LDC) located inside the classroom, and a minimum of three (3) student Category 6 drops, one (1) Category 6 drop for network printers and one (1) Category 6 drops at the teacher's location. The Category 6 drops shall be run from the LDC inside the classroom. All empty openings on each of the faceplates shall be effectively closed using factory made blank inserts. All classroom drops should terminate on two port faceplates. Student two position outlets containing two Category 6 drops shall be located per educational specification requirements. Printer outlet shall be located near teacher's desk. All drops shall be located on a single wall.

n. In Computer Laboratories, Technology Centers, Multi-Media Centers and Accounting Classrooms; A minimum of one (1), 6-strand fiber drop to the LDF in the Computer Laboratory and forty (40) Category 6 data drops distributed from the LDF. Category 6 drops shall be grouped with up to six Category 6 jacks per faceplate. Empty openings on faceplates shall be effectively closed using factory made blank inserts. The LDF may be installed in the closest signal room or collocated within an IDF.

o. In Administrative Units, for offices a minimum of one wall outlet with two Category 6 outlets in a single 2-position faceplate shall be provided at each workstation. One of the two network connections will be labeled for Data. The remaining one connection will be labeled for Voice. Empty openings on faceplates shall be effectively closed using factory made blank inserts.

p. General workrooms shall receive a minimum of the following:

1. Workroom/Project Rooms for Secondary Schools: Three (3) Category 6, one (1) Category 6 drop for printer.
2. General Workroom for Secondary Schools: One (1) Category 6.
3. Workrooms for Elementary Schools: One (1) Category 6.
4. Workroom for Administration: One (1) copy machine.
5. Workroom for Performing Arts/Music Workroom: Two (2) Category 6.

6. Workroom for Science Classrooms: One (1) Category 6.

q. Conference rooms will receive up to two (2) Category 6 drops; at two separate locations (faceplates) in the room. Drops will terminate in a single faceplate with two Category 6 drops. One drop shall be labeled "voice" and the other "data".

r. In Library Reading Room, Circulation Center, Library Office and Conference Room, outlets at each workstation shall be provided. A minimum of one (1) 4-strand fiber drop to the Library LDF and a minimum of twelve (12) Category 6 data drops distributed from the LDF. Category 6 drops must be grouped with two Category 6 jacks (and two blank jacks) per faceplate. Drops must be distributed within the room according to the Project documents. Empty openings on faceplates shall be effectively closed using factory made blank inserts.

1. High Schools circulation desks shall receive four (4) data drops.

2. Middle Schools circulation desks shall receive three (3) data drops.

3. Elementary Schools and Primary Centers circulation desks shall receive two (2) data drops.

4. All Library offices shall receive two (2) drops.

5. All Library Workrooms shall receive two (2) drops.

6. All Primary Centers shall receive a minimum of six (6) student data drops in addition to the circulation drops.

7. All Secondary School sites shall receive a minimum of 12 and a maximum of 40 total library drops. The designer shall base the student drop counts above 12 on a 6:1 ratio as applied to the maximum occupant load capacity of the room. As an example, if a library has an occupant capacity of eighty, the drop count will be 13 (13.3333 rounded down).

8. Elementary School Library shall receive a minimum of one (1) 4-strand fiber drop to the Library LDF and a minimum of eight (8) student's Category 6 data drops distributed from the LDF (three (3) at circulation desk and five (5) in reading area), two (2) Category 6 data drops at librarian's circulation desk, and two (2) Category 6 data drops at librarian's workroom.

s. Student Nutritional Support Areas: A minimum of one (1), 4-strand fiber drop to the LDF and up to twenty (20) Category 6 data drops distributed from the LDF (12 drops for Elementary Schools, and 20 drops for Middle and High Schools). Category 6 drops must be grouped with two Category 6 jacks (and two blank jacks) per faceplate. Empty openings on faceplates shall be effectively closed using factory made blank inserts. Drops must be distributed within the room according to the District's standard schematic details.

t. Student Nutritional Support Areas (Exterior Locations): Each location shall receive two (2) Category 6 drops in an environmentally sealed enclosure as described in section 1.02 B. 4 of this specification.

u. Multi-purpose rooms/Auditorium shall contain a total of: Eight (8) Category 6 data drops distributed from the closest LDF or IDF location. Category 6 drops must be grouped with two Category 6 jacks per faceplate. Empty openings on faceplates shall be effectively closed using factory made blank inserts. Drops must be distributed within the room according to the Project documents and consistent with the descriptions below.

1. In the stage area of a multipurpose room/auditorium, there shall be two (2) Category 6 drops located either at stage apron or the proscenium arch.
2. On the other three walls of the multipurpose room, two (2) Category 6 data drops shall be evenly distributed and installed.

v. Gymnasium shall receive two (2) Category 6 data drops distributed from closest available LDF or IDF location. Category 6 drops must be grouped with two Category 6 jacks per faceplate. Empty openings on faceplates shall be effectively closed using factory made blank inserts.

w. Project documents shall indicate all horizontal fiber and Category 6 cabling requirements for non-instructional and office work areas, including book rooms and students stores.

x. Provide a cable tray system divided in three sections for all signal systems, except fire alarm, clock and building control systems.

y. Provide two (2) floor mounted outlets, one for connection to projector and one for connection to the school's computer network; also provide a microphone outlet in the same location, appropriately 15 feet from projection screen.

3. Uninterruptible Power Supply (UPS)

a. The site MDF cabinet shall be provisioned with one 208 volt, 30 amps NEMA L6-30P receptacle to connect to owner furnished contractor supplied uninterruptible power supply.

E. TELEPHONE SYSTEM

1. General

a. The Architect-Engineer shall consult and coordinate with the telephone utility provider in requesting service, and shall include in the contract documents the drawings and specifications or other requirements provided by the utility. Requests must be made early in design, to allow sufficient time for obtaining the utility engineers' input. For assistance in this area, please contact Information Technology Divisions Telecommunications Branch.

b. System requirements are different for Elementary Schools and for Middle Schools / High Schools. Requirements also may be different for new school construction and existing schools.

c. PABX or PBX systems, depending upon the size of the project to be served, require either floor space or wall-mounting space. Some PBX systems are contained within a system cabinet. Others may utilize a rack-mounted equipment configuration similar to data networking equipment. In planning a project, the access and egress to the cabinets or racks, and especially at the front, rear and sides of the main control cabinet, must be determined and planned to provide adequate space for operation and service. Consult the Information Technology Divisions Telecommunications Branch for proper sizing of floor space requirements.

d. System shall interface with the PA / Intercom system. Manual control of program tone over PA system shall be locked out when Fire Alarm System is in "Alarm". All manual and automatic program signals shall be deactivated during a fire-alarm condition.

e. Provide dedicated telephone line connections needed for elevators, areas of refuge, fire alarm and intrusion alarm systems monitoring.

1. The design shall indicate and provide all necessary elements to meet the latest applicable ASME code for elevators.
    a. Provide an autodialing telephone located within the elevator cab, which shall have a button labeled "HELP"; this button will trigger the emergency telephone. The emergency telephone will cause an indicator light to illuminate in the elevator car after the call is answered at the call receiving location.
    b. Provide an autodial hands free telephone, which shall first dial a red wall mounted telephone instrument strategically located in the Administrative Area/Main Office, and in the Adult School. If these devices are not answered in 30 seconds or less, the autodialing telephone will redial to an alternate location, such as school police.
    c. This telephone system shall be capable of being quizzed by the person answering the call, and must be capable of informing the location of the elevator emergency. This can be accomplished via pre-recorded messages. All elevator emergency telephone instruments at a site shall operate using the same dialing codes and procedures.
    d. The wall mounted telephone instrument shall be connected to the second Fire Alarm DACT telephone line via an RJ-31X switch, though a jack at the administration office(s). All elevator calls shall come to this telephone first.
    e. Provide document frames with operational instructions and procedures adjacent to the telephone instrument. Refer to technical specification 14240, and standard technical electrical details for additional information.

f. Telephones in the designated areas of refuge shall be dial-less, hand free telephone instruments capable of automatically dialing the Main Office at a PBX extension, and an alternate location if the office does not answer in 30 seconds.

2. Coordinate alternate location dialing destination with the Design Manager; make all necessary provisions for a complete system in the original design.

3. Number and location of telephone lines dedicated for security system usage shall be coordinated with the Design Manager.

4. Where required provide ADA compliant phones.

2. Elementary Schools

a. The following telephone lines are required for Elementary Schools (identical requirements for Early Education Centers provided the working areas exist) shall be as follows:

1. 1 PRI (Primary Rate Interface) with 40 DIDs.

2. 1 dedicated fax line.

3. 1 intrusion alarm line per alarm panel.

4. 2 fire alarm line per FACP (minimum or as needed to meet code requirements).

5. 1 line per elevator as needed.

6. 1 line for environmental control system as needed.

7. 1 T1 for data.

8. 1 phone with direct access to the outside at teacher's lounge.

3. Middle and High Schools - New Construction:

a. System shall consist of a PBX telephone system and telephone lines with connections to other systems (i.e., intercom, public address and class/program change signaling system. Provide public address, intercom, PBX telephone, and class/program change signaling system.

b. In Middle and High Schools the line requirements are as follows:

1. Secondary sites with 1 - 30 administrative phones.
   a. One (1) PRI (Primary Rate Interface) with 100 DIDs
   b. One (1) dedicated fax line.
   c. One (1) dedicated intrusion alarm line per alarm panel.
   d. Two (2) dedicated fire alarm lines per FACP (or as needed to meet code requirements).
   e. One (1) dedicated line per elevator as needed.

f. One (1) dedicated line for environmental control system as needed.

g. One (1) payphone per campus under a sheltered student accessible area. A preferred location would be near the administration buildings or near the student's quad (possibly adjacent to the lunch shelter/MPR).

h. Two (2) T1's for data.

i. One (1) phone with direct access to the outside at teacher's lounge.

2. Secondary sites with more than 30 administrative phones.

a. Two (2) PRI with 100 DIDs.

b. One (1) dedicated fax line.

c. One (1) dedicated intrusion alarm line per alarm panel.

d. Two (2) dedicated fire alarm lines per FACP (minimum or as needed to meet code requirements).

e. One (1) dedicated line per elevator as needed.

f. One (1) payphone per campus under a sheltered student accessible area. A preferred location would be near the administration building, or near the student quad (possibly adjacent to the lunch shelter/MPR).

g. Two (2) T1 for data.

4. Telephone Outlets

a. Telephone outlets shall be provided as follows:

1. One (1) attendant telephone console Type T1 in main office in Elementary Schools and two in Middle and High Schools' main office, plus one in each small learning community (SLC) administrative office.

2. Multi-line telephones in Principal's, Vice Principal's, Assistant Principal's, Dean's Offices, at workstations in Attendance Office (high schools and middle schools only), SLC's (Small Learning Communities), in Kitchen's office, (one fax, one telephone) and at each workstation in main office (except at workstations where attendant telephone consoles are located), Work Experience Coordinator and College Coordinator offices in high schools, Counselors Offices in Adult School and for each of following offices in high schools and middles schools: Custodian, Librarian, Nurse, Doctor, Textbook Room, Girls' P.E. Department, Boys P.E. Department, Industrial Arts Department, Grade Counselors, Counselors, and a two line telephone with two phone lines to library circulation desk.

3. Use wall mounted single line telephone where no desk is available such as teachers lounge rooms.

4. Single line desk PABX telephones shall be used only where specifically directed.

5. All telephone outlets, type IW and ID shall be connected to the PA/Intercommunication System. Identify Intercommunication Telephones from PABX telephones per LAUSD standard Symbol List and show them in appropriate location on Riser Diagrams. Descriptions above using the "Tx" descriptors refer to the LAUSD standard symbol definitions.

6. One wire connection (jack only) for each elevator.

7. One wire connection (jack only) for each fax machine in main administration area.

8. One wire connection for kitchen's office fax.

9. Two wire connection (jack only) for fire alarm system.

10. One wire connection (jack only) for intrusion alarm.

b. Single line Intercommunication Desk type telephones (ID) shall be used in classrooms and library reception desks. Use single line Intercommunication wall mounted telephones (IW) in Cafeteria, Auditorium, Gymnasium, Computer Rooms, Faculty Lounge, First Aid Room, Music/Choral Room, Locker rooms, etc. The classroom outlets are contractor-furnished and contractor-installed items and are specified under Guide Specification Section 25750. PBX and P.A. systems shall be interconnected to provide paging access capability from any designated intercommunication telephone. Do not program any classroom phones with this feature; they are only to possess this capability. . A separate interconnection provides classroom phones (IW and ID) access to the PBX for emergency calls to the public switched telephone network (PSTN).

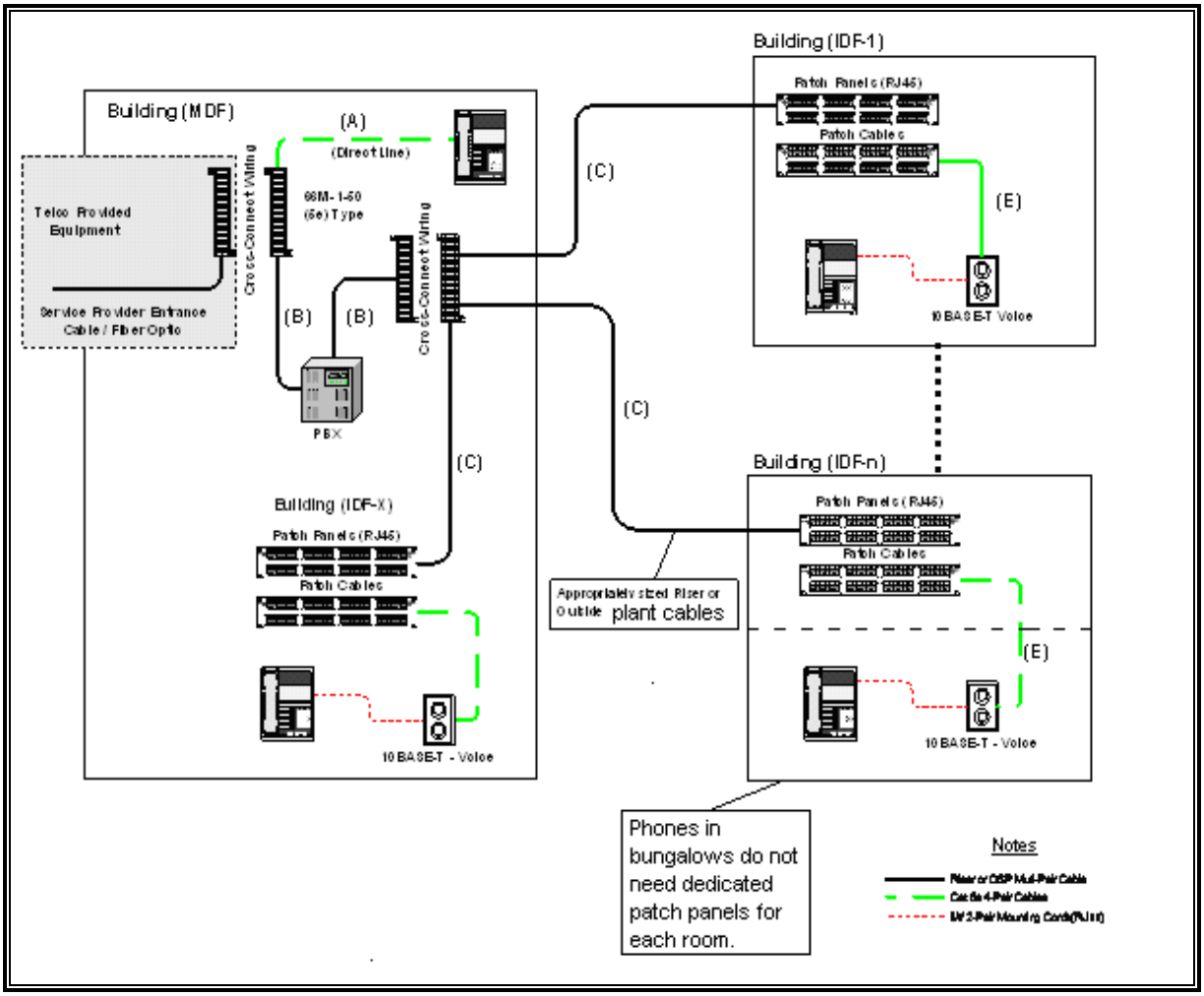
5. Wiring Requirements

1. Wiring requirements for T5 telephone outlets is Category 6 cable terminating in Category 6 jack as specified in Specification Section 25568. The homeruns shall be routed to the closest IDF's dedicated voice patch panel for future Voice over IP network connections. From IDF a multi-pair telephone cable shall be used to connect all telephones to the PBX system in the administration building.

2. Wiring requirements for jack only telephone ports is one twisted pair #22 AWG, Category 3, cable terminating in RJ-11 jack and shall homerun to the main telephone backboard (thru telephone terminal cabinet of the building if applicable).

3. See Guide Construction Specifications Sections 25568 (wiring and infrastructure) and 25723 (Owner furnished PBX equipment and outlets) for equipment description and general requirements

4. The following diagram, Voice Communications Topology, shows a typical wiring selection and design for a multiple building campus or multi-floor building.



6. PBX General Requirements

a. A dedicated UPS providing at least 1 hour of emergency power for each system shall be furnished and installed by PBX equipment's vendor under separate contract (Owner Furnished, Owner installed under this contract).

b. Provide a dedicated, 30 Amp, 208 volt, 1 phase circuit with NEMA L6-30P outlet for connection to owner furnished UPS (which supplies power to the PABX equipment).

c. Allow 4 square feet of floor space adjacent to dedicated power outlet for the PBX UPS.

d. When designing for telephone systems take into account future requirements and make provisions for expansion in systems such as

providing spare cables, sizing terminal boards with adequate spare terminals.

e. On sites with more than one school, such as a continuation high school co-located on a high school campus shall be equipped with a single PABX to serve all users on both sites wherever feasible.

f. The PBX system will be located either in the campus or building LAN room, or a separately designated room. Always provide main cross connect backboard or terminal cabinet in main building in LAN Equipment Room next to main telephone backboard (in new school campuses only). All wiring shall be routed via Cross-connect backboard or terminal cabinet through cable tray system.

g. Allow a separate 84 inch rack for the PABX and associated equipment in the LAN room.

h. Indicate on drawings the location of equipment and components, conduit and cable runs, and cable trays.

i. Cables shall be in raceways. Exposed cables will be allowed in cable tray system only.

j. All cable homeruns from outlets shall be routed to the closest IDF at each building. Provide separate patch panel in IDF dedicated to VOICE.

k. Cables homeruns to IDF may be run in same conduit or cable tray, which contain data cables routed to the same IDF. Voice and Data outlets are allowed to be installed on the same multi-position faceplates/boxes.

l. From IDF use a multi-pair telephone cable (riser rated or better) to route the telephone lines to PBX Cabinet (cross connect at both ends, in IDF room and LAN room). This temporary wiring shall be removed after Voice over IP system is implemented.

F. PUBLIC ADDRESS/INTERCOM/CLASS CHANGE SIGNALING SYSTEM

1. General:

a. Provide public address, intercom, and class/program change signaling systems.

b. Systems requirements are different for Elementary Schools and for Middle Schools / High Schools. Requirements also may be different for new school construction and existing schools. Verify specific requirements for each project.

c. There shall be a single public address/intercommunication system for each site. The Architect/Engineer shall select the appropriate system from one of the three specification-compliant manufacturers. The design shall comply with the following criteria:

1. The proposed public address/intercommunication system shall not exceed manufacturer's system capacity.

2. It is not acceptable to increase the manufacturer's stated capacity by tying two or more systems together.

d. Provide an Autonomous Public Address System in Multi-Purpose Rooms, large Group Instruction Rooms and Auditoriums. System shall include an override muting capability from main PA system associated with the emergency all-call announcements.

e. Provide an Autonomous Public Address System in Gymnasiums and athletic fields in Middle and High Schools. System shall include a muting capability from main PA system associated with the emergency all-call announcements.

f. The Main Public Address System and all Autonomous PA Systems shall be interfaced with the facility Fire Alarm System to cause audio muting of PA system speakers during general fire alarm conditions.

2. Main PA/Intercom System

a. Main PA System shall consist of public address, intercommunication and class/program change signaling equipment with capacity for speakers and telephones.

b. Provide intercom telephone service to each classroom, wired to the main Intercom/PA rack. In some cases, the classroom phones connect directly to the PBX; coordinate with Design Manager.

c. The system shall permit the following paging and intercom communication as follows: main office phone to classroom phones, classroom to classroom, and classrooms to office. Outside line access from a classroom phone through the PBX is limited to contacting emergency services only.

d. When designing PA systems, take into account future requirements and make provisions for expansion in systems such as providing spare cables, sizing terminal boards with adequate spare terminals, providing conduit stub-outs outside of buildings and size equipment such as P.A racks and PABX to accommodate future circuits as planned, or 20% minimum expansion.

e. See Guide Construction Specification, Section 25821 and 25750 for equipment description and additional requirements. These Specifications shall be included in the Contract Specifications.

f. PA/Intercom Rack(s)

1. P.A. Rack(s) shall be located in the LAN Equipment Room, lining up with TV, MDF, PBX and Energy Management System (EMS) racks.
    a. Rack(s) shall be front and rear accessible for servicing. Main P.A. rack(s) shall consist of one or more free standing 19" rack(s) with following components:
    b. AM-FM tuner. Antenna for this tuner is mounted on roof of Administrative Building with conduit and antenna down leads installed to P.A. Rack Using a TV antenna for receiving the FM signal is not permitted. Change connection of tuner to

input of software programmed, digital PA system so tuner output can be delivered to selected speakers or zones.

c. CD player in Main Office with microphone. Cassette player is no longer required.

d. Intercom and program control panel. Analog intercom is disabled with the deletion of the switchbank requirement.

e. P.A. and emergency amplifier.

f. Berhinger feedback eliminator (or equivalent) for Main Office microphone.

g. Microphones. One microphone (always on via the microphone switch) shall be installed in Main office wired to the PA Rack.

h. CD changer. One CD changer shall be installed in Main office installed in a wall mount enclosure (optionally with angled fold down) wired to PA Rack. The CD player may be limited to a single CD.

i. For schools with an outside quad assembly area, a requirement may be added for a remote microphone outlet or wireless microphone system. Existing PA horns in or near this quad area would be zoned for the PA broadcasts from this microphone without installing additional horns. If a wired microphone outlet is installed, provide electrical safety measures to isolate this outdoor appliance. Coordinate with Design Manager prior to incorporating this requirement.

2. In medium and large campuses, multiple PA racks are required to accommodate the numbers of speakers. Show the elevation of racks with all components shown. Prove adequate space to install multiple racks.

3. In small campuses with single racks and a single card cage, provide ample room for expansion within this rack for a complete additional card cage.

g. An additional function of P.A. speakers is to announce program/classroom change. System shall interface with master clock system and Fire Alarm System for class-change signaling utilizing P.A. speakers. The P.A. Rack equipment must include a tone generator and inputs from Program/Clock Controller. Manual activation of separate tones shall be provided by both telephone codes and manual buttons on front of the PA rack.

h. Provide a switch on the PA rack which reroutes the master clock zone one switch closure to built-in steady tone of the secondary analog PA system. In the event that the primary digital, software-programmed PA has failed or is being serviced, an all-bell class change tone shall be provided via this switch. The tone duration is still controlled by the master clock.

i. Provide a separate manual activation button in the main office for notifying the plant manager via two beeps. This button would activate a zone of outside horns only. This zone has to be created in software and

is accomplished using a spare software zone for outside horn assignment.

j. System shall interface with Fire Alarm System to silence all speakers during a general fire alarm condition and activation of indicating devices. (See Standard Details 5.14 and 5.15.)

k. System shall interface with the site PBX to allow access to emergency services from the classrooms. (Refer to Standard Detail 5.8)

l. Wiring Requirements.

1. For each P.A. speaker/horn provide one shielded twisted pair, #22 -#12 AWG, depending on the size of speaker and the length of the run.

2. For intercom telephones, one twisted unshielded pair #22.

3. For intercom telephones with co-located speaker, two twisted pair #22 one pair shielded and one pair unshielded.

4. For each microphone outlet, one twisted pair #22 AWG with overall shield.

5. For overriding autonomous P.A. system, one twisted pair #18 AWG.

6. For underground applications or under slabs at ground level use flooded type cables.

m. Intercommunication Phone Outlets

1. Provide intercommunication telephone Outlets as follows. (See also the sub-section "Telephone PBX Systems.")

2. Single line intercom desk telephones (ID) in Classrooms.

3. Single line intercom wall-mounted telephones (IW) in Cafeteria, Auditorium, Locker Rooms, Faculty Lounge, First Aid Room, Music/Choral Room, Teachers Work Rooms, etc.

4. Intercom telephone outlets, type ID (desk type where desk is available) and IW (wall-type) shall be connected to the PA/Intercommunication System thru PA Main terminal cabinet. The wires for speakers and intercom telephone serving a room shall be combined in a single cable with an overall jacket containing both shielded and unshielded twisted pairs.

5. Identify intercom telephones as separate from PABX telephones per LAUSD standard Symbol List and show them in appropriate locations on riser diagrams.

n. P.A. Speakers

1. Provide P.A. speakers in the following locations at minimum:

a. Classrooms, offices, corridors, library, teachers' workrooms, student store, plant manager's office and all occupied rooms where no PBX telephone has been provided.

b. Outdoors to cover all student assembly, athletic and activity areas. Size speakers/horns appropriate to the area covered. Do not impact adjacent residential areas.

c. Parking garages.

d. All other rooms and areas as appropriate to specific projects.

o. Paging

1. PABX and Intercom/P.A. systems shall be interfaced to provide paging capability from any designated telephone. Do not program classroom phones with this feature; they are only to possess this capability. PA/PBX interconnections shall be accomplished by using two separate paths. Paging lines from the PBX are required to have direct connections to the main Intercom/P.A. rack phone ports which operate as fxs ports. A telephone card in the PA rack operating as fxo ports, provides communications to the PBX, initiated from a classroom phone.

2. Provide a general paging zone for elementary schools and separate paging zones for middle and high schools. Zones for class change tones and or paging are as follows:

a. General paging zone. Note: Consider if this will include the gyms, shops, auditorium and athletic field and if the override mute is to be activated for these areas. Also, consider if this zone will be used by the class change tones and if these areas are to be included.

b. Classrooms only.

c. Gymnasium and athletic fields.

d. Shops. Note: Art shops are often left off this list. Have OAR determine if they want to be included (requires simple software configuration).

e. Auditorium/Multi-Purpose Rooms.

p. General System Requirements

1. Provide at least 1 hour of emergency power for PA/Intercom system at full load by installing a dedicated, rack mounted UPS unit. Provide a dedicated 120-volt circuit from UPS to each P.A. rack. The UPS shall be located in the PA rack with one or more battery packs. The model number and battery packs used depend on power calculations for 1 hour emergency power. Provide a SNMP web card into this UPS and Cat 6 in conduit to overhead cable tray. Provide conduit from cable tray to top of MDF cabinet and route the Cat 6 cable to one of the last switch positions of the core switch. Additional requirements for the UPS include 208 Vac single phase (phase to phase) input power. In addition, the input and output power connections with receptacles are provided by

adding a SUPDM12 module. Be aware of radius tolerance requirements for the thick cable connecting the SUPDM12 and the AC input receptacle. Consider using a deeper cabinet as is required for the MDF to accommodate this cable. Have the OAR contact ITD to configure both the SNMP card and switch port.

2. In classrooms and offices, provide flush mounted baffles where new suspended ceilings are installed. Locate speaker at center of the room. Otherwise, provide surface mounted speaker baffles directly above the telephone handset at 8'-0".

3. In rooms without a teacher's desk, telephone handsets shall be located in close proximity to Teacher's work station, wall mounted at 4'-0" maximum to the highest operable part. In classrooms telephones shall be desk mounted with telephone jack mounted at +15" measured from the bottom of the receptacle outlet box to the level of the finished floor.

4. Provide speaker volume control in office areas only. For wall mounted speakers, volume control shall be installed within baffle with shaft extending out of baffle. Where speakers are ceiling-mounted, the volume controls shall be located on the wall in a convenient location.

5. Place the PA/ Intercom wall display, main PA display phone, CD player, and one emergency "always hot" (via mic switch) PA microphone in main clerical core area. Plan location of wall display so that it can be viewed from a maximum number of desks.

6. When designing P.A. systems, take into account future requirements and make provisions for expansion in systems such as providing spare cables, sizing terminal boards with adequate spare terminals. In small sites with room for only one cabinet, provide for expansion including room for additional card cages.

7. Main PA terminal cabinet shall be located on the wall in the same room where PA racks are located (LAN room in new campuses). All wiring shall be routed via main terminal cabinet through cable tray system. In situations where the cabling conduit penetrates the roof to route to another room for the MPATC, do not penetrate directly above the PA or autonomous PA rack. Roof leaks shall be prevented from leaking directly in or around these conduits into the PA cabinet.

8. Provide at least one terminal cabinet in each building. Locate terminal cabinet in building IDF room(s).

9. Design loudspeaker installation using proper types and numbers of speakers to provide adequate listening patterns in larger or special rooms and outdoor areas. Position outdoor speakers in a manner that minimizes the impact to residential neighbors of the site. Consider problems of feedback. Provide a feedback eliminator in

PA rack for Main Office microphone. Some models are line level and require a preamp for the microphone; however, as an alternative, one mic level model should be available, but it should be rack mountable.

10. Note on plans: The final class change tone type may or may not be volume sensitive. For example, a chime sounds relatively the same at different levels, but a last minute change to a steady tone may be exceedingly loud or very low. Contractor shall test the class change tone by setting to each available type and perform a final volume adjustment of the preamps, software volume settings, and PA amplifier accordingly.

11. Fire Department requires self-supporting, non-guyed antenna masts. Ensure adequate structural support.

12. Locate antenna masts in least conspicuous locations as viewed from main school entrance.

13. Indicate mounting details on drawings of antenna, speaker baffles, special speaker mounting brackets, speaker clusters, etc.

14. Indicate on drawings a block-riser diagram of entire P.A. system, indicating components such as speakers and intercom telephones, cable trays, conduit and cable runs and underground facilities.

15. Indicate on drawings the location of equipment and components, conduit and cable runs, and cable trays. Also indicate on drawings the wiring details of all point to point connections inside the PA racks.

16. Cables shall be in raceways. Exposed cables will be allowed in cable tray system only.

17. Provide grounding facilities for Public Address Systems consisting of 3/4" conduit and a #6 THWN wire, or as required by code and specification to connect the Main Public Address terminal cabinet, and other terminal cabinets to the building grounding system. Where connection to existing building ground system is not practical, provide a separate ground rod to be used for grounding of the racks and antennas.

3. Gymnasium Autonomous P.A./Sound System

a. Components include:

1. Freestanding 19" rack with mixer pre-amplifiers, power amplifiers, cassette tape player, CD player, AM-FM radio, and graphic or parametric equalizer. Locate rack in Gymnasium Office.

2. Terminal cabinet for termination of all inputs and outputs of the system.

3. AM-FM antenna mounted on roof with downlead in conduit to radio tuner and grounding. Do not use a TV antenna for the FM signal.

4. Loudspeakers in gymnasium court consisting of a cluster of minimum 4 horn loudspeakers mounted near ceiling in center of room in such a manner as to cover all 4 quadrants of room. Mount cluster in a steel enclosure firmly anchored to ceiling or roof structure.

5. Two microphone outlets mounted flush with finished floor at center of side court. Use microphone pockets that prevent a tripping hazard. Next to microphone outlets, provide two 120V, 15 amp receptacles flush with finish floor.

6. One microphone outlet in each of the Girls and Boys Coaches Offices.

7. Assistive Listening System.

b. Provide Program line to main P.A. rack in Administrative Unit to distribute local programs to main P.A. system.

c. Provide Emergency Override line, including relays from main P.A. console, to mute the local program during an emergency all-call.

d. Provide adequate speaker coverage from main P.A. rack to allow broadcast of main P.A. system programs and announcements into gymnasium areas. A separate Program line to an input of the autonomous system is not required.

e. Provide a dedicated 120-volt circuit for Autonomous PA Rack.

4. Elementary Schools Multi-Purpose Room Autonomous P.A./Sound System

a. Components include:

1. Wall mounted amplifier in cabinet with a minimum of 8 input sources for tape, projector, and 5 microphones. Amplifier cabinet shall be flush or surface mounted and located back stage.

2. Input/output switching panel mounted adjacent to or below amplifier cabinet.

3. Three recessed floor microphone outlets flush mounted near front of stage platform, equally spaced and wired to pre-amplifier mixer inputs.

4. Recessed microphone outlet flush mounted in front face of stage platform and wired to pre-amplifier mixer input.

5. Recessed microphone outlet flush mounted in floor at center of audience area and wired to pre-amplifier mixer input.

6. A minimum of two Speakers mounted on either side of the stage platform and wired to amplifier outputs.

7. Projector outlet flush mounted in floor at center of audience area and wired to pre-amplifier mixer input.

8. Receptacle, 120V, 15 amps, flush mounted in floor at center of audience area.

9. Assistive Listening System.

b. Provide adequate speaker coverage from the Main PA to hear emergency, class passing tones, zone pages and all-call announcements

c. Provide Emergency Override line, including relays from the main P.A. console, to mute the local program during emergency announcements..

d. Provide sufficient main P.A. speaker/horn coverage to allow broadcast of main P.A. system programs and announcements in multi-purpose rooms, gymnasia, auditoria, and other specialized areas with separate or autonomous PA systems. Include horns for area just outside the gym offices.

e. Provide dedicated 120-volt circuit for Autonomous PA wall mounted Rack.

5. Large Group Instruction Room Autonomous P.A./Sound System

a. Large Group Instruction Rooms are rooms with capacity for 100 students or more, but without a stage. Contact the Office of Risk Assessment for any necessity of ADA required assistive listening systems in this or similar locations.

b. Components include:

1. Wall mounted amplifier in cabinet with a minimum of 8 input sources for tape/CD, Audio from laptop computer, projector, and 4 microphones. Amplifier cabinet shall be flush or surface mounted in closest signal room.

2. Input/output switching panel mounted adjacent to or below amplifier cabinet.

3. Microphone outlet flush mounted on instruction wall at +48" A.F.F. and wired to pre-amplifier mixer input.

4. Microphone outlet flush mounted in floor at center of audience area and wired to pre-amplifier mixer input.

5. Provide two infrared wireless microphones.

6. Speakers mounted above instructional wall and wired to amplifier outputs.

7. Projector outlet flush mounted in floor at center of audience area and wired to pre-amplifier mixer input.

8. Receptacle, 120V, 15 amps, flush mounted in floor at center of audience area.

9. Assistive Listening System.

c. Provide Emergency Override line, including relays, to mute local program from main P.A. console.

d. Provide adequate speaker coverage from the main P.A. rack to allow broadcast of main P.A. system programs/class change tones and announcements in multi-purpose room areas.

e. Provide dedicated 120-volt circuit for Autonomous PA wall mounted Rack.

6. Middle and High Schools Multi-Purpose Room / Auditorium / Theater Autonomous P.A./Sound System

a. Components include:

1. A freestanding 19" rack backstage with mixer pre-amplifiers, power amplifiers, CD player, cassette tape player, AM-FM radio, graphic or parametric equalizer, and receivers for wireless microphones.

2. Terminal cabinet for termination of all inputs and outputs of system, except inputs of wireless microphones.

3. AM-FM antenna mounted on roof with surge/arrester, and downlead in conduit to radio tuner. The antenna mast shall be grounded.

4. Microphone outlets (three) mounted flush in stage platform, overhead, and in stage platform front. Each microphone outlet shall be wired to one input of pre-amplifier mixer. Wireless microphones and receivers shall be provided. Each wireless microphone receiver shall be wired to one pre-amplifier mixer input. Use high quality, multichannel wireless microphone systems designed to prevent interference from other emissions (e.g. radio/TV stations).

5. Provide two speaker outlets in the front face of the stage for monitor speaker connections. Unmounted, stage monitor (wedge shaped) speakers lay on the front of stage to allow performers to hear themselves, and have flexible cord connections to these outlets.

6. Projector outlet in control room wired to pre-amplifier mixer input.

7. Speakers shall be provided to produce a uniform sound level throughout auditorium. Optionally, provide sub-woofers separately from the speaker clusters, either on or in the face of the stage platform. Note on plans that prior to start of installation, a sound system analysis shall be performed to properly locate sound columns.

8. A headset intercom system shall be provided between projection rooms and backstage for stage cueing and lighting coordination. System shall include headsets, power supplies and input jacks.

9. Assistive Listening System with signage.

10. In performing arts auditoriums, as an option, provide a mixing console either located in the sound booth room or in a sectioned area in the seating area (typically in the center back behind the seating area). Install a conduit in or on the floor to cable the console snake cable to the sound booth. Provide a means to secure the console from vandalism. Provide adequate AC outlets and lighting for operation of the console.

b. Provide Emergency Override line, including relays, to mute local program from main P.A. console.

c. Provide speakers from main P.A. rack to allow broadcast of main P.A. system programs and announcements with adequate coverage in auditorium building areas (for emergency all-call or auditorium zone page only).

d. Provide dedicated 120-volt circuit for Autonomous PA wall mounted Rack.

e. In Performing Art Centers/Theaters (new facilities), a theater consultant hired by the architect shall determine the scope of sound system beyond the requirements defined here.

1. The electrical engineer shall coordinate with theater consultant and architect to provide power, cabling, racks, speaker clusters and raceways where needed. In gymnasiums focus the design to limit reflected sound yet permit intelligible, increased volume which occurs during emergency all-call announcements.

7. Athletic Field Autonomous P.A./Sound System

a. Components include:

1. Rack mounted amplifier in cabinet with a minimum of 8 audio input sources for tape, projector, and 5 microphones. Amplifier cabinet shall be flush or surface mounted, located in sound control booth.

2. Provide a separate system of home side horns, home side stand microphones, home side microphone outlets and amplifier for the cheerleaders (a common system that used to be provided with older athletic field P.A. systems).

3. Provide GFCI power outlets for athletic field sound systems.

4. Input/output switching panels mounted adjacent to or below amplifier cabinet.

5. Microphone outlet mounted on an appropriate light pole or at concession room and wired to amplifier input. Consider using a wireless microphone solution instead of conduit and cabling that previously ran to the visitor's bleacher side. Use high performance, multiple channel wireless systems to prevent interference from various emission sources such as local radio and TV broadcasts (see the Shure Pro Audio web site for updates on wireless noise solutions).

6. Outdoor horn loudspeakers to cover all P.E. fields.

b. Assisted listening system where an outdoor assembly area is designated as assembly occupancy.

c. Provide Emergency Override line, including relays, to mute local program from autonomous PA to permit emergency broadcasts from main P.A. console through separate speakers/horns.

d. Provide adequate speaker coverage from the main P.A. rack to allow broadcast of main P.A. system programs and announcements in auditorium building areas. Emergency announcements are hard-wired to these speakers. Software dictates if these speakers are included in any zone pages or in a normal all-call page.

e. Provide a dedicated 120-volt circuit for Autonomous PA Rack.

f. Do not locate any equipment in the field or areas that would create a safety hazard.

G. SECURITY INTRUSION ALARM SYSTEM

1. General

a. The District's preferred security intrusion alarm system is the DSC MAXSYS 4020 intrusion system.

1. The input element is a sensing device designed to monitor status of a protected area in a school, using infrared/motion detectors. These intrusion detectors are connected individually to identified terminals of the control panel or controller, via cable to form a closed loop.

2. The control panel provides a small amount of current constantly flowing through loop. However, if one of the intrusion detectors is disrupted, opened, or the cable is cut, the controller senses the absence of current in the loop.

3. In an alarm condition, the controller can activate an optional siren and transmits alarm code to a digital receiver located at the central station of the Los Angeles School Police Headquarters.

4. Upon answering the call, information appears on a dispatcher's computer screen.

2. Sensing Devices

a. Motion Detectors:

1. Motion detectors shall be passive infrared detecting both motion and infrared emission at the same time to eliminate false detection.

2. Provide motion detectors in all areas or rooms that are located along the perimeter of the first floor of a building.

3. Provide motion detectors in rooms located above the first floor only if there is outside access or potential for entering directly by climbing trees, etc.

4. Provide motion detectors in corridors and hallways on each floor of a building.

5. Provide motion detectors in computer rooms, LAN equipment rooms, IDF rooms, Multi-Purpose Building, Kitchen and Dining Rooms, Gymnasium and all other major spaces.

6. Install motion detectors on an outlet box on the ceiling to obtain maximum efficiency. Use wall-mounted detectors only where ceiling-mounted are impractical.

7. Locate the motion detector at a corner of a room, facing away from sunlight, windows, heating elements, HVAC outlets and any turbulent air movements.

8. Provide remote control panel including a 12VDC power supply in each building for motion detectors.

9. A siren is required. An interior siren is preferred to an outdoor installation. If the school decides against a siren feature, bypass the connection with a 500 ohm resistor but leave the siren in place.

b. Door Switches (provide only in special cases):

1. Door switches shall be of magnetic type.

2. Provide door switches for walk-in freezers or coolers in a kitchen.

3. Provide door switches for all exterior doors not covered by motion detectors on the interior, including restrooms with direct exterior access.

3. Alarm Zones

a. Each sensing device shall be identified with an alarm zone or alarm point, which shall be identified at the remote annunciator and at the control center. The zone or point identification shall be descriptive of the location of the sensing device, such as Administrative Building Room 120.

b. There shall be no more than two motion detectors per zone or no more than two points to identify the location. Areas where two detectors per

zone may be required include multi-purpose buildings, gymnasiums, auditoriums, and two classroom relocatable buildings.

c. Zones or points shall be listed and indicated on site and building drawings, identifying each one by building, area and room number.

4. Zone By-Pass Keypads

a. Provide a strategically located zone by-pass keypad in places such as the interior wall of the Main Office, Kitchen/Cafeteria building, Student Store, Gymnasium Lobby, Multi-Purpose Building, Auditorium/Theater, Adult School Office, Computer/Multi-media/Science laboratories, Music/Band Room, offices of academies in multi-academy learning centers, and Plant Manager's Office to de-activate the alarm when entering a building is necessary after the alarm system is armed.

1. A separate keypad will not be required, if any of the areas listed above is only accessible through another controlled area with a keypad.

2. Each main security panel can support a maximum of 8 keypads. If more key pads are required obtain authorization from District representative.

b. The by-pass keypad shall be a liquid crystal display.

c. Do not locate keypads in corridors or other areas easily subject to impact damage or vandalism (MS and HS only).

d. Consult with District representative to determine if other locations may be required.

5. Main Security Panel (MSP) and Annunciator

a. Main Security Panel and graphic annunciator are also called headend equipment. They are used to annunciate alarm zones and to transmit alarm signals via telephone line to the central monitoring station located at the District Police Headquarters.

b. MSP consists of maximum of 16 zones, expandable to 128 zones by the use of zone expansion modules, each with motion and tamper inputs, single phone line monitor and power supply housed in a lockable cabinet.

c. Controller shall be located in a LAN equipment room (new facilities) or closet in Administration Unit (existing facilities).

d. In campuses where numbers of zones exceed 128, or in campuses where total combus wiring from the controller to a remote security panel or to any keypad connected, exceed 1000 feet, split the campus to be protected by two independent controllers. Both controllers shall be annunciated in the main office.

e. MSP shall be fed from a separate circuit of 120-volt power source. It will be stepped down through a 120/16-18 VAC, 40VA transformer.

f. Graphic annunciator(s) shall be located in main office of the Administration Building. The Graphic Annunciator shall have full LED annunciation for all zones. Provide a keypad at each annunciator. Provide a separate repower module for each graphic annunciator panel if required (based on power calculations). Wire size of combus may have to be increased to accommodate increased power demand between repower module and led driver boards in the graphic annunciator panels.

6. Remote Security Panels (RSP)

a. Provide a Remote Security panel at each building (except relocatable buildings where a group of relocatables may be controlled by one RSP), connected to the main security panel by combus wiring

b. RSP consists of maximum of 16 zones, expandable to 128 zones by the use of zone expansion modules, each with motion inputs and power supply housed in a lockable cabinet.

c. RSP shall be fed from a separate circuit of 120-volt power source. It will be stepped down through a 120/16-18 VAC, 40VA transformer.

d. The RSPs shall be located in IDF rooms wherever possible.

7. Power Supply, Cables, Raceways and Cabinets

a. Cables used for connection between MSP and annunciator in clerk's office, all homeruns from sensing devices to MSP/RSP and combus wiring between MSP and RSP as well as wiring to the keypads shall be 4 conductor, #22 for up to 1000 feet. Note on plans: do not set the charging jumper for high-charge on repower modules, and adjust the voltage potentiometer for 13.8 vdc, and apply fingernail polish to prevent tampering of this pot setting.

b. Use flooded type cables for underground applications.

c. Cables shall be installed in raceways. Concealed raceway shall be used for new building construction and exposed raceway shall be used for existing building installations. Exposed raceway in electrical rooms shall be conduit and exposed raceway in classrooms; offices and corridors shall be wiremold.

d. Cable length, resistance, capacitance and power calculations must be designed by the Architect to strictly conform to the manufacturer's design guide. Any deviation from the manufacturer's specifications for these types of systems can result in system malfunctions and/or high maintenance costs to the District.

e. Existing underground raceways used for public address system or TV master antenna system may be used to run security intrusion alarm system cables if there are spaces available in those raceways. Any cables pulled out from an existing conduit shall be replaced with new.

f. Power supplies consisting of receptacles, transformer/ rectifier and batteries shall be installed in a lockable NEMA 1 enclosure or a lockable terminal cabinet.

g. Terminal Cabinets and Junction Boxes:

1. At least one terminal cabinet shall be provided in each building except relocatable buildings.

2. At least one junction box (6"x 8") shall be provided in each relocatable building.

8. Existing Security Intrusion Alarm Systems

a. At some District school sites existing intrusion alarm equipment may differ from the system described above.

b. Existing system headend equipment may consist of an annunciator/switch panel, a relay panel and a dialer or transponders.

c. If this situation is encountered, remove existing annunciator/switch panel, relay panel, dialer or transponder. Wire all existing zones directly to new controller. A new annunciator panel shall be installed in main office (or LAN room if present).

9. Site Plan

a. Instruct the contractor to provide a site plan for use by the District central monitoring stations. Site plan shall be as follows:

1. Indicate location of buildings, zone numbers, and repower battery panel locations.

2. Indicate school code number and zone chart.

3. Indicate surrounding street names and direction.

4. Site plan shall be drawn on 8 1/2" x 13" sheet.

H. CLOSED CIRCUIT TELEVISION (CCTV) AND AUDIO SURVEILLANCE SYSTEMS

1. General

a. As part of the Los Angeles Unified School District's commitment to provide a safe working and learning environment, surveillance systems are to be used in approved, designated areas of schools and school grounds where there is no expectation of privacy as an additional and further means to continue to provide for that safe environment. Surveillance systems are defined as electronic devices for visual image (only) monitoring, recording and visual image data storage. (Parking garages are an exception and have audio monitoring and recording as well as video.)

b. Surveillance systems ARE STRICTLY PROHIBITED WHERE A "REASONABLE EXPECTATION OF PRIVACY" EXISTS. This includes the following:

1. No surveillance shall be installed in such spaces as restrooms, locker rooms, classrooms, private offices, and private workspaces.

2. Cameras must be directed so that they do not look through windows or other openings into private areas.

3. Cameras providing outside surveillance, such as parking lots or building perimeters must not be directed beyond school property.

c. Currently, only a coax or Cat 6 converted home run cabling CCTV design using DVRs is permitted. Use of the local LAN, use of a newly constructed separate LAN or the WAN is not permitted. See Bulletin 1197.

d. All real-time visual monitoring equipment (except point-of-entry monitors), including monitor screens, consoles, controllers and other appropriate equipment, and data recording devices, must be located in a secure monitoring site, with restricted access by approved individuals only. Do not locate them in a common LAN Equipment Room.

1. Secure monitoring sites may be located, secure from public viewing, in Principal's Office, Assistant Principal's Office, or a Police Office or special Security Room. For adult education or other after-hours use, the same provisions apply; systems must be able to be secured from unauthorized use.

e. Provide CCTV surveillance systems as follows:

1. Parking Garage Systems: In all parking structures (Audio Surveillance are also required).

2. School Building and Site Systems: Only when directed in writing by the District's authorized representative. (These systems shall be video only, with NO AUDIO SURVEILLANCE OR RECORDING.)

2. Parking Garage Surveillance System

a. Closed circuit television system shall consist of CCTV cameras, camera enclosures, monitors, coaxial switcher/controller system, digital video controller and recorders (DVR), and pan-and-tilt drives, cablings, power supplies and raceways. The video surveillance system shall be designed to be integrated with a School Building and Site System, either concurrently or in the future.

b. Audio surveillance equipment shall consist of controller, microphones, speaker/microphones, combiners, and call stations.

c. The basic system requirements are as follows:

1. One CCTV camera with pan and tilt spaced every 100 feet and within vandal-resistant enclosure in parking structures.

2. One fixed CCTV camera within vandal-resistant enclosure installed inside the parking structure entrance. Field of view shall include the vehicle access gate to the parking lot.

3. Surveillance microphones spaced every 60 feet, with a maximum of six microphones per zone.

4. Push to talk Emergency Speaker/microphone call stations every 50 feet in garage, one at elevator's lobby and one at each pedestrian point of egress.

5. Sixteen CCTV cameras maximum per DVR.

6. One monitor for each group of sixteen cameras.

d. Locate monitors, Digital Video controller and recorders (DVR) and audio surveillance base stations system in a console/rack station either in the Police /Security Office (in secondary schools) or the Main Administrative office. Terminal cabinets for Parking Garage Systems may be located in the LAN Equipment Room.

3. School Building and Site Surveillance System (Required only at selected sites)

a. Provide CCTV surveillance system, cameras and other equipment to monitor any remote spaces where safety or security risks indicate a need. These include:

1. Main Office and Reception public spaces.

2. Attendance Office public space.

3. Corridors, lobbies, and other public circulation and access spaces.

4. Cafeteria

5. Lunch Shelter

6. Other interior and exterior locations determined during the design phase of the project.

b. Closed circuit television system shall consist of CCTV cameras, camera enclosures, monitors, digital video controller and recorders (DVR), and pan-and-tilt drives. Where Garage exists, the headend equipment shall be integrated with the Parking Garage Surveillance System to provide a single campus-wide system.

1. Provide pan-and-tilt or fixed CCTV camera to cover all corridors, stairwells, elevator lobbies, and other interior public areas (no classrooms).

2. Provide sixteen cameras maximum for each monitor and DVR, fewer if design and monitoring conditions warrant.

3. Cameras shall be located so that every camera is monitored by at least one other camera.

4. Cameras shall be located and secured so as to minimize vandalism, but there shall be no covert or concealed cameras.

c. No audio surveillance shall be provided for this system.

d. Provide drawings at Design Development and Construction. Document Phases that show all camera locations and zones of coverage. Use VideoCAD 6 or equivalent for designing and indicating camera coverage.

e. At all schools using CCTV buildings and site surveillance systems, appropriate signage must be posted to advise the public that the systems and camera are in operation.

1. Standard sign language and format has been adopted and is available on request.

2. Signs must be placed prominently at all points of entry to the school site, both pedestrian and vehicle. Where surveillance is provided in parking garages, place the sign at the entrance to the parking garage.

3. Location of signs shall be submitted at Design Development Phase for the District review. Signage with details must be shown in project construction documents.

I. GARAGE AND MAIN DOOR ENTRY SYSTEMS

1. Parking Structure Entry

a. Provide a stand-alone intercom call station to be mounted on card reader pedestal (provided under section 11150). The intercom unit shall be connected to PA/Intercom system. A switch at main reception office (provided under Guide Specification Section 11150), next to PA administrative telephone shall be connected to garage entry controls and to allow remote operation of the gate.

b. See Guide Specification Section 11150 for description of Garage Entry system.

2. School Main Entrance Surveillance System (in selected sites only)

a. Provide a CCTV camera in a vandal proof enclosure connected to a monitor in the main office. It shall be located directly inside the entrance door it protects. No recording shall be permitted for this system.

b. Provide an intercom base station in the main office near the CCTV monitor, and a two-way talk/listen remote station outdoors near the entry door.

c. Provide a pushbutton and wiring to activate door electric strike to permit entrance.

d. See Guide Specification Section 25725 for description of components.

J. TELEVISION DISTRIBUTION SYSTEM

1. TV System

a. The television distribution system shall be an over-the-air (OTA) system constructed to receive the following Advanced Television Systems Committee (ATSC) digital television channels in the VHF/UHF television spectrum (channel assignment subject to change – verify channels designations at time of design development):

Call Letters	Previous Analog	DTV Freq
KCBS - DT	2	43
KNBC - DT	4	36
KTLA- DT	5	31
KABC- DT	7	07
KCAL- DT	9	09
KTTV - DT	11	11
KCOP - DT	13	13
KCET - DT	28	28
KMEX - DT	34	34
KLCS - DT	58	41

b. Consult with the Design Manager and/ or OAR for projects needing locally broadcasted TV signals. This is particularly important in schools whose design scope includes media centers; the design shall include the necessary pathways and equipment for this operation.

2. System Descriptions

a. TV system and equipment consists of:

1. Head End Equipment:
    a. Headend 19" rack with mixing networks, channel converters, processors, splitters, combiners, modulators, directional couplers, test taps, line amplifier, and video monitor.
2. Line extender TV cabinets including amplifiers to be located in the IDF (Signal room) of remote buildings.
3. Digital antennas mounted on roof of Administration Unit.
4. For antenna downleads use coax RG-6/U.
5. In the event of difficulties in the transmission of UHF channels across the campus, set the agile processors for conversion to available unused VHF channels 3, 6, 8, 10, or 12. Additionally, in schools that predominately have older analog TVs with only 2-13 channel tuners, these three channels will have to be reassigned to unused VHF.

6. Antenna location(s) requires field-site signal measurements and line-of-site availability (use http://www.antennaweb.org as a guide). .In the event of weak or insufficient signal availability, provide alternative CATV services. If required, locate antenna on the highest building, condition the signal for distance, and route conduit to TV rack. Also, using a fringe area antenna is an alternative solution as long as the antenna is durable for a high wind area.

7. If CATV is required, the rack modules have to be analog to digital QAM (AQD) since only local analog channels in a basic cable service package are provided "in the clear." If digital to digital modules are used (AQT), the school will have to subscribe to a digital channel package and receive only one set top box. This service only provides one channel at a time for distribution. Unless 10 of these boxes are obtained and adapted to rack mounting, 10 digital channel distribution for the school is unobtainable without an antenna.

8. The TV front end design shall permit the use of 8VSB digital over-the-air signal or CATV digital QAM signal processing. The output signal in either case shall be 256 QAM for ATSC compatible TV receivers.

9. When using output combiners either to division (before the AQT modules) or combine TV signals (after the AQT modules) from or to a single coax signal in the rack, do not connect adjacent channels to connectors physically next to each other. Co-channel interference may occur.

10. Digital signals are self-correcting, but produce no output below certain levels. The design shall address necessary modifications and requirements to correct signal weakening, such requirements may include but not be limited to gain settings reduction, and minimizing length of jumper coaxial cables.

Distribution, Cabling and Power

b. Distribution:

1. Backbone: Use two (2) single mode fibers from the data fiber optic backbone cabling to transmit the television signals between buildings. One single mode fiber shall be used, while the second shall be left as spare. Install fiber to coax distribution amplifiers in the first floor of remote building at TV terminal cabinet. A coax-RG11/U cable shall be used to connect media converter's output to TV terminal cabinet located in the same room.

2. In small sites, or where less than ten TV outlets are served in the remote building, use coax-RG11/U or larger cable for distribution from the closest IDF to remote TV terminal cabinets.

3. For building distribution from TV terminal cabinet to outlets, use coax-RG6/U cables.

4. Use self-terminating, dropping tap methods for building coax distribution (no splitters).

c. Provide adequate number of line extender amplifiers in system so that signal level at any outlet shall nominally be between -1 dBmV and +4 dBmV (digital). Usually up to four TV outlets may be daisy chained to be served by a single RG-6U cable homerun to TV terminal cabinet.

d. Provide 120 volts, 20 amps, dedicated circuit to headend rack and line extender cabinets.

e. Cable runs shall be in raceways or cable trays.

f. Terminal outlets shall be mounted 18" above finished floor at TV monitor location or directly behind any wall mounted TV locations (existing sites with wall-mounted TVs only), and shall have a self-tapping directional coupler design.

g. TV outlet shall be provided at VCR/ DVR location (media cabinet), Principal's Office, Library, and at teacher's workstation. A single TV drop from cable tray shall serve the classroom.

h. Provide the following cable and outlets as follows:

1. Provide double gang outlet boxes for audio/video system next to ceiling mounted projector, at TV monitor location, and at wall next to teacher's workstation.

i. Provide 120 volt, 15-amp receptacle at TV and projector outlets.

j. Antenna mast, cabinets and raceways shall be effectively grounded.

k. Submit system calculations indicating signal levels at components including terminal outlets. All block diagrams and construction details must be included in construction drawings.

3. Modernization Projects

a. For modernization projects, or where new buildings are added to existing school sites and an existing television distribution system is to be extended, following procedure shall be followed:

1. Obtain project record drawings of existing system.

2. Visit job site to compare project record drawings with actual field conditions and note any deviations from project record drawings.

3. Determine at what point existing TV system can be tapped and extended to new work location.

4. Usually line extender amplifiers need to be installed depending on attenuation values calculated. Signal level at any outlet shall be between +7 dBmV and +10 dBmV (analog signal). The optimum digital signal measurements are +6 to +8 dBmV lower (256 Qam) than these analog measurements. Digital signals also have

requirements for minimum carrier to noise, multiplex quality analysis, MER, constellation, and BER (bit error rate) evaluation. Use a Sencore 1426 portable tester or equivalent. The BER test is dependent on two different carrier to noise tests which differ only if there are adjacent broadcast channels next to the channel under test. Refer to the CATV specifications for test procedures.

K. OVERHEAD DIGITAL PROJECTOR SYSTEM

1. In all classrooms and any instructional areas make provisions for an overhead digital projector system as follows:

a. Provide a video projector mounting plate with a duplex receptacle. Locate mounting plate approximately 15' away from projector screen location.

b. Stub-up a 1 ½" conduit, 4" minimum above ceiling space from teacher's workstation area, and at Audio/Visual cabinet.

L. SOUND ENHANCEMENT SYSTEM

1. In all classrooms and any instructional areas make provisions as follows for owner furnished owner installed audio enhancement systems:

a. Stub-up a 1 ½" conduit, 4" above ceiling space from teacher's workstation area, and audio/visual cabinet.

M. SCHOOL RADIO COMMUNICATION SYSTEM

1. System Requirements

a. Each secondary school has a radio communication base station to support its hand-held portable radios. It is provided by the District, and is located in the open office of the Administration Unit – usually on top of file cabinets or on special shelving. It receives signals from a roof-mounted antenna.

b. A one-inch inside diameter conduit for the coax antenna cable from the roof to the room is required as part of the building construction, terminating in a double gang deep device box with a single hole (one inch grommeted) stainless steel cover plate at the base-station location and in a weatherhead on the roof. Locate the box at 18 inches above finished floor in an accessible location. Conduit shall be provided with pull string.

1. Conduit should extend 24 inches to 30 inches above the roof; it shall be braced at roof level and properly flashed to support the antenna.

2. Conduit must have only sweep bends, no sharp turns.

3. Conduits shall have no more than two 90 degree bends between pull boxes.

c. Provide a 120V duplex U-ground dedicated power receptacle for the base station; locate outlet at no more than 12 inches from antenna device box.

N. SIGNAL SYSTEMS RACEWAY AND TERMINAL CABINETS

1. Raceways and Routing

a. All signal systems' wiring and cabling, including fire alarm, clock, security intrusion alarm, telephone, public address, television, and computer networking shall be installed in raceways.

b. Fire alarm and clock systems shall be installed in conduit. For all other signal systems, cable trays are preferred.

c. For underground distribution to all buildings, signal systems shall be installed in conduit, sized for 40% fill (30% fill for new campus to accommodate future growth), with the following as a minimum standard:

1. 4" C- Fiber Optic Data Backbone System with three innerducts – two 1 ½" and one 1".
2. 3" C- PA / Intercommunication/ Telephone systems. In large campuses, use 4" conduit or multiples conduit as needed.
3. 3" C- Intrusion Alarm System/ CCTV system.
4. 3" C- Cat. 6 data cables/ TV distribution (coaxial cables if applicable).
5. 2" C- Fire Alarm System.
6. 2" C- Clock System.
7. 3" C- Spare.
8. 3" C Minimum of two for telephone entrance service.
9. 3" C EMS and Lighting Controls backbone system with one 1½", and one 1" innerducts.

d. For end drops to buildings not containing more than two classrooms, the conduit size shall be as follows as a minimum standard:

1. 3" C- Fiber Optic Data System.
2. 2" C- PA / Intercommunication/ Telephone systems
3. 2" C- Intrusion Alarm System/ CCTV system.
4. 2" C- Cat. 6 data cables/ TV distribution (coaxial cables if applicable).
5. 2" C- Fire Alarm System.

6. 1" C- Clock System.

7. 2" C- Spare.

8. 2" C- EMS and Lighting Controls backbone system with two ¾" innerducts.

e. For inside building distribution, the sizes of conduits or cable trays shall be selected per 40% cable fill requirements for different systems. Provide separate conduits for fire alarm and clock systems.

2. Terminal Cabinets and backboards

a. The information indicated here are supplemental to requirements indicated elsewhere in the design guideline.

b. Terminal cabinets shall be provided for each signal system, in each building.

1. For public address system, a main PA terminal cabinet shall be provided, located near PA Rack and PABX equipment. If the Main PA terminal cross connects are located inside the dedicated LAN room, an open field (rather than a cabinet) cross-connect is acceptable. If the open field solution is selected, the backboard used must be separate and distinct from the main telephone backboard and cross connect field. All wiring between PABX and P.A. rack and stations shall be routed thru this terminal cabinet. Cabinet or backboard must be sized in accordance with number of terminations required to be made plus 20% spare capacity. Other buildings shall each be provided with at least one P.A terminal cabinet sized in same manner as PA main terminal cabinet. All cabinets shall include required terminal blocks for cable terminations.

2. For Telephone system, locate main telephone and PBX cross connect backboard shall be provided in LAN room, next to Main PA terminal cabinet. Provide at least one telephone terminal cabinet in the IDF room at first floor of each remote building to cross connect all multi-pair telephone cables originating from voice patch panels of all IDF's in the building.

3. For security intrusion alarm system, one terminal cabinet shall be provided for the main security panel and for each remote security panel. Cabinets shall include terminal strips, power supply, power outlet, and backup battery.

4. For fire alarm system, a main terminal cabinet shall be provided, located near control panel. All wiring between control panel and field devices shall be routed thru this terminal cabinet. Cabinet shall be sized in accordance with number of terminations required to be made plus 20% spare capacity. Each building shall be provided with at least one terminal cabinet sized in same manner as main terminal cabinet. All cabinets shall include required terminal strips for wire or cable terminations.

5. For clock/program system, a main terminal cabinet shall be provided, located near Clock/Program Controller. All wiring between control panel and field devices shall be routed thru this terminal cabinet. Each building shall be provided with at least one terminal cabinet. All cabinets shall include required terminal strips for wire terminations.

6. For TV system, at least one terminal cabinet shall be provided in each building. Cable terminations shall be made in cabinets, with approved components. Depending on distance and signal drop from headend equipment to remote terminal cabinets, remote terminal cabinets may include line extender amplifiers to compensate for signal drop (only where copper distribution is used).

O. PROXIMITY CARD ACCESS CONTROL SYSTEM

Note to Project Architect: These requirements are applicable to all new construction projects; for existing facilities projects coordinate the applicability of these requirements with the Design Manager or Owner Authorized Representative.

1. System Requirements:

a. Each school site shall be equipped with a contact less proximity card access control system to control access to elevators and parking garages/areas.

b. The system shall be capable of operating on a new or existing IP network, and shall be accessible, configurable, and manageable from any network connected computer.

c. The system shall be capable of continuous operation even during power downtimes or outages, and shall be equipped with the hardware and software necessary for the orderly shut down of the controller during a power failure.

d. The system shall be designed with a full feature, high performance data base management system.

1. The operating system shall not require client side software other than a web browser.

e. The system shall be compatible with HID Corporate 1000 LAUSD formatted card coding system.

f. Elevators with multiple access points (doors) on a single floor shall receive a card reader at each hall call station.

g. Locate proximity card access control equipment cabinets in electrical rooms, signal terminal rooms, or other suitable spaces approved by the Design Manager or Owner Authorized Representative.

h. The system must be capable of notifying school and/or District designated personnel via SMS or E-mail messages (utilizing the District's mail server) when problems or situations that require immediate attention arise.

2. Power Requirements:

a. Provide a dedicated 120 volt circuit for power and battery backup at each system cabinet.

3. Data System Requirements:

a. Provide a data network outlet inside each access control system cabinet. These outlets shall be connected via Cat 6 cables to the nearest computer network system distribution point (MDF, IDF, or LDF).

4. Specifications and Technical Details:

a. The District's technical specifications and construction details are based on the S2 NetBox Enterprise Security Management System. Equal or better products from other manufacturers may be acceptable subject to Owner's review and approval.

b. The AOR shall edit or modified the specifications and technical details to reflect the actual requirements of the system being proposed if other than the S2 Netbox. Obtain approval on any substitutions prior to start of design.

3.9 PLANTING AND IRRIGATION

A. GENERAL REQUIREMENTS

B. PLANTING

C. SOILS

D. IRRIGATION

E. LIST OF APPROVED PLANT MATERIALS

3.9 PLANTING AND IRRIGATION

A. GENERAL REQUIREMENTS:

Landscapes are essential to the quality of life by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystem lost to development. Because schools represent important visual elements in the community, a well-conceived landscape design is essential – one that is economically maintainable and water efficient yet still provides a naturally beautiful campus that enhances its neighborhood. Adequate shading of outdoor teaching, gathering and play areas with year-round shade trees; durable plants that need little pruning or shaping; drought-tolerant landscaping providing ease of maintenance – all are important elements of the landscape development.

B. PLANTING

1. Examine existing trees on site, identify those that should be preserved, and incorporate them into site planning, with recommendations to the District that they be saved in place, relocated, and provide method of protection during construction.
2. See **"Site Design"** section for planning and design criteria on landscaping, planting and tree locations.
3. Trees shall be spaced to provide a maximum of five-feet of overlap of full canopies.
4. Use plant materials appropriate to the site and project, selected from District's "Approved Plant List".
5. Refer to the District's "Guide Specifications" for additional requirements.
6. No tree box smaller than 24 inches is to be specified.
7. Trees provided by DWP shall be located in areas away from student activities and access to maximize their survival. These 15 gallon trees are provided as part of "Trees for a Green LA" program with a limit of 50 per school site.

C. SOILS

1. Examine physical properties of the existing soil at site and provide during the Design Development Phase a preliminary assessment of possible major soil problems, such as salinity and alkali conditions, and the need for soil amendments or imported topsoil in the early design stage.
2. If considered necessary, consult with the District regarding services of a soil specialist and laboratory testing during the design stage.

3. Provide for stockpiling of good existing topsoil to be used in planting areas, free of all debris and rock over ¾".
4. Specify characteristics and source approval for topsoil to be imported, installation methods and blending if appropriate.
5. Specify subsoil ploughing and subsurface drainage to alleviate problems created by poor aeration, soil compaction or inadequate drainage.
6. Specify replacement of top 3 feet of soil where trees are planted in existing paved areas or other heavily compacted soils.
7. Indicate method of slope stabilization on banks 2:1 or steeper.
8. On plans indicate the area (in square feet) of each planting area.

D. IRRIGATION

1. Design Requirements:

   Shall be consistent with the California Code of Regulation, Title 23 Water, Division 2 Department of Water Resources, Chapter 2.7 State Model Water Efficient Landscape Ordinance, Section 490-495.

a. The landscape design documents shall include the following elements as detailed in the State Model Water Efficient Landscape Ordinance Section 492(b&c), provide all formulas and calculations to support your estimates.

Each landscape documentation package shall include a cover sheet, referred to as the Water Conservation Concept Statement. It serves as a check list to verify that the following elements of the landscaping documentation package have been completed:

1. Maximum Applied Water Allowance.
2. Estimated Applied Water use.
3. Estimated Total Water Use.
4. Landscape Design.
5. Irrigation Design.
6. Planting Design Plan shall include the square footage of the landscape area for each station, zone, controller and total square footage for all landscape area.
7. Irrigation Watering Program Schedules. For controllers based on a Y2 month cycle.
8. Maintenance Schedules.
9. Landscape Irrigation Audit Schedule.
10. Grading Design plan.
11. Soil Analysis.

2. Design Efficiencies:

All irrigation systems shall be provided with automatic controllers with electrically operated control valves and seasonal irrigation schedules, incorporating water conservation design and utilizing methods appropriate for specific terrains, soil

types, wind conditions, temperatures and other environmental factors in order to ensure a high degree of water efficiency.

a. Soil types and infiltration shall be considered when designing irrigation system.

b. All irrigation systems shall be designed to avoid runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks roadways, or structures.

c. Proper irrigation schedules for each station, to include sequences of cycle and soak times shall be provided with your designs and plans.

d. Special attention shall be given to avoid runoff on slopes and to overspray in planting areas with a width less than ten feet and in median strips.

e. Select the proper equipment components and provide irrigation schedules for each station to meet or exceed the required irrigation efficiency of 0.625.

3. Design Plans:

a. Provide CAD site plans that shall include:

1. A Master site plan shall include showing the location of all irrigation zones for each controller with point of connections, backflow device, pressure regulators, isolation valves, mainlines, flow sensor/master valve & conduit, remote valves stations and quills.
2. A complete plan layout for each controller shall include showing the location of the point of connection to the main piping system, main and lateral lines, isolation valves, pressure regulator, master valve & conduit, flow sensor & cable, remote valves, rain sensor, controller and all sprinklers
3. Design Plans shall utilize and include District Design Guide Details.

4. Design Calculations:

a. Provide design hydraulic calculations worksheet per station to support the irrigation design plans using the following format:

1. Static Water Pressure- Hi and Low
2. Water meter- Size, friction loss @ required GPM
3. Backflow Device- Size, friction loss @ required GPM
4. Master Valve- Size, friction loss @ required GPM
5. Flow Sensor- Size, friction loss @ required GPM
6. Isolation Valves, Size, friction loss @ required GPM
7. Mainline piping, Size, developed length, friction loss at each sizes used @R/GPM
8. Lateral piping, Size, developed length, friction loss at each sizes @R/GPM
9. Remote Valves, Sizes, friction loss @ required GPM
10. Elevation Change

11. Total Pressure loss
12. Pressure required @ sprinkler head
13. Lowest Static Pressure (-10%)
14. Residual Water pressure

b. Provide design hydraulic calculations to support the design when incorporating a booster pump. Keep in mind, peak demands effecting water pressures are normally not during irrigation watering hours (10 pm to 6 AM)

c. Provide design calculations information to support incorporating a pressure regulator.

d. Water pressure over 80 psi shall be regulated per Zone to meet manufacturer's suggested pressure-heads.

5. Design Materials and Components:

a. Call out design materials as specified in the LAUSD Guideline Specifications and LAUSD Design Guide Details to ensure quality of materials with uniformity in maintenance and procurement.

b. The following are some notable required materials that shall not be compromised:

1. All valves including remote valves, isolation and shut-off valves shall be brass or bronze. Plastic valves are not acceptable.
2. Drip Irrigation is not acceptable.
3. Mainline and lateral PVC piping shall be a minimum schedule 40 PVC piping above ground is not acceptable.
4. PVC male adapters are not acceptable, use schedule 80 PVC nipples when connecting to copper, brass, bronze or steel materials.

6. Water Supply, Meter and Backflow Device:

a. Provide a separate irrigation water meter and main of adequate size to satisfy maximum instantaneous demand and projected future demands.

b. For large sites, three or more watering acres, or any multiple of that in unit size, there may be separate points of connection on designated irrigation meters for each such unit.

c. Water piping from meter connection to backflow device shall be no smaller in diameter than backflow device served.

d. Provide Reduced-Pressure-Principle Backflow Prevention Devices upstream from irrigation system for meter protection.

e. Provide pressure regulator when necessary, never exceeding 100 psi.

f. Provide enclosure for backflow device and pressure regulators where necessary to reduce potential vandalism.

7. Piping Design:

a. Piping materials shall conform to the District's Guide Specifications.

b. Flow velocity: Five (5) feet per second maximum, based on industry-standard friction pressure loss values and complete hydraulic calculations.

c. Pipe size shall be sufficient to support a minimum of two control valves operating at the same time. (One opening, one closing)

d. Follow the manufacturer's GPM demand and pressure requirements; make allowance for a 10% error margin with all GPM demand and sprinkler-head coverage values.

e. Size all valves (including remote control valves) no smaller than the piping served downstream, except that when piping is increased in size to reduce friction loss, remote valves may then be sized one pipe size smaller than the piping served.

f. Install shut off valves needed to isolate loop systems or major branch lines.

g. Do not use exposed PVC piping above ground.

8. Athletic Fields:

a. The placement and location of irrigation equipment such as Controllers, backflow devices, remote valve, isolation valves, quill valves and yard boxes for maintenance accessibility and student safety is a very important concern. The following are ideal locations for placement of the above irrigation equipment in order of number 1 is the most preferred location.

For Sports fields (Football, Baseball, Softball, Soccer field):

1. Install all equipment including the controller off the field of play in a fenced enclosure with valves such as remote valves, normally placed in a yard box, installed above the ground on a manifold system.

   Place the hose quill valves for football fields up against the perimeter cement curb to field. For other sport fields install next to wall, fence or outer perimeter of grass field, preferably next to pavement.

2. Install Controller and backflow device as near as possible to a wall or fence, away from the field of play. Place the remote valves in marked yard box with-in 12 inch of fence, wall, and or outer perimeter of grass field which is normally next to pavement. An Isolation valve in a marked yard box prior to the group of quills is ideal.

3. Install remote valves in a minimum group of three to easily locate the yard boxes in future. An Isolation valve in a marked yard box prior to the group of remote valves is ideal.

b. General Physical Education Field:

1. Install Controller and backflow device as near as possible to a wall or fence, away from the field of play. Place the remote valves in marked yard box with-in 12 inch of fence, wall, and or outer perimeter of grass field which is normally next to pavement.

2. Install remote valves in a minimum group of three to easily locate the yard boxes in future. An Isolation valve in a marked yard box prior to the group of remote valves is ideal.

9. Sleeves:

a. Pressure piping installed under driveways, heavy traffic thresholds or sidewalks shall be sleeved.

b. Sleeves shall be a minimum of 2 pipe sizes larger than the pipe it serves and include a tracer wire.

c. Sleeves for long distances are not a good thing. Mainline piping must be center loaded to prevent movement due to expansion and contraction, which will cause the main line to break within the sleeve. Never exceed 60 feet of continues sleeve in any area.

10. Sprinklers:

a. Provide 100% head-to-head triangulated coverage or other approved 100% configuration

b. Locate sprinklers with pop-up spray 12 inches away from buildings, 4 inches away from paved areas or parking stalls, and where trees will not interfere with spray pattern.

c. Reduce spacing in areas where winds during irrigation times may blow spray outside irrigation area.

d. Locate sprinkler lines on banks parallel to contours.

e. Sprinklers on fixed risers are not acceptable. All sprinkler heads shall be pop-up heads and installed with double swing-joints.

f. Drip irrigation is not acceptable.

g. All sprinkler spray heads shall have a built-in check valve to prevent drain down from the lowest head, including level irrigation systems.

11. Controllers shall be provided with the following:

a. Locate controller close to a building, wall or fence and accessible for use. Install in vandal-resistant secured enclosure that prevents unauthorized access and control changes.

b. Provide Rain Sensor-Locate in area accessible to rain and not easily vandalized. Do not in stall under roof overhang.

c. Flow Sensor and Master Valve to provide mainline and lateral line protection

1. Do not install manual control valves and quill valves on irrigation stations/zones using a flow monitoring system. Tie in before flow sensor.

d. Provide a hand-held wireless remote control unit (one per site).

e. Each controller shall be provided with three (3) extra statios for future connections.

12. Remote Valves serving Lawn and Planter Locations:

a. Remote valves serving planter areas shall be installed in marked yard box, located along the outer perimeter of planter it is serving as close to the side walk or pavement as possible in order to easily access and utilize during operation with getting wet by sprinklers during operation.

b. Remote valves serving turf areas shall be installed in marked yard box, located along the outer perimeter of grass area it is serving, as close as possible to the sidewalk or pavement in order to easily access and utilize during operation with getting wet by the sprinklers during operation.

1. When at all possible, install remote valves in a minimum group of three to easily locate the yard boxes in future. An Isolation valve in a marked yard box prior to the group of remote valves is ideal.

LOS ANGELES UNIFIED SCHOOL DISTRICT
MAINTENANCE AND OPERATIONS 12

APPROVED PLANT LIST

EVERGREEN CANOPY SHADE TREE

	BOTANICAL NAME	COMMON NAME
●	ARBUTUS UNEDO	STRAWBERRY TREE
	CASSIA EXCELSA	CROWN OF GOLD TREE
	CASSIA LEPOPHYLLA	GOLD MEDALLION
	CERANTONIA SILIQUA (MALE ONLY)	CAROB TREE
	CINNAMOMUM CAMPHORA	CAMPHOR TREE
	CUPANIOPIS ANACARDIOIDES	CARROT WOOD
	ERIOBOTRYA DEFLEXA	BRONZE LOQUAT
	FICUS BENJAMINA	WEEPING CHINESE BANYAN
	FRANXINUS UHDEI	EVERGREEN ASH
	HARPEPHYLLUM CAFFRUM	KAFFIR PLUM
	LIGUSTRUM LUCIDUM	GLOSSY PRIVET
	MAGNOLIA GRANDIFLORA	SOUTHERN MAGNOLIA
	MAGNOLIA GRANDIFLORA 'MAJESTIC BEAUTY'	MAJESTIC BEAUTY MAGNOLIA
	MAYTENUS BOARIA	MAYTEN TREE
	METROSIDEROS EXCELSUS	NEW ZEALAND CHRISTMAS TREE
□ ●	OLEA EUROPAEA	'FRUITLESS' OLIVE ONLY
●	PINUS PINEA	ITALIAN STONE PINE
	PYRUS KAWAKAMII	EVERGREEN PEAR
□ ●	QUERCUS AGRIFOLIA	COAST LIVE OAK
●	QUERCUS CHRYSOLEPIS	CANYON LIVE OAK
●	QUERCUS DOUGLASII	BLUE OAK
●	QUERCUS ENGELMANNII	MESA OAK

● QUERCUS WISLIZENII	INTERIOR LIVE OAK
SCHINUS TEREBINTHEFOLIUS	BRAZILIAN PEPPER
TIPUANA TIPU	TIPU TREE
ULMUS PARVIFOLIA	EVERGREEN ELM

EVERGREEN INFORMAL UPRIGHT

BOTANICAL NAME	COMMON NAME
● BRACHYCHITON POPULEUM	BOTTLE TREE
HYMENOSPORUM FALVUM	SWEET SHADE
□ ● LAURUS NOBILIS	SWEET BAY
● LYONOTHAMNUS FLORIBUNDUS	CATALINA IRONWOOD
● LYSILOMA MICROPHYLLA VAR. THORNBERI	FEATHER BUSH
● MELALEUCA LINARIIFOLIA	FLAXLEAF PAPERBARK
● MELALEUCA NESOPHILA	PINK MELALEUCA
MELALEUCA QUINQUENERVIA	CAJEPUT TREE
● PINUS COULTERI	COULTER PINE
● PINUS EDULIS	PINYON PINE
□ ● PITTOSPORUM UNDULATUM	VICTORIAN BOX
STENOCARPUS SINUATUS	FIREWHEEL TREE
TRISTANIA CONFERTA	BRISBANE BOX

EVERGREEN SCREENS TREES

BOTANICAL NAME	COMMON NAME
● ARBUTUS UNEDO 'COMPACTA'	DWARF STRAWBERRY TREE
CUPRESSOCYPARIS LEYLANDII	LEYLAND CYPRESS
● CUPRESSUS ARIZONICA VAR. GLABBA	ARIZONA CYPRESS SMOOTH ARIZONA CYPRESS
● CUPRESSUS FORBESII	TECATE CYPRESS
● CUPRESSUS SEMPERVIRENS	ITALIAN CYPRESS

	FICUS MICROCARPA NITIDA 'GREEN GEM'	GREEN GEM INDIAN LAUREL
●	JUNIPERUS CHINENSIS 'TORULOSA'	HOLLYWOOD JUNIPER
	PINUS THUNBERGIANA 'MAJESTIC BEAUTY'	JAPANESE BLACK PINE
	PRUNUS CAROLINIANA	CAROLINA LAUREL CHERRY
	PITTOSPORUM EUGENOIDES	TARATA
	PODOCARPUS GRACILIOR	FERN PINE
	PODOCARPUS MACHROPHYLLUS	YEW PINE
	PODOCARPUS HENKEII	LONGLEAFED YELLOW WOOD
●	UMBELLULARIA CALIFORNICA	CALIFORNIA BAY LAUREL

EVERGREEN WEEPING FORM

	BOTANICAL NAME	COMMON NAME
●	ACACIA STENOPHYLLA	SHOESTRING ACACIA
□ ●	AGONIS FLEXUOSA	PEPPERMINT TREE
●	ALLOCASUARINA VERTICILLATA (CASUARINA STRICTA)	COAST BEEFWOOD
□ ●	CALLISTEMON VIMINALIS	WEEPING BOTTLE BRUSH
□ ●	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW
	LEPTOSPERUM LAEVIGATUM	AUSTRALIAN TEA TREE
●	PITTOSPORUM PHILLYRAEOIDES	WILLOW PITTOSPORUM

EVERGREEN PYRAMID

	BOTANICAL NAME	COMMON NAME
	CALOCEDRUS DECURRENS	INCENCSE CEDAR
●	CASUARINA CUNNINGHAMIANA	RIVER SHE-OAK
●	CEDRUS ATLANTICA 'GLAUCA'	BLUE ATLAS CEDAR
□ ●	CEDRUS DEODARA	DEODAR CEDAR
●	CEDRUS LIBANI	CEDAR OF LEBANON
□ ●	PINUS CANARIENSIS	CANARY ISLAND PINE
□ ●	PINUS ELDARICA	AFGHAN PINE

PINUS HALEPENSIS	ALEPPO PINE
● PINUS MONTEZUMAE	MONTEZUMA PINE

PALMS

BOTANICAL NAME	COMMON NAME
● ARCHONTOPHOENIX CUNNINGHAMIANA	KING PALM
● SYAGRUS ROMANZOFFIANA	QUEEN PALM
● BRAHEA ARMATA	BLUE HESPERPALM
● BRAHEA EDULIS	GUADALUPE PALM
CHAMAEROP HUMILIS	MEDITERRANEAN FAN
CYCAS REVOLUTA	SAGO PALM
TRACHYCARPUS FORTUNEI	WINDMILL PALM
● WASHINGTONIA FILIFERA	CALIFORNIA FAN PALM

DECIDIOUS CANOPY SHADE TREES

BOTANICAL NAME	COMMON NAME
ACER SACCHARINUM	SILVER MAPLE
ALBIZZIA JULIBRISSIN	SILK TREE
FRAXINUS OXYCARPA 'RAYWOOD'	RAYWOOD ASH
GLEDITSIA TRIACANTHOS INERMIS	HONEY LOCUST (THORNLESS)
KOELREUTERIA BIPINNATA	CHINESE FLAME TREE
KOELREUTERIA PANICULATA	GOLDENRAIN TREE
MORUS ALBA	FRUITLESS MULBERRY
PISTACIA CHINENSIS	CHINESE PISTACHE
QUERCUS LOBATA	VALLEY OAK
SOPHORA JAPONICA	PAGODA TREE
● ZELKOVA SERRATA	SAWLEAF ZELKOVA

DECIDIOUS UPRIGHT

BOTANICAL NAME	COMMON NAME
GINKO BILOBA (MALE ONLY)	MAIDENHAIR TREE
LIQUIDAMBAR STYRACIFLUA HYBRIDS	'PALO ALTO' SWEET GUM
PYRUS CALLERYANA 'ARISTOCRAT'	ORNAMENTAL PEAR
PYRUS CALLERYANA 'CHANTICLEER'	ORNAMENTAL PEAR

DECIDIOUS FLOWERING TREE

BOTANICAL NAME	COMMON NAME
BAUHINIA BLAKEANA	HONG KONG ORCHID TREE
BAUHINIA VARIEGATA (PURPUREA)	PURPLE ORCHID TREE
CALODENDRUM CAPENSE	CAPE CHESTNUT
● CERCIS OCCIDENTALIS	WESTERN REDBUD
● CHILOPSIS LINEARIS	DESSERT WILLOW
□ ● CHITALPA TASHKENENSIS	CHITALPA
CHIONANTHUS RETUSUS	CHINESE FRINGE TREE
● FRAXINUS DIPETALA	FOOTHILL ASH
JACARANDA MIMOSIFOLIA	JACARANDA (LAWN ONLY)
LAGERSTROEMIA INDICA	CRAPE MYRTLE
LAGERSTROEMIA INDICA HYBRIDS	'MUSKOGEE' CRAPE MYRTLE
MAGNOLIA SOULANGIANA	SAUCER MAGNOLIA
MAGNOLIA STELLATA	STAR MAGNOLIA
PRUNUS CERASIFERA 'ATROPURPUREA'	PURPLE LEAF PLUM
PYRUS CALLERYANA	FLOWERING PEAR
ROBINIA 'PURPLE ROBE'	PURPLE ROBE LOCUST
TABEBUIA CHRYSOTRICHA	GOLDEN TRUMPET TREE
TABEBUIA IPE	PINK TRUMPET TREE

HERBACIOUS PERENNIALS SHRUBS

BOTANICAL NAME	COMMON NAME
ACANTHUS MOLLIS	BEARS BREECH (SHADE ONLY)
ACHILLEA MILLEFOLIUM & HYBRIDS	COMMON YARROW
AGAPANTHUS /VARIETIES	LILY OF THE NILE
ALOYSIA TRIPHYLLA	LEMON VERBENA
ANIGOZANTHOS FLAVIDUS	KANGAROO PAW
ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH
ASTER CHILENSIS 'POINT SAINT GEORGE'	POINT SAINT GEORGE ASTER
BULBINE FRUTESCENS	STALKED BULBINE
CLIVIA MINIATA	KAFFIR LILY (SHADE ONLY)
CONVOLVULUS CNEORUM	BUSH MORNING GLORY
COREOPSIS AURICULATA 'NANA'	DWARF COREOPSIS
COREOPSIS GIGANTEA	GIANT COREOPSIS
COREOPSIS LANCEOLATA	COREOPSIS
COREOPSIS VERTICILATA CVS.	THREADLEAF COREOPSIS
DIETES VEGETA	FORTNIGHT LILY
ENCELIA CALIFORNICA	ENCELIA
EPILOBIUM CANUM SPP. CANUM	CALIFORNIA FUCHSIA
EREMOPHILA MACULATA	SPOTTED EMU BUSH
ERIGERON (ALL)	SEASIDE DAISY
ERIOPHYLLUM CONFERTIFLORUM	GOLDEN YARROW
ESCHSCHOLZIA CALIFORNICA (RESEEDS ITSELF)	CALIFORNIA POPPY
HEMEROCALLIS HYBRIDS	DAY LILY
IRIS DOUGLASIANA	DOUGLAS IRIS
JUSTICIA CALIFORNICA	CHUPAROSA
JUSTICIA SPICIGERA	MEXICAN HONEYSUCKLE
KNIPHOFIA UVARIA	RED HOT POKER
LAVANDULA/VARIETIES	LAVENDER
LOBELIA LAXIFLORA	MEXICAN BUSH LOBELIA

LOTUS SCOPARIUS	DEER WEED
MIMULUS AURANTIACUS	MONKEY FLOWER
MONARDELLA VILLOSA	COYOTE MINT
PELARGONIUM / VARIETIES	GERANIUM
PENSTEMON WILD SPP.	PENSTEMON (WILD)
PHORMIUM SPP.	NEW ZEALAND FLAX
ROMNEYA COULTERI	MATILIJA POPPY
ROSEMARINUS 'PROSTRATUS'	TRAILING ROSEMARY
SISYRINCHIUM BELLUM	BLUE-EYED GRASS
SPHAERALCEA AMBIGUA	DESERT MALLOW
STRELIZIA REGINAE	BIRD OF PARADISE
TEUCRIUM FRUTICANS	BUSH GERMANDER
TEUCRIUM MARUM	CAT THYME
THALICTRUM FENDLERI VAR. POLYCARPUM	MEADOW RUE
TRICHOSTEMA LANATUM	WOOLLY/MOUNTAIN BLUE CURLS
TULBAGHIA VIOLACEA 'VARIGATA'	SOCIETY GARLIC
VERBASCUM PHOENICEUM	PURPLE MULLEIN
VERBENA LILACINA	LILAC VERBENA

SUN SHRUBS

BOTANICAL NAME	**COMMON NAME**
ABUTILON PALMERI	INDIAN MALLOW
ADENOSTOMA FASCICULATUM	CHAMISE
ALYOGNE HUEGELII	BLUE HIBISCUS
AZALEA SOUTHERN INDICA	SUN AZALEAS
BACCHARIS "CENTENNIAL'	CENTENNIAL BACCHARIS
BACCHARIS PILULARIS	COYOTE BRUSH
CAESALPINEA GILLIESII	DESERT BIRD OF PARADISE
CALLIANDRA CALIFORNICA	BAJA FAIRY DUSTER
CALLIANDRA ERIOPHYLLA	FAIRY DUSTER

CAMELLIA SASANQUA	SUN CAMELLIA
CEANOTHUS/VARIETIES	WILD LILAC
● CERCOCARPUS BETULOIDES	MOUNTAIN IRONWOOD
● CORDIA PARVIFOLIA	LITTLE LEAF CORDIAL
● DALEA BICOLOR	INDIGO BUSH
● ERIOGONUM FASCICULATURM	BUCKWHEAT
ESCALLONIA/VARIETIES	ESCALLONIA
EURYOPS PECTINATUS	GOLDEN SHRUB DAISY
● FALLUGIA PARADOXA	APACHE PLUME
● FORESTIERA NEOMEXICANA	DESERT OLIVE
● GALVESIA SPECIOSA	ISLAND BUSH SNAPDRAGON
GREVILLEA NOELLII	GREVILLA
HEBE/VARIETIES	HEBE
● ISOCOMA MENZIESII	GOLDENBUSH
● JUNIPERUS/VARIETIES	JUNIPER
LANTANA/VARIETIES	LANTANA
● LAVATERA ASSURGENTIFLORA	TREE MALLOW
● LEPTOSPERMUM/VARIETIES	LEPTOSPERMUM
● LEUCOPHYLLUM SPP.	PURPLE SAGE, TEXAS RANGER ETC.
LOROPETALUM CHINENSE	FRINGE FLOWER
MYRTUS/VARIETIES	MYRTLE
NANDINA DOMESTICUS/VARIETIES	HEAVENLY BAMBOO
OSMANTHUS FRAGRANS	SWEET OLIVE
PITTOSPORUM/VARIETIES	PITTOSPORUM
PLUMBAGO AURCULATA	BLUE PLUMBAGO
● QUERCUS DURATA	LEATHER OAK
RHAPHIOLEPIS/VARIETIES	INDIAN HAWTHORNE
● RHUS OVATA	SUGAR BUSH
● ROSMARINUS/VARIETIES	ROSEMARY
● SALVIA APIANA	WHITE SAGE
● SALVIA CLEVELANDII & HYBRIDS	CLEVELAND/ALAN CHICKERING ETC.

● SALVIA LEUCANTHA	MEXICANA BUSH SAGE
● SALVIA LEUCOPHYLLA	PURPLE SAGE
● SALVIA MELLIFERA	BLACK/GREEN SAGE
● SALVIA 'MRS. BEARD'	MRS. BEARD SAGE
● SALVIA MUNZII	SAN MIGUEL MOUNTAIN SAGE
● SIMMONDSIA CHINENSIS	JOJOBA
● SALVIA "BEE'S BLISS"	BEE'S BLISS SAGE
SYRINGA/VARIETIES	LILAC
TRACHELOSPERMUM JASMINOIDES	STAR JASMINE
VIBURNUM/VARIETIES	VIRBURNUM
XYLOSMA CONGESTUM 'COMPACTA'	XYLOSMA

SHADE SHRUBS

BOTANICAL NAME	COMMON NAME
ACUBA JAPONICA	JAPANESE ACUBA
AZALEA BELGIUM HYBRIDS	SHADE AZALEAS
● CARPENTERIA CALIFORNICA	BUSH ANEMONE
CYRTOMIUM FALCATUM	HOLLY FERN
● DENDROMECON RIGIDA	BUSH POPPY
FATSIA JAPONICA	JAPANESE ARALIA
● GALVEZIA SPECIOSA	ISLAND BUSH SNAPDRAGON
● RHUS TRILOBATA	BASKET BUSH
● RIBES AUREUM	GOLDEN CURRANT
● RIBES INDECORUM	WHITE FLOWERING CURRANT
● RIBES MALVACEUM	CHAPARRAL CURRENT
● RIBES SANGUINEUM	RED FLOWERING CURRANT
● RIBES VIBURNIFOLIUM	EVERGREEN CURRANT
● RUELLIA CALIFORNICA	RAMA PARDA
● SALVIA MICROPHYLLA	CHERRY/GRAHAM SAGE

HEDGE SHRUBS

	BOTANICAL NAME	COMMON NAME
●	ARCTOSTAPHYLOS SPP. 'HOWARD MCMINN'	HOWARD MCMINN MANZANITA
	BUXUS MICROPHYLLA JAPONICA	JAPANESE BOXWOOD
	BUXUS SEMPERVIRENS	COMMON BOXWOOD
	CHOISYA TERNATA	MEXICAN ORANGE BLOSSOM
	COPROSMA REPENS	MIRROR PLANT
●	COMAROSTAPHYLIS DIVERSIFOLIA	SUMMER HOLLY
●	CORREA SPP.	AUSTRALIAN FUCHSIA
●	DODENAEA VISCOSA 'PURPUREA'	PURPLE HOPSEED BUSH
	ESCALLONIA 'FRADES'	ESCALLONIA
	EUGINIA MYRTIFOLIA/VARIETIES	BRUSH CHERRY
●	EURYOPS PECTINATUS	EURYOPS/SHRUB DAISY
	GREWIA CAFFRA	LAVENDER STARFLOWER
●	HETEROMELES ARBUTIFOLIA	TOYON
●	ILEX VOMITORIA	YAUPON
	LIGUSTRUM JAPONICUM	JAPANESE PRIVET
	LIGUSTRUM TEXANUM	WAXLEAF PRIVET
●	MAHONIA NEVINII	NEVIN MAHONIA
●	MALACOTHAMNUS FASCICULATUS	BUSH MALLOW
●	MALOSMA LAURINA (RHUS LAURINA)	LAUREL SUMAC
	MURRAYA PANICULATA	ORANGE JESSAMINE
●	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE
●	MYRSINE AFRICANA	AFRICAN BOXWOOD
●	MYRTUS / VARIETIES	MYRTUS
	MYRTUS COMMUNIS 'COMPACTA'	DWARF MYRTLE
	PITTOSPORUM/VARIETIES	PITTOSPORUM
	PHOTINIA FRASERI/VARIETIES	FRASER'S PHOTINIA
●	PRUNUS I. ILICIFOLIA	HOLLY LEAF CHERRY

● RHAMNUS CALIFORNICUS	COFFEEBERRY
● RHUS INTEGRIFOLIA	LEMONADE BERRY
● SENNA STURTII (CASSIA STURTII)	STURT'S CASSIA/SENNA
● TECOMA STANS	YELLOW BELLS
TAXUS/VARIETIES	YEW
● WESTRINGIA FRUITICOSA (ROSMARINIFORMIS)	COAST ROSEMARY
● XYLOCOCCUS BICOLOR	MISSION MANZANITA

VINES

BOTANICAL NAME	**COMMON NAME**
CISSUS VARIETIES	GRAPE IVY
● CLEMATIS LASIANTHA	PIPESTEM CLEMATIS
● CLEMATIS LIGUSTICIFOLIA	WESTERN VIRGIN'S BOWER
● CLYTOSTOMA CALLISTEGIOIDES	LAVENDER TRUMPET VINE
DISTICTIS BUCCINATORIA	BLOOD RED TRUMPET VINE
FICUS PUMILA	CREEPING FIG
HARDENBERGIA VIOLACEA	HAPPY WANDERER
HIBERTIA SCANDENS	GUINEA GOLD VINE
JASMINUM VARIETIES	JASMINE
LONICERA HILDEBRANDIANA	BURMESE HONEYSUCKLE
PANDOREA JASMINOIDES	BOWER VINE
PARTHENCISSUS TRICUSPIDATA	BOSTON IVY
PASSIFLORA ALATOCAERULEA	PASSION VINE
POLYGONUM AUBERTII	SILVER LACE VINE
SOLANDRA MAXIMA	CUP OF GOLD VINE
STEPHANOTIS FLORIBUNDA	MADAGASCAR JASMINE
TECOMERIA CAPENSIS	CAPE HONEYSUCKLE
TRACHELOSPERMUM JASMINOIDES	STAR JASMINE
WISTERIA FLORIBUNDA	JAPANESE WISTERIA
WISTERIA SINENSIS	CHINESE WISTERIA

GROUND COVERS

BOTANICAL NAME	COMMON NAME
ACACIA REDOLENS	PROSTRATE ACACIA
ACHILLEA CLAVENNAE	SILVERY YARROW
ACHILLEA TOMENTOSA	WOOLY YARROW
ARCTOTHECA CALENDULA	CAPE WEED
ARCTOSTAPHYLOS/VARIETIES	MANZANITA
ARTEMISIA SPP. (HERBACEOUS)	TARRAGON/ANGEL'S HAIR ETC.
BACCHARIS PILULARIS 'PIGEON POINT'	COYOTE BRUSH
CAMPANULA POSCHARSKYANA	SERBIAN BELL FLOWER
CEANOTHUS GRISEUS HORIZONTALIS	CARMEL CREEPER
CERASTIUM TOMENTOSUM	SNOW-IN-SUMMER
CONVOLVULUS SABATIUS	GROUND MORNING GLORY
CYLINDROPHYLLUM SPECIOSA	RED SPIKE ICE PLANT
DALEA GREGGII	TRAILING INDIGO BUSH
DROSANTHEMUM HISPIDUM	LAVENDER-PINK ICE PLANT
DYMONDIA MARGARARETAE	DYMONDIA
FELICIA AMELLOIDES	BLUE MARGUERITE
FRAGARIA CHILOENSIS	WILD STRAWBERRY
GAZANIA HYBRID/VARIETIES	GAZANIA
HYPERICUM CALYCINUM	ST. JOHN WORT
IVA HAYESIANA	POVERTY WEED
JUNIPERUS/VARIETIES	JUNIPER
KECKIELLA ANTIRRHINNOIDES	YELLOW PENSTEMMON
KECKIELLA CORDIFOLIA	HEART-LEAVED PENSTEMMON
SENECIO MANDRALISCAE	KLEINIA
LAMPRANTHUS SPECTABILIS	TRAILING ICE PLANT
LANTANA MONTEVIDENSIS	LANTANA
LIRIOPE/VARIETIES	LILY TURF

LONICERA JAPONICA 'HALLIANA'	HALL'S HONEYSUCKLE
● MYOPORUM PARVIFOLIUM	MYORPUM
● OENOTHERA STUBBEI	BAJA EVENING PRIMROSE
OSTEOSPERMUM FRUTICOSUS/VARIETIES	TRAILING AFRICAN DAISY
PACHYSANDRA TERMINALIS	JAPANESE SPURGE
PELARGONIUM PELTATUM	IVY GERANIUM
● PLECOSTACHYS SERPYLLIFOLIA	STRAW FLOWER
POTENTILLA VERNA	SPRING CINQUEFOIL
● ROSMARINUS OFFICINALIS 'PROSTRATUS'	ROSEMARY
● SEDUM/VARIETIES	SEDUM
● SENECIO MANDRALISCAE	KLEINIA
TRACHELOSPERMUM JASMINOIDES	STAR JASMINE
VERBENA LILIACINA 'DE LA MINA'	LILIAC VERBENA
VERONICA/VARIETIES	SPEED WELL
VINCA MINOR	DWARF RUNNING MYRTLE

LAWNS AND TURF

BALLFIELDS

CYNONDON SPECIES:	HYBRID BERMUDA
	GN-1
	TIFGREEN

GENERAL USE

FESTUCA ARUNDINACEA	DRAWF TALL FESCUE (90%) BLUE GRASS (10%)
	MEDALLION VARIETIES
STENOTAPHREM SECUNDATUM	ST. AUGUSTINE GRASS
	SHADE CONDITIONS

ORNAMENTAL GRASSES

BOTANICAL NAME	COMMON NAME
● DESCHAMPSIA CAESPITOSA	TUFTED HAIRGRASS
● LEYMUS CONDENSATUS 'CANYON PRINCE'	CANYON PRINCE WILD RYE
FESTUCA OVINA 'GLAUCA'	BLUE FESCUE
● FESTUCA RUBRA	RED FESCUE
	MARATHON VARIETIES
● MUHLENBERGIA RIGENS	DEER GRASS
● NASSELLA CERNUA	NODDING NEEDLEGRASS
● NASSELLA LEPIDA	FOOTHILL NEEDLEGRASS
● NASSELLA PULCHRA	PURPLE NEEDLEGRASS
OPHIOPOGON JAPONICUS	MONDO GRASS
● PANICUM (NATIVE SPP.)	SWITCH GRASS
● STIPA GIGANTEA	GIANT NEEDLE GRASS

BIO-SWALES

BOTANICAL NAME	COMMON NAME
TREES	
ALNUS RHOMBIFOLIA	WHITE ALDER
POPULUS FREMONTII	WESTERN COTTONWOOD
SHRUBS	
ARTEMISIA DOUGLASIANA	MUGWORT
BACCHARIS DOUGLASII	MARSH BACCHARIS
BACCHARIS EMORYI	EMORY BACCHARIS
BACCHARIS PILULARIS	COYOTE BRUSH
PERRENIALS	
ACHILLEA MILLEFOILUM	COMMON YARROW
IRIS DOUGLASIANA	DOUGLAS IRIS
MIMULUS CARDINALIS	SCARLET MONKEY FLOWER
POTENTILLA EGEDII	MARSH CINQUEFOIL
SISYRINCHIUM BELLUM	BLUE-EYED GRASS
GRASSES/SEDGES	

CAREX GLOBOSA	GLOBE SEDGE
CAREX SUBFUSCA	RUSTY SEDGE
CAREX TUMULICOLA	BERKELEY SEDGE
JUNCUS PATENS	COMMON RUSH

□ **- LOW WATER USAGE PLANT**

● **- LOW WATER USAGE PLANT**

Appendix "A"

Appendix "A"

A. 1 CHPS Score Card – New Facilities (Separate Volume-Not Included)

A. 2 CHPS Score Card – Existing Facilities (Separate Volume-Not Included)

A. 3 Submittal Requirements & Checklists

A. 4 Building Acoustical Requirements (Separate Volume-Not Included)

A. 5 Checklist of Off-Site Work, Utilities & Easements (Separate Volume-Not Included)

A. 6 Planning and Design Guidelines for Small Learning Communities (Separate Volume-Not Included)

A. 7 Estimating Guide (Separate Volume-Not Included)

Appendix A.3

Submittal Requirements & Checklist

Submittal Requirements & Checklists

- **SCHEMATIC DESIGN**
- **DESIGN DEVELOPMENT**
- **CONSTRUCTION DOCUMENT – 50%**
- **CONSTRUCTION DOCUMENT – 100% – DSA SUBMITTAL**
- **CIVIL DESIGN CHECKLIST – 100% SUBMITTAL**
- **ELECTRICAL DESIGN CHECKLIST – 100% SUBMITTAL**
- **MECHANICAL DESIGN CHECKLIST – 100% SUBMITTAL**
- **DSA SUBMITTAL – LOCAL FIRE AUTHORITY APPROVAL CHECKLIST**

SUBMITTAL REQUIREMENTS

Los Angeles Unified School District Facilities Services Division

Schematic Design

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Informaton Included	Location Reference
General				
At a preliminary Schematics review meeting, present the District with three or more design solutions, for selection of one to be refined. Provide site analysis diagrams showing key site influences: Solar, winds, views, traffic, neighborhood context, topographical features. Mount illustrations (*) on 30"x40" boards. The deliverables include the following:				
Title Sheet			☐ Project name & address, project directory w/ all consultants ☐ LAUSD ID and Logo (on all drawings)	
Vicinity and Location Map	*		☐ Neighborhood land uses and characteristics, parking, setbacks on adjacent and frontage properties ☐ Streets, crossings, signals, gen'l traffic & pedestrian densities	
Color Photos	*		☐ Surrounding properties and improvements ☐ Proposed site, incl. existing bldgs. and surroundings	
Site Plan	*		☐ Buildings, playground areas, future buildings ☐ Scope and Limits of Work, Off-Site Improvements ☐ Relevant topographical features, grading concepts ☐ Driveways, streets, parking, walks, future street widening ☐ Existing landscape features, planting concepts	
"Check List of Offsite Work, Utilities & Easements"	Prelim.		☐	
Civil Engineering				
Site Survey	100%		☐ Boundary & Topography. Note "FOR REFERENCE ONLY."	
Basis of Design	Prelim.		☐ Description of systems, criteria, surface drainage & retention, water availability & conservation, other sustainability issues, sub-surface investigation recommendations, City requirem'ts and post-construction storm water treatment ☐ Symbols List, coordinated with LAUSD Civil Standards	
Landscape				
Basis of Design	Prelim.		☐ Description of design approach & criteria, plant selections, irrigation, soil preparation requirements	
Architecture				
Floor Plans	Schem.	1/8	☐ Room names, doors and windows, special finishes ☐ Cabinets, furniture & equipment to show function, capacity ☐ Stairs, ramps, elevators, major structural elements ☐ Equipment rooms (mech'l, power, data), major shafts & chases	
Roof Plans	Schem.	1/8	☐ Slopes, covered walks, material changes	
Exterior Elevations	Schem.	1/8	☐ Wall features and materials, important features	
Building Sections	Schem.	1/8	☐ Relevant sections to show important bldg. configurations or structural conditions	

Schematic Design

DRAWINGS: / OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Informaton Included	Location Reference
Basis of Design	Prelim.	☐	Design approach and philosophy, general description of buildings & mat'ls, important design factors, community issues, sustainability measures	
Structural Engineering				
Floor and Roof Plans	Schem.	☐	Diagrammatic layout of structural elements, if necessary	
Basis of Design	Prelim.	☐	Description of systems, bearing conditions, load criteria, foundation-engineering report reference (or geologic investigation recommendations)	
HVAC				
Basis of Design	Prelim.	☐	Description of systems, criteria, special energy and sustainability issues, envelope criteria, possible phasing	
Plumbing & Fire Protection				
Basis of Design	Prelim.	☐	Description of systems and criteria, fixture types, gen'l loads, water availability, on- and off-site drainage provisions	
Electrical				
Basis of Design	Prelim.	☐	Description of all electric power related systems, including emergency power, computer power, equipment types, etc.	
		☐	Description of all signal systems, incl. Fire alarm, intrusion alarm, CCTV/Audio Surveillance Systems, PA/Intercom, Autonomous PA/Sound System (Gym, Auditorium, Athletic fields, multi-purpose rooms and large instruction rooms), TV Distribution (copper or Fiber Optic), clock system, Classroom Sound Enhancement System.	
		☐	Description of lighting system in typical areas, indicating fixture types and lighting controls.	
		☐	Indicate measures and strategies to achieve maximum CHPS scores.	
		☐	Typical Classroom Plan (Lighting, Power & Data Outlets). Other special conditions,if necessary (8.5 x11 or 11x17 bound with Basis of Design).	
Food Service	Prelim.	☐	Basis of Design, criteria, descriptive material	
Graphics & Signage	Prelim.	☐	of other design disciplines as may be needed	
Theater Consultant	Prelim.	☐	by the size and complexity of the project.	
Kitchen Consultant	Prelim.	☐		
Other:				
SP2A Building Area Diagrams and Area Calculations		☐	Show compliance with Building Program	
Cost Estimate		☐	O.O.M. for each alternate. Final estimate in District format	
CHPS Scorecard		☐	Show compliance with Building Program	
Savings by Design Incentive Program		☐	Record of application subbmittal	

SUBMITTAL REQUIREMENTS

Los Angeles Unified School District Facilities Services Division

Design Development

DRAWINGS:

OTHER DOCUMENTS:

	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
General				
Title Sheet, Vicinity and Location Map	80%		☐ Project name & address, project directory w/ all consultants ☐ LAUSD ID and Logo (on all drawings) ☐ List of DSA Deferred Approvals	
Drawing Index	95%		☐ List all drawings planned for final set. Indicate those included.	
General Notes	65%		☐ Legend, Abbreviations, Symbols (LAUSD Approved)	
Code Analysis	80%		☐ Constr'n Type, Occupancies, Areas, Separat'ns,Exit Wdth. ☐ ADA path of travel and accessibility criteria ☐ Exit signs, fire extinguishers ☐ Applicable Codes	
Site Plan	50%	1/20	☐ Buildings, w/ names, overhangs, nbr.of stories, gross area ☐ Driveways, service roads, parking & layouts, walks ☐ Hardscape, planting areas, site furniture, drinking fountains ☐ Playground layouts, paving types ☐ ADA accessibility signage, ramps, railings, HC parking ☐ Fire Dept. access, hydrants & F.D. Approval block ☐ DSA Application Nbr. for existing buildings	
Construction Phasing Plan	25%		☐ For multi-phase projects: Limits of Work, barriers, access	
Site Details	20%		☐ Flag pole, planters, site walls, fencing, railings, signage, parking, playground equipment, stairs and ramps, bollards, trash enclosure	
Architectural Presentation Drawings			☐ Vicinity Plan and Photos (as for Schematic Design Submittal) ☐ Site and Floor Plans, Elevations, Sections (in color) ☐ Perspective Rendering (in color) (Above mounted on 30" x 40" boards) ☐ Materials / Finishes Boards	
"Check List of Offsite Work, Utilities & Easements"	100%		☐	
CHPS Scorecards			☐ Detailed Account of CHPS Points achieved in School Design.	
Civil Engineering				
Topographic Survey	100%		☐ Note "FOR REFERENCE ONLY"	
Site Plan	50%	1/20	☐ Building locations (dimensions or coordinates), Work Limits ☐ Floor Plan Elevations, Key Dimensions, Grids ☐ Existing and Finish Contours (0.5' intervals typ.), spot elevations, ADA-compliant slopes ☐ Property lines, streets, setbacks, easements, walls & fences ☐ Site walls and top-of-wall elevations ☐ Utilities, UG tanks, fencing, walks, drives, planting, other features, onsite and adjacent (existing and new) ☐ Construction phasing provisions, for multi-phase projects	

Design Development

DRAWINGS:

OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
Demolition Plan	25%		☐ Buildings, paving, utilities, old foundations - offsite and onsite. Limits of Work, specific demolition notes, legend, coordinate sysmbols with LAUSD Standards	
Street and Parking Plan	30%	1/20	☐ Pavement dimensions, Fire Department access, references	
Grading and Drainage Plan	30%	1/20	☐ Existing & New Design grades,final grading, flow lines, CB's, culverts, downspouts, references legend & symbols per LAUSD Standards. Identify paving types & landscape areas Post construction storm water management system including structural and nonstructural BMP's	
Site Utilities Plan (Water & Drainage)	30%	1/20	☐ Piping, manholes, valves, CB's, drinking fountains, hose bibbs, combination SS/SD drain valves, PIV's	
Off-site Civil Work Plans	30%		☐ Off-site work (drains, walks, drives, streets, hydrants, utilities tie-ins, street-vacations, street trees, power poles, etc.) per public agency requirements	
Drainage Plans/ Profiles	30%	1/10	☐	
Site Details	20%		☐ Curbs, gutters, drainage structures, valves, boxes, utilities connections, . . .	
Log of soil borings	100%		☐	
Storm Water Calc'ns	100%		☐	
Basis of Design	100%		☐	
Landscaping				
Site Plan *(on Civil Engineering Background)*	50%	1/20	☐ Planting areas with plant references Location of existing trees (to remain) in area of work and proposed relocation if necessary	
Plant Schedules	35%		☐ Names, sizes, detail references	
Details	35%		☐ Planting, site furniture, special features	
Irrigation Plans	50%		☐ Piping, sprinkler & controller locations, references Water POC, meter & backflow preventor locations	
IrrigationDetails	35%		☐ Valves, control schedules	
Basis of Design	100%			
Architecture				
Floor Plans	35%	1/8	☐ Structural grid, finish floor elevations, final dimensions ☐ Room Names, Numbers, References ☐ Floor finishes, floor drains ☐ Door & Window locations, sizes ☐ Partition locations, finishes, types, fire-ratings ☐ ADA compliance provisions, references ☐ Cabinets, furniture & equipment layout (incl. N.I.C. items)	
Enlarged Floor Plans	20%	1/4	☐ Educational spaces, library, admin. area, restrooms, kitchens, mech'l equip.rooms, special areas. All FFE incl. N.I.C. items.	
Roof Plans	35%	1/8	☐ Struct'l grid, slopes, drains, scuppers ☐ Elevations of top of steel, sheathing, parapet walls ☐ Parapets, screens, walkways, items visible on roof	
Reflected Ceiling Plans	25%	1/8	☐ Lights, grilles, access panels	

Design Development

DRAWINGS:

OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
			☐ Fire ratings of ceilings and walls ☐ Soffits, special items	
Exterior Elevations	35%	1/8	☐ Structural grid, floor elevations, key dimensions ☐ Wall features and materials, all important features ☐ Doors, windows, louvers	
Building Sections	35%	1/8	☐ Sections sufficient to show all major building configurations ☐ Structural grid, floor elevations, dimensions, Rm.Names, Nbrs. ☐ Major materials, structural elements	
Exterior Envelope Sections	75%	1/2	☐ Key wall sections w/ structl.grid, dimensions, address acoustical requirements per Acoustical Design Guidelines	
Exterior Envelope Details	20%	1 1/2	☐ Key details, incl. roofing, drains, skylights, waterproofing	
Interior Elevations	10%	1/8	☐ Major room elevations, mat'ls & features (MP, Gym, typ.CR) ☐ Cabinets, Furniture & Equipment (incl. N.I.C.)	
Interior Finish Schedules	20%		☐ Room Names, Numbers, Elevation & Detail References ☐ Ceiling and soffit heights ☐ Preliminary materials and paint finishes	
Door Schedules and Types	10%		☐ Numbers, Locations, Detail References ☐ Door and Frame Materials	
Window and Louver Schedules and Types	25%		☐ Numbers, Locations, Detail References ☐ Sash and Frame Materials	
Door, Window and Louver Details	25%		☐ All details incl. Thresholds, hardware references, fire ratings, panic hardware, smoke seals	
Vertical Circulation Plans, Sections, Details	35%	1/4	☐ Stairs, Elevators, etc. with structl.grid, dimensions ☐ Major materials and equipment, typical details ☐ Equipment room layouts, pits,holding tanks,etc.	
Interior and Miscellaneous Details	25%		☐ Wall types and details, with fire-ratings, address acoustical requirements per Acoustical Design Guidelines ☐ Ceiling, soffit, suspended fixtures w/ structural anchoring ☐ Floor/ ceiling/ wall/ roof assemblies w/ fire ratings, UL fire-assembly numbers ☐ Cabinet and equipment, w/ structural anchoring	
Basis of Design	100%		☐ Design approach and philosophy, general description of b'ldgs & mat'ls,community issues, sustainability measures	
Structural Engineering				
Foundation Plans	20%	1/8	☐ Structural grid, finish floor elevations, dimensions, references ☐ Bottom-of-footing elev'ns, pipe trenches adj. to footings ☐ Slab penetrations & depressions, dimensioned	
Floor and Roof Plans	35%		☐ Framing and floor construction, penetrations, openings ☐ Shear walls and other lateral force resisting elements	
Sections	35%	1/8	☐ Foundation and member sizes	

Design Development

DRAWINGS: / OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
Wall Sections & Elevations	35%		☐	
Secondary framing & supports for finishes	20%		☐	
Retaining wall elevations,sections	20%		☐	
Details	20%		☐	
Basis of Design	-		☐ Description of systems, bearing conditions, load criteria, foundation-engineering report reference	
Preliminary Calculations	35%		☐ Including calculations and details for: 1) Elements of non-structural components, equipment anchorage and attachment to the structure; 2) Stairs, handrails, and landings.	
HVAC				
HVAC Floor and Roof Plans *(On Architectural Backgrounds)*	35%	1/8	☐ Duct & diffuser/ grille layout (double-line) with CFM's, smoke detectors, combination smoke/ fire dampers with State Fire Marshal approval numbers ☐ Existing mechanical systems & components ☐ Equipment locations and rooms	
HVAC Piping Plans	35%		☐ Piping & valve layouts and sizes	
Air-flow Diagrams	35%		☐ Flow and riser diagrams for each air system, incl. controls, outside air and exhaust, CFM, velocities, pressures	
HVAC Piping System Diag'ms	35%		☐ Schematic and riser diagrams for each piping system, incl. pipe sizes, controls, instrumentation, valves, etc.	
Enlarged Floor Plans	25%		☐ Equipment layouts, piping, ducts,coordination of major duct & pipe space, and a typical classroom layout	
Equipment Schedules	25%		☐ All equipment -- types, sizes, capacities, weights	
Control System Diagrams	25%		☐	
Details	20%		☐	
Equipment Mounting Details	10%		☐ Mounting details for all HVAC components, incl.pads, curbs, seismic restraints, vibration isolators	
Basis of Design	-		☐ Description of systems, criteria, controls, exhaust provisions, impacts on building envelope	
Final load estimates	100%		☐	
Calculations per CBC Energy Efficiency St'ds	50%		☐ Critical findings affecting glazing, lighting, other bldg elements	
Plumbing				
Site Plan *(on Civil Engineering Background)*	50%		☐ Mechanical Utilities (gas, steam, heating water), coordinate w/ site utilities	
Floor and Roof Plans *(on Arch'l Backgrounds)*	35%	1/8	☐ Piping, fixtures, floor drains, equipment and rooms ☐ Existing utilities, equipment and P.O.C's, demo. requirements ☐ Major pipe space coordination, incl. roof-drain locations	
Enlarged Floor Plans	25%		☐ Equipment layouts, piping, supply air & exhaust, major pipe space coordination	
Equipment Schedules	25%		☐ All equipment -- types, sizes, capacities, weights	

Design Development

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
Piping System Diagrams	25%		☐ Schematic and isometric riser diagrams for each piping system, incl. pipe sizes, controls, valves, etc.	
Details	20%		☐	
Piping and Equpment Mounting Details	10%		☐ Mounting details for all components, incl.pads, curbs, seismic restraints, vibration isolators	
Basis of Design	-		☐ Description of systems, criteria, restroom controls, water conservation, utilities connections requirements	
Calculations	50%		☐	
Fire Protection				
Floor Plans	35%	1/8	☐ Mains, risers, P.O.C.'s	
(on Arch'l Backgrounds)			☐ Sprinkler head layouts	
			(On smaller projects, may be shown with Plumbing)	
	100%		☐ Hydraulic calculations	
Electrical				
Site Plan	10%		☐ Service equipment locations (power, phone, TV, MPOE)	
(on Civil Engineering Background	10%		☐ Conduit duct bank routing and underground pull boxes for power and signal systems	
	35%		☐ Exterior lighting (Pole mount and wall mount), Indicate fixture types.	
	35%		☐ Exterior Signal devices (Fire Alarm horns, PA speakers, CCTV cameras, etc.)	
Lighting Floor Plans/RCPs	35%	1/8	☐ Indicate all lighting fixture locations and types. Show panels. Show switches and lighting control components in all rooms.	
Power Floor Plans	35%	1/8	☐ Indicate all receptacles locations and types. Show panels.	
Signal Floor Plans	35%	1/8	☐ Indicate all signal system devices. Show Cable tray layouts and conduit sleeves locations. Show Terminal cabinets, racks and data frames.	
Fire Alarm Floor Plans	35%	1/8	☐ Indicate all initiating & alarm devices, control panels, annunciator and terminal cabinets.	
Enlarged Floor Plans	35%	1/4	☐ Equipment rooms layouts showing panels, transformers, inverters, cable trays, LAN racks & signal equipment, terminal cabinets, working & access space	
Light Fixture Schedule	90%		☐ Show fixture description, manufacturers cat.#, lamp type, ballast type, numbers of lamps and ballasts, input wattage and mounting type.	
Panel Schedules	65%		Show panel schedules.	
Lighting Control Diagrams	65%		Show contol diagrams and energy forms	
Signal Block and Riser Diagrams	35%		☐ Show headend equipment and terminal cabinets/racks in satellite buildings. Show interconnections.	
Fire Alarm Block and Riser Diagrams	35%		☐ Show Main Fire Alarm Control Panel and Satellite control panels or expanders.. Show interconnections.	
Single-line Diagram	35%		☐ Equipment & feeder sizes (new and existing to be used)	
			☐ Main switchboards, panels, breakers, MCC's, etc.	
			☐ Load calculations based on allotments indicated in Design Guide per square foot basis to size main service and power distribution panels and for submission to Utility Company.	

Design Development

DRAWINGS:

OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included	Location Reference
			☐ Indicate Grounding system.	
Details	35%		☐ Utility company details if available. ☐ ADA-complying heights of all racks and devices	
Equipment Mounting Details	35%		☐ Mounting details for all fixtures, shelving & equipment, incl. seismic restrain-Not required for this submittal.	
Basis of Design	95%		☐ Update and indicate changes to original Basis of Design submitted in schematic phase.	
Lighting Calculations	65%		☐ Provide point-by-point calcs. incl. graphic display for all typical rooms and areas for both normal and emergency modes demonstrating compliance with Design Guide, IES standards, SCE Classroom Lighting Design manuals and applicable codes.	
Fire Alarm System Calcs.	65%			
Title 24 Compliance	50%		☐ Critical findings affecting glazing, lighting, HVAC, other bldg elements and use of day lighting. ☐ LTG forms showing compliance with Title 24 and CHPS guidelines and standards. ☐ Coordinate with Mechanical Engineer and Architect to optimize energy use and achieve higher CHPS scores.	
Food Service	25%		☐ Plans, Elevations, Sections, Details, Descriptive Data	
Graphics & Signage	25%		☐ of other design disciplines as may be needed	
Theater Consultant	25%		☐ by the size and complexity of the project.	
Specifications			☐ *List of District Guide Specification and special sections required for project, with Table of Contents*	
Other:				
Product Information			☐ Catalog cut sheets of architectural and engineering products, organized in CSI format, esp. those not in District standards	
SP2A Building Area Diagrams and Area Calculations			☐ Updated, showing compliance with Building Program	
Cost Estimate			☐ Detailed CSI Cost Estimate in compliance with Districts estimating guide. ☐ Site Development Cost Estimate in compliance with Districts estimating guide	
CHPS Scorecard			☐ Detailed account of CHPS Points achieved in School Design	
Savings by Design Incentive Program			☐ Record of design documents sent to Savings by Design	

SUBMITTAL REQUIREMENTS

Los Angeles Unified School District Facilities Services Division

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
General			
Title Sheet, Vicinity and Location Map	80%		☐ Project name & address, project directory w/ all consultants ☐ LAUSD ID and Logo (on all drawings) ☐ List of DSA Deferred Approvals
Drawing Index	95%		☐ List all drawings planned for final set. Indicate those included.
General Notes	80%		☐ Legend, Abbreviations, Symbols (LAUSD Approved)
Code Analysis	90%		☐ Constr'n Type, Occupancies, Areas, Separat'ns,Exit Wdth. ☐ ADA path of travel and accessibility criteria ☐ Exit signs, fire extinguishers ☐ Applicable Code
Site Plan	75%	1/20	☐ Buildings, w/ names, overhangs, nbr.of stories, gross area ☐ Driveways, service roads, parking & layouts, walks ☐ Hardscape, planting areas, site furniture, drinking fountains ☐ Playground layouts, paving types, detail references ☐ ADA accessibility signage, ramps, railings, HC parking ☐ Fire Dept. access, hydrants & F.D.Approval block ☐ DSA Application Nbr. for existing buildings
Construction Phasing Plan	50%		☐ For multi-phase projects: Limits of Work, barriers, access
Site Details	35%		☐ Flag pole, planters, site walls, fencing, railings, signage, parking, playground equipment, stairs and ramps, bollards, trash enclosure
"Check List of Offsite Work, Utilities & Easements"			☐
CHPS Scorecard			☐ Detailed account of CHPS Points achieved in School Design
Civil Engineering			
Topographic Survey	100%		☐ Note "FOR REFERENCE ONLY"
Site Plan	75%	1/20	☐ Building locations (dimensions or coordinates), Work Limits ☐ Floor Plan Elevations, Key Dimensions, Grids ☐ Existing and Finish Contours (0.5' intervals typ.), spot elevations, ADA-compliant slopes ☐ Property lines, streets, setbacks, easements, walls & fences ☐ Site walls and top-of-wall and bottom-of-footing elevations ☐ Utilities, UG tanks, fencing, walks, drives, planting, other features, onsite and adjacent (existing and new) ☐ Construction phasing provisions, for multi-phase projects
Demolition Plan	75%		☐ Buildings, paving, utilities, old foundations - offsite and onsite. Limits of Work, specific demolition notes, legend, coordinate symbols with LAUSD Standards
Street and Parking Plan	65%	1/20	☐ Pavement dimensions, Fire Department access, references

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Grading and Drainage Plan	65%	1/20	☐ Existing & New Design grades,final grading, flow lines, CB's, culverts, downspouts, references legend & symbols per LAUSD Standards. Identify paving types & landscape areas. Post construction storm water management system including structural and nonstructural BMP's
Site Utilities Plan (Water & Drainage)	65%	1/20	☐ Piping, manholes, valves, CB's, drinking fountains, hose bibbs, combination SS/SD drain valves, PIV's
Off-site Civil Work Plans	65%		☐ Off-site work (drains, walks, drives, streets, hydrants, utilities tie-ins, street-vacations, street trees, power poles, etc.) per public agency requirements
Drainage Plans/ Profiles	65%	1/10	☐
Site Details	35%		☐ Curbs, gutters, drainage structures, valves, boxes, utilities connections, . . .
Log of soil borings	100%		☐
Calculations	100%		☐
Basis of Design	-		☐ Updated

Landscaping

Site Plan *(on Civil Engineering Background)*	75%	1/20	☐ Planting areas with plant references Location of existing trees (to remain) in area of work and proposed relocation if necessary
Plant Schedules	65%		☐ Names, sizes, detail references
Details	35%		☐ Planting, site furniture, special features
Irrigation Plans	50%		☐ Piping, sprinkler & controller locations, references Water POC, meter & backflow preventor locations
IrrigationDetails	35%		☐ Valves, control schedules
Basis of Design	-		☐ Updated

Architecture

Floor Plans	75%	1/8	☐ Structural grid, finish floor elevations, final dimensions ☐ Room Names, Numbers ☐ Door & Window Numbers, Wall Numbers, references ☐ Partition types, fire-ratings, ADA compliance, references ☐ ADA compliance, references ☐ Cabinets,furniture & equipment layout, detail references (incl. N.I.C. items) ☐ Floor depressions, penetrations, housekeeping pads, FD's & slopes, detail references
Enlarged Floor Plans	50%	1/4	☐ Educational spaces, library, admin. area, restrooms, kitchens, mech'l equip.rooms, special areas. All FFE incl. N.I.C. items shown.
Roof Plans	75%	1/8	☐ Struct'l grid, slopes, drains, scuppers, penetrations ☐ Elevations of top of steel, sheathing, parapet walls ☐ Equipment, ducts, pipes, curbs and pads, pipes & ducts ☐ Parapets, screens, walkways,all items visible on roof with dimensiions and detail references

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Reflected Ceiling Plans	75%	1/8	☐ Lights, grilles, access panels, sprinklers, penetrations ☐ Fire ratings of ceilings and walls ☐ Soffits, special items, dimensioned & referenced
Exterior Elevations	75%	1/8	☐ Structural grid, floor elevations, dimensions ☐ All wall features and materials, w/ dimensions & references, incl. expansion joints, screeds, copings and sills ☐ Doors, windows, louvers, w/ dimensions and references
Building Sections	75%	1/8	☐ Sections sufficient to show all major building configurations ☐ Structural grid, floor elevations, dimensions, Room Names, Nbrs. ☐ Major materials, structural elements, detail references
Exterior Envelope Sections	100%	1/2	☐ Key wall sections w/ structl.grid, dimensions, references address acoustical requirements per Acoustical Design Guidelines
	50%		☐ Other wall sections
Exterior Envelope Details	50%	1 1/2	☐ Key details, incl. roofing, drains, skylights, waterproofing
		1 1/2	☐ Roof-mounted equipment curbs, platforms, pipe and duct supports, penetrations, with WPing and flashings
Interior Elevations	50%	1/8	☐ All room elevations, materials ☐ All wall features, w/ dimensions & detail references ☐ Cabinets, Furniture & Equipment (incl. N.I.C.)
Interior Finish Schedules	65%		☐ Room Names, Numbers, Elevation & Detail References ☐ Ceiling and soffit heights ☐ Completed materials and paint finishes ☐ Paint color selections
Door Schedules and Types	50%		☐ Numbers, Locations, Elevations, Detail References ☐ Door and Frame Materials ☐ Finish Hardware Types
Window and Louver Schedules and Types	50%		☐ Numbers, Locations, Detail References ☐ Sash and Frame Materials
Door, Window and Louver Details	50%	3	☐ All details incl. thresholds, hardware references, fire ratings, panic hardware, smoke seals
Vertical Circulation Plans, Sections, Details	50%	1/4	☐ Stairs, Elevators, etc. with structl.grid, dimensions ☐ Major materials and equipment, typical details ☐ Equipment room layouts, pits,holding tanks,etc.
Interior and Miscellaneous Details	25%		☐ Wall types and details, with fire-ratings address acoustical requirements per Acoustical Design Guidelines ☐ Ceiling, soffit, suspended fixtures w/ structural anchoring ☐ Floor/ ceiling/ wall/ roof assemblies w/ fire ratings, UL fire-assembly numbers ☐ Cabinet and equipment, w/ structural anchoring
Basis of Design	-		☐ Updated

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Structural Engineering			
Foundation Plans	35%	1/8	☐ Structural grid, finish floor elevations, dimensions, references ☐ Bottom-of-footing elevations, pipe trenches adj. to footings ☐ Slab penetrations & depressions, dimensioned
Floor and Roof Plans	65%		☐ Framing and floor construction, penetrations, openings ☐ Shear walls and other lateral force resisting elements
Sections	60%	1/8	☐ Foundation and member sizes
Wall Sections & Elevations	60%		☐
Secondary framing & supports for finishes	40%		☐
Retaining wall elevations,sections	60%		☐
Details	50%		☐
Basis of Design	-		☐ Updated
Calculations	75%		☐ Including calculations and details for: 1) Elements of non-structural components, equipment anchorage and attachment to the structure; 2) Stairs, handrails, and landings.
HVAC			
Floor and Roof Plans *(On Architectural Backgrounds)*	75%	1/8	☐ Duct & diffuser/ grille layout (double-line) with CFM's, smoke detectors, combination smoke/ fire dampers with State Fire Marshal approval numbers ☐ Existing mechanical systems & components ☐ Equipment locations and rooms
HVAC Piping Plans, Flr./Roof	75%		☐ Piping & valve layouts and sizes
Air-flow Diagrams	75%		☐ Flow and riser diagrams for each air system, incl. controls, outside air and exhaust, CFM, velocities, pressures
HVAC Piping System Diag'ms	75%		☐ Schematic and riser diagrams for each piping system, incl. pipe sizes, controls, instrumentation, valves, etc.
Enlarged Floor Plans	50%		☐ Equipment layouts, piping, ducts, major duct & pipe space coordination
Equipment Schedules	50%		☐ All equipment -- types, sizes, capacities, weights
Control System Diagrams	50%		☐
Details	35%		☐
Equipment Mounting Details	35%		☐ Mounting details for all HVAC components, incl.pads, curbs, seismic restraints, vibration isolators
Basis of Design	-		☐ Updated
Final load estimates	100%		☐
			☐ Title 24 Energy Standards Compliance Forms: Performance Method analysis of each building
Final calculations per CBC Energy Efficiency St'ds	100%		

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Plumbing			
Site Plan *(on Civil Engineering Background)*	75%		☐ Mechanical Utilities (gas, steam, heating water), coordinate w/ site utilities
Floor and Roof Plans *(on Arch'l Backgrounds)*	75%	1/8	☐ Piping, fixtures, floor drains, equipment and rooms ☐ Existing utilities, equipment and P.O.C's, demo. requirements ☐ Major pipe space coordination, incl. roof-drain locations
Enlarged Floor Plans	50%		☐ Equipment layouts, piping, supply air & exhaust, major pipe space coordination
Equipment Schedules	60%		☐ All equipment -- types, sizes, capacities, weights
Fixture Schedules	60%		☐
Piping System Diagrams	75%		☐ Schematic and isometric riser diagrams for each piping system, incl. pipe sizes, controls, valves, etc
Details	35%		☐
Piping and Equpment Mounting Details	35%		☐ Mounting details for all components, incl.pads, curbs, seismic restraints, vibration isolators
Basis of Design	-		☐ Updated
Final calculations	100%		☐
Fire Protection			
Floor Plans *(on Arch'l Backgrounds)*	75%	1/8	☐ Mains, risers, P.O.C.'s ☐ Sprinkler head layouts ☐ (On smaller projects, may be shown with Plumbing)
Electrical			
Site Plan *(on Civil Engineering Background)*	75%		☐ Service equipment locations (power, phone, TV) Show vault/pad details, primary and secondary conduit routing ☐ Conduit duct bank routing and underground pull boxes for power and signal systems. Show sizes. ☐ Exterior lighting (Pole mount and wall mount), Indicate fixture types. Assign panel circuit homeruns ☐ Exterior Signal devices (Fire Alarm horns, PA speakers, CCTV cameras, etc.)
Lighting Floor Plans/RCPs	75%	1/8	☐ Indicate all lighting fixture locations and types. Show panels. Show switches and lighting control components in all rooms. Assign panel circuit homeruns
Power Floor Plans	75%	1/8	☐ Indicate all receptacles locations and types. Show panels. Assign panel circuit homeruns
Signal Floor Plans	75%	1/8	☐ Indicate all signal system devices. Show Cable tray layouts and conduit sleeves locations. Show Terminal cabinets, racks and data frames. Show conduit interconnections.

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Fire Alarm Floor Plans	75%	1/8	☐ Indicate all initiating & alarm devices, control panels, annunciator and terminal cabinets. Indicate candela ratings
Enlarged Floor Plans Equipment room layouts	75%	1/4	☐ Provide equipment rooms layouts showing panels, transformers, inverters, cable trays, LAN racks & signal equipment, terminal cabinets, working & access space. ☐ Size equipment and provide dimensioned layouts and weight information. Coordinate with Structural Engineer for seismic details. ☐ Calculate heat loads and coordinate with Mechanical for sizing HVAC equipment. ☐ Provide cable tray layout in LAN Room and signal rooms.
Light Fixture Schedule	100%		☐ Show fixture description, manufacturers cat.#, lamp type, ballast type, numbers of lamps and ballasts, input wattage and mounting type.
Panel Schedules	80%		☐ Provide Panel schedules showing load details and calculations.
Lighting Control Diagrams	75%		☐ Provide lighting control diagram showing all components and interconnections.
Signal Block and Riser Diagrams	75%		☐ Show Headend equipment and terminal cabinets/racks in satellite buildings. Show interconnections. Show all components. Show all interconnections indicating conduit and cabling information.
Fire Alarm Block and Riser Diagrams	75%		☐ Show Main Fire Alarm Control Panel and Satellite control panels or expanders. Show all components. Show all interconnections indicating conduit and cabling information.
Single-line Diagram	75%		☐ Equipment & feeder sizes (new and existing to be used) ☐ Main switchboards, panels, breakers, MCC's, etc. ☐ Load calculations based on actual connected loads Resize main service and power distribution panels based on actual loads. Include spare capacities required by Design Guide. ☐ Indicate Grounding system for main service and satellite buildings. ☐ Indicate Voltage drops and length for all feeders.

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
			☐ Short-circuit ratings of all panelboards calculated based on available fault current from utility company
			☐ Provide Utility company contact information.
Details	85%		☐ Utility company standard details
			☐ Typical ADA-complying heights of all racks and devices
			☐ Applicable LAUSD standard details.
Equipment Mounting Details	50%		☐ Mounting details for all fixtures, shelving & equipment, incl. seismic restrain. Coordinate with structural
Basis of Design	95%		☐ Update and indicate changes to original Basis of Design submitted in schematic phase.
Lighting Calculations	95%		☐ Update Point-by-point calcs. incl. graphic display typical rooms and areas for both normal and emergency modes demonstrating compliance with Design Guide, IES standards, SCE Classroom Lighting Design manuals and applicable codes.
Fire Alarm System Calcs.	50%		☐ Battery and voltage-drop calculations.
Title 24 Compliance	100%		☐ Update-Critical findings affecting glazing, lighting, HVAC, other bldg elements and use of day lighting.
			☐ Update-LTG forms showing compliance with Title 24 and CHPS guidelines and standards.
			☐ Update-Coordinate with Mechanical Engineer and Architect to optimize energy use and achieve higher CHPS scores.
			☐ Incorporate comments received from "Saving by Design" Review
Food Service	50%		☐ Plans, Elevations, Sections, Details, Descriptive Data
Graphics & Signage	50%		☐ of other design disciplines as may be needed
Theater Consultant	50%		☐ by the size and complexity of the project.

Construction Documents -- 50 %

DRAWINGS / *OTHER DOCUMENTS*	% Compl	Scale (Min) "/ ft.	Information Included
Specifications			
			☐ *Set of District Guide Specifications with Table of Contents and Technical Sections required for the project, red-marked (or edited in MS Word while tracking changes and highlighting) to reflect the specific work of the project, plus additional sections to recognize unique materials or assemblies.Specify two or more manufacturers for each product.*
OTHER:			
SP2A Building Area Diagrams			☐ Updated
Product Information			☐ Catalog cut sheets not submitted with DD package
Record Reports			☐ All utility company, public agency and fire dep't contacts
Cost Estimate			☐ Detailed CSI Cost Estimate in compliance with Districts Estimating Guide
			☐ Site Developlent Cost Estimate in compliance with Districts Estimating Guide
CHPS Scorecard			☐ Detailed account of CHPS Points achieved in School Design
Savings By Design Incentive Program			☐ Savings by Design Energy Analysis Recommendation Letter & Architect's Response
D.D. Review Comments			☐ All comments & dwgs., with responses to each comment

SUBMITTAL REQUIREMENTS

Los Angeles Unified School District Facilities Services Division

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
General			
Title Sheet, Vicinity and Location Map	100%		☐ Project name & address, project directory w/ all consultants ☐ LAUSD ID and Logo (on all drawings) ☐ List of DSA Deferred Approvals
Drawing Index	100%		☐ List all drawings for final set.
General Notes	100%		☐ Legend, Abbreviations, Symbols (LAUSD Approved)
Code Analysis	100%		☐ Constr'n Type, Occupancies, Areas, Separat'ns,Exit Wdth. ☐ ADA path of travel and accessibility criteria ☐ Exit signs, fire extinguishers ☐ Applicable Codes
Site Plan	100%	1/20	☐ Buildings, w/ names, overhangs, nbr.of stories, gross area ☐ Driveways, service roads, parking & layouts, walks ☐ Hardscape, planting areas, site furniture, drinking fountains ☐ Playground layouts, paving types, detail references ☐ ADA accessibility signage, ramps, railings, HC parking ☐ Fire Dept. access, hydrants & F.D.Approval block ☐ DSA Application Nbr. for existing buildings
Construction Phasing Plan	100%		☐ For multi-phase projects: Limits of Work, barriers, access
Site Details	100%		☐ Flag pole, planters, site walls, fencing, railings, signage, parking, playground equipment, stairs and ramps, bollards, trash enclosure
"Check List of Offsite Work, Utilities & Easements"			☐
Civil Engineering			
Topographic Survey			☐ Note "FOR REFERENCE ONLY"
Site Plan	100%	1/20	☐ Building locations (dimensions or coordinates), Work Limits ☐ Floor Plan Elevations, Key Dimensions, Grids ☐ Existing and Finish Contours (0.5' intervals typ.), spot elevations, ADA-compliant slopes ☐ Property lines, streets, setbacks, easements, walls & fences ☐ Site walls and top-of-wall and bottom-of-footing elevations ☐ Utilities, UG tanks, fencing, walks, drives, planting, other features, onsite and adjacent (existing and new) ☐ Construction phasing provisions, for multi-phase projects
Demolition Plan	100%		☐ Buildings, paving, utilities, old foundations - offsite and onsite Limits of Work, specific demolition notes
Street and Parking Plan	100%	1/20	☐ Pavement dimensions, Fire Department access, references
Grading and Drainage Plan	100%	1/20	☐ Final grading, flow lines, CB's,culverts,downspouts,references, post-construction storm water management system including structural and non-structural BMP's

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
Site Utilities Plan (Water & Drainage)	100%	1/20	☐ Piping, manholes, valves, CB's, drinking fountains, hose bibbs, combination SS/SD drain valves, PIV's
Off-site Civil Work Plans	100%		☐ Off-site work (drains, walks, drives, streets, hydrants, utilities tie-ins, street-vacations, street trees, power poles, etc.) per public agency requirements
Drainage Plans/ Profiles	100%	1/10	☐
Site Details	100%		☐ Curbs, gutters, drainage structures, valves, boxes, utilities connections, . . .
Log of soil borings	100%		☐
Calculations	100%		☐
Basis of Design	-		☐ Final update

Landscaping

Site Plan (on Civil Engineering Background)	100%	1/20	☐ Planting areas with plant references
Plant Schedules	100%		☐ Names, sizes, detail references
Details	100%		☐ Planting, site furniture, special features
Irrigation Plans	100%		☐ Piping, sprinkler & controller locations, references Plans shall contain information required by the California State Water Efficient Landscape Ordinance Section 492 b & c.
IrrigationDetails	100%		☐ Valves, control schedules
Basis of Design	-		☐ Final update
			☐

Architecture

Floor Plans	100%	1/8	☐ Structural grid, finish floor elevations, final dimensions
			☐ Room Names, Numbers
			☐ Door & Window Numbers, Wall Numbers, references
			☐ Partition types, fire-ratings, ADA compliance, references
			☐ ADA compliance, references
			☐ Cabinets,furniture & equipment layout, detail references (incl. N.I.C. items)
			☐ Floor depressions, penetrations, housekeeping pads, FD's & slopes, detail references
Enlarged Floor Plans	100%	1/4	☐ Educational spaces, library, admin. area, restrooms, kitchens, mech'l equip.rooms, special areas. All FFE incl. N.I.C. items.
Roof Plans	100%	1/8	☐ Struct'l grid, slopes, drains, scuppers, penetrations
			☐ Elevations of top of steel, sheathing, parapet walls
			☐ Equipment, ducts, pipes, curbs and pads, pipes & ducts
			☐ Parapets, screens, walkways,all items visible on roof with dimensiions and detail references
Reflected Ceiling Plans	100%	1/8	☐ Lights, grilles, access panels, sprinklers, penetrations
			☐ Fire ratings of ceilings and walls
			☐ Soffits, special items, dimensioned & referenced
Exterior Elevations	100%	1/8	☐ Structural grid, floor elevations, dimensions

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
			☐ All wall features and materials, w/ dimensions & references, incl. expansion joints, screeds, copings and sills
			☐ Doors, windows, louvers, w/ dimensions and references
Building Sections	100%	1/8	☐ Sections sufficient to show all major building configurations
			☐ Struct'l grid, floor elevations, dimensions, Room Names, Nbrs.
			☐ Major materials, structural elements, detail references
Exterior Envelope Sections	100%	1/2	☐ All wall sections w/ structl.grid, dimen's, references
Exterior Envelope Details	100%	1 1/2	☐ Key details, incl. roofing, drains, skylights, waterproofing
		1 1/2	☐ Roof-mounted equipment curbs, platforms, pipe and duct supports, penetrations, with WPing and flashings
Interior Elevations	100%	1/8	☐ All room elevations, materials
			☐ All wall features, w/ dimensions & detail references
			☐ Cabinets, Furniture & Equipment (incl. N.I.C.)
Interior Finish Schedules	100%		☐ Room Names, Numbers, Elevation & Detail References
			☐ Ceiling and soffit heights
			☐ Completed materials and paint finishes
			☐ Paint color selections
Door Schedules and Types	100%		☐ Numbers, Locations, Detail References
			☐ Door and Frame Materials
Window and Louver Schedules and Types	100%		☐ Numbers, Locations, Detail References
			☐ Sash and Frame Materials
Door, Window and Louver Details	100%		☐ All details incl. Thresholds, hardware references, fire ratings, panic hardware, smoke seals
Vertical Circulation Plans, Sections, Details	100%	1/4	☐ Stairs, Elevators, etc. with structl.grid, dimensions
			☐ Major materials and equipment, typical details
			☐ Equipment room layouts, pits,holding tanks,etc.
Interior and Miscellaneous Details	100%		☐ Wall types and details, with fire-ratings
			☐ Ceiling, soffit, suspended fixtures w/ structural anchoring
			☐ Floor/ ceiling/ wall/ roof assemblies w/ fire ratings, . UL fire-assembly numbers
			☐ Cabinet and equipment, w/ structural anchoring
Basis of Design			☐ Final update

Structural Engineering

Foundation Plans	100%	1/8	☐ Structural grid, finish floor elevations, dimensions, references
			☐ Bottom-of-footing elevations, pipe trenches adj. to footings
			☐ Slab penetrations & depressions, dimensioned
Floor and Roof Plans			☐ Framing and floor construction, penetrations, openings
			☐ Shear walls and other lateral force resisting elements
Sections	100%	1/8	☐ Foundation and member sizes
Wall Sections & Elevations	100%		☐
Secondary framing &	100%		☐

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
supports for finishes			
Retaining wall elev'ns,sections	100%		☐
Details	100%		☐
Basis of Design	-		☐ Description of systems, bearing conditions, load criteria, foundation-engineering report reference
Final Calculations	100%		☐ Including calculations and details for: 1) Elements of non-structural components, equipment anchorage and attachment of the structure; 2) Stairs, handrails, and landings.

HVAC

Floor and Roof Plans *(On Architectural Backgrounds)*	100%	1/8	☐ Duct & diffuser/ grille layout (double-line) with CFM's, smoke detectors. combination smoke/ fire dampers with State Fire Marshal approval numbers
			☐ Existing mechanical systems & components
			☐ Equipment locations and rooms
HVAC Piping Plans, Flr./Roof	100%		☐ Piping & valve layouts and sizes
Air-flow Diagrams	100%		☐ Flow and riser diagrams for each air system, incl. controls, outside air and exhaust, CFM, velocities, pressures
HVAC Piping System Diag'ms	100%		☐ Schematic and riser diagrams for each piping system, incl. pipe sizes, controls, instrumentation, valves, etc.
Enlarged Floor Plans	100%		☐ Equipment layouts, piping, ducts, major duct & pipe space coordination
Equipment Schedules	100%		☐ All equipment -- types, sizes, capacities, weights
Control System Diagrams	100%		☐
Details	100%		☐
Equipment Mounting Details	100%		☐ Mounting details for all HVAC components, incl.pads, curbs, seismic restraints, vibration isolators
Basis of Design	-		☐
Final load estimates	100%		☐
Final calculations	100%		☐ Title 24 Energy Standards Compliance Forms: Performance Method with analysis of each building.
CBC Energy Efficiency St'ds			

Plumbing

Site Plan *(on Civil Engineering Background)*	100%		☐ Mechanical Utilities (gas, steam, heating water), coordinate w/ site utilities
Floor and Roof Plans *(on Arch'l Backgrounds)*	100%	1/8	☐ Piping, fixtures, floor drains, equipment and rooms
			☐ Existing utilities, equipment and P.O.C's, demo. requirements
			☐ Major pipe space coordination, incl. roof-drain locations
Enlarged Floor Plans	100%		☐ Equipment layouts, piping, supply air & exhaust, major pipe space coordination
Equipment Schedules	100%		☐ All equipment -- types, sizes, capacities, weights
Piping System Diagrams	100%		☐ Schematic and isometric riser diagrams for each piping system, incl. pipe sizes, controls, valves, etc.

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: / *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
Details	100%		☐
Piping and Equipment Mounting Details	100%		☐ Mounting details for all components, incl.pads, curbs, seismic restraints, vibration isolators
Final calculations	100%		☐
Fire Protection			
Floor Plans	100%	1/8	☐ Mains, risers, P.O.C.'s
(on Arch'l Backgrounds)			☐ Sprinkler head layouts
			☐ (On smaller projects, may be shown with Plumbing)
Electrical			
Site Plan	100%		☐ Service equipment locations (power, phone, TV) Show vault/pad details, primary and secondary conduit routing Show utility companies point of connections
(on Civil Engineering Background)			☐ Conduit duct bank routing and underground pull boxes for power and signal systems. Show sizes. Show underground conduits fill ratios. Coordinate with Civil to avoid conflict with Sewer, Gas and water lines and access manholes.
			☐ Exterior lighting (Pole mount and wall mount), Indicate fixture types. Indicate homeruns and conduit routing to panelboard. Show circuit numbers and wiring.
			☐ Exterior Signal devices (Fire Alarm horns, PA speakers, CCTV cameras, etc.) Indicate Device types. Indicate homeruns and conduit routing to signal terminal cabinet. Show wiring infor.
Lighting Floor Plans/RCPs	100%	1/8	☐ Indicate all lighting fixture locations and types. Show panels. Show circuit numbers, J. boxes, switching and wiring for all areas. Indicate rooms ID's. Show all wiring and conduit interconnections. Provide exit signs (high and low mount) and all exit door. Provide directional exit signs.
Power Floor Plans	100%	1/8	☐ Indicate all receptacles locations and types. Show panels. Show circuit numbers, J. boxes and wiring for all areas. Indicate rooms ID's. Show all wiring and conduit interconnections.

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS:

OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included
Signal Floor Plans	100%	1/8	☐ Indicate all signal system devices. Show Cable tray layouts Show terminal cabinets, J. boxes, equipment and wiring for all areas. Indicate rooms ID's. Show all wiring and conduit interconnections.
Fire Alarm Floor Plans	100%	1/8	☐ Indicate all initiating & alarm devices, control panels, annunciator and terminal cabinets. Indicate candela ratings Show J. boxes, devices ID's, circuit ID's and wiring for all areas. Indicate rooms ID's. Show all wiring and conduit interconnections.
Enlarged Floor Plans Equipment room layouts	100%	1/4	☐ Provide equipment rooms layouts showing panels, transformers, inverters, LAN racks & signal equipment, terminal cabinets, working & access space. ☐ Update equipment sizes and provide dimensioned layouts and weight information. Coordinate with Structural Engineer for seismic details. ☐ Update calculate heat loads and coordinate with Mechanical for sizing HVAC equipment. ☐ Update cable tray layout in LAN Room and signal rooms. ☐ Indicate Outside plant conduits terminations in LAN Room. ☐ Indicate Telephone and Cable TV utilities point of connections in LAN Room.
Light Fixture Schedule	100%		☐ Update fixture description, manufactures cat.#, lamp type, ballast type, numbers of lamps and ballasts, input wattage and mounting type. Coordinate with book specification.
Panel Schedules	100%		☐ Update Panel schedules showing load details and calculations.
Lighting Control Diagrams	100%		☐ Update lighting control diagram showing all components and interconnections. Show Room ID's where components are located.
Signal Block and Riser Diagrams	100%		☐ Show Headend equipment and terminal cabinets/racks in satellite buildings. Show interconnections. Show all components. Show all interconnections indicating conduit and cabling information. Show Room ID's where components are located. Provide separate Riser Diagram for each signal system. Data and telephone (PBX) shall be combined.

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
Fire Alarm Block and Riser Diagrams	100%		☐ Show Main Fire Alarm Control Panel and Satellite control panels or expanders.. Show all components. Show all interconnections indicating conduit and cabling information. Show Room ID's where components are located.
Single-line Diagram	100%		☐ Update equipment & feeder sizes (new and existing to be used) ☐ Update information for Main switchboards, panels, breakers, MCC's, etc. Provide physical spaces for future expansion. ☐ Update load calculations based on actual connected loads Resize main service and power distribution panels based on actual loads. Include spare capacities required by Design Guide. ☐ Update information for grounding system for main service and satellite buildings. ☐ Update Voltage drops and length for all feeders. ☐ Update short-circuit ratings of all panelboards calculated based on available fault current from utility company ☐ Update Utility company contact information.
Details	100%		☐ Provide complete Utility company standard details ☐ Provide ADA-complying heights of all typical racks and devices ☐ Provide complete relevant LAUSD standard details.
Equipment Mounting Details	100%		☐ Provide mounting details for all fixtures, racks, panels & equipment, incl. seismic restrain. Coordinate with structural
Basis of Design	100%		☐ Update and indicate changes to original Basis of Design submitted in previous submittal phase.
Lighting Calculations	100%		☐ Update Point-by-point calcs. incl. graphic display-Update typical rooms and areas for both normal and emergency modes demonstrating compliance with Design Guide, IES standards, SCE Classroom Lighting Design manuals and applicable codes.
Fire Alarm Sys. calc.	100%		☐ Update Battery and voltage-drop calculations-
Title 24 Compliance	100%		☐ Update-Critical findings affecting glazing, lighting, HVAC, other bldg elements and use of day lighting. ☐ Update-LTG forms showing compliance with Title 24 and CHPS guidelines and standards.

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS: *OTHER DOCUMENTS:*	% Compl	Scale (Min) "/ ft.	Information Included
			☐ Update-Coordinate with Mechanical Engineer and Architect to optimize energy use and achieve higher CHPS scores.
			☐ Incorporate comments received from "Saving by Design" Review
			☐ Complete CHPS score board.
Food Service	100%		☐ Plans, Elevations, Sections, Details of other design disciplines as may be needed by the size and complexity of the project.
Graphics & Signage	100%		
Theater Consultant	100%		
Kitchen Consultant	100%		
Specifications	100%		☐ Cover indicating District, project name & address, architect's name & address, license number, professional seal and signature
			☐ Clearly described scope of work in Division 1, Section 01010
			☐ 6 sets incl. Gen'l Cond'ns (7 if project has a kitchen)
Other Documents:			
DSA Aplication Form			☐ 3 Sets. Completed and signed by the Architect of Record
			☐ Scope of work clearly described, identifying all new buildings and uses
			☐ Coordinate required fees with DSA and LAUSD Project Managers
SP3A Building Area Diagrams			☐ 2 Sets.
Check Lists for DSA Submittal:			☐ 2 Sets each.
DSA Structural Requirements			☐ All documents checked to address "Checklists"
DSA Fire and Life Safety			☐ referenced & attached.
DSA Local Fire Authority Approval			☐
DSA Energy Review			☐ 1 set of Construction Documents and Title 24 electronic data input
Calculations:			☐ 2 Sets each.
Structural Engineering			☐ Final Calculations (see "Structural Requirements Checklist")
			☐ "Testing and Inspection" List
HVAC Engineering			☐ Final Energy Calculations & Compliance Forms (Title 24)
Electrical Engineering			☐ Final Energy Calculations & Compliance Forms (Title 24) (Coordinate and bind with Mechanical Engineering Calcs)
Reports and Approvals:			☐ 1 Set each.
Soils Report			☐
Local Fire Authority Approval			☐ Approval block signed by Fire Dept. representative, and showing fire mains, valves, hydrants, connections, access drives
Product Information:			☐ 2 Sets each.
Mechanical			☐ Equipment catalog data indicating dimensions, weights, corner weight distribution and center of gravity locations
			☐ Catalog Data on vibration isolators and seismic restraints

Construction Documents -- 100 % C.D. - DSA Submittal

DRAWINGS:

OTHER DOCUMENTS:	% Compl	Scale (Min) "/ ft.	Information Included
			☐ Struct'l calculations on vibration isolators, seismic restraints and equipment anchorage (Submit all above with plans in a binder with proper reference to the plans.)
Plumbing			☐ Cut sheets of all Plumbing Fixtures for Accessibility Review
Electrical			☐ Fire Alarm System Manual containing: ☐ Cut sheets and CSFM Listing sheets of all fire-alarm devices, with index ☐ F.A. System Devices Symbol List
			☐ Cut sheets for Assistive-Listening System of Autonomous PA/ Sound Systems for Auditorium, Gymnasium, and Multi-Purpose Room
Cost Estimate			☐ 6 Sets.
CHPS Scorecard			☐ Detailed account of CHPS Points achieved in School Design
Savings by Design *Incentive Program*			☐ Savings by Design Contract
D.D.Review Comments			☐ All comments and drawings with responses to each comment

Los Angeles Unified School District

CIVIL DESIGN CHECKLIST

New School Facilities
100% Submittal

School: _____

Architect: _____

Project Name: _____

Engineer: _____

*This form shall be completed and submitted with the submittal package. The submittal will be deemed incomplete without the completed form.

Items required for submittal:	Check Items Complete.
A. Demolition Plan:	
1. Show removal of all concrete or masonry walls, fences, curbs, gutters, trees, asphaltic concrete pavement, planting, debris, pipes and all structures required to be removed.	----------
2. Coordinate plumbing, electrical, architectural and mechanical drawings and specifications with the civil engineering drawings to ensure that there are no conflicts or interferences.	----------
3. Cover removals in the specifications.	----------
4. Show all pertinent information which will aid contractor in making removals.	--------
B. Paving Plan:	
1. Thickness and types of all paving and base course. Use thickness directed by the district.	----------
2. Paving limits.	----------
3. Concrete landings at all exterior doorways of buildings, not opening onto concrete areas, for installation of door stops.	----------
4. Contraction and expansion joints and pattern for score lines in concrete areas and dimension for same. In walks on adobe soils omit expansion joints. Use continuous mild steel reinforcement instead. (No wire mesh)	----------
C. Grading Plan:	
1. New and existing contours in and adjacent to work area.	----------
2. Benchmark. (Location and elevation)	----------
3. Paving and grading limits.	----------
4. Exterior door locations.	----------
5. Finish elevations in paved areas to 0.01'.	----------

6. Ridges, flow lines, grade changes and top and bottom of banks, indicate spot elevations at changes in directions of above items.
7. Existing and finish contours at 0.5' intervals except on high banks, where 5'-0", contours may be used.
8. Finish contours as straight lines. Free hand or curved lines are not acceptable.
9. Wall elevations at top, ends, at slope changes and at abrupt changes in elevations.
10. Downspouts and drinking fountain locations and label.
11. Date of topographical survey.
12. Spot elevations and arrows indicating direction of slope are not acceptable on working drawings.
13. Existing manholes, yard boxes, vaults, and other surface structures which may require adjustments to fit new finish grade.
14. Depth and location of existing underground utility lines if information is available.
15. Floor drains in lunch area and indicate top of grate elevation.
16. Submit final quantity estimates of earthwork volumes.

D. Storm Drain Plan:

1. Complete storm drain system with type of pipes, sizes slopes, invert elevations, catch basin top and invert elevations and downspout lines.
2. Locations, details, and construction detail for manholes, junction chambers, transition structures, collars, easements, connections to existing storm drain lines, outlet structures, and other storm drain structures.
3. Storm drain system on grading plan, provided plan is not unduly cluttered.
4. Profiles of storm drain pipes, and for drain pipes 12" or larger, when conflicts with other utilities are possible.

E. Miscellaneous

1. Miscellaneous details on separate sheet or on any civil engineering drawings where space is available.
2. Details of catch basin, curbs, walls, cleanouts, headers, storm drain structures, headwalls, encasements, mow strips, gutters, and other pertinent details.
3. Plan and profile of retaining walls, concrete block fences and respective footings. Coordinate retaining wall and footing elevations with structural engineer. Structural details of such structures to be indicated on structural drawings. Plan and profile may be indicated on architectural or structural drawings provided that dimensions and elevations required for staking are indicated.

F. Special Earthwork Plan:

1. Limits of areas where special earthwork is required such as removal of loose fills trash or dump areas, or loose earth in basements, swimming pools tanks, etc.
2. This information is usually determined from soil reports and information supplied by the District.
3. Limits of special earthwork described above are denoted by term "bottom of excavated plane" and is abbreviated to "B.E.P." B.E.P. elevations, locations and dimensions should be indicated on grading plan if it can be clearly indicated. Data shall originate from the structural engineer in coordination with the soil engineer. The B.E.P. and specifications for special earthwork will be reviewed by the District structural engineer.
4. A special paragraph shall be included for specifications for over excavation.

G. Staking Plan:

1. Building ties, overall property dimensions and building corner dimensions required for staking. Coordinates system for staking required for secondary schools.
2. Controls for major improvements such as wall, banks, athletic fields, etc., shall be adequately tied downed by dimensions and coordinates.
3. If above data is indicated on other that civil engineering drawings, it shall be checked by the civil; engineer.

H. Logs Of Soil Boring:

1. Show logs of soil borings and indicate locations on plan. Datum of boring samples must be coordinated with datum of grading plan.
2. Logs of soil borings may be reproduced from the soils reports onto standard size vellum as part of set of drawings. Location of soil borings may likewise be reproduced on same sheet.

I. Off-Site Drawings:

1. Prepare drawing in accordance with the requirements of the agencies having jurisdiction.
2. See attachment to this chapter, “checklist of offsite work, utilities & easements”. This checklist must be completed and submitted to the design and construction branch with the 100% construction documents.

Los Angeles Unified School District

ELECTRICAL DESIGN CHECKLIST

New School Facilities
100% Submittal

School: _____

Architect: _____

Project name: _____

Engineer: _____

*This form shall be completed and submitted with the submittal package. The submittal will be deemed incomplete without the completed form.

Items required for submittal:		Check Items Complete
A. Single Line Diagram:		
1.	Voltage, amperage, phase and wires shown.	
2.	Available fault current shown at each equipment bus.	
3.	Circuit breaker frame and trip size.	----------
4.	Switch rating, fuse size and type of fuse.	----------
5.	Conduit, wire size, length and voltage drop of each feeder.	----------
6.	Load summary of main distribution switchboard showing 30% future growth spare capacity above connected load. Provide the space in main switchboard for future growth.	---------- ---------- ----------
7.	Obtain written approval from the electric utility company for new electrical services planned for the facility.	---------- ----------
8.	Ground fault protection on main for 480/277 volt, 3 phase, 4 wire, 1000 amps or higher main switchboards.	---------- ----------
9.	Ground fault protection on each feeder of 480/277 volts 3 phase, 4 wire rated at 800 amps or more.	---------- ----------
10.	Location of existing utility facilities such as power poles to be removed where applicable.	---------- ----------
11.	Identify electronic grade panel boards intended for computer system power. If these panels are serviced via a step down transformer, then transformer must be K-Rated.	---------- ---------- ----------
12.	Step down transformer are k-rated.	---------- ----------
B. Site Plan:		---------- ----------
1.	Location of electric utility equipment, concrete pad, vault, power pole, underground conduits, and main switchboard, in compliance with serving utility company requirements, industry standards, and applicable codes.	---------- ---------- ---------- ----------
2.	Telephone facilities, as per approved requirements.	----------
3.	Cable TV facilities, as per approved requirements.	----------
4.	Location of existing underground utilities (if applicable), where trenching is required.	---------- ----------

5.	Underground feeders and branch circuits.	----------
6.	Terminal cabinets and underground conduit runs for P.A., fire alarm, TV, CCTV, clock, intrusion detection, and computer systems.	---------- ----------
7.	Location of other outdoor equipment such as transformers, motor control centers, light standards, etc.	---------- ----------
8.	Building names or numbers, scale, north arrow and streets.	----------
9.	Minimum underground conduit size shall be two inch for power system, two inch for clock system, four inch for fiber optic backbone interduct system, and three inch for all other signal systems, except for end runs to buildings containing maximum two classrooms which are not used as a distribution point to other small buildings.	---------- ---------- ---------- ---------- ----------
10.	Provide spare underground conduits for power, and signal systems, minimum one 3 inch for power and three inch for signal system, except for end runs to buildings described in item 9.	---------- ---------- ----------
11.	Provide properly sized pull boxes, or manholes and show their locations.	----------
12.	Names and telephone numbers of utility service planners.	---------- ----------
C. Power Requirements		---------- ----------
1.	Front elevation of main distribution switchboard.	----------
2.	Distribution panel schedules including load calculations for each building.	----------
3.	Grounding schematic diagram and details.	----------
4.	Feeders and branch circuits clearly shown on plans.	----------
5.	Provide conduits, starters and relays shown on mechanical control diagrams as items by Division 16. Coordinate with the mechanical engineer.	---------- ----------
6.	Equipment ratings are the same as those shown on mechanical and plumbing drawings.	---------- ----------
7.	Fused disconnects at motorized equipment.	----------
8.	Ground fault circuit protection for receptacles located in toilets and outdoor.	---
9.	Provide outdoor receptacles (W.P., GFCI) on new buildings. A switch shall be provided in janitor room to switch all exterior outlets.	
10.	Separate branch circuits for the supply of lights, fans, and other outlets in or on each elevator car.	
11.	Feeders and branch circuits sized for the intended load and not less than 125% of continuous loads.	
12.	Provide main circuit breaker in the distribution panelboard or main panelboard of each building to satisfy code requirements for main service disconnect at each building. Provide main circuit breaker for the main panelboard serving each floor of the building. Subpanels located in the same electrical rooms need not to have main circuit breaker.	
13.	Properly sized grounding electrode conductors.	
14.	Properly sized equipment grounding conductors for equipment and raceway systems.	
15.	Outdoor and underground raceways shall carry a properly sized equipment grounding conductor.	
16.	Provide adequate ventilations in electrical equipment rooms. Coordinate with mechanical engineer for the heat dissipation data of equipment such as transformers.	
17.	Locate data equipment, computer networking racks and all electronic equipment in air conditioned rooms. The air conditioning shall be available 24 hours. Coordinate with mechanical engineer.	
18.	Indicate circuit designations near outlets and identify all homeruns.	
19.	Provide required working space, adequate illumination and access to work space for electrical and signal equipment.	
20.	A single receptacle installed on an individual branch circuit shall have an ampere rating of not less than that of the branch circuit.	
21.	A building or other structure shall be supplied by only one set of service drop or service lateral conductors; except where electronic grade panel is installed,	

a second feeder may provide power for computers.

22. Provide weatherproof, GFCI receptacles within 25 feet of all roof mounted equipment.
23. Provide primary and secondary protection for each transformer.
24. Panelboards supplying power to motor loads shall be fully rated for available fault current at the panelboard's bus; series rating is not acceptable per U.L. standards.
25. Provide panel schedules for power showing bus size, feeder size, main circuit breaker/lug size, top/bottom fed, bus bracing, and short circuit rating of circuit breakers.
26. For electronic grade panels provide double sized neutrals, filter and surge suppression modules per specification.

D. Lighting Requirements:

1. Lighting fixture mounting details.
2. Provide emergency lighting in corridor, multi-purpose rooms, auditoriums, gymnasiums, cafeteria, classrooms of larger than 1000 square feet and all other areas required by code. A separate central battery/inverter system shall be sized for each building to provide emergency power for lighting.
3. Provide illuminated exit signs at each exit. Exit signs shall be powered from normal and emergency sources.
4. Show lighting fixture schedule.
5. Use lighting fixtures that are specified in District's standard specification.
6. Lights in classrooms, offices and work rooms shall be controlled by motion sensors with separate light level controller (or built in light sensors) and switches as required by title 24. Separate switches shall be provided for daylight areas. Rooms of more than 100 square feet shall have double switching.
7. Lighting branch circuits shall be sized for 125% of continuous load.
8. Show number of conductors, conductor size, and conduit size for each lighting branch circuit.
9. Show lighting panelboard schedules showing bus size, feeder size, main circuit breaker/lug size, top/bottom fed, bus bracing, and short circuit rating of circuit breakers.
10. Submit lighting calculations and energy compliance forms as required by the California Energy Commission, Title 24.

E. Signal Requirements For Public Address, Telephone Fire Alarm, Television, CCTV, Security Intrusion Alarm, Clock And Computer Systems:

1. Install all signal system headend equipment in LAN room. Do not locate electrical equipment and panels in LAN room with the exception of the electronic grade panel feeding equipment in the LAN room.
2. All components, equipment, terminal cabinets, instruments, conduit, wiring and cables must be shown in plans.
3. District standard specifications must be edited to comply with the specific job requirements.
4. Do not combine fire alarm wiring with any other signal wiring.
5. Show riser diagrams of each signal system.
6. Provide main terminal cabinet in administration building and at least one terminal cabinet at each building for each signal system, except for computer networking system, where IDF are installed at each building.
7. Provide two hour uninterruptible power supply for PABX, and PA/Intercom systems.
8. Security intrusion alarm and fire alarm systems shall contain integral emergency power supplies per specification.
9. Computer networking system shall have rack mounted UPS system.

10. Clearly identify all cables (or wires) used for each signal system.
11. Clearly identify all signal system components.
12. Provide zone schedules for security systems on drawings and specifications.
13. Use ¾" conduit as the minimum size for each signal system.
14. Fire alarm system components include:
    a. Control panel.
    b. Annunciator panel.
    c. Bells (part of sprinkler system)
    d. Horns, strobes, combination horns/strobes.
    e. Pull stations.
    f. Smoke detectors.
    g. Duct smoke detectors.
    h. Heat detectors.
    i. Flow switches.
    j. Tamper switches.
    k. Conduit, wiring and terminal cabinets.
    l. Interconnection to Public Address system for interlocking the manual and automatic bell or tone.
    m. Ventilation systems where required for the purpose of fan shutdown.
    n. Damper control or smoke management system.
    o. Water based fire sprinkler system.
    p. Chemical fire extinguisher systems.
    q. Autonomous PA System(s).
    r. List of all interactive components
    s. Connections to PA system, program controller for class change signal.
    t. Fire alarm shall report water flow to central station only.
15. Fire alarm system and all initiating devices shall be addressable.
16. Fire alarm system shall not be interconnected to any of the following systems:
    a. Sump warning systems
    b. Carbon monoxide detection systems.
    c. Methane gas detection systems.
    d. Elevator car alarm bell circuit.
    e. Any other unrelated system.
17. Fire alarm drawings shall include complete submittal information required for DSA approval including battery calculation for all control and transponder/expander panels and voltage drop calculation for branch circuits as required by specification.
18. The design of the fire alarm system shall be based on a radial system with a main control panel in the administration buildings, and network nodes or slave panels in other buildings, as specified in section 16715
19. Security alarm systems components include:
    a. Control panel
    b. Annunciator panel
    c. Motion sensors
    d. Door switches
    e. Terminal cabinets
    f. Cable tray, conduit and cables
20. Public address intercommunication and telephone systems components include:
    a. P.A. console
    b. PABX
    c. Emergency power supply
    d. Telephone instruments
    e. Speakers.
    f. Terminal cabinets.
    g. Cable tray, conduit and cables.
21. Television system components include:
    a. Head and equipment installed in rack.
    b. Terminal outlets.
    c. Terminal cabinets.

d. Line extension amplifiers.
e. Cable tray, conduit and cables.

22. Clock system components include:
    a. Clock controller.
    b. Boosters.
    c. Clocks.
    d. Terminal cabinets.
    e. Conduit and wires.
    f. Program controller for class change signals.
    g. Interactive components with fire alarm and P.A. systems.
23. Computer system components include:
    a. Server rack, MDF, IDF, and LDF, and CLDF racks with related switching equipment and patch panels.
    b. Cable tray, conduit and cables.
    c. Wall and floor boxes.
    d. Fiber optic backbone system shall be used to connect IDF's, LDF's, and CLDF's to MDF located in LAN room.
    e. Cat 5e cables shall be used for horizontal wiring not to exceed 90 meters.
24. Conductors and cables for fire alarm, and clock systems shall be enclosed in separate conduit systems.
25. Conductors and cables for security intrusion alarm, television, public address, telephone, and computer systems shall be placed in a three section wire mesh cable tray system with dividers where possible, placed in separate conduit sleeves in accessible areas, and in separate underground conduits in duct banks.

F. General Requirements:

1. Symbol list.
2. General notes.
3. Each project must include a site plan.
4. Provide the following details:
    a. Lighting fixture mounting.
    b. Floodlight standard and footing.
    c. Roof receptacle.
    d. Transformer pad and manhole.
    e. Precast concrete pull boxes for power and signal systems.
    f. Ground rod and precast concrete box.
    g. Underground conduit stub-up.
    h. Conduit roof penetration.
    i. Disconnect switch mounting.
    j. Electrical equipment room.
    k. Switchboard pad.
    l. P.A. handset and speaker mounting.
    m. P.A. rack elevation and mounting details.
    n. TV elevation and mounting rack details.
    o. MDF, IDF, LDF, and CLDF rack details.
    p. Motion sensor mounting.
    q. Fire alarm system devices point to point connection details, fire alarm control panels, annunciator panel, and remote power supply mounting details.
    r. Security alarm system control panel, and devices mounting details.
    s. Television system equipment mounting details.
    t. CCTV equipment system mounting details.
    u. Front elevation of P.A. system console.

5. Switchboards, transformers, and motor control Centers shall be installed on 4 inch concrete pads. Main switchboard's concrete pad shall extend 40 inches in front of switchboard.

	6. Provide wiring or schematic diagrams for: a. All motor controls and motor control centers, or refer to applicable mechanical drawings in coordination with mechanical engineer. b. Lighting controls. 7. All plans shall indicate the drawing scale, north arrow, the name of the project, school or location name, and address. 8. The signature and registration number of a State of California registered electrical engineer is required on all the electrical plans. The engineer signing the plans shall be a principal or a project manager/director in charge of the electrical design.	

MECHANICAL DESIGN CHECKLIST

NEW SCHOOL FACILITIES

100% SUBMITTAL

ITEMS REQUIRED FOR SUBMITTAL	CHECK ITEMS COMPLETE

DRAWING GENERAL CHECK LIST

FOR ALL DRAWINGS

1. Drawing Title
2. Scale
3. Sheet Title
4. Project Title
5. Sheet Number
6. Company Sticker
7. Registration Seal

PLANS

A. General

1. North Arrow.
2. Key Plan. (where applicable)
3. Match Line. (where applicable)
4. Column line numbers.
5. Room names and numbers.
6. Floor elevations indicated at least on first floor and basement floor plans.
7. General notes and reference to them on each drawing.
8. Legend of symbols and abbreviations.
9. Detail references.
10. Equipment anchorage details and / or reference to the structural drawings. Structural drawings shall address anchorage of all equipment.
11. Coordinated with structural drawings. Mechanical drawings shall address space coordination with structural members.
12. Coordinated with Electrical Drawings. All mechanical and plumbing equipment that requires power must be addressed on the electrical drawings. All transformers and other heat dissipating equipment must be addressed on the mechanical drawings.
13. Coordinated with Architectural elevations, furniture plans etc. so that thermostats and registers are not behind doors or on chalkboards etc.

14. Spell check all drawings with room for proper service.
15. Indicate service clearances on drawings.

B. Floor Plans

1. All air inlets and outlets must be identified for service, type, throw pattern and capacity by both symbols and notes.
2. All ducts must have sizes indicated.
3. No ducts will straddle walls.
4. No ducts will cross a wall at a slant unless absolutely unavoidable.
5. No ducts will cross a fire-rated wall at a slant.
6. Manual volume dampers at all branches.
7. All equipment must be identified as follows:
    a. Equipment that is specified in a schedule must be identified by the symbol indicated in the schedule.
    b. Equipment described in the legend must be identified by the symbol indicated in the legend.
    c. Equipment that is neither in the schedules or the legend must be fully identified and described in detail.
8. Preferably no equipment except plain ducts are to be located above non-lift up type ceilings.
9. No unrelated ductwork across electrical rooms or computer rooms if possible.
10. No thermostats on exterior walls.
11. Abbreviations indicated in legend.
12. Indicate access panels and doors.
13. No air inlet / outlet openings close to fans, air handlers or air conditioning units. Provide some ductwork in between for sound attenuation.
14. Whether sufficient space is available to accommodate ductwork and equipment with room for proper service.
15. Indicate service clearances on the drawings.

C. Floor Plans (Piping)

1. No pipes across electrical rooms and computer rooms.
2. No valves above non-lift up ceilings if possible.
3. No straddling of walls with pipes.
4. No crossing walls at a slant.
5. No unnecessary penetration of demising walls.
6. Zone valves provided for each floor or logical zone.
7. Expansion loops and anchors for straight runs longer than 50’-0”.
8. Seismic joints and anchors at seismic separations.
9. Leak containment troughs for pipes that have to pass through electrical rooms.

10. All pipes and equipment identified.
11. All pipe sizes indicated.
12. Indicate access panels / doors.
13. Reference notes between plans and risers
14. Reference notes between plans and plot (site) plan.
15. Invert elevations of house sewers leaving the building.
16. In general, piping should be run to clear steel and concrete beams. Where absolutely necessary, piping may be run through beams. Where it is necessary to clip beam flanges or run piping through the web of steel beams or through concrete beams, permission from the structural engineer must be obtained and confirmed; and all such special conditions should be clearly noted on the drawings.
17. Note piping rising within a story as "rise." Note that rising to the story above as "UP." Piping dropping within a story should be noted as "drop." That dropping to the story below should be noted as "Dn." Piping at the ceiling should be noted as "at ceiling" when exposed and as "in ceiling" when concealed. Piping under the floor, other than obvious fixture drain lines, should be noted as "under floor," "at ceiling below," or "in ceiling below," as required.
18. Verify wall thickness where 3” or larger pipes risers are located inside walls.
19. Verify column structural construction before locating risers inside column sheathing.
20. Verify all utilities including domestic water, fire service, sewer, storm drain and gas are addressed on the plumbing and civil site plans as applicable.

PLUMBING (DOMESTIC HOT AND COLD WATER SYSTEMS)

P1. Indicate the job address on each page of the plan.

P2. Plans shall not be smaller than 1/8 inch per foot scale.

P3. Provide ¼” scale blow-ups of toilets, kitchens and laboratories except for single closet toilets.

P4. Show all pipe sizes on the plan.

P5. Provide riser diagrams for hot & cold water systems, waste & vent systems, storm drainage systems and fuel gas systems.

P6. Provide site water piping plans. If provided on civil drawings co-ordinate and indicate proper reference.

P7. Indicate size and location of water meter. If provided on civil drawings co-ordinate and indicate proper reference.

P8. Install a shut-off valve in the domestic water supply to each building in a vault outside the building as specified.

P9. The riser diagram shall indicate all the fixtures served, the pipe size and the fixture unit count on each leg of pipe, pressure regulators, back flow prevention devices, and water meter if applicable.

P10. Show all new and all existing devices located between the city water service and the building plumbing system that cause pressure losses or gains in the system. Devices shall include but not be limited to pumps, water softeners, and sub meters. If site water distribution is indicated on civil drawings, make proper references but water pressure loss calculations must be provided on plans.

P11. State make(s), model(s), and size(s), of the above items and indicate if they are new or existing.

P12. Provide manufacturer's specification sheets for such devices indicating the pressure loss

through the device(s) from 0 flow to the rated flow.

P13. Indicate on the plans, all fixture unit loads in addition to the loads of the new fixtures including but not limited to, existing fixtures, irrigation load, make up water for cooling towers and boilers, demand for future use, and any other uses.

P14. Show the future water demand where applicable.

P15. Indicate maximum and minimum water supply pressure on the plans.

P16. Provide hydraulic calculations for sizing the cold and hot water systems on plans. Also refer to P-10.

P17. The minimum water pressure supplied to the most remote fixture shall be not less than the requirements of that fixture and not less then 15 PSI, whichever is higher.

P18. Indicate pressure-regulating valves on the plans where maximum water pressure is more than 80 psi.

P19. Verify whether a reduced pressure backflow device at the meter by the local water purveyor and provide if required comply with LADWP Rule 16-D.

P20. Show size of water meter on the riser diagram.

P21. Provide a temperature & pressure relief valve on the water heater. The valve shall discharge to an approved location. Pressure relief valves for water heaters installed inside a building shall discharge to a floor sink or service sink.

P22. Provide an approved thermal expansion tank at the water heater.

P23. Indicate make, model and size of the thermal expansion tank.

WASTE & VENT SYSTEMS

W1. Show the slope of the horizontal drainage piping.

W2. Show size and location of the sewer main in the street. If provided on civil drawings co-ordinate and indicate proper reference.

W3. Provide suds relief for laundry washers where applicable.

W4. The aggregate cross sectional area of the vents shall not be less than that of the largest required building sewer.

W5. Obtain a Bureau of Sanitation permit or clearance for Industrial Waste. (Fat, oils, grease & corrosive laboratory waste)

W6. Show details for the island venting.

W7. Install a clean out every 100 feet or a manhole every 300 feet in the building sewer (site sewer) in straight runs and for each aggregate horizontal change in direction exceeding 135°.

W8. Provide yoke vents where required.

W9. Provide lot subdivision. The building sewer shall not cross lot lines.

W10. All wet vented fixtures shall be within the same story.

W11. Combination waste and vent system is only allowed where structural conditions preclude the installation of a conventional system.

W12. Provide a separate vent for each waste branch line exceeding 15' in length.

W13. The minimum area of any vent installed in a combination waste and vent system shall be at least 1/2 the cross sectional area of the drainpipe served.

W14. Each drainpipe and each trap, in a combination waste and vent system, shall be 2 pipe sizes

larger than the sizes required by UPC.

W15. No vertical waste pipes, toilets or urinals are allowed a combination waste and vent system.

W16. Relief vents shall be provided every 100' along the main.

W17. Show on plans type & use of each fixture served by the combination waste and vent system.

W18. Provide a vent downstream of the furthest fixture served by the combination waste and vent system.

W19. The discharge line from the ejector shall be provided with an accessible check valve and gate valve. The gate valve shall be located on the discharge side of the check valve. Gate valve and check valve shall be located outside the pit.

W20. Provide detail of sewage ejector on plans with valves, fittings and sump complete with elevations of inlet pipe; pump on/off and high water alarm levels.

W21. Provide dual pumps each capable of handling the load independently.

W22. Provide airtight cover for the sump.

W23. Sump(s) shall be provided with a vent pipe that extends through the roof.

W24. Show load discharging into the sump on plans.

W25. Indicate pump schedule complete with make, model, flow rate, head, horsepower and electrical characteristics of pump on plan.

W26. State length of pipe & elevation difference between the bottom of the sump and the gravity line.

W27. Sumps receiving waste from water closets shall have minimum 3-inch discharge.

W28. Allow two fixtures units for each gallon per minus discharging from the sewage ejector.

NATURAL GAS SYSTEMS

G1. Indicate on the plans the total developed length of the system from the meter or regulator to the most remote gas outlet.

G2. Provide a separate gas shutoff valve for each logical part of the system to allow independent service of connected equipment and devices.

G3. Indicate on the plans the hourly volume (CFH) of gas required at each outlet.

G4. Provide an approved type seismic gas shutoff valve.

G5. Show on plan size, make and model of seismic gas shut off valve.

G6. The seismic shut off shall be installed rigidly to the exterior of the building or structure containing the fuel gas piping.

G7. No gas pipes shall be installed under a new building.

G8. Provide a letter from the gas company stating that they will deliver the desired pressure and volume of gas at 100% submittal.

G9. Show on plans size, make, model, orifice size, spring number, pressure at the inlet of the pressure regulator, and setting of pressure regulator.

G10. An approved gas valve shall be installed immediately preceding each regulator.

G11. Pressure regulator shall be vented to the outside of the building.

G12. Provide engineering calculations used in sizing the piping system on plans.

RAIN WATER SYSTEMS

R1. Indicate on riser diagram the area (ft2) covered by each drain.

R2. Indicate on the plan the slope of horizontal piping.

R3. Indicate overflow drain. Otherwise, note the reasons for not having them such as scuppers on plans.

R4. Roof drain and over flow drains shall be piped independently to the outside of the building.

R5. The discharge line from the sump shall be provided with an accessible backwater valve.

R6. Backwater valve shall be located outside the pit.

R7. Sump(s) shall be made of concrete, metal or other approved materials. Fiberglass sumps shall be approved by the Los Angeles city Mechanical Testing Laboratory.

R8. Provide dual sump pumps.

R9. Minimum size of pump shall be 15 gpm.

R10. Provide an airtight cover. (94.1101.5.3)

R11. The sump pit shall be at least 15 inches in diameter and 18 inches in depth.

R12. The discharge line from the sump shall be at least 1 1/2 inch diameter.

R13. Where the pump discharge line connects to a horizontal drain line, such connection shall be made from the top through a wye branch fitting.

R14. The lowest inlet to the sump shall have a minimum clearance of 2 inches above the high water level.

R15. Sump(s) shall be provided with a vent pipe, which shall extend a minimum of six feet above the solid sump cover.

R16. Show load discharging into the sump.

R17. Indicate pump schedule complete with make, model, flow rate, head, horsepower and electrical characteristics of pump on plan.

R18. Provide detail of sump pump on plans with valves, fittings and sump complete with elevations of inlet pipe; pump on/off and high water alarm levels.

R19. State length of pipe & elevation difference between the bottom of the sump and the gravity line.

SUBSURFACE DRAINS

S1. Show subsurface drainage on the floor plans.

S2. State piping material.

S3. Non-perforated piping shall be made of metal as in sanitary drainage systems.

S4. Provide a statement from a civil engineer showing the required flow.

S5. Either terminate the subsurface drains to the city storm drain, or provide a soil report showing that there is no continuously flowing springs or ground water.

AIR CONDITIONING

A1. Show job address on plans.

A2. Plans shall be clearly legible, and at a scale no smaller than 1/8 inch per foot.

A3. Show equipment schedule on the plans.

A4. Show the room names and room numbers of each area.

A5. Show all fire rated walls and ceilings on plans.

A6. Indicate if rated corridors are tunnel type or full height.

A7. Provide a primary and a secondary condensate drains and secondary drains pans for cooling coils installed above the ceiling or in furred spaces. The drain from the secondary drain pan shall terminate in a visible location.

A8. Duct shall be constructed in accordance with chapter 6 of the Uniform Mechanical Code.

A9. Provide duct type smoke detectors in the supply air duct: in every air conditioning system in excess of 2,000 cfm. Multiple units serving the same room, or having common return air plenum or a common outside air duct are considered to be one system for the determination of the cfm. If the area smoke detection system is of the complete area coverage type, the area detectors may be used for shutdown.

A10. Show all fire rated walls and ceilings on planes.

A11. Listed fire dampers and smoke dampers are required to be installed at all duct penetrations through area separation and occupancy separation walls. Indicate smoke detectors that will operate these dampers on plans.

A12. Listed fire dampers and smoke dampers are required to be installed at all duct penetrations through fire rated shafts.

A13. Listed fire dampers are required to be installed at all due penetrations through fire rated ceilings.

A14. Provide a copy of the manufacturer catalogs for the mechanical equipment used.

A15. Provide combination smoke/fire dampers to isolate ducts serving rated corridors.

A16. Provide combination smoke/fire dampers in ducts penetrating elevator lobbies.

A17. Provide a permanent roof access.

TITLE 24

A18. Provide outside air per current Title 24 requirements.

A19. Make-up air shall be electrically interlocked with their associated exhaust systems.

A20. Back draft dampers shall be provided in outdoors air supply and exhaust systems.

A21. Provide economizer in every cooling unit exceeding 2,500 cfm. (3 Tons capacity for roof top units.)

A22. Show thermostats for each unit or zone control device.

A23. Provide complete Title 24 Compliance Documentation with the Performance Compliance Approach.

VENTILATION SYSTEMS

GENERAL

V1. Exhaust ducts under positive pressure and venting systems shall not extend into or pass through ducts or plenums.

V2. Show location & sizes of all ventilation ducts & openings.

V3. Environmental exhausts duct shall terminate outside the building and shall be equipped

with a back draft damper.

V4. Exhaust outlets shall be 10 feet from property line: 3 feet from exterior roof/wall; 10 feet from opening into the building: 10 feet above grade.

V5. Make-up air shall be provided for all rooms with exhaust.

TOILET ROOMS

V6. Toilet rooms shall have 10 air changes per hour.

V7. Provide a duct type smoke detector in the toilet exhaust system exceeding 2,000 cubic feet per minute.

V8. Provide combination fire smoke dampers where the toilet exhaust ducts penetrate a fire rated shaft. (If the area smoke detection system is of the complete area coverage type, the area detectors may be used for shutdown.)

V9. Provide combination fire smoke dampers at every penetration of area separation and occupancy separation wall.

CORRIDOR VENTILATION

V10. Rooms adjacent to the corridor shall not draw air from the corridor or transfer air to the corridor except for small quantities as exfiltration into a negative pressure toilet with make up air supply.

GARAGE VENTILATION

V11. Provide calculations on plans showing that the exhaust system is capable of uniformly exhausting 1.5 cfm per square foot of gross floor area.

V12. Provide make up air.

V13. Show the termination of the garage exhaust. Exhaust outlet shall terminate not less than 10 feet from property line, 3 feet from exterior wall or roof, 10 feet from openings into the building, 10 feet above adjoining grade.

V14. Do not connect any other ventilation system to the garage ventilation system.

KITCHEN HOODS

H1. Provide kitchen lay out plans showing location of hoods ducts, shafts, make-up air, operable windows and their area, and the volume of the kitchen.

H2. Provide roof plans showing the location of the kitchen exhaust blower, property line and any openings into the building.

H3. Provide make-up air.

H4. Provide elevations showing finished floor, cooking equipment, grease exhaust hood, distance between cooking equipment and grease filters, overhang, finished ceiling, flushing, fire rated shaft, clearance between duel and shaft, cleanouts, slope of horizontal ducts, roof, blower, diverter, distance of outlet termination above roof.

H5. Each exhaust outlet within a hood shall serve not more than a 12-foot section of hood unless the hood is U.L. listed to exceed.

H6. Duct system shall have a slope not less than 1/4 inch per linear foot toward the hood or toward an approved grease reservoir. When horizontal ducts exceed 75 feet in length, the slope shall not be less than 1 inch per linear foot. The bottom of duct elevations shall be

indicated on plans to verify clearance from structural members, etc.

H7. Duct enclosures from the point of ceiling, wall or floor penetration shall be at least one hour, except it shall be two-hour fire resistive construction in Type I & II buildings.

H8. The duct enclosure shall be sealed around the duct at the point of penetration.

H9. A clearance of at least 3 inches and not more man 12 inches shall be maintained between duct and enclosure.

H10. Air velocity within the duct system shall be not less than 1,500 feet per minute and shall not exceed 2,500 ft/min.

H11. Exposed grease duct/hood systems serving a Type I hood shall have a clearance from unprotected combustible construction of at least 18 inches. Clearance may be reduced to not less than 3 inches when the combustible construction is protected with material required for one-hour fire-resistive construction.

H12. Hoods less than 12 inches from the ceiling or wall shall be flashed solidly with materials as specified in CMC Sec.508.2.

H13. Exhaust outlets serving grease duct systems shall terminate above the roof surface, 10 feet from property line, 10 feet from air intake openings and 10 feet above adjoining grade. Base of fan shall be 2 feet above roof surface.

H14. A grease gutter shall drain to a receptacle accessible for cleaning.

H15. Type I Hoods for use over solid-fuel cooking equipment shall be provided with separate exhaust systems.

H16. Indicate on plans what provisions have been made for fire protection in the hood and in the duct.

H17. The fire-extinguishing system shall be interconnected to the fuel or current supply so that the fuel or current is automatically shut off to all equipment under the hood when the system is actuated. Show controls on plans.

H18. The exhaust and make-up air systems shall be connected by electrical interlock switch. Show controls on plans.

H19. Provide grease duct cleanouts per code.

FUME HOOD EXHAUST

H20. Motors for fans used to convey flammable vapors or dusts shall be located outside the duct or shall be protected with approved shields and dust-proofing.

H21. Motors and fans shall be accessible for servicing and maintenance.

H22. Parts of fans in contact with explosive or flammable vapors, fumes or dusts shall be of nonferrous or non-sparking materials or their casing shall be lined or constructed of such material.

H23. Both the fan and the casing shall be of non-sparking materials. When fans are required to be spark resistant, their bearings shall not be within the air stream, and all parts of the fan shall be grounded.

H24. The termination point for fume hood exhaust shall not be less than the following:

1. 30 feet from property line
2. 10 feet from openings into the building
3. 6 feet from exterior walls or roofs
4. 30 feet from combustible walls or openings into a building which are in the direction of the exhaust discharge

5. 10 feet above adjoining grade.

REFRIGERATION MACHINERY ROOM (Chiller Rooms)

M1. A 3 feet wide & 6 feet 8 inches high clearance shall be provided around at least two sides of all moving machinery.

M2. Door(s) shall swing in the direction of exit.

M3. Provide 2 separate exits.

M4. Provide calculation showing that the capacity of the exhaust system complies with section.

M5. A switch of the break-glass type, controlling the emergency purge ventilation system, shall be provided adjacent to and outside of the exit door.

M6. Switch controlling fans providing ventilation shall be in glass-covered enclosures and shall be located adjacent to and outside of the exit door.

M7. Show make-up air inlets and exhaust outlets on plan.

M8. Make-up air shall be from outside of the building and shall be equipped with a back draft damper.

M9. Exhaust shall be discharged at least 20 feet from property line. Show that on plans.

M10. Only equipment essential to the operation of refrigeration system shall be allowed in the machinery room.

M11. State type of refrigerant.

M12. Show location of refrigerant-vapors detectors.

FIRE PUMP & GENERATOR ROOM

M13. Show engine exhaust pipe.

M14. Show clearances for the engine exhaust pipe. It shall be a minimum of 18 inches from combustible construction and 2 inches from non-combustible construction.

M15. Show termination of engine exhaust pipe.

M16. The engine exhaust pipe shall extend above the roof surface, and shall be legated not less than 12 inches from any openings into the building, 2 feet from an adjoin building and 7 feet above grade when located adjacent a public walkway.

M17. Enclose the engine exhaust pipe in a fire rated shaft.

M18. Show combustion air.

M19. Dampers are not allowed in combustion-air ducts.

M20. Show room ventilation.

M21. The room ventilation shall be added to the combust air.

M22. Show room ventilation exhaust.

M23. Show point of termination outside of the building of the room ventilation.

M24. Combustion air shall not be drawn from the garage.

SUBMITTAL REQUIREMENTS

Los Angeles Unified School District Facilities Services Division

DSA Submittal -- Local Fire Authority Approval Checklist

DSA reviews fire sprinkler installations for compliance with NFPA Standards in accordance with CBC Section 904.1.2. In addition, requirements pertaining to fire flow and mains, hydrant spacing, types of control valves, and the location of valves and connections vary with jurisdiction and specific sites within each jurisdiction. Requirements of the local fire authority must be met, and documentation of local fire authority approval must be submitted to DSA prior to DSA approval.

The following is a Check List of items critical to DSA review and approval of a fire sprinkler system.

☐ 1. Fire department connection is visible, accessible and installed on the address side of the building.

☐ 2. Fire department connection is located at the public street as close to the curb face as possible. The distance from the fire department connection to the curb face does not exceed 25'.

☐ 3. Fire department connection is located with 150' of a public fire hydrant.

☐ 4. Fire department connection is located at least 25' from the building, or, if not feasible, a minimum two hour fire-resistive wall is provided.

☐ 5. Each fire sprinkler system has a mini post indicator valve located at the public water valves connection.

☐ 6. Each fire sprinkler riser has an exterior control valve located above grade.

☐ 7. Requirements of the local water purveyor have been included for cross-connection backflow-control devices (Reduced pressure principal backflow assembly).

☐ 8. Local fire jurisdiction requirements pertaining to fire flow, hydrant spacing, and

For a current Project Submittal checklist required by DSA check their website as follows;
www.dsa.dgs.ca.gov
Click on: Project Submittal and Plan Review Process

Appendix A.4

Building Acoustical Requirements

Los Angeles Unified School District

Facilities Services Division

Design Section

BUILDING ACOUSTICAL REQUIREMENTS

Allowable Maximum Background Sound Level (BSL) from HVAC Noise		
Function	**dBA**	**Suggested Construction**
Classrooms	45 Max. 40 Target	See HVAC Design Criteria
Conference Rooms Library Office	45	
Cafeteria Gymnasium Corridor Locker Rooms	50	
Multi-Purpose Room	40 Max. 35 preferred	Duct routing and location or air transfer openings shall not significantly compromise the sound isolation of the envelope of the space.

Allowable Maximum Background Sound Level (BSL) from Traffic Noise or Playground Noise		
Function	**DBA**	**Suggested Construction**
Classroom	45 Max. 40 Target	Wall construction to provide STC based on actual exterior sound levels. Glazing: ¼" monolithic typical. ¼ "3/8" laminated if needed. DO NOT use thermal insulating dual glazing. Weather-stripped solid core or hollow metal door with drop threshold, or provide vestibules with two doors.
Conference Library Office	45	Same as above.

Cafeteria Gymnasium Corridor Locker Rooms	50	¼" monolithic glazing. Weather-stripped solid core or hollow metal door with drop threshold, or provide vestibules with two doors.
Multi-Purpose Room	40 Max. 35 Preferred	Doors from the Stage and Multi-Purposes Room should lead into corridors and other circulation areas, NOT directly into adjoining classrooms or other occupied spaces. As far as is practical, attempt to site the space away from noise sources such as railways, freeways, industrial noise sources etc. Reasonable measures should be incorporated to limit transient noise intrusion into the space, e.g. acoustical seals should be provided at all doors to the Multi-Purpose Rom and Stage,

NOTE: Background noise shall be defined and measured as specified in ANSI Standard 2.60

Allowable Maximum Reverberation Time (RT 60)

Function	T60	Suggested Construction
Classroom (all) Conference Library	.60	Acoustical tile ceiling with minimum NRC of .0.70 min.
Conference Library Office >15,000 cu.ft.	.70	Acoustical tile ceiling with minimum NRC of .55
Cafeteria Gymnasium Corridor Locker Rooms		Minimum 50% of ceiling area covered with acoustical tile with minimum NRC of .55 or equivalent absorption.
Multi-Purpose Room		The target mid frequency reverberation time for the space, unoccupied, is 1.2 seconds. Since a greater quantity of acoustically absorbent finishes are required as the volume of the space increases. It is suggested that this volume accommodating the audience should not exceed 240 cu. feet per person.

Allowable Minimum Sound Transmission Class (STC) Values for Partitions Separating a Classroom or Library from:

Function	STC	Suggested Construction
Classroom Conference Library Office Corridor Shower Room Staircase Outdoor Playground or lunch Shelter	45	One layer of 5/8" thick drywall on each side of a single steel stud 24 on center or 2x4 wood staggered studs at 16" on center partition with full width insulation, penetrations not desirable All joints and penetrations properly sealed.
Speech Clinic Health Care Facility	50	One layer of 5/8" thick drywall on one side of a single steel stud 24" on center or 2"x4" wood staggered studs at 16" on center partition and 2-layers of 5/8" thick drywall on the other side with full width insulation, penetrations not desirable All joints and penetrations properly sealed.
Music Room Mech. Equipment Rm Gymnasium Cafeteria M/P Room	60	Two layers of 5/8" thick drywall on one side of a double steel stud partition 24" on center or 2"x4" wood staggered studs at 16" on center and 3-layers of 5/8" thick drywall on the other side with full width double insulation. Stud lines are separated by a one inch airspace. All joints and penetrations properly sealed.

Allowable Minimum STC Values for Floor / Ceiling Assemblies Separating Classrooms or Libraries from:

Function	STC	Suggested Construction
Classroom Conference Library Office Corridor Shower Room Staircase Outdoor Playground Or Lunch Shelter	45 (unless higher needed to meet background noise level criteria)	Nominal 6" thick lightweight concrete on steel fluted deck or plywood sub floor with suspended acoustical tile ceiling a minimum 30" below the deck. or 5/8" drywall suspended ceiling; All penetrations properly sealed.
Speech Clinic Health Care Facility	50	Same as above

Music Room Mech. Equipment Gymnasium Cafeteria	60	Nominal 6” thick lightweight concrete on steel fluted deck or plywood sub floor with suspended 5/8 acoustical tile ceiling a minimum 30” below the deck with insulation in the cavity. Install the cavity. All joints and penetrations properly sealed.

Allowable Minimum STC Values for Demising Partitions Separating Alike and Dislike Functions

Function	STC	Suggested Construction
From Office or Conference Room to Office or Conference Room	35	1-layer of 5/8” thick drywall on each side of a single steel stud 24” on center or 2”x4” wood staggered stud at 16” on center partition Weather-stripped solid-core wood door with drop-threshold. All joints and penetrations properly sealed.
From Office or Conference Room to Corridor or Staircase or Shower Room	45	1-layer of 5/8” thick drywall on each side of a single steel stud 24” on center or 2”x4” wood staggered stud at 16” on center partition insulate the cavity. Weather-stripped solid-core wood door. All joints and penetrations properly sealed.
From Office Conference Room Music Room to Outdoor Playground	50	1-layer of 5/8” thick drywall on one side of a single steel stud 24” on center or 2”x4” wood staggered stud at 16” on center partition and 2-layers of 5/8” thick drywall on the other side Insulate the cavity. All joints and penetrations properly sealed. Steel sound-rated door STC-49.
From Corridor or Staircase or Shower Room to Corridor Staircase Shower Room		No requirements.

From Music Room to Mech. Equipment Rm Gymnasium Cafeteria M/P Room Office Conference Room	60	2-layers of 5/8" thick drywall on one side of double steel stud 24" on center or 2"x4" wood staggered stud at 16" on center partition and 3-layers of 5/8" thick drywall on the other side. Insulate the cavity. All joints and penetrations properly sealed. Steel sound-rated door. STC-49.
From Office Conference Room to Mech. Equipment Rm or Gymnasium or Cafeteria	60	2-layers of 5/8" thick drywall on one side of double steel stud 24" on center or 2"x4" wood staggered stud at 16" on center partition and 2-layers of 5/8" thick drywall on the other side. Insulate the cavity. All joints and penetrations properly sealed. Steel sound-rated door. STC-49.
From Music Room To Music room	62	2-layers of 5/8" thick drywall on one side of double steel partition 24" on center or 2"x4" wood staggered stud at 16" on center and 3-layers of 5/8" on the other side. Insulate the cavity. All joints and penetrations properly sealed. Steel sound rated door. STC-49

Allowable Minimum STC Values for Floor / Ceiling Assemblies Separating Other Alike and Dislike Function

Function	STC	Suggested construction
From Office or Conference Room to Office or Conference Room	35	Nominal 6" thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended acoustical tile ceiling a minimum 30" below the deck. All joints and penetrations properly sealed.
From Office or Conference Room to Corridor or Staircase or Shower Room	45	Nominal 6" thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended acoustical tile ceiling a minimum 30" below the deck. All joints and penetrations properly sealed.

From Office or Conference Room or Music room to Outdoor Playground		Provide extra wall STC to meet 45 DBA background noise level; (See “Traffic noise” requirement above. All joints and penetrations properly sealed.
From Corridor or Staircase or Shower Room to Corridor or Staircase or Shower Room		Provided extra STC to meet 45DBA background noise level; See “Traffic noise” requirement above. All joints and penetrations properly sealed.
From Music Room to Mechanical Equipment Room or Gymnasium or Cafeteria	60	Nominal 6” thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended 5/8” thick drywall ceiling a minimum 30” below the deck. Insulate the cavity. All joints and penetrations properly sealed.
From Office or Conference Room to Mech. Equipment Rm Gymnasium Or Cafeteria	60	Nominal 6” thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended 5/8” thick drywall ceiling a minimum 30” below the deck. Insulate the cavity. All joints and penetrations properly sealed.
From Music Room To Music Room	62	Nominal 6” thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended 5/8” thick drywall ceiling a minimum 30” below the deck. Insulate the cavity. All Joints and penetrations properly sealed.

Allowable Maximum Impact & Isolation Class (IIC) levels for Floor/Ceiling assemblies Above Classrooms

Function	IIC	Suggested Construction
Classroom	50	Vinyl tile over 6” thick lightweight concrete on a steel fluted deck or plywood sub floor with a suspended acoustical tile a minimum 30” below the deck. Alternative: Equivalent IIC using carpeting.

Gymnasium Music Room Dance Studio	50+	Vinyl tile over 6” thick lightweight concrete on a steel fluted deck or plywood sub floor with a 5/8” thick suspended drywall ceiling a minimum 30 below the deck. Insulate the cavity.

GENERAL NOTES:

Provide acoustical consultant recommendations for all auditoria and for special cases such as unusual exterior ambient noise.

Appendix A.5

Checklist of Off-Site Work, Utilities & Easements

CHECKLIST OF OFF-SITE WORK, UTILITIES & EASEMENTS

(Provide details on a separate sheet)

PROJECT TITLE _____ PROJECT NO. _____

Telephone No.

ARCHITECT _____ _____

CONSULTANTS

CIVIL _____ _____

MECHANICAL _____ _____

ELECTRICAL _____ _____

	Agency Consulted	Needed Y/N	Coordinated			Date	
			Y	N	N/A		
Street Dedications & Alley Vacations	City-Dept. of Transportation						
Widening	"						
Cul-de-sac	"						
Corner Cuts	"						
Bus Turn-outs	"						
Transit shelter est.	"						
Street Improvements	City – Dept. of Transportation						
Widening (Check all streets abutting school)	"						
Cul-de-sac	"						
Bus Turn Out	"						
Bus Pad	"						
Sidewalk	City – Dept. of Transportation						
Repair							
Replacement							
Pave Parkway							
Street Trees	City Planning/Zoning Street Tree Div.						
Street Lighting	City Planning/Zoning Street Lighting Div						
Handicapped Ramps (4 sides of each corner)	City Planning/Zoning						
Building Setbacks							
Front							
Side							
Rear							
Building to Building							
Fencing Requirement							
Fire Truck Access	Fire Dept						
Fire Hydrants	Fire Dept						

CHECKLIST OF OFF-SITE WORK, UTILITIES & EASEMENTS

(Provide details on a separate sheet)

Utilities	Agency Consulted	Needed Y/N	Coordinated			Date	
			Y	N	N/A		
Electrical							
Overhead Power Pole							
Underground Manhole							
Transformer							
Guy Wires & Poles							
Telephone							
Overhead Poles							
Underground Manhole							
Cable TV							
Overhead Power Poles							
Water							
Gas							
Storm Drain							
Sanitary Drain							
Fuel Line							

Sidewalks: Provide repairs and improvements as needed for safe access, including improvements for new driveway, etc.

Street Trees: Minimum of 1 tree per 25 linear feet of frontage recommended. Verify requirement and types of trees acceptable by the City Street tree Division

Street Lighting: No Mandatory requirement except as may be required for street dedications and alley vacations. Contract City Street Lighting Division

Driveway location: Transportation Department would prefer access driveway to a site garage at a minimum of 150 feet from curb. Verify requirements.

Building Setbacks: Identify zoning requirement for building setbacks in addition to Fire Department and code requirements.

Fire Truck Access: Verify with the Fire Department where access should be located. Ensure proper paving thickness is identified on the drawings.

Fire Hydrant: Contact the Fire Department and determine if new fire hydrants are required and coordinate locations if new hydrants are required.

“A” Permit Identify if “A” permit is required. Identify scope of work if the “A” permit is required.

“B” Permit Identify if “B” permit is required. Identify scope of work if the “B” permit is required.

Appendix A.6

Planning and Design Guidelines for Small Learning Communities (Separate Volume – Not Included)

Appendix A.7

Estimating Guide
(Separate Volume – Not Included)

Estimating Guide

(revised 12/01/09)

FACILITIES SERVICES DIVISION
ESTIMATING UNIT

ESTIMATING GUIDE

(Revised 12/01/09)

CONTENTS:

PREFACE

SECTION 1
- Submittal Documentation

SECTION 2
- a. Instruction for the Preparation of Diagrams of Building Areas
- b. Sample of Diagrams of Building Areas
- c. Instruction for the Preparation of Building Envelope Calculation Worksheet
- d. Sample of Building Envelope Calculation Worksheet

SECTION 3
- a. Instruction for the Preparation of Schematic Uniformat Cost Estimate
- b. Uniformat Appendix: Code of Accounts
- c. Sample of Schematic Design Cost Estimate - Uniformat

SECTION 4
- a. Instruction for the Preparation of Specifications Division Cost Estimate
- b. Sample of Detailed Specifications Division Cost Estimate

SECTION 5
- a. Instruction for the Preparation of Cost Difference Reconciliation
- b. Sample of Cost Difference Reconciliation

SECTION 6
- a. Instruction for the Preparation of Site Development Cost Supplement
- b. Sample of Site Development Cost Supplement

SECTION 7
- a. Instruction for the Preparation of District/Independent Cost Estimate
- b. Sample of District/Independent Cost Estimate

SECTION 8
- a. Instruction for Preparation and Review of Change Order Estimate

Preface

The intent of this guide is for quality control and to establish uniformed formats that are acceptable to funding sources. This guide does not waive any contractual requirements.

This guide provides instructions necessary to prepare cost estimates and related documents required for submittals.

This guide is divided by sections. Section 1 lists the documentation required to submit to the District at each design phase. Sections 2 through 6 provide instructions and sample for each type of documentation. Section 7 provides instruction for the preparation of District/Independent estimate. Section 8 provides instruction for the review and preparation change order estimate.

If you have any questions or comments, contact Luther Luu at (213) 241-8643.

Section 1: Submittal Documentation

Submittal Documentation must be in a format and contain appropriate information that the District can verify and confirm.

A cost estimate is due along with building areas calculation or building area diagrams, plans and specifications for each phase of the project: Schematic Development, Design Development, Construction Documentation and Bid Documentation. Each phase requires a different set of documents as outlined below:

1. SD: Schematic Development:
    a. Building Areas Calculation[1]
    b. UNIFORMAT Schematic Design Cost Estimate
    c. Building Envelope Calculation Worksheet

2. DD: Design Development
    a. SP-2A Diagrams and Calculation of Building Areas
    b. Detailed Specifications Division Cost Estimate
    c. Cost Estimate Supplement (Site Development)
    d. Cost Difference Reconciliation from Schematic to Design Development

3. CD: Construction Documentation
    a. SP-3A Diagrams and Calculation of Building Areas
    b. Detailed Specifications Division Cost Estimate
    c. Cost Estimate Supplement (Site Development)
    d. Cost Difference Reconciliation from Design Development to 50% CD
    e. Cost Difference Reconciliation from 50% CD to 100% CD

4. BID: Bid Documentation
    Update the CD submittal to reflect DSA plan check corrections.

[1] Building Areas Calculation must correspond with the accompanied floor plans / diagrams. They shall contain enough information for review and crosscheck. Refer to “Section 2a: Instruction for the Preparation of Diagrams of Building Areas” for instruction in computing the building areas. The Building Areas Calculation can be in the same format as the SP-2A / SP-3A Diagrams of Building.

Section 2a: Instruction for the Preparation of Diagrams of Building Areas

Diagrams of Building Areas will be submitted at Design Development (SP-2A), Construction Documentation (SP-3 A) and Bid do cumentation (SP-3A). Me asurement of the prop osed building a rea shal l be i n acco rdance wi th t he Sta te Sch ool Buil ding Leas e-Purchase Program Applicant Handbook, revised April 1998 (see Section 2b for Sample).

Diagrams a re dimensioned scal e dra wings on 8-1/2" x 11" or 8 -1/2" x 14 " sheets, containing following:

1. First or Cover Sheet

    a. Titl e Block indicating:
        (1) Name of project and address of proposed new facilities
        (2) Name and code of district.
        (3) Name of Architect.
        (4) Cu rrent date

    b. Plo t Plan indicating:
        (1) Sit e boundary dimensions
        (2) Name of streets adjacent to the school site
        (3) Location of all proposed new buildings included in the project and their relationship to existing structures, each identified by number or letter
        (4) Area summary for each proposed building

    c. T he Architect's signature.

2. Additional sheets for each proposed building indicating:

    a. Dimensioned floor plan including covered parking garage identifying each area by incl uding a na me and a ke ying n umber or l ett er w hichever is applicable. A keying number shall be used to identify enclosed and covered spaces which are counted as full of th e actual areas and keying letter sh all b e u sed t o identify unenclosed covered spaces which are counted as one-third of the actual areas. Covered parking g arage's a ctual parking a rea sh ould n ot b e i ncluded in calculation of building area but all other spaces such as electrical room, storage, lobby, etc. Act ual p arking a rea s hould also have a s eparate line i n area summary a s it is ne ither a chargeable nor a non-chargeable sp ace. (See Section 2b - Sample).

    b. Area co mputations a re to b e s eparated by building and b y f loor. Sho w identifying number or letter, name (area function), dimensions and total area in square feet.

Measurement of Proposed New Building Area:

1. All measurements are taken from exterior wall lines and the c enter lines of interior partitions.

2. Arcades and open shelter areas are measured from the exterior wall line to the edge of the paving or the edge of the overhang, whichever is lesser.

3. Totally enclosed space is counted as full area. Such space includes, but is not limited to:

    a. Generally all area inside the exterior wall lines.
    b. Each floor of multi-story buildings.
    c. Basement and boiler rooms.
    d. Heater rooms, including those above the normal floor level.

4. Partially enclosed areas counted as full area:

    a. Each floor of library stacks.
    b. Mezzanines open on one or more sides which may easily and readily be converted to use as instructional space or passage ways.
    c. Open covered areas which provide shelter between buildings that are less than 20 feet apart.
    d. Entry recesses less than 20' in width.

5. Covered unenclosed space counted as one-third of the actual area, including but not limited to:

    a. Open covered passages, arcades, shelters, covered porches, and covered planting areas. This includes lunch shelters, sheltered bicycle racks and covered play areas.
    b. Open covered areas which provide shelter between buildings that are 20 feet apart or more.
    c. Overhangs and sun control devices which are so designed and located that they function as, or in lieu of, covered walks or other sheltered areas.
    d. Mezzanines for storage purposes.

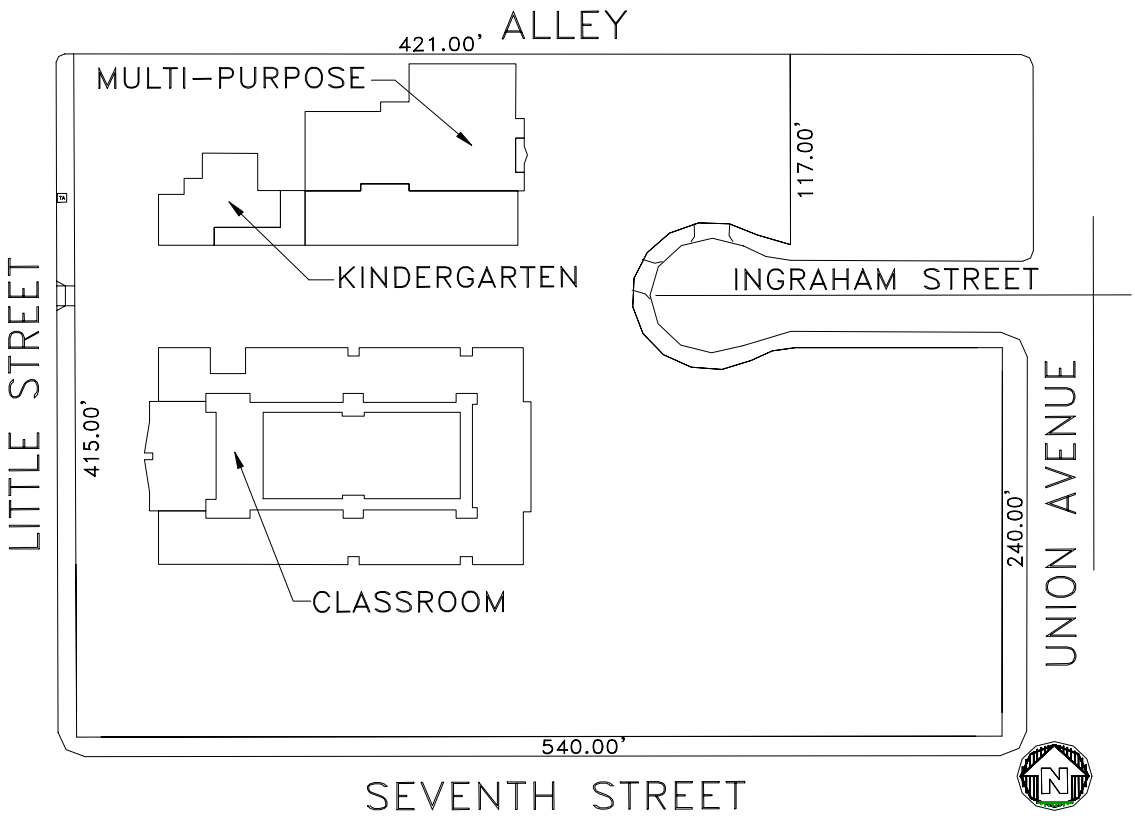
The following are excluded from the computation of building area:

    a. Eaves and sun control devices except as specified above.
    b. Unsheltered platforms and steps. Small sheltered platforms or steps on relocatable classroom units.
    c. When isolated from building structures, the area of incinerators, pump houses, transformer vaults, and service yards.
    d. Buildings the State Allocation Board determines are structurally or otherwise inadequate and which the Board finds would not be economical or good practice to rehabilitate.
    e. Elevator shafts, elevator machine rooms where constructed for the purpose of complying with Chapter 7, Division 5, Government Code, relating to facilities for handicapped persons.
    f. Buildings purchased with special override taxes, federal funds, local funds or specific State funds for use as adult education or child day care use.
    g. The area of completely enclosed stairs for each floor level.

Section 2b: Sample of Diagrams of Building Areas

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT LOS ANGELES SCHOOL DISTRICT	5 DIGIT DISTRICT CODE 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	PROJECT NO. 22/24028
SCHOOL NAME BELMONT ELEMENTARY SCHOOL #3	COUNTY LOS ANGELES
SCHOOL ADDRESS 680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM ABC ARCHITECTS AND ASSOCIATES	DATE OF ESTIMATE 10/20/95

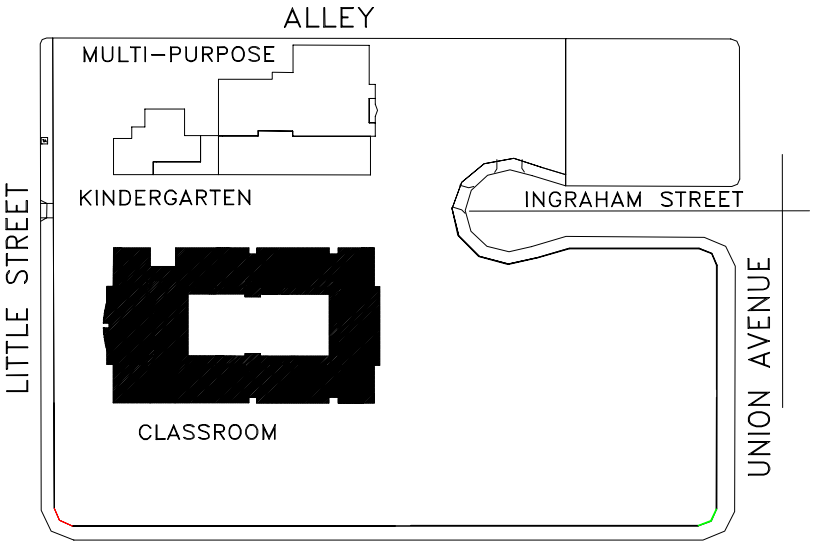


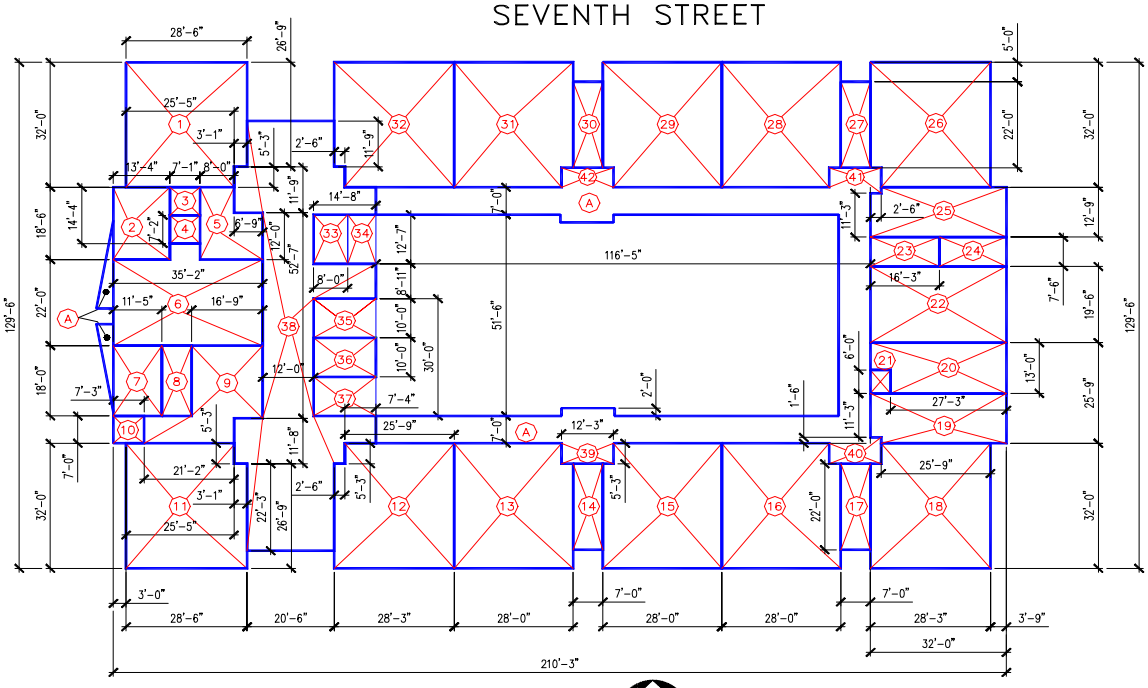
AREA SUMMARY:

01. CLASSROOM BUILDING	37,055
02. MULTI-PURPOSE BUILDING	7,595
03. KINDERGARTEN BUILDING	2,503
A. COVERED AREA @ 1/3	3,089
TOTAL GROSS BUILDING AREA	50,242
(LESS NON-CHARGEABLE AREA)	(1,566)
TOTAL CHARGEABLE AREA	**48,676**

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT LOS ANGELES SCHOOL DISTRICT	5 DIGIT DISTRICT CODE 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	PROJECT NO. 22/24028
SCHOOL NAME BELMONT ELEMENTARY SCHOOL #3	COUNTY LOS ANGELES
SCHOOL ADDRESS 680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM ABC ARCHITECTS AND ASSOCIATES	DATE OF ESTIMATE 10/20/95





CLASSROOM BUILDING – FIRST FLOOR

PAGE 2 OF 12

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

CLASSROOM BUILDING - FIRST FLOOR	SIZE	AREA (SF)	
1 GENERAL CLASSROOM	(28'-6")X(26'-9")+(25'-5")X(5'-3")	842	
2 CONFERENCE ROOM	(18'-6")X(13'-4")	264	
3 PRINCIPAL'S TOILET	(7'-1")X(7'-2")	51	
4 TOILET	(7'-1")X(7'-2")	51	
5 PRINCIPAL'S OFFICE	(18'-6")x(8'-0")+(6'-9")X(12'-0")	229	
6 CLERICAL AREA/SECRETARY	(35'2")X(22'-0")+(4'-2")X(7'-1")	803	
7 VICE PRINCIPAL'S OFFICE	(18'-0")X(11'-5")	206	
8 SUPPLY ROOM	(18'-0")X(7'-0")	126	
9 NURSE'S OFFICE	(7'-0")X(21'-2")+(16'-9")X(18'-0")	450	
10 TOILET	(7-0")X(7'-3")	51	
11 GENERAL CLASSROOM	(25'-5")X(5'-3")+(28'-6")X(26'-9")	896	
12 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
13 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
14 WORK ROOM	(22'-0")X(7'-0")	154	
15 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
16 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
17 WORK ROOM	(22'-0")X(7'-0")	154	
18 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	890	
19 GIRL'S TOILET	(29'-6")X(1'-6")+(11'-3")X(32'-0")	404	
20 BOY'S TOILET	(27'-3")X(13'-0")+(7'-0")X(4'-9")	386	
21 CUSTODIAN ROOM	(4'-9")X(6'-0")	29	
22 PASSAGE	(32'-0")X(19'-6")	624	
23 ALL PURPOSE ROOM/AREA/SPACE	(16'-3")X(7'-6")	122	
24 MECHANICAL ROOM	(15'-9")X(7'-6")	118	
25 STAIRS (INTERIOR)	(29'-6")X(1'-6")+(11'-3")X(32'-0")	404	*
26 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
27 WORK ROOM	(22'-0")X(7'-0")	154	
28 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
29 WORK ROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
30 WORK ROOM	(22'-0")X(7'-0")	154	
31 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
32 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
33 ELEV. MACHINE RM	(12'-7")X(8'-0")	101	*
34 ELEV. MACHINE RM	(12'-7")X(6'-8")	84	*
35 STAIRS (INTERIOR)	(10'-0")X(14'-8")	147	*
36 ELECTRIC ROOM	(10'-0")X(14'-8")	147	
37 TOILET	(10'-0")X(14'-8")	147	
38 CORRIDOR	(20'-6")X(22'-3")+(11'-8")X(26'-1")+(7'-0")X(7'-4")+ (52'-7")X(12'-0")+(11'-9")X(26'-1")+(7'-0")X(7'-4")+ (20'-6")X(11'-3")+(14'-8")X(8'-11")	2,172	
39 CORRIDOR	(5'-3")X(12'-3")	64	
40 CORRIDOR	(5'-3")X(12'-3")+(2'-6")X(1'-6")	68	
41 CORRIDOR	(5'-3")X(12'-3")+(2'-6")X(1'-6")	68	
42 CORRIDOR	(5'-3")X(12'-3")	64	
SUBTOTAL GROSS FIRST FLOOR		18,599	

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

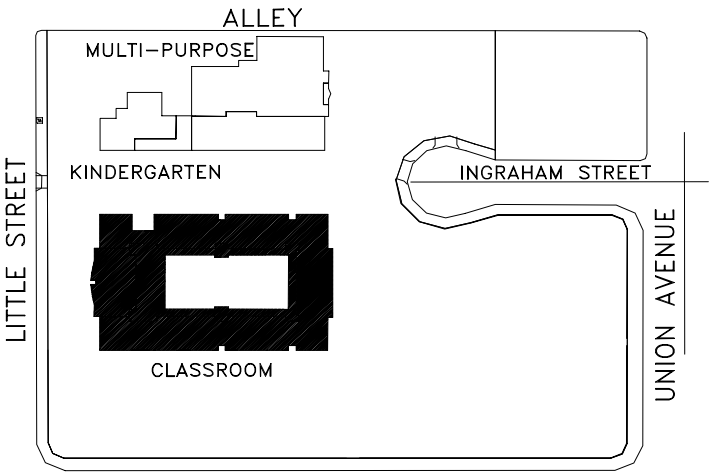
SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

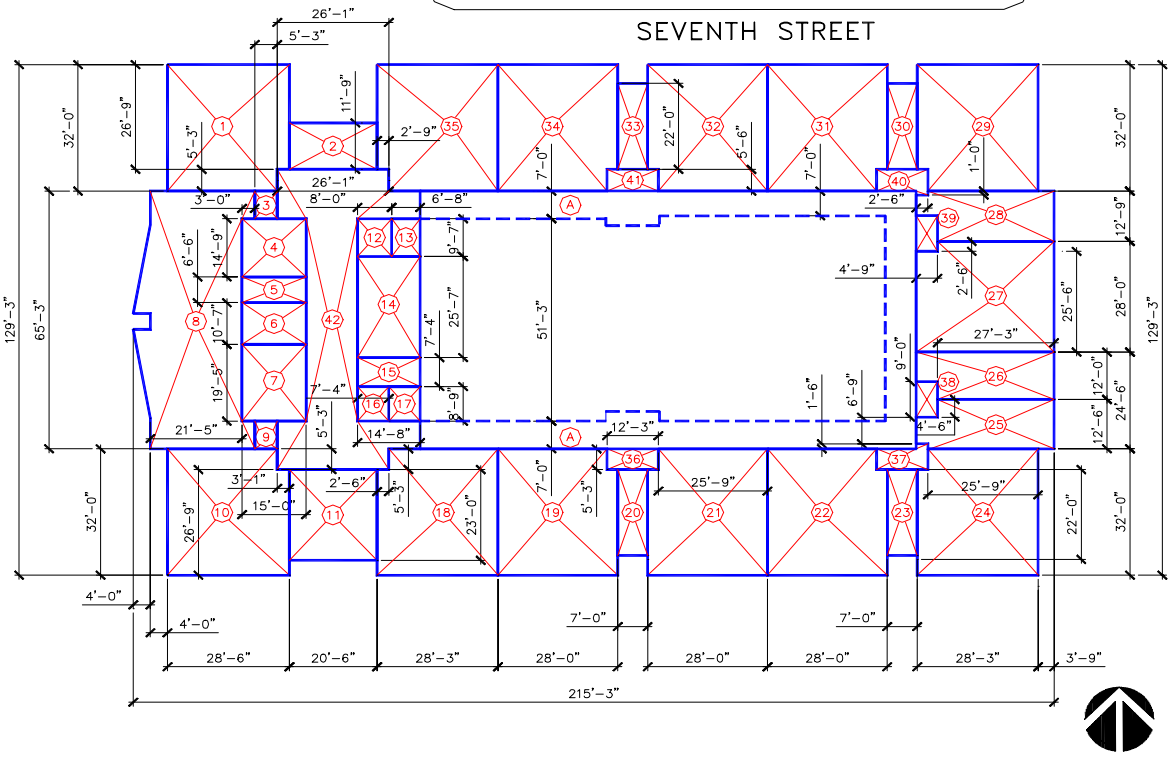
CLASSROOM BUILDING - FIRST FLOOR (CONT.)	SIZE	AREA (SF)
A COVERED AREA-CORRIDOR @ 1/3	((7'-0")X(116'-5")+(2'-0")X(12'-3")+ (7'-0")X(51'-6")+(7'-0")X(116'-5")+ (2'-0")X(12'-3")+117 SQ.FT. (IRREG.))/3	718
SUBTOTAL COVERED AREA @ 1/3		718
TOTAL GROSS FIRST FLOOR		19,317
LESS NON-CHARGEABLE AREA		(735)
TOTAL CHARGEABLE AREA - FIRST FLOOR		18,581

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT LOS ANGELES SCHOOL DISTRICT	5 DIGIT DISTRICT CODE 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	PROJECT NO. 22/24028
SCHOOL NAME BELMONT ELEMENTARY SCHOOL #3	COUNTY LOS ANGELES
SCHOOL ADDRESS 680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM ABC ARCHITECTS AND ASSOCIATES	DATE OF ESTIMATE 10/20/95





CLASSROOM BUILDING – SECOND FLOOR

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

CLASSROOM BUILDING - SECOND FLOOR	SIZE	AREA (SF)	
1 GENERAL CLASSROOM	(28'-6")X(26'-9")+(25'-5")X(5'-3")	842	
2 THERAPY ROOM	(11'-9")X(20'-6")	241	
3 ENTRY (CLOSED)	(5'-3")X(7'-0")	37	
4 TEXTBOOK ROOM	(15'-0")X(14'-9")	221	
5 ALL PURPOSE ROOM/AREA/SPACE	(15'-0")X(6'-6")	98	
6 SUPPLY ROOM	(15'-0")X(10'-7")	159	
7 TEACHER'S WORK ROOM	(15'-0")X(19'-5")	291	
8 LIBRARY	(7'-0")X(7'-3")+(21'-5")X(65'-3")+ (7'-0")X(7'-3")+117 SQ.FT.(IRREG.)	1,616	
9 ENTRY (CLOSED)	(5'-3")X(7'-0")	37	
10 GENERAL CLASSROOM	(25'-5")X(5'-3")+(28'-6")X(26'-9")	896	
11 ALL PURPOSE ROOM/AREA/SPACE	(20'-6")X(23'-0")	472	
12 SHAFT ELEVATOR	(9'-7")X(8'-0")	77	*
13 KILN ROOM	(9'-7")X(6'-8")	64	
14 STAIRS (INTERIOR)	(14'-8")X(25'-7")	375	*
15 CUSTODIAN ROOM	(14'-8")X(7'-4")	108	
16 TOILET	(8'-9")X(7'4")	64	
17 TOILET	(8'-9")X(7'4")	64	
18 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
19 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
20 WORK ROOM	(22'-0")X(7'-0")	154	
21 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
22 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
23 WORK ROOM	(22'-0")X(7'-0")	154	
24 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
25 GIRL'S TOILET	(27'-3")X(4'-6")+(6'-9")X(28'-3")+ (1'-6")X(25'-9")	352	
26 BOY'S TOILET	(27'-3")X(4'-6")+(28'-3")X(7'-6")	334	
27 GENERAL CLASSROOM	(28'-3")X(25'-6")+(2'-6")X(27'-3")	789	
28 STAIRS (INTERIOR)	(2'-6")X(6'-0")+(2'-6")X(7'-0")+(17'-3")X(12'-9")	379	*
29 GENERAL CLASSROOM	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
30 WORK ROOM	(22'-0")X(7'-0")	154	
31 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
32 GENERAL CLASSROOM	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
33 WORK ROOM	(22'-0")X(7'-0")	154	
34 LANGUAGE/SPEECH IMPAIRED	(28'-0")X(26'-9")+(25'-9")X(5'-3")	884	
35 LANGUAGE/SPEECH IMPAIRED	(28'-3")X(26'-9")+(25'-9")X(5'-3")	891	
36 CORRIDOR	(5'-3")X(12'-3")	64	
37 CORRIDOR	(5'-3")X(12'-3")+(2'-6")X(1'-6")	68	
38 VESTIBULE	(9'-0")X(4'-9")	43	
39 VESTIBULE	(9'-0")X(4'-9")	43	
40 CORRIDOR	(5'-3")X(12'-3")+(2'-6")X(1'-6")	68	
41 CORRIDOR	(5'-3")X(12'-3")	64	
42 CORRIDOR	(20'-6")X(12'-3")+(7'-0")X(6'-8")+ (51'-3")X(7'-4")+(20'-6")X(12'-3")+ (7'-0")X(6'-8")	1,108	
SUBTOTAL GROSS SECOND FLOOR		18,457	

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

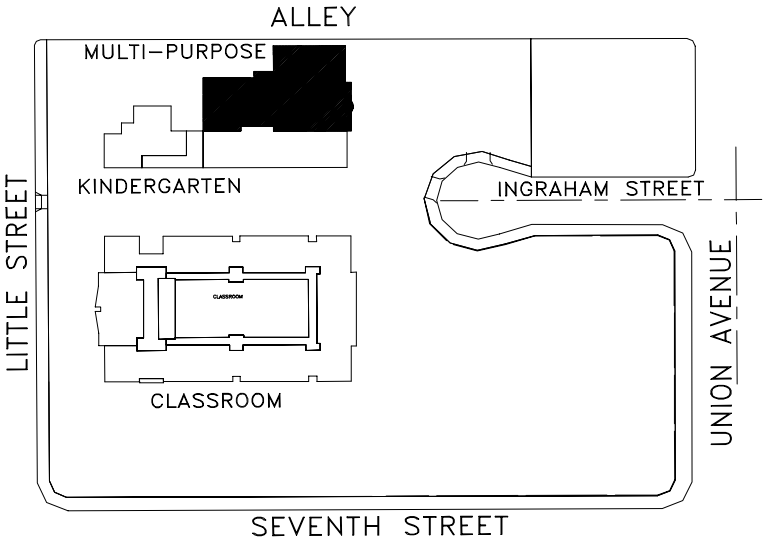
SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

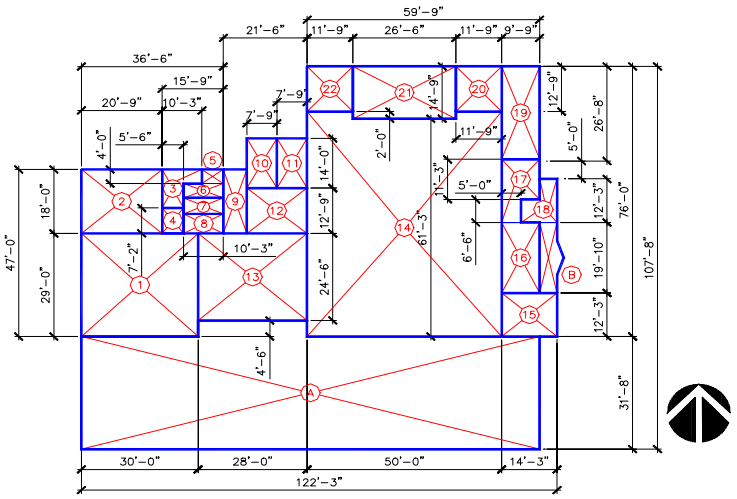
CLASSROOM BUILDING - SECOND FLOOR (CONT.)	SIZE	AREA (SF)
A COVERED BALCONY @ 1/3	((7'-0")X(116'-5")+(2'-0")X(12'-3")+ (7'-0")X(51'-6")+(7'-0")X(116'-0")+ (2'-0")X(12'-3"))/3	680
SUBTOTAL COVERED BALCONY @ 1/3		680
TOTAL GROSS SECOND FLOOR		19,136
LESS NON-CHARGEABLE AREA		(831)
TOTAL CHARGEABLE AREA - SECOND FLOOR		18,305

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT LOS ANGELES SCHOOL DISTRICT	5 DIGIT DISTRICT CODE 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	PROJECT NO. 22/24028
SCHOOL NAME BELMONT ELEMENTARY SCHOOL #3	COUNTY LOS ANGELES
SCHOOL ADDRESS 680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM ABC ARCHITECTS AND ASSOCIATES	DATE OF ESTIMATE 10/20/95





MULTI–PURPOSE BUILDING

DIAGRAM OF BUILDING AREAS (3A)

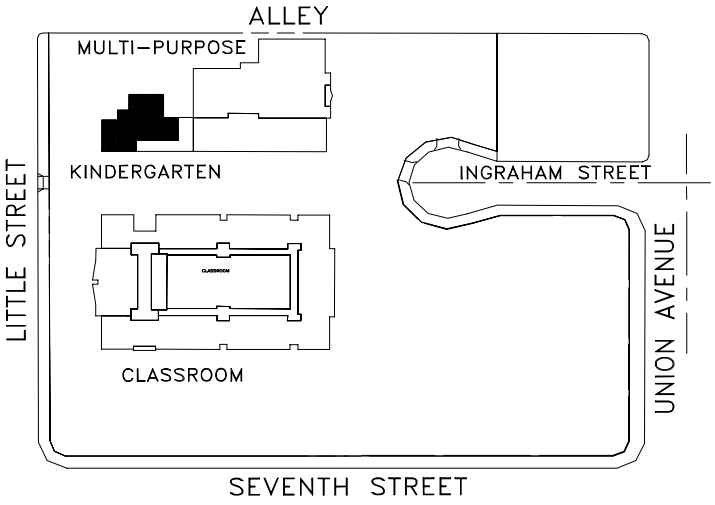
SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

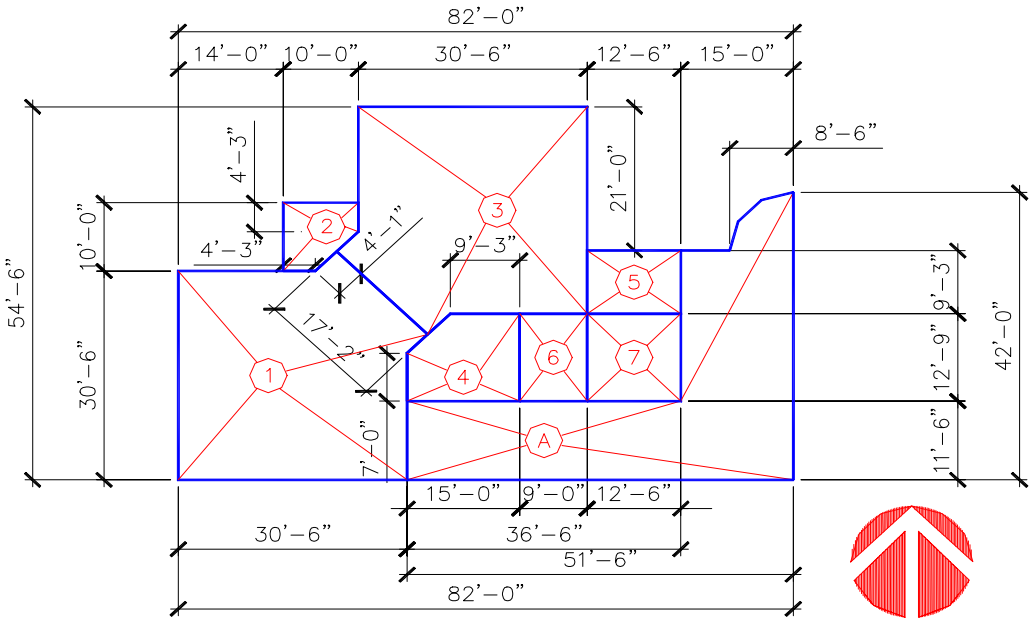
MULTI-PURPOSE BUILDING	SIZE	AREA (SF)
1 FACULTY DINING	(30'-0")X(29'-0")	870
2 LOUNGE	(20'-9")X(18'-0")	374
3 TOILET	(5'-6")X(10'-10")+(4'-0")X(4'-9")	79
4 TOILET	(5'-6")X(7'-2")	39
5 WATER HEATER	(4'-0")X(5'-6")	22
6 CUSTODIAN ROOM	(10'-3")X(4'-0")	41
7 STORE ROOM	(10'-3")X(4'-6")	46
8 DRESSING ROOM	(10'-3")X(5'-9")	59
9 CORRIDOR	(18'-0")X(6'-0")	108
10 WALK-IN REFRIGERATOR	(14'-0")X(7'-9")	109
11 WALK-IN FREEZER	(14'-0")X(7'-9")	109
12 FOOD STORAGE	(12'-9")X(15'-6")	198
13 KITCHEN AREA	(24'-6")X(28'-0")	886
14 MULTIPURPOSE ROOM	(50'-0")X(61'-3")+(11'-9")+(2'-0") (11'-9")X(2'-0")	3,110
15 WOMEN'S TOILET	(14'-3")X(12'-3")	175
16 FOYER	(19'-10")X(9'-9")	193
17 MEN'S TOILET	(5'-0")X(6'-6")+(9'-9")X(11'-3")	142
18 CUSTODIAN ROOM	(6'-6")X(4'-9")+(12'-3")X(4'-6")	86
19 STORE ROOM	(26'-8")X(9'-9")	260
20 PASSAGE	(12'-9")X(11'-9")	150
21 PLATFORM	(26'-6")X(14'-9")	391
22 ORAL ARTS ROOM	(12'-9")X(11'-9")	150
SUBTOTAL MULTI-PURPOSE		7,595
A LUNCH AREA @ 1/3	((122'-3")X(31'-8")+(28'-0")X(4'-6"))/3	1,332
B COVERED AREA-CORRIDOR @ 1/3	((4'-6")X(19'-10")+11 SQ.FT (IRREG.))/3	33
SUBTOTAL COVERED BALCONY		1,365
TOTAL GROSS MULTI-PURPOSE		8,960

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT LOS ANGELES SCHOOL DISTRICT	5 DIGIT DISTRICT CODE 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	PROJECT NO. 22/24028
SCHOOL NAME BELMONT ELEMENTARY SCHOOL #3	COUNTY LOS ANGELES
SCHOOL ADDRESS 680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM ABC ARCHITECTS AND ASSOCIATES	DATE OF ESTIMATE 10/20/95





KINDERGARTEN BUILDING

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

KINDERGATEN BUILDING	SIZE	AREA (SF)
1 KINDERGARTEN CLASSROOM	(30'-6")X(8'-6")+(17'-2")X(4'-1")+(((30'-6")+(18'-3"))X(12'-6")))/2	927
2 STORE ROOM	(10'-0")X(4'-3")+(((10'-0")+(4'-3"))X(5'-9")))/2	84
3 KINDERGARTEN CLASSROOM	(30'-6")X(8'-6")+(17'-2")X(4'-1")+(((30'-6")+(18'-3"))X(12'-6")))/2	927
4 TOILET	(7'-0")X(15'-0")(((15'-0")+(9'-3"))X(5'-9")))/2	175
5 OFFICE	(12'-6")X(9'-3")	116
6 OFFICE	(9'-0")X(12'-9")	115
7 CONFERENCE ROOM	(12'-6")X(12'-9")	159
SUBTOTAL KINDERGARTEN BUILDING		2,502
A ARCADE @ 1/3	((11'-6")X(36'-6")+(22'-3")X(15'-0"))/3+56 SQ.FT (IRREG.)	326
SUBTOTAL KINDERGARTEN BUILDING		326
TOTAL GROSS KINDERGARTEN BUILDING		2,828

*NON-CHARGEABLE AREAS

DIAGRAM OF BUILDING AREAS (3A)

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	22/2408
SCHOOL NAME	**COUNTY**
BELMONT ELEMENTARY SCHOOL #3	LOS ANGELES
SCHOOL ADDRESS	
680 LITTLE STREET, LOS ANGELES, CA. 90017	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
ABC ARCHITECTS AND ASSOCIATES	10/20/95

AREA SUMMARY	**AREA (SF)**
CLASSROOM BUILDING	
FIRST FLOOR	19,317
SECOND FLOOR	19,136
MULTI-PURPOSE BUILDING	8,960
KINDERGARTEN BUILDING	2,828
TOTAL GROSS	50,242
LESS NON-CHARGEABLE AREA	(1,566)
TOTAL CHARGEABLE AREA	**48,676**

*NON-CHARGEABLE AREAS

Section 2c: Instruction for Preparation of Building Envelope Calculation Worksheet

Building Envelope Calculation Worksheet as shown in the succeeding page (Electronic copy of worksheet could be obtained from respective project's Design Manager) shall be submitted at Schematic and Design Development documentation. Outlined below is the instruction for its preparation:

The Program Model Ratio assumes an efficient design. It will be determined once facility program area (in square foot) allowance is established and input in the space provided in the worksheet. The Envelope/Gross and Skin/Gross Ratios should be equivalent and should have a minimum value for an efficient design. Actual Model ratio should also be close enough or similar to Program Model Ratio. These values will be determined after accomplishing the following:

A. Gross Building Area Calculations
   1. First Floor is the first level of the building except parking. Parking should not be included in calculation of building area in any case.
   2. Open/Covered Corridor is counted or calculated as 1/3 of its actual area in the Total (will be done automatically in the e-copy with its built-in formula) but it should be input as full area in the worksheet. Open Corridor is defined as confined by two walls (either building walls or balcony walls), exposed to external air while Covered Corridor is confined by only one wall and covered.
   3. Lunch Shelter is also counted or calculated as 1/3 of its actual area in the Total but should be input as full area also in the worksheet.
   4. Follow 1 and 2 in calculation for Second Floor Level and above.

B. Building Envelope Area Calculations
   1. Building envelope area includes the exterior surface i.e. walls and roof of enclosed areas but not including parapet wall, open corridors, and external stairs.

C. Building Skin Area Calculations
   1. Building Skin is the area of all exterior building surfaces. This includes the Building envelope area as described above, one side of parapet walls, Corridor or Roof Overhangs, Balconies and other Soffits and one side of Balcony Wall or Rail.
   2. Any additional features that cover finished exterior walls should include area for the Architectural Feature and the exterior wall that is covered. An example is an angled faux wall. It will include the actual area of faux wall and the area of vertical wall behind it.

D. Glazing Calculations
   1. Wall glazing area includes all exterior wall window, storefront/curtainwalls/ clerestory in all floor levels.
   2. Roof glazing area includes the skylight.

BUILDING ENVELOPE CALCULATION WORKSHEET

Project Name:	ABC High School	**Program Square Foot:**	90,000
Project No.:	55.98888	**Design Square Foot:**	91,080
Project Manager:	TBD	**Design Allowance:**	$18,000,000
# of Classrooms:	32	**Architect's Estimate:**	$18,292,000
		Project Phase:	CD

MODEL RATIO[1]: 1.17	**ACTUAL RATIOS:**	
	Envelope/Gross:	**0.98**
	Skin/Gross:	**1.10**
	Glazing/Gross:	**0.04**
	Glazing/Envelope:	**0.04**

A. GROSS BUILDING AREA CALCULATIONS:

1. First Floor Area[2]:	42,836
a. First Floor Open/Covered Corridor[3]:	5,891
b. Lunch Shelter[4]:	2,438
2. Second Floor Area:	45,468
a. Second Floor Open/Covered Corridor:	
3. Third Floor Area:	
a. Third Floor Open/Covered Corridor:	
4. Fourth Floor Area:	
a. Fourth Floor Open/Covered Corridor:	
5. Fifth Floor Area:	
a. Fifth Floor Open/Covered Corridor:	
Total "A":	91,080

B. BUILDING ENVELOPE AREA CALCULATIONS[5]:

1. First Floor Wall Area:	19,694
2. Second Floor Wall Area:	23,976
3. Third Floor Wall Area:	
4. Fourth Floor Wall Area:	
5. Fifth Floor Wall Area:	
6. Roof Area:	45,468
Total "B":	89,138

C. BUILDING SKIN AREA CALCULATIONS[5]:

1. Building Envelope ("B"):	89,138
2. Parapet Wall (one-side):	1,892
3. Roof Overhang:	970
4. Overhang Soffit:	2,706
5. Balcony:	
6. Balcony Soffit:	
7. Balcony Wall or Rail (one-side):	
8. Architectural Features[6]	5,040
Total "C":	99,746

D. GLAZING CALCULATIONS:

I. WALL

a. Storefronts/Curtainwalls/Clerestory[7]:	
b. First Floor Windows:	3,082
c. Second Floor Windows:	
d. Third Story Windows:	
e. Fourth Story Windows:	
f. Fifth Story Windows:	
Total "D-I":	3,082

II. ROOF

a. Skylights:	200
Total "D-II":	200
Total "D":	3,282

FOOTNOTES:

[1]The Model Ratio assumes an efficient design, therefore the Envelope/Gross and Skin/Gross Model Ratios should be equivalent and have a minimum value.

[2]First Floor is first non parking level.

[3]Open/Covered Corridor is counted as 1/3 in the Total, input as full area. Open Corridor is defined as confined by two walls (either building walls or balcony walls), exposed to external air. Covered Corridor is defined as confined by maximum one wall and covered. Whereas, a walkway is confined by maximum one wall and uncovered.

[4]Lunch Shelter is counted as 1/3 in the Total, input as full area.

[5]Building envelope area includes the exterior surface of enclosed areas. The following items should not be included: parapet wall, open corridors, external stairs.

[6]Building skin area includes all exterior building surfaces. This includes the Building envelope Area, one side of parapet walls, Corridor or Roof Overhangs and their Soffits, Balconies and their Soffits and one side of Balcony Walls.

[7]Any additional features that cover finished exterior walls should include area for the Architectural Feature and the exterior wall that is covered. For example angled faux walls will include the area for that and the area for the vertical wall behind it.

[8]Storefronts/Curtainwalls may span multiple floors, ignore this area in Floor Window Areas.

Section 3a: Instruction for the Preparation of Schematic Uniformat Cost Estimate

1. Schematic Cost Estimate shall be submitted at Schematic Development. It should be prepared in UNIFORMAT developed by the General Services Administration (GSA). A copy of the Uniformat code of accounts have been reproduced and attached for reference.

2. Schematic Cost Estimate using UNIFORMAT must be clearly organized into 12 major group elements as established by GSA and shall be prepared on 8-1/2" x 11" sheets, containing the following:

   A. First or cover sheet

      a. Title block indicating:
         (1) Name and code of District
         (2) Name of project and address of proposed new facilities.
         (3) Project number.
         (4) Name of commissioned Architect.
         (5) Current date.

      b. 12-element summary with subtotal amount for each element. For multiple design schemes and /or stil l in scheme selection process, a summary comparison for multiple schemes with sub total amount for each element shall also be included. See sample in Section 3c.

      c. The commissioned Architect's signature

   B. Additional sheets containing:

      a. Add etailed description of building systems organized into 12 UNIFORMAT group elements.

      b. Level 2 through level 6 of cost breakdowns: Each line item includes applicable description, specifications, quantity, unit, unit cost, and subtotal. Lump sum amounts shall be held to an absolute minimum.

3. All quantities for items that can be measured directly from the drawing shall be derived by a takeoff. For systems such as electrical and mechanical, a cost per square foot may be used for items which are not yet shown on the drawings. Where size of quantity of a system can be assumed, this method is preferred to a cost per square foot allowance.

4. If the project has more than one building, a complete estimate of every building and an overall site construction estimate should be prepared. If there is a parking garage, it should also have a separate estimate that will include all work from its foundation to roof or elevated slab. Building estimate/cost will include all work within five feet outside the building perimeter. Site work estimates will be within five feet outside the building perimeter.

5. If the opinion of probable cost is exceeding the design allowance, value engineering and reduction of scope should be performed. Usual major source of budget overrun is exceeding the facility allotted or programmed area. It would be advisable to address the overage right away from this stage of design to avoid budget related problems in the future.

6. Cost estimate multipliers or mark-ups should be per District's direction as follows:

   a. Design Contingency
   - Contingency at Preliminary Schematic Design 10%
   - Contingency at Final Schematic Design 8%
   - Contingency at Design Development 5%
   - Contingency at 50% Construction Documents 2%
   - Contingency at 100% Construction Documents 0%

   b. General Requirements
   - General Conditions 10%
   - Overhead and Profit 5%
   - Bonds and Insurance 1 .5%

   c. Escalation
   - Annual escalation 3.5%

   It should be noted that the above multipliers or mark-ups were provided for District's internal use and for cost comparison purposes only. The commissioned Architect and their estimator should provide a separate summary to include their own recommendations in lieu of this District's direction to project their own independent opinion of probable cost of their proposed design.

   All cost estimate multipliers or mark-ups i.e. General Conditions, Bonds, and Design Contingency must be indicated as such and added to bottom of summary of each estimate to arrive at anticipated current bid cost without escalation. The cost estimate should reflect also the "normal market" condition. Escalation is then added to arrive at an anticipated bid cost for the work based on a specified bid date.

7. The estimate must be in precise uniformat as required and must be submitted in hard copy as well as in electronic copy that is readable by Microsoft Excel software.

8. Section 3c is the sample of the Schematic Design Cost Estimate in Uniformat for reference however; its data and figures are fictitious and should not be used as reference. In the stage of selecting the appropriate scheme, a component summary of multiple schemes should be included as well as the respective scheme's detailed estimate and after a scheme has been selected, only the selected scheme's summary and detailed estimate should be provided.

UNIFORMAT CODE OF ACCOUNTS

NOTE: This appendix shows UNIFORMAT levels 2 through 5. Level 6, which is not shown, would be a further breakdown of the level 5 item by types, sizes, material description, and individual quantities of labor and material.

For example, level 5, 08111 Cold Water Service, at level 6 detail would show a breakdown of:
... type of pipe, by diameter and lineal feet
... list of fittings
... type of valves, by size and number
... type of insulation, by diameter and lineal feet
... etc.

UNIFORMAT ELEMENT/ITEM

01 Foundations

011 Standard Foundations

0011 Wall Foundations
01111 Wall Footings
01112 Foundation Walls & Pilasters
01113 Excavating & Backfilling

0112 Column Foundations & Pile Caps
01121 Column Footings
01122 Pile Caps
01123 Column Piers & Base Plates
01124 Excavating & Backfilling

012 Special Foundation Conditions

0121 Pile Foundations
01211 Mobilization/Demobilization
01212 Pile Tests
01213 Piles

0122 Caissons
01221 Open Caissons
01222 Caisson Accessories
01223 Special Caissons

0123 Underpinning
01231 Temporary Shoring to Structure
01232 Excavating
01233 Sheeting & Shoring to Excavation
01234 Backfilling
01235 Concreting
01236 Formwork
01237 Steel Bar Reinforcing
01238 Cutoff Projecting Footings
01239 Grouting & Dry Packing

0124 Dewatering
01241 Pumping
01242 Well-Point
01243 Gravity Drainage

0125 Raft Foundations
01251 Slab Construction
01252 Base Courses
01253 Moisture Protection

0126 Other Special Foundation Conditions
01261 Removal of Old Foundations
01262 Rock Grouting
01263 Tunneling
01264 Shoring Existing Buildings

02 Substructure

021 Slab on Grade

0211 Standard Slab on Grade
02111 Slab Construction
02112 Base Courses
02113 Moisture Protection

0212 Structural Slab on Grade
02121 Slab Construction
02122 Grade Beams
02123 Base Courses
02124 Moisture Protection

0213 Inclined Slab on Grade
02131 Ramps
02132 Inclined Floor Slabs
02133 Stepped Slabs on Grade
02134 Steps

0214 Trenches, Pits, & Bases
02141 Trenches & Depression in Slabs
02142 Pits
02143 Equipment & Machine Bases

0215 Foundation Drainage
02151 Perimeter Drains
02152 Under Slab Drains

022 Basement Excavation

0221 Excavation for Basements
02211 Excavating
02212 Waste Material Disposal

0222 Structure Backfill & Compaction
02221 Structure Backfill with Excavated Material
02222 Borrow Backfill

0223 Shoring
02231 Sheeting and Shoring
02232 Tiebacks & Anchors
02233 Slurry Walls

023 Basement Walls

0231 Basement Wall Construction
02311 Basement Walls
02312 Pilasters
02313 Expansion & Construction Joints

0232 Moisture Protection
02321 Dampproofing
02322 Waterproofing

0233 Basement Wall Insulation

03 Superstructure

031 Floor Construction

0311 Suspended Basement Floor Construction
03111 Structural Frame
03112 Interior Structural Walls
03113 Floor Slabs & Decks
03114 Inclined & Stepped Floors
03115 Expansion & Contraction Joints

0312 Upper Floors Construction
03121 Structural Frame
03122 Interior Structural Walls
03123 Floor Slabs & Decks
03124 Inclined & Stepped Floors
03125 Expansion & Contraction Joints

0313 Balcony Construction
03131 Supported Balconies
03132 Cantilevered Balconies

0314 Ramps
03141 Pedestrian Ramps
03142 Vehicle Ramps

0315 Special Floor Construction
03151 Catwalks
03152 Space Frames
03153 Cable-Supported Floor Systems

032 Roof Construction

0321 Flat Roof Construction
03211 Structural Frame
03212 Interior Structural Walls
03213 Roof Slabs & Decks
03214 Expansion & Contraction Joints

0322 Pitched Roof Construction
03221 Frame & Trusses
03222 Roof Decking & Sheathing

0323 Canopies
03231 Supported Canopies
03232 Cantilevered Canopies

0324 Special Roof Systems
03241 Concrete Shells & Domes
03242 Hyperbolic Parabaloid Roofs
03243 Space Frames
03244 Barrel Vault Roofs
03245 Saw Tooth Roofs
03246 Cable-Supported Roofs
03247 Air-Supported Structures

033 Stair Construction

0331 Stair Structure
03311 Regular Stairs
03312 Curved Stairs
03313 Spiral Stairs
03314 Exterior Fire Escape Stairs
03315 Steps in Suspended Slabs

04 Exterior Closure

041 Exterior Walls

0411 Exterior Wall Construction
04111 Exterior Skin
04112 Insulation & Vapor Barriers
04113 Interior Skin
04114 Parapets
04115 Dampproof Courses
04116 Finish to Exposed Structure
04117 Expansion Joints
04118 Cornerstones

0412 Exterior Louvers & Screens
04121 Exterior Louvers
04122 Decorative Grilles & Screens
04123 Exterior Vents

0413 Sun Control Devices (Exterior)
04131 Projecting Sun Screens
04132 Awnings
04133 Exterior Shutters & Blinds

0414 Balcony Walls & Handrails
04141 Balcony Walls
04142 Balcony Railings
04143 Balcony Handrails
04144 Balcony Dividing Walls

0415 Exterior Soffits
04151 Building Soffits
04152 Balcony Soffits
04153 Canopy Soffits

042 Exterior Doors & Windows

0421 Windows
04211 Window Units & Hardware
04212 Glazing
04213 Wall Opening Elements
04214 Protective Window Elements
04215 Exterior Window Painting & Staining

0422 Curtain Walls
04221 Curtain Walls-Grid Systems
04222 Curtain Walls-Panel Systems

0423 Exterior Doors
04231 Glazed Doors & Entrances
04232 Solid Exterior Doors
04233 Revolving Doors
04234 Overhead Doors
04235 Special Doors & Entrances

0424 Storefronts

04241 Framing
04242 Panels & Bulkheads
04243 Doors & Hardware
04244 Glazing
04245 Rolling Grilles & Folding Closures
04246 Storefront Awnings
04247 Caulking

05 Roofing

No Level 3

0501 Roof Coverings
05011 Membrane Roofing
05012 Shingles & Roofing Tile
05013 Preformed Roofing
05014 Sheet Metal Roofing
05015 Expansion Joints & Covers

0502 Traffic Toppings & Paving Membrane
05021 Traffic Toppings
05022 Waterproof Membranes Below Paving
05023 Slatted Roof Decks & Walkways

0503 Roof Insulation & Fill
05031 Roof Vapor Barriers
05032 Roof & Deck Insulation
05033 Roof Fill

0504 Flashings & Trim
05041 Flashings
05042 Gravel Stops
05043 Fascia & Eaves
05044 Gutters & Downspouts
05045 Miscellaneous Roofing Specialties

0505 Roof Openings
05051 Glazed Roof Openings
05052 Hatches
05053 Gravity Roof Ventilators

Interior Construction

061 Partitions

0611 Fixed Partitions
06111 Solid Partitions
06112 Glazed Partitions
06113 Mesh Partitions

0612 Demountable Partitions
06121 Full Height Demountable Partitions
06122 Bank Height Demountable Partitions

0613 Retractable Partitions
06131 Accordion Folding Partitions
06132 Folding Leaf Partitions
06133 Coiling Partitions

0614 Compartments & Cubicles
06141 Toilet Partitions
06142 Shower & Dressing Compartments
06143 Hospital Cubicles

0615 Interior Balustrades & Screens
06151 Stair Balustrades
06152 Balustrades At Floor Openings
06153 Interior Grilles & Decorative Screens

0616 Interior Doors & Frames
06161 Interior Doors
06162 Interior Door Frames
06163 Interior Door Hardware
06164 Interior Door Wall Opening Element
06165 Interior Door Sidelights & Transoms
06166 Interior Door Painting & Staining
06167 Hatches & Access Doors

0617 Interior Storefronts
06171 Framing
06172 Panels & Bulkheads
06173 Doors & Hardware
06174 Glazing
06175 Rolling Grilles & Folding Closures

062 Interior Finishes

0621 Wall Finishes
06211 Wall Finishes to Inside Exterior Wall
06212 Wall Finishes to Interior Walls
06213 Column Finishes

0622 Flooring

06221 Screens & Toppings
06222 Floor Finishes
06223 Bases, Curbs & Trim
06224 Stair Finish
06225 Access Flooring (Pedestal Floors)

0623 Ceiling Finishes
06231 Ceiling Finishes Applied to Structure
06232 Suspended Ceilings
06233 Special Ceilings
06234 Stair Soffits
06235 Expansion Joint Covers

063 Specialties

0631 General Specialties

06311 Chalk & Tackboards
06312 Identifying Devices
06313 Lockers
06314 Toilet & Bath Accessories
06315 Storage Shelving
06316 Miscellaneous Metalwork
06317 Miscellaneous Specialties

0632 Built-in Fittings
06321 Counters & Vanities
06322 Kitchen Cabinets
06323 Closets
06324 Miscellaneous Built-in Cabinetwork

07 Conveying Systems
No Level 3

0701 Elevators
07011 Passenger Elevators
07012 Freight Elevators

0702 Moving Stairs & Walks
07021 Escalators
07022 Moving Walks

0703 Dumbwaiters
07031 Hand-Operated Dumbwaiters
07032 Electric-Operated Dumbwaiters

0704 Pneumatic Tube Systems
07041 Pneumatic Message Tube Systems
07042 Pneumatic Trash Tube Systems
07043 Pneumatic Linen Tube Systems

0705 Other Conveying Systems
07051 Lifts
07052 Hoists & Cranes
07053 Conveyors
07054 Chutes
07055 Turntables

0706 General Construction Items

07061 Hoistway Beams
07062 Hydraulic Elevator Shaft Drilling
07063 Miscellaneous Metals
07064 Lintels to Openings
07065 Concrete Work
07066 Masonry Work
07067 Painting

08 Mechanical

081 Plumbing

0811 Domestic Water Supply System
08111 Cold Water Service
08112 Hot Water Service
08113 Domestic Water Supply Equipment

0812 Sanitary Waste & Vent System

08121 Waste Piping & Fittings
08122 Vent Piping & Fittings
08123 Floor Drains
08124 Sanitary Waste Equipment
08125 Thermal Pipe Insulation

0813 Rainwater Drainage System
08131 Pipe & Fittings
08132 Roof Drains
08133 Rainwater Drainage Equipment
08134 Thermal Pipe Insulation

0814 Plumbing Fixtures
08141 Bath Tubs
08142 Bidets
08143 Kitchen Sinks
08144 Laundry Sinks & Trays
08145 Lavatories
08146 Mop Sinks
08147 Service Sinks
08148 Showers
08149 Urinals
081410 Water Closets
081411 Wash Fountains
081412 Drinking Fountains & Coolers

082 HVAC

0821 Energy Supply
08211 Oil Supply System
08212 Gas Supply System
08213 Coal Supply System
08214 Steam Supply System
08215 Solar Energy Supply System
08216 Wind Energy Supply System

0822 Heat Generating System
08221 Steam Boilers
08222 Hot Water Boilers
08223 Furnaces
08224 Boiler Room Piping & Specialties
08225 Auxiliary Equipment
08226 Equipment Thermal Insulation

0823 Cooling Generating Systems
08231 Chilled Water Systems
08232 Direct Expansion Systems

0824 Distribution Systems
08241 Air Distribution
08242 Exhaust Ventilation Systems
08243 Steam Distribution
08244 Hot & Chilled Water Distribution
08245 Change Over Distribution Systems
08246 Glycol Heating Distribution System

0825 Terminal& Package Units
08251 Terminal Units
08252 Packaged Units

0826 Controls & Instrumentation
08261 Air-Conditioning Systems
08262 Energy Supply System

08263 Heat-Generating System
08264 Cooling-Generating System
08265 Special Mechanical Systems
08266 Instrument Panels
08267 Instrument Air Compressor
08268 Gas Purging System

0827 Systems Testing & Balancing
08271 Water Side Testing & Balancing
08272 Air Side Testing & Balancing

083 Fire Protection

0831 Water Supply (Fire Protection)
08311 Water Connection
08312 Pipe & Fittings
08313 Valves

0832 Sprinklers
08321 Wet Sprinkler System
08322 Dry Sprinkler System

0833 Standpipe Systems
08331 Standpipe Equipment
08332 Fire Hose Equipment
08333 Pumping Equipment

0834 Fire Extinguishers
08341 Hand-Held Fire Extinguishers
08342 Wheeled Cart Fire Extinguishers
08343 Fire Extinguisher Cabinets

084 Special Mechanical Systems

0841 Special Plumbing Systems
08411 Special Piping Systems
08412 Acid Waste Systems
08413 Interceptors
08414 Pool Equipment
08415 Special Plumbing Fixtures

0842 Special Fire Protection Systems
08421 Carbon Dioxide Extinguishing Equipment
08422 Foam-Generating Equipment
08423 Halon System Equipment
08424 Hood & Duct Fire Protection

0843 Miscellaneous Special Systems & Devices
08431 Special Cooling Systems & Devices
08432 Process Heating
08433 Storage Cells & Devices
08434 Dust & Fume Collectors
08435 Deodorizing Equipment
08436 Carbon Monoxide Equipment
08437 Sound Attenuating Equipment
08438 Special Waste Treatment Devices

09 Electrical

91 Service & Distribution

0911 High Tension Service & Distribution
09111 High Tension System Monitoring
09112 High Tension System Equipment
09113 High Tension System Distribution

0912 Low Tension Service & Distribution
09121 Low Tension System Monitoring
09122 Low Tension System Equipment
09123 Low Tension System Distribution

92 Lighting and Power

0921 Branch Wiring
09211 Wiring Circuits
09212 Branch Wiring Devices

0922 Lighting Equipment
09221 Fluorescent Interior Lighting Fixtures
09222 Incandescent Interior Lighting Fixtures
09223 Other Lighting Fixtures & Equipment

093 Special Electrical Systems

0931 Communications & Alarm Systems
09311 Public Address Systems
09312 Central Music Systems
09313 Intercommunication Systems
09314 Paging Systems
09315 Utility Telephone Systems
09316 Nurses' Call System
09317 In-Out Registers
09318 Bell Systems
09319 Television Systems
093110 Clock & Program Systems
093112 Burglar Alarm Systems
093113 Other Systems

0932 Grounding Systems
09321 Lightning Protection
09322 Building Ground Systems
09323 Special Grounding Systems

0933 Emergency Light & Power
09331 Emergency Generator Systems
09332 Emergency Battery Systems
09333 Other Emergency Light & Power Systems

0934 Electric Heating

09341 Heating Equipment
09342 Control Devices
09343 Branch Wiring
09344 Other Heating Systems

0935 Floor Raceway Systems
09351 Standard Underfloor Duct Systems

09352 Header (Feeder) Duct
09353 Industrial (square) Duct
09354 Trench Duct
09355 Wiring Devices & Accessories

0936 Other Special Systems & Devices
09361 Special Lighting Systems
09362 Special Protective Systems & Devices
09363 Special Electronic Controls

0937 General Construction Items
09371 Cuffing & Patching
09372 Trenching & Backfill
09373 Painting .
09374 Equipment Installation Items

11 Equipment

111 Foxed & Movable Equipment

1111 Built-in Maintenance Equipment
11111 Window Washing Equipment
11112 Vacuum Cleaning System

1112 Checkroom Equipment
11121 Manual Checkroom Equipment
11122 Automatic Storage & Retrieval Cheekroom Equipment

1113 Food Service Equipment
11131 Refrigeration Cases
11132 Insulated Rooms
11133 Storage Units
11134 Cooking Equipment
11135 Food Preparation Machines
11136 Food Serving Units
11137 Washing Units & Conveyors

1114 Vending Equipment
11141 Hot Drink Vending Unit
11142 Cold Drink Vending Unit
11143 Hot Food Vending Unit
11144 Cold Food Vending Unit
11145 Cigarette Vending Unit
11146 Condiment Unit & Counter
11147 Refuse Unit
11148 Coin Changer
11149 Microwave Oven
111410 Bases for Unit

1115 Waste Handling Equipment
11151 Waste Compactors
11152 Incinerators
11153 Waste Storage Containers
11154 Pulping Machines & Systems

1116 Loading Dock Equipment
11161 Dock Levellers
11162 Levelling Platforms
11163 Dock Bumpers
11164 Dock Seats & Shelters

1117 Parking Equipment
11171 Parking Bumpers & Guard Rails
11172 Parking Control Equipment

1118 Detention Equipment
11181 Cell & Corridor Construction
11182 Cell Accessories
11183 Courtroom Security Devices
11184 Detention Screens

1119 Postal Equipment
11191 Mail Boxes
11192 Post Office Equipment

11110 Other Specialized Equipment
111101 Darkroom Equipment
111102 Educational Equipment
111103 Athletic Equipment
111104 Laboratory Equipment
111105 Laundry Equipment
111106 Library Equipment
111107 Medical Equipment
111108 Mortuary Equipment
111109 Residential Equipment
111110 Auditorium & Stage Equipment
111111 Miscellaneous Specialized Equipment

112 Furnishings

1121 Artwork
11211 Bases & General Contract Work for Artwork & Sculpture

1122 Window Treatment
11221 Blinds
11222 Interior Shutters
11223 Roll Shades
11224 Curtains & Drapes

1123 Seating
11231 Auditorium Seating
11232 Bleachers

113 Special Construction

1131 Vaults
11311 Steel Vault Linings
11312 Vault Doors & Frames
11313 Vault Ventilation
11314 Prefabricated Vaults

1132 Interior Swimming Pools
11321 Prefabricated Swimming Pools
11322 Swimming Pool Equipment

1133 Modular Prefabricated Assemblies

1134 Special Purpose Rooms
11341 Audiometric Room
11342 Clean Room
11343 Hyperbaric Room
11344 Sauna
11345 Fallout Shelters (Interior)

1135 Other Special Construction
11351 Radiation Protection
11352 Radio Frequency Shielding

12 Site Work

121 Site Preparation

1211 Clearing
12111 Clearing & Grubbing
12112 Tree Removal
12113 Selective Thinning
12114 Tree Pruning

1212 Demolition
12121 Building Demolition
12122 Site Demolition
12123 Relocations

1213 Site Earthwork
12131 Site Grading
12132 Site Excavating
12133 Borrow Fill
12134 Soil Stabilization
12135 Soil Treatment
12136 Site Dewatering
12137 Site Shoring

122 Site Improvements

1221 Parking Lots
12211 Parking Lot Paving & Surfacing
12212 Curbs, Rails & Barriers
12213 Parking Booths & Equipment

1222 Roads, Walks, & Terraces
12221 Roads
12222 Walks
12223 Terraces & Plazas

1223 Site Development
12231 Fences & Gates
12232 Walls
12233 Signs
12234 Site Furnishings
12235 Fountains, Pools & Watercourses
12236 Playing Field & Sports Facilities
12237 Flagpoles
12238 Miscellaneous Structures

1224 Landscaping
12241 Fine Grading & Soil Preparation
12242 Top Soil & Planting Beds
12243 Seeding & Sodding
12244 Planting
12245 Planters
12246 Special Landscape Feature

123 Site Utilities

1231 Water Supply & Distribution
12311 Potable Water Systems
12312 Fire Protection Systems
12313 Process Water Systems
12314 Irrigation Systems

1232 Drainage & Sewerage Systems
12321 Storm Drainage
12322 Sanitary Sewer
12323 Process & Acid Waste Systems
12324 Combined Drainage & Sewerage Systems

1233 Heating & Cooling Systems
12331 Heating System
12332 Cooling Systems

1234 Gas Distribution Systems
12341 Natural Gas Systems
12342 Other Gas Systems

1235 Electric Distribution & Lighting Systems
12351 Overhead Power Services
12352 Underground Services
12353 Exterior Yard & Road Lighting
12354 Exterior Flood Lighting
12355 Exterior Lighting Controls
12356 Exterior Sign Lighting

1236 Snow Melting Systems
12361 Piped Snow Melting Systems
12362 Electrical Snow Melting Systems

1237 Service Tunnels
12371 Excavating & Backfilling
12372 Constructed Service Tunnel
12373 Prefabricated Service Tunnels
12374 Moisture Protection
12375 Insulation
12376 Miscellaneous Items

124 Off-Site Work

1241 Railroad Work

1242 Marine Work

1243 Tunneling

1244 Other Off-Site Work

10 General Conditions & Profit

1001 Mobilization & Initial Expenses
10011 Mobilization
10012 Permits & Fees
10013 Insurance & Bonds

1002 Site Overhead
10021 Site Supervisory & Emergency Staff
10022 Labor On-Costs
10023 Sales & Use Taxes
10024 Construction Equipment
10025 Site Office Operating Costs
10026 Temporary Facilities
10027 Site Protection Security
10028 Cleanup
10029 Inspection & Testing
100210 Winter Conditions
100211 Miscellaneous Site Overheads

1003 Demobilization
10031 Temporary Enclosures (Removal)
10032 Temporary Buildings (Removal)
10033 Temporary Services (Removal)
10034 Equipment Demobilization
10035 Final Clean-up
10036 Repairing Sidewalks & Streets
10037 Punch List & Warranties
10038 Maintenance Manuals & As-built Drawings
10039 Staff Relocation Costs
100310 Opening Ceremonies

1004 Main Office Expense & Profit
10041 Main Office Expense
10042 Profit

Section 3c: Sample of Schematic Design Cost Estimate – Uniformat

1. Component summary of 3 schemes showing respective scheme's total cost. This should be provided during the selection process of ideal scheme.

2. Component summary of selected scheme.

3. Detailed estimate of selected scheme. Detailed estimate of other schemes should also be provided during the ideal scheme selection process.

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

COMPONENT SUMMARY -SCHEMES 1, 2, and 3

UNIFORMAT ELEMENT		Scheme 1	Cost/SF	Scheme 2	Cost/SF	Scheme 3	Cost/SF
01 FOUNDATIONS		$492,253	$6.38	$456,008	$5.91	$468,992	$6.08
02 SUBSTRUCTURE		$1,054,326	$13.66	$975,231	$12.63	$990,225	$12.83
03 SUPERSTRUCTURE		$3,221,829	$41.73	$3,100,560	$40.16	$3,215,525	$41.65
04 EXTERIOR CLOSURE		$2,789,774	$36.14	$2,756,000	$35.70	$2,796,550	$36.22
05 ROOFING		$667,938	$8.65	$670,222	$8.68	$685,000	$8.87
06 INTERIOR CONSTRUCTION		$2,308,762	$29.91	$2,425,003	$31.41	$2,488,966	$32.24
07 CONVEYING		$145,000	$1.88	$145,000	$1.88	$145,000	$1.88
08 MECHANICAL		$2,666,072	$34.53	$2,645,542	$34.27	$2,678,000	$34.69
09 ELECTRICAL		$2,291,430	$29.68	$2,285,000	$29.60	$2,297,850	$29.76
10 GC, OH & P		$0	$0.00	$0	$0.00	$0	$0.00
11 EQUIPMENT		$238,450	$3.09	$238,450	$3.09	$238,450	$3.09
12 SITE WORK		$1,826,216	$23.66	$1,820,225	$23.58	$1,800,562	$23.32
SUBTOTAL		**$17,702,049**	**$229.30**	**$17,517,241**	**$226.91**	**$17,805,120**	**$230.64**
General Conditions	10.0%	$1,770,205	$22.93	$1,751,724	$22.69	$1,780,512	$23.06
SUBTOTAL		**$19,472,254**	**$252.23**	**$19,268,965**	**$249.60**	**$19,585,632**	**$253.70**
GC'S OH & P	5.0%	$973,613	$12.61	$963,448	$12.48	$979,282	$12.68
SUBTOTAL		**$20,445,867**	**$264.84**	**$20,232,413**	**$262.08**	**$20,564,914**	**$266.38**
Bonds and Insurance	1.5%	$306,688	$3.97	$303,486	$3.93	$308,474	$4.00
SUBTOTAL		**$20,752,555**	**$268.82**	**$20,535,900**	**$266.01**	**$20,873,387**	**$270.38**
Design Contingency	10.0%	$2,075,256	$26.88	$2,053,590	$26.60	$2,087,339	$27.04
TOTAL CURRENT BID COST		***$22,827,811***	***$295.70***	***$22,589,490***	***$292.61***	***$22,960,726***	***$297.42***
Escalation to BID DATE Jan 05 @ 3.5% PER YEAR	7.0%	$1,597,947	$20.70	$1,581,264	$20.48	$1,607,251	$20.82
TOTAL ANTICIPATED BID COST		***$24,425,757***	***$316.40***	***$24,170,754***	***$313.09***	***$24,567,977***	***$318.24***

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

COMPONENT SUMMARY -SCHEME 1

UNIFORMAT ELEMENT		SITE WORK	CLASSROOM/ ADMIN/ LIBRARY/ KINDERGARTEN	MULTI-PURPOSE AREAS	PARKING	TOTAL	Cost/SF
01 FOUNDATIONS			$310,160	$0	$182,093	**$492,253**	$6.38
02 SUBSTRUCTURE			$221,925	$34,010	$798,391	**$1,054,326**	$13.66
03 SUPERSTRUCTURE			$2,057,897	$437,538	$726,395	**$3,221,829**	$41.73
04 EXTERIOR CLOSURE			$2,394,974	$388,800	$6,000	**$2,789,774**	$36.14
05 ROOFING			$508,061	$108,804	$51,073	**$667,938**	$8.65
06 INTERIOR CONSTRUCTION			$1,957,057	$298,082	$53,623	**$2,308,762**	$29.91
07 CONVEYING			$65,000	$15,000	$65,000	**$145,000**	$1.88
08 MECHANICAL			$1,961,988	$416,807	$287,278	**$2,666,072**	$34.53
09 ELECTRICAL			$1,856,489	$324,556	$110,385	**$2,291,430**	$29.68
10 GC, OH & P			$0	$0	$0	**$0**	$0.00
11 EQUIPMENT			$64,962	$154,463	$19,025	**$238,450**	$3.09
12 SITE WORK		$1,826,216	$0	$0	$0	**$1,826,216**	$23.66
SUBTOTAL		**$1,826,216**	**$11,398,511**	**$2,178,060**	**$2,299,262**	**$17,702,049**	**$229.30**
General Conditions	10.0%	$182,622	$1,139,851	$217,806	$229,926	$1,770,205	$22.93
SUBTOTAL		**$2,008,838**	**$12,538,362**	**$2,395,866**	**$2,529,188**	**$19,472,254**	**$252.23**
GC'S OH & P	5.0%	$100,442	$626,918	$119,793	$126,459	$973,613	$12.61
SUBTOTAL		**$2,109,280**	**$13,165,280**	**$2,515,659**	**$2,655,648**	**$20,445,867**	**$264.84**
Bonds and Insurance	1.5%	$31,639	$197,479	$37,735	$39,835	$306,688	$3.97
SUBTOTAL		**$2,140,919**	**$13,362,759**	**$2,553,394**	**$2,695,482**	**$20,752,555**	**$268.82**
Design Contingency	10.0%	$214,092	$1,336,276	$255,339	$269,548	$2,075,256	$26.88
TOTAL CURRENT BID COST		***$2,355,011***	***$14,699,035***	***$2,808,734***	***$2,965,030***	***$22,827,811***	***$295.70***
Escalation to BID DATE Jan 05 @ 3.5% PER YEAR	7.0%	$164,851	$1,028,932	$196,611	$207,552	$1,597,947	$20.70
TOTAL ANTICIPATED BID COST		***$2,519,862***	***$15,727,968***	***$3,005,345***	***$3,172,583***	***$24,425,757***	***$316.40***

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - SITE WORK - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
12 SITE WORK					
Site clearing and grading					
Clearing and grubbing	188,000	SF	$ 0.20	$ 37,600	
Rough grading, including allowance for cut and fill	188,000	SF	$ 0.75	$ 141,000	
Fine grading	188,000	SF	$ 0.25	$ 47,000	
Overexcavate and recompact under paved areas (2' deep)	7,500	CY	$ 8.00	$ 60,000	
Vehicular paving					
Parking lot paving	11,340	SF	$ 4.00	$ 45,360	
Service yard paving	1,660	SF	$ 7.00	$ 11,620	
Parking lot striping	36	EA	$ 30.00	$ 1,080	
Parking wheel stop	36	EA	$ 60.00	$ 2,160	
Signage allowance	12,750	SF	$ 0.20	$ 2,550	
Pedestrian paving					
Concrete paving to hardscape areas	4,000	SF	$ 6.00	$ 24,000	
Accent paving to courtyard	6,350	SF	$ 10.00	$ 63,500	
Corridor paving	9,007	SF	$ 7.00	$ 63,049	
Concrete topping @ lunch shelter	6,712	SF	$ 5.00	$ 33,560	
Waterproofing @ lunch shelter	6,713	SF	$ 6.00	$ 40,278	
Signage allowance	41,764	SF	$ 0.10	$ 4,176	
Games and sport surfaces					
Asphalt concrete paving to apparatus area	66,585	SF	$ 3.00	$ 199,755	
Premium for Fire Department access road	9,900	SF	$ 2.00	$ 19,800	
Allowance for striping game surfaces	1	LS	$ 5,000.00	$ 5,000	
Site structure					
Fences and gates					
Chain link fence perimeter	1,175	LF	$ 40.00	$ 47,000	
Chain link fence to kindergarten	360	LF	$ 40.00	$ 14,400	
Metal fence/ sliding gate/ swinging gate	89	LF	$ 225.00	$ 20,025	
Chain link swing gate, 6'/2	2	EA	$ 1,750.00	$ 3,500	
Chain link swing gate, 10'/2	1	EA	$ 3,000.00	$ 3,000	
Chain link swing gate, single	5	EA	$ 1,000.00	$ 5,000	
Chain link swing gate, fire truck access, 20'/2	2	EA	$ 5,000.00	$ 10,000	
Walls					
CMU perimeter wall	4,838	SF	$ 19.00	$ 91,922	
CMU perimeter wall foundation	87	CY	$ 450.00	$ 39,150	
Trash enclosure	300	SF	$ 50.00	$ 15,000	
Playground equipment and structures					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - SITE WORK - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Play structure for kindergarten	1	EA	$ 12,000.00	$ 12,000	
Resilient play surfaces	720	SF	$ 16.00	$ 11,520	
Basketball backstop	6	EA	$ 2,500.00	$ 15,000	
Tetherball post	4	EA	$ 1,000.00	$ 4,000	
Handball					
CMU wall, painted	405	SF	$ 22.00	$ 8,910	
Foundation	9	CY	$ 450.00	$ 4,050	
Site furnishings					
Flagpoles	1	EA	$ 4,000.00	$ 4,000	
Protective bollards	10	EA	$ 350.00	$ 3,500	
Exterior signage	1	LS	$ 10,000.00	$ 10,000	
Bike racks	1	LS	$ 3,000.00	$ 3,000	
Landscaping					
Soil preparation, topsoil	35,000	SF	$ 0.50	$ 17,500	
Shrubs and groundcover	15,964	SF	$ 3.00	$ 47,892	
Lawns and turf to field areas	19,036	SF	$ 1.50	$ 28,554	
Trees	30	EA	$ 400.00	$ 12,000	
Lawn irrigation	19,036	SF	$ 1.50	$ 28,554	
Strip Irrigation	15,964	SF	$ 2.75	$ 43,901	
Irrigation to trees	30	EA	$ 150.00	$ 4,500	
Site lighting					
Allowance for site lighting	1	LS	$ 40,000.00	$ 40,000	
Off-site street improvement					
Concrete driveway approach	700	SF	$ 12.00	$ 8,400	
General off-site clearing	19,000	SF	$ 0.25	$ 4,750	
Concrete curb	1,900	LF	$ 15.00	$ 28,500	
Concrete sidewalk	16,000	EA	$ 5.00	$ 80,000	
Street lights	20	EA	$ 5,000.00	$ 100,000	
Allow for street trees	56	EA	$ 1,200.00	$ 67,200	
Allow for site utilities	188,000	SF	$ 1.00	$ 188,000	
Site work Subtotal					**$ 1,826,216**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
01 FOUNDATIONS					
Excavation					
Overexcavate and remove soils under building areas extending 5' from the outside of building, backfilling with excavated material, 4' deep	5,744	CY	$ 15.00	$ 86,160	
Reinforced concrete including excavation					
Conventional spread footing	31,000	SF	$ 7.00	$ 217,000	
Elevator pit	1	EA	$ 7,000.00	$ 7,000	
01 Subtotal					**$ 310,160**
02 SUBSTRUCTURE					
Floor at lowest level					
Reinforced concrete slab-on grade, 5"	31,000	SF	$ 6.00	$ 186,000	
Concrete curb	2,395	LF	$ 15.00	$ 35,925	
02 Subtotal					**$ 221,925**
03 SUPERSTRUCTURE					
Columns and pilasters					
Steel columns (allow 3 lbs/sf)	104	T	$ 3,000.00	$ 312,000	
Shear bracing					
Steel bracing (allow 4.5 lbs/sf)	157	T	$ 3,000.00	$ 471,000	
Suspended floors					
Steel framing (allow 4.5 lbs/sf)	68	T	$ 3,000.00	$ 204,000	
Metal deck with concrete topping	27,068	SF	$ 7.00	$ 189,476	
Roof					
Steel framing (allow 4.5 lbs/sf)	121	T	$ 3,000.00	$ 363,000	
Metal deck	41,516	SF	$ 4.50	$ 186,822	
Roof sheathing	6,253	SF	$ 2.50	$ 15,633	
Fireproofing steel					
Fireproofing to steel works	64,322	SF	$ 2.00	$ 128,644	
Miscellaneous					
Miscellaneous metals	64,322	SF	$ 1.00	$ 64,322	
Allowance for premium for exposed steel	42	Ton	$ 1,500.00	$ 63,000	
Staircase flights, floor to floor					
Metal pan steel staircase including railing	3	EA	$ 20,000.00	$ 60,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
03 Subtotal					**$ 2,057,897**
04 EXTERIOR CLOSURE					
Wall framing, furring and insulation					
Metal stub framing	76,333	SF	$ 6.00	$ 457,998	
Exterior sheathing, gypsum board	74,129	SF	$ 2.65	$ 196,442	
Batt insulation	74,129	SF	$ 0.65	$ 48,184	
Applied exterior finishes					
Cement plaster	64,349	SF	$ 9.00	$ 579,141	
Galvanized metal siding	7,452	SF	$ 12.00	$ 89,424	
Interior finish to exterior walls					
Gypsum board, taped and sanded	65,852	SF	$ 2.65	$ 174,508	
Paint to gypsum board	65,852	SF	$ 0.65	$ 42,804	
Windows, glazing and louvers					
Glazed aluminum framed windows	5,816	SF	$ 48.00	$ 279,168	
Glazed aluminum curved window	186	SF	$ 70.00	$ 13,020	
Security grilles	3,050	SF	$ 30.00	$ 91,500	
Sunscreen louvers	2,000	SF	$ 25.00	$ 50,000	
Exterior doors, frames and hardware					
Hollow metal doors and frames					
Single	98	EA	$ 1,400.00	$ 137,200	
Double	4	EA	$ 1,500.00	$ 6,000	
Fascias, bands, screens and trim					
Metal fascia	463	LF	$ 30.00	$ 13,890	
Soffits					
Paint to exposed soffit	16,600	SF	$ 1.00	$ 16,600	
Trellis at main entrance	1,426	SF	$ 50.00	$ 71,300	
Balustrades, parapets and roof screens					
Built up roofing to back of parapet walls	5,949	SF	$ 4.50	$ 26,771	
Metal guardrail at corridors	463	LF	$ 175.00	$ 81,025	
Mechanical equipment screens	1	LS	$ 20,000.00	$ 20,000	
04 Subtotal					**$ 2,394,974**
05 ROOFING					
Waterproofing slabs					
Waterproofing elevator pits	1	EA	$ 1,000.00	$ 1,000	
Waterproofing to deck	7,573	SF	$ 5.00	$ 37,865	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Insulation					
Rigid board insulation	41,516	SF	$ 3.00	$ 124,548	
Roofing					
Built-up roofing	31,887	SF	$ 4.50	$ 143,492	
Sloped corrugated metal roof	6,253	SF	$ 15.00	$ 93,795	
Roof or deck traffic surfaces					
Concrete topping to covered corridor	7,573	SF	$ 5.00	$ 37,865	
Mechanical equipment pads	1	LS	$ 15,000.00	$ 15,000	
Roofing upstands and sheet metal					
Allow for miscellaneous flashing and sheet metal	38,140	SF	$ 0.50	$ 19,070	
Caulking and sealants					
Miscellaneous caulking and sealants	65,852	SF	$ 0.50	$ 32,926	
Roof access and ventilation					
Roof access hatch and ladder	1	EA	$ 2,500.00	$ 2,500	
05 Subtotal					**$ 508,061**
06 INTERIOR CONSTRUCTION					
Partition framing					
Metal stud framing					
Typical walls	26,930	SF	$ 4.00	$ 107,720	
Chase walls	7,686	SF	$ 8.00	$ 61,488	
Elevator shaft walls	2,394	SF	$ 5.00	$ 11,970	
Partition surfacing					
Gypsum board, taped and sanded	70,546	SF	$ 2.65	$ 186,947	
Batt insulation	44,156	SF	$ 0.70	$ 30,909	
Paint to gypsum board	70,546	SF	$ 0.65	$ 45,855	
Shaft wall liner	2,394	SF	$ 3.00	$ 7,182	
Sound insulation					
Acoustical insulation	36,470	SF	$ 0.60	$ 21,882	
Interior doors and frames					
Interior doors, single leaf	59	EA	$ 1,400.00	$ 82,600	
Window walls and borrowed lights					
Allowance for interior glazing	150	SF	$ 40.00	$ 6,000	
Floor					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Vinyl composition tiles	43,873	SF	$ 2.50	$ 109,683	
Carpet	10,924	SF	$ 3.50	$ 38,234	
Ceramic tile	3,306	SF	$ 14.00	$ 46,284	
Walls					
Ceramic tile walls, 4' high	4,756	SF	$ 15.00	$ 71,340	
Bases					
Rubber base	8,662	LF	$ 1.50	$ 12,993	
Ceramic tile base	1,189	LF	$ 9.00	$ 10,701	
Ceiling					
Acoustic tile ceiling	53,908	SF	$ 2.50	$ 134,770	
Gypsum board ceiling system	4,195	SF	$ 7.00	$ 29,365	
Ceiling bulkheads	840	LF	$ 50.00	$ 42,000	
Prefabricated compartment and accessories					
Toilet partitions	40	EA	$ 1,000.00	$ 40,000	
Urinal partitions	8	EA	$ 500.00	$ 4,000	
Toilet accessories	62	EA	$ 500.00	$ 31,000	
Soap and towel dispenser in Classroom	42	EA	$ 200.00	$ 8,400	
Shelving and millwork					
Janitor shelf and mop rack	4	EA	$ 350.00	$ 1,400	
Library shelving	1,350	LF	$ 60.00	$ 81,000	
Cabinets and countertops					
Classroom casework					
Teacher's learning unit	42	EA	$ 8,500.00	$ 357,000	
Storage cabinet/Teacher's wardrobe	42	EA	$ 1,500.00	$ 63,000	
TV cabinet	42	EA	$ 1,500.00	$ 63,000	
Base cabinet with sink	222	LF	$ 300.00	$ 66,600	
Coat hook, 4'	42	EA	$ 200.00	$ 8,400	
Administration casework	1	LS	$ 25,000.00	$ 25,000	
Library casework	1	LS	$ 30,000.00	$ 30,000	
Teacher's workroom casework	5	EA	$ 4,000.00	$ 20,000	
Chalkboard, insignia and graphics					
Marker boards	1,344	SF	$ 15.00	$ 20,160	
Tack board surfaces	6,001	SF	$ 8.00	$ 48,008	
Interior signage	64,332	SF	$ 0.50	$ 32,166	
06 Subtotal					**$ 1,957,057**
07 CONVEYING					
Elevators					
Hydraulic elevator, 2 stops	1	EA	$ 65,000.00	$ 65,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
07 Subtotal					**$ 65,000**
08 MECHANICAL					
Plumbing System					
Sanitary fixtures and connecting piping					
Water closets	57	EA	$ 1,150.00	$ 65,550	
Urinals	12	EA	$ 1,100.00	$ 13,200	
Lavatory	40	EA	$ 950.00	$ 38,000	
Shower	1	EA	$ 1,350.00	$ 1,350	
Sinks	42	EA	$ 1,050.00	$ 44,100	
Service sinks	2	EA	$ 1,250.00	$ 2,500	
Drinking fountain	5	EA	$ 2,850.00	$ 14,250	
Sanitary waste, vent and service pipe work					
Floor drains and sinks, <=4"	1	LS	$ 15,000.00	$ 15,000	
Hose bibs, 3/4"	1	LS	$ 7,500.00	$ 7,500	
Rough-in waste, vent, domestic cold and hot water pipe work including valves, specialties and insulation	159	EA	$ 1,800.00	$ 286,200	
Reduced pressure backflow preventers	1	LS	$ 3,000.00	$ 3,000	
Condensate drainage	1	LS	$ 10,000.00	$ 10,000	
Elevator drains					
Sump pit, pumps, pipe work, holding tanks and controls - allow	1	LS	$ 6,000.00	$ 6,000	
Water treatment, storage and circulation					
Domestic water heater, gas fired including circulating pumps and expansion tanks	1	LS	$ 20,000.00	$ 20,000	
Natural gas distribution	64,322	SF	$ 0.50	$ 32,161	
Roof and surface water drainage	64,322	SF	$ 1.00	$ 64,322	
Testing and disinfecting	80	HR	$ 95.00	$ 7,600	
HVAC System					
Piping, fittings valve and insulation					
Refrigerant pipe work, <1" with insulation	350	LF	$ 25.00	$ 8,750	
Air handling equipment					
Packaged rooftop air conditioning units, gas heating and electric cooling, prefabricated roof curb, spring isolator and seismic restraints					
Classrooms, 5 tons	35	EA	$ 10,000.00	$ 350,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Special education, 3 tons	4	EA	$ 6,610.00	$ 26,440	
Administration, 2 tons	3	EA	$ 5,000.00	$ 15,000	
Library, 5 tons	1	EA	$ 10,000.00	$ 10,000	
Split system air conditioning unit					
Small group rooms, 2 tons	4	EA	$ 3,000.00	$ 12,000	
Elevator machine room, 1 1/2 tons	4	EA	$ 2,500.00	$ 10,000	
Air distribution, return and exhaust					
Galvanized sheet metal ductwork	45,025	LB	$ 7.00	$ 315,175	
Flexible ductwork	200	EA	$ 100.00	$ 20,000	
Dampers, volume	300	EA	$ 100.00	$ 30,000	
Dampers, smoke/fire	30	EA	$ 400.00	$ 12,000	
Insulation	32,024	SF	$ 2.50	$ 80,060	
Acoustical lining	1	LS	$ 5,000.00	$ 5,000	
Sound attenuation	1	LS	$ 5,000.00	$ 5,000	
Diffusers, registers and grilles	300	EA	$ 200.00	$ 60,000	
Controls and instrumentation					
DDC system for equipment control including CO2 monitoring	64,322	SF	$ 1.50	$ 96,483	
Testing and balancing	600	HR	$ 95.00	$ 57,000	
Unit ventilation					
Toilet exhaust fans					
1,200 - 1,400 cfm	4	EA	$ 1,200.00	$ 4,800	
<500 cfm	6	EA	$ 500.00	$ 3,000	
General exhaust fans	1	LS	$ 1,500.00	$ 1,500	
Fire Protection					
Automatic wet sprinkler system	64,322	SF	$ 3.25	$ 209,047	
08 Subtotal					**$ 1,961,988**
09 ELECTRICAL					
Main service and distribution					
Main switchboard, distribution switchboards, transformers, distribution boards, feeder conduit and cable	64,322	SF	$ 3.75	$ 241,208	
Emergency power					
Interruptible power supply (IPS), 15kVA - allow	1	EA	$ 30,000.00	$ 30,000	
Machine and equipment power					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - CLASSROOMS - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Connections and switches, including conduit and cable	64,322	SF	$ 1.00	$ 64,322	
User convenience power					
Panel board breakers, 120 V circuits - allow	504	EA	$ 85.00	$ 42,840	
Feeder conduit and cable	1	LS	$ 25,000.00	$ 25,000	
Receptacles including conduit and cable	64,322	EA	$ 3.00	$ 192,966	
Lighting					
Panel board breakers, 277 V circuits - allow	252	EA	$ 75.00	$ 18,900	
Feeder conduit and cable	1	LS	$ 32,000.00	$ 32,000	
Fixtures/switching, including conduit and cable	64,322	SF	$ 8.00	$ 514,576	
Lighting and power specialties					
Grounding	64,322	SF	$ 0.15	$ 9,648	
Lighting control	64,322	SF	$ 0.20	$ 12,864	
Telephone and communications					
Computer networking system	64,322	SF	$ 2.05	$ 131,860	
PA/Intercom system	64,322	SF	$ 2.45	$ 157,589	
CATV system	64,322	SF	$ 0.65	$ 41,809	
Alarm and security					
Fire alarm system	64,322	SF	$ 3.35	$ 215,479	
Security system	64,322	SF	$ 1.45	$ 93,267	
Clock System					
Clock/Program system	64,322	SF	$ 0.50	$ 32,161	
09 Subtotal					**$ 1,856,489**
11 EQUIPMENT					
Light control and vision equipment					
Window blinds	6,002	SF	$ 6.00	$ 36,012	
Amenities and convenience items					
Fire extinguisher cabinets	21	EA	$ 350.00	$ 7,350	
Special use equipment of all types					
Protection screens, manual	36	EA	$ 600.00	$ 21,600	
11 Subtotal					**$ 64,962**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
01 FOUNDATIONS					
01 Subtotal					**$ -**
02 SUBSTRUCTURE					
Slab on Grade					
Floor at lowest level					
Premium for elevated slab, stage	1,084	SF	$ 15.00	$ 16,260	
Premium for steps	200	LF	$ 40.00	$ 8,000	
Concrete curb	650	LF	$ 15.00	$ 9,750	
02 Subtotal					**$ 34,010**
03 SUPERSTRUCTURE					
Columns and pilasters					
Steel columns (allow 3 lbs/sf)	20	T	$ 3,000.00	$ 60,000	
Shear bracing					
Steel bracing (allow 4.5 lbs/sf)	30	T	$ 3,000.00	$ 90,000	
Roof					
Steel framing (allow 4.5 lbs/sf)	28	T	$ 3,000.00	$ 84,000	
Metal deck	10,718	SF	$ 5.00	$ 53,590	
Secondary roof					
Lunch shelter framing (allow 4.5 lbs/sf)	15	T	$ 3,000.00	$ 45,000	
Premium for exposed steel	15	T	$ 1,500.00	$ 22,500	
Galvanized 1-5/16" 24 gage metal roof deck	3,800	SF	$ 10.00	$ 38,000	
Fireproofing steel					
Fireproofing to steel works	108	SF	$ 250.00	$ 27,000	
Miscellaneous					
Miscellaneous metals	11,632	SF	$ 1.50	$ 17,448	
03 Subtotal					**$ 437,538**
04 EXTERIOR CLOSURE					
Wall framing, furring and insulation					
Metal stub framing	14,318	SF	$ 6.50	$ 93,067	
Exterior sheathing, gypsum board	14,318	SF	$ 2.75	$ 39,375	
Batt insulation	13,452	SF	$ 0.65	$ 8,744	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Applied exterior finishes					
Cement plaster	13,452	SF	$ 9.00	$ 121,068	
Interior finish to exterior walls					
Gypsum board lining, painted	11,832	SF	$ 3.00	$ 35,496	
Windows, glazing and louvers					
Glazed aluminum framed windows	159	SF	$ 48.00	$ 7,632	
Glazed aluminum framed storefront	707	SF	$ 55.00	$ 38,885	
Exterior doors, frames and hardware					
Hollow metal doors and frames					
Single	8	EA	$ 1,400.00	$ 11,200	
Double	3	EA	$ 2,800.00	$ 8,400	
Fascias, bands, screens and trim					
Allow for architectural detailing	1	LS	$ 10,000.00	$ 10,000	
Soffits					
Paint to exposed soffit	3,564	SF	$ 1.00	$ 3,564	
Cement plaster soffits	340	SF	$ 12.00	$ 4,080	
Balustrades, parapets and roof screens					
Built up roofing to back of parapet walls	1,620	SF	$ 4.50	$ 7,290	
04 Subtotal					**$ 388,800**
05 ROOFING					
Insulation					
Rigid board insulation	10,718	SF	$ 3.00	$ 32,154	
Batt insulation between joists	3,671	SF	$ 1.00	$ 3,671	
Roofing					
Built-up roofing	10,718	SF	$ 4.50	$ 48,231	
Roof deck and traffic surfaces					
Mechanical equipment pads	1	LS	$ 5,000.00	$ 5,000	
Roofing upstands and sheet metal					
Allow for miscellaneous flashing and sheet metal	14,389	SF	$ 1.00	$ 14,389	
Caulking and sealants					
Miscellaneous caulking and sealants	10,718	SF	$ 0.50	$ 5,359	
05 Subtotal					**$ 108,804**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
06 INTERIOR CONSTRUCTION					
Partition framing					
Metal stud framing					
Typical walls	5,530	SF	$ 4.00	$ 22,120	
Chase walls	1,526	SF	$ 8.00	$ 12,208	
Shaft walls	392	SF	$ 5.00	$ 1,960	
Partition surfacing					
Gypsum board, taped and sanded	14,504	SF	$ 2.50	$ 36,260	
Batt insulation	8,974	SF	$ 0.65	$ 5,833	
Shaft wall liner	392	SF	$ 3.00	$ 1,176	
Paint to gypsum board	14,504	SF	$ 0.70	$ 10,153	
Sound insulation					
Acoustical insulation	8,974	SF	$ 0.60	$ 5,384	
Interior doors and frames					
Single leaf	12	EA	$ 1,400.00	$ 16,800	
Double leaf	1	EA	$ 2,800.00	$ 2,800	
Floor					
Vinyl composition tiles	8,813	SF	$ 2.50	$ 22,033	
Quarry tiles	1,116	SF	$ 8.00	$ 8,928	
Ceramic tile	415	SF	$ 14.00	$ 5,810	
Walls					
Ceramic tile walls, 4' high	732	SF	$ 15.00	$ 10,980	
Bases					
Rubber base	1,481	LF	$ 1.50	$ 2,222	
Ceramic tile base	183	LF	$ 6.00	$ 1,098	
Ceiling					
Acoustic tile ceiling	5,101	SF	$ 2.50	$ 12,753	
Gypsum board ceiling	5,243	SF	$ 8.50	$ 44,566	
Allowance for ceiling bulkheads	1	LS	$ 20,000.00	$ 20,000	
Prefabricated compartment and accessories					
Toilet partitions	3	EA	$ 1,000.00	$ 3,000	
Urinal partitions	1	EA	$ 750.00	$ 750	
Toilet accessories	6	EA	$ 500.00	$ 3,000	
Shelving and millwork					
Janitor shelf and mop rack	1	EA	$ 350.00	$ 350	
Lockers	1	LS	$ 3,500.00	$ 3,500	
Cabinets and countertops					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Serving counter	12	LF	$ 200.00	$ 2,400	
Multi purpose casework (in wall folding tables)	12	EA	$ 3,500.00	$ 42,000	
06 Subtotal					**$ 298,082**
07 CONVEYING					
Elevators					
Wheelchair lift	1	EA	$ 15,000.00	$ 15,000	
07 Subtotal					**$ 15,000**
8 MECHANICAL					
Plumbing System					
Sanitary fixtures and connecting piping					
Water closets	6	EA	$ 1,150.00	$ 6,900	
Urinals	2	EA	$ 1,100.00	$ 2,200	
Lavatory basins	7	EA	$ 950.00	$ 6,650	
Sink	1	EA	$ 1,050.00	$ 1,050	
Drinking fountain	1	EA	$ 2,850.00	$ 2,850	
Sanitary waste, vent and service pipe work					
Floor drains and sinks, <=4"	1	LS	$ 3,000.00	$ 3,000	
Hose bibs, 3/4"	1	LS	$ 1,000.00	$ 1,000	
Rough-in waste, vent, domestic cold and hot water pipe work including valves, specialties and insulation	17	EA	$ 1,800.00	$ 30,600	
Condensate drainage	1	LS	$ 5,000.00	$ 5,000	
Water treatment, storage and circulation	1	LS	$ 10,000.00	$ 10,000	
Kitchen equipment service					
Grease interceptor, 750 gallons	1	EA	$ 7,500.00	$ 7,500	
Kitchen waste and equipment connections	1	LS	$ 15,000.00	$ 15,000	
Natural gas distribution	10,718	SF	$ 0.75	$ 8,039	
Roof and surface water drainage	11,645	SF	$ 1.00	$ 11,645	
Testing and disinfecting	1	LS	$ 3,000.00	$ 3,000	
HVAC System					
Air handling equipment					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Packaged rooftop air conditioning units, gas heating and electric cooling, prefabricated roof curb, spring isolator and seismic restraints					
Multi-purpose, 45 tons	1	EA	$ 80,000.00	$ 80,000	
Faculty dining lounge, 3 tons	1	EA	$ 6,000.00	$ 6,000	
Kitchen packaged furnace, DX cooling and evap cooling	1	EA	$ 7,500.00	$ 7,500	
Make-up air unit	2	EA	$ 5,000.00	$ 10,000	
Air distribution, return and exhaust					
Galvanized sheet metal ductwork	7,503	LB	$ 7.50	$ 56,273	
Stainless steel ductwork, kitchen	1,500	LB	$ 15.00	$ 22,500	
Dampers, volume	60	EA	$ 100.00	$ 6,000	
Dampers, smoke/fire	1	LS	$ 3,000.00	$ 3,000	
Insulation	5,336	SF	$ 3.00	$ 16,008	
Acoustical lining	1	LS	$ 2,000.00	$ 2,000	
Sound attenuation	1	LS	$ 3,000.00	$ 3,000	
Diffusers, registers and grilles	60	SF	$ 150.00	$ 9,000	
Controls and instrumentation	11,645	SF	$ 2.50	$ 29,113	
Testing and balancing	11,645	SF	$ 0.50	$ 5,823	
Unit ventilation					
Toilet exhaust fans, <500 cfm	4	EA	$ 350.00	$ 1,400	
Grease exhaust fans	1	LS	$ 2,000.00	$ 2,000	
Dishwasher exhaust fans	1	LS	$ 1,000.00	$ 1,000	
General exhaust fans	1	LS	$ 1,000.00	$ 1,000	
Fire Protection					
Automatic wet sprinkler system	11,645	SF	$ 3.50	$ 40,758	
08 Subtotal					**$ 416,807**
09 ELECTRICAL					
Allow for electrical system	10,344	SF	$ 26.00	$ 268,944	
Covered area - lighting/power	1,301	SF	$ 12.00	$ 15,612	
Autonomous PA system	1	LS	$ 40,000.00	$ 40,000	
Electrical Subtotal					**$ 324,556**
11 EQUIPMENT					
Light control and vision equipment					
Window blinds	866	SF	$ 6.00	$ 5,196	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - MULTI-PURPOSE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Chalkboard, insignia, and graphics					
Signage	11,645	SF	$ 0.60	$ 6,987	
Special equipment of all types					
Food service equipment	1,116	SF	$ 80.00	$ 89,280	
Walk-in cooler/freezer	178	SF	$ 250.00	$ 44,500	
Food storage shelving	1	LS	$ 5,000.00	$ 5,000	
Projection screens, motorized	1	EA	$ 3,500.00	$ 3,500	
11 Subtotal					**$ 154,463**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - PARKING STRUCTURE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
01 FOUNDATIONS					
Reinforced concrete foundation					
Conventional spread footing	23,479	SF	$ 7.50	$ 176,093	
Elevator pit	1	EA	$ 6,000.00	$ 6,000	
01 Subtotal					**$ 182,093**
02 SUBSTRUCTURE					
Floor at lowest level					
Reinforced concrete slab-on grade	23,479	SF	$ 7.00	$ 164,353	
Concrete ramp	1,461	SF	$ 15.00	$ 21,915	
Excavation					
Excavating basement and remove	9,676	CY	$ 7.00	$ 67,732	
Excavating sides of retaining walls	1,780	CY	$ 10.00	$ 17,800	
Backfill behind retaining walls	1,780	CY	$ 15.00	$ 26,700	
Disposal of excess excavation	9,676	CY	$ 12.00	$ 116,112	
Shoring	3,113	SF	$ 33.00	$ 102,729	
Retaining wall					
Reinforced concrete retaining walls	7,700	SF	$ 32.00	$ 246,400	
Retaining wall to parking ramp	990	SF	$ 35.00	$ 34,650	
02 Subtotal					**$ 798,391**
03 SUPERSTRUCTURE					
Columns and pilasters					
Concrete columns	42	CY	$ 1,000.00	$ 42,000	
Roof					
Reinforced concrete flat slab, 12" thick	22,077	SF	$ 28.00	$ 618,156	
Drop panel	36	CY	$ 700.00	$ 25,200	
Miscellaneous					
Miscellaneous metals	22,077	SF	$ 0.50	$ 11,039	
Staircase flights floor to floor					
Metal pan steel staircase including railing	2	EA	$ 15,000.00	$ 30,000	
03 Subtotal					**$ 726,395**
04 EXTERIOR CLOSURE					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - PARKING STRUCTURE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
Exterior doors, frames and hardware					
Overhead coiling grille	1	EA	$ 6,000.00	$ 6,000	
04 Subtotal					**$ 6,000**
05 ROOFING					
Waterproofing slabs					
Waterproofing elevator pit	1	EA	$ 1,000.00	$ 1,000	
Waterproofing walls below grade					
Waterproofing sides of retaining wall	8,690	SF	$ 5.00	$ 43,450	
Caulking and sealants					
Miscellaneous caulking and sealants	22,077	SF	$ 0.30	$ 6,623	
05 Subtotal					**$ 51,073**
06 INTERIOR CONSTRUCTION					
Partition framing					
CMU wall, 8" thick	1,930	SF	$ 20.00	$ 38,600	
Interior doors and frames					
Hollow metal framed doors, single leaf	6	EA	$ 1,400.00	$ 8,400	
Specialties					
Signage and graphics	22,077	SF	$ 0.30	$ 6,623	
06 Subtotal					**$ 53,623**
07 CONVEYING					
Elevators					
Hydraulic elevator, 2 stops	1	EA	$ 65,000.00	$ 65,000	
07 Subtotal					**$ 65,000**
08 MECHANICAL					
Plumbing System					
Parking - drainage - allowance	23,479	SF	$ 4.00	$ 93,916	
Clarifier	1	EA	$ 5,000.00	$ 5,000	
Sump pumps, 100 gpm, 3 hp, duplex, with basin, cover and controls - allow	1	EA	$ 5,000.00	$ 5,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	12345
SCHOOL NAME	**COUNTY**
ABC ELEMENTARY SCHOOL	LOS ANGELES
SCHOOL ADDRESS	
123 ALPHABET STREET, LOS ANGELES, CA 90000	
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECT AND ASSOCIATES	1/15/2003

DETAILED ESTIMATE - PARKING STRUCTURE - SCHEME 1

ELEMENT	QUANTITY	UNIT	UNIT COST	TOTAL	ELEMENT TOTAL
HVAC System					
Air distribution and return					
Galvanized steel ductwork	11,039	LB	$ 7.00	$ 77,273	
Duct riser protection	20	EA	$ 350.00	$ 7,000	
Fire and smoke damper allowance	6	EA	$ 400.00	$ 2,400	
Controls and instrumentation					
Controls and carbon monoxide detection system	22,077	SF	$ 0.75	$ 16,558	
Testing and balancing	20	HR	$ 95.00	$ 1,900	
Unit ventilation					
Parking garage exhaust, 33,000 cfm	1	EA	$ 12,000.00	$ 12,000	
Fire Protection					
Automatic wet sprinkler system - complete	22,077	SF	$ 3.00	$ 66,231	
08 Subtotal					**$ 287,278**
09 ELECTRICAL					
Lighting, power, fire alarm	22,077	SF	$ 5.00	$ 110,385	
09 Subtotal					**$ 110,385**
11 EQUIPMENT					
Parking stall striping	95	EA	$ 35.00	$ 3,325	
Parking wheel stop	95	EA	$ 60.00	$ 5,700	
Parking control equipment	1	EA	$ 10,000.00	$ 10,000	
11 Subtotal					**$ 19,025**

Section 4a: Instruction for the Preparation of Specifications Division Cost Estimate

1. Detailed Specifications Division Cost Estimate shall be submitted with Design Development, Construction Document, and Bid submittals. All items listed on the cost estimate must be clearly organized into the specified divisions as listed in the project manual/specifications.

2. Should the District require multiple contracts or multiple funding applications, the commissioned Architect shall submit separate detailed division cost estimates for each bid package or funding application.

3. Cost estimate shall be prepared on 8-1/2" x 11" sheets, containing the following:

   A. First or cover sheet
      a. Title block indicating:
         (1) Name and code of District
         (2) Name of project and address of proposed new facilities.
         (3) Project number.
         (4) Name of commissioned Architect.
         (5) Current date.

      b. Division summary with subtotal amount for each division from each building

      c. The commissioned Architect's signature

   B. Additional sheets containing:
      a. Cost breakdowns shall be organized into Divisions as listed in the project manual/specifications. In Design Development level, all quantities must be derived by take-off from the drawings or as indicated by specifications and/or calculations. In Construction Document level, a detail take-off of all components is required.
         - Cost breakdowns must be reflecting the plans and specifications.
         - Each line item includes detailed description, quantity, unit, unit cost, and subtotal.
         - Lump sum or square foot allowances will not be acceptable for final estimates.

      b. Cost breakdowns in division 2 - "Site work" shall be arranged into four categories: 1). Service Site, 2). Off-site, 3). Utility Site, and 4). General Site. (Excluding state grant for parking structures, architectural / engineering fees, and other soft costs.)

         Note: Unless stated otherwise herein, Service Site, Off-site, and Utility Site are as defined in SB-50, section 1859.76 (These definitions can also be found in section 6a of this guide). General Site shall be defined as all site works that are not part of the Service Site, Off-site, and Utility Site.

4. All costs in the Division Estimates shall be independently prepared based on true costs. All construction costs within the scope of the project shall be included to reflect the plans and specifications.

5. If the project has more than one building, a complete estimate of every building and an overall site construction estimate should be prepared. If there is a parking garage, it should also have a separate estimate that will include all work from its foundation to roof or elevated slab. Building estimate/cost will include all work within five feet outside the building perimeter. Site work estimates will be within five feet outside the building perimeter.

6. If the opinion of probable cost is exceeding the design allowance, value engineering and reduction of scope should be performed.

7. Cost estimate multipliers or mark-ups should be per District's direction as follows:

a. Design Contingency

• Contingency at Preliminary Schematic Design	10%
• Contingency at Final Schematic Design	8%
• Contingency at Design Development	5%
• Contingency at 50% Construction Documents	2%
• Contingency at 100% Construction Documents	0%

b. General Requirements

• General Conditions		10%
• Overhead and Profit		5%
• Bonds and Insurance	1	.5%

c. Escalation

• Annual escalation	3.5	%

It should be noted that the above multipliers or mark-ups were provided for District's internal use and for cost comparison purposes only. The commissioned Architect and their estimator should provide a separate summary to include their own recommendations in lieu of this District's direction to project their own independent opinion of probable cost of their proposed design.

All cost estimate multipliers or mark-ups i.e. General Conditions, Bonds, and Design Contingency must be indicated as such and added to bottom of summary of each estimate to arrive at anticipated current cost without escalation. The cost estimate should reflect also the "normal market" condition. Escalation is then added to arrive at an anticipated bid cost for the work based on a specified bid date.

8. Any applicable design contingency and escalation will only be shown for evaluation purposes in various stages of design but they should be shown as mentioned above.

9. The estimate must be in precise format as required and must be submitted in hard copy as well as in electronic copy that is readable by Microsoft Excel spreadsheet software.

10. Changes in cost, either increase or decrease from Schematic to Design Development stage of any item, trade or scope of work in the estimate should be provided with explanation or justification. It could be in paragraph or enumerated form but should be clear enough to give an overview of the changes that provided the impact to the cost. It is also required in any changes in cost from Design Development to 50% CD and from 50% CD to 100% CD but in these phases; it should be detailed and arranged as specifications division estimate. Explanation for changes in cost, either increase or decrease of affected items or scope of work, should be provided respectively. It could be incorporated right in the detailed cost estimate or in a separate sheet sequentially arranged as in the order of specifications divisions.

Section 4b: Sample of Detailed Specifications Division Cost Estimate

SPECIFICATIONS/DIVISION ESTIMATE

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

PROJECT SUMMARY (with District's directed mark ups)

CSI 16 Divisions		SITE WORK	BUILDING 1 MULTI-PURPOSE	BUILDING 2 CLASSROOM	U. G. PARKING	TOTAL
01 GENERAL REQUIREMENTS		see below	see below	see below	see below	see below
02 SITE WORK		$ 1,288,888	$ 1,981	$ -	$ 200,806	**$ 1,491,675**
03 CONCRETE			$ 136,709	$ 43,374	$ 726,418	**$ 906,501**
04 MASONRY			$ -	$ -	$ 45,234	**$ 45,234**
05 METALS			$ 31,251	$ 74,393	$ 39,236	**$ 144,880**
06 WOOD & PLASTICS			$ 360,640	$ 716,555	$ -	**$ 1,077,196**
07 THERMAL & MOIST. PROTECT.			$ 136,965	$ 156,995	$ 21,502	**$ 315,462**
08 DOORS & WINDOWS			$ 95,302	$ 148,770	$ 23,040	**$ 267,112**
09 FINISHES			$ 325,615	$ 528,459	$ 54,131	**$ 908,205**
10 SPECIALTIES			$ 32,695	$ 105,495	$ 10,001	**$ 148,191**
11 EQUIPMENT			$ 75,728	$ 8,000	$ 10,000	**$ 93,728**
12 FURNISHING			$ 57,927	$ 10,140	$ -	**$ 68,067**
13 SPECIAL CONSTRUCTIONS			$ -	$ -	$ -	**$ -**
14 CONVEYING SYSTEMS			$ 10,000	$ 60,000	$ 30,000	**$ 100,000**
15 MECHANICAL			$ 335,843	$ 615,783	$ 91,072	**$ 1,042,697**
16 ELECTRICAL			$ 219,035	$ 414,774	$ 79,092	**$ 712,901**
25 LOW VOLTAGE SYSTEMS			$ 85,370	$ 94,466	$ 19,795	**$ 199,631**
SUBTOTAL 1,288,888		**$**	**$ 1,905,061**	**$ 2,977,204**	**$ 1,350,326**	**$ 7,521,480**
*General Conditions	10%	$ 128,889	$ 190,506	$ 297,720	$ 135,033	**$ 752,148**
*Overhead and Profit	5%	$ 70,889	$ 104,778	$ 163,746	$ 74,268	**$ 413,681**
*Bonds and Insurance	1.5%	$ 22,330	$ 33,005	$ 51,580	$ 23,394	**$ 130,310**
SUBTOTAL		**$ 1,510,996**	**$ 2,233,351**	**$ 3,490,251**	**$ 1,583,021**	**$ 8,817,619**
*Design Contingency	5%	$ 75,550	$ 111,668	$ 174,513	$ 79,151	**$ 440,881**
TOTAL (current BID COST)		**$ 1,586,546**	**$ 2,345,018**	**$ 3,664,764**	**$ 1,662,172**	**$ 9,258,499**
*Escalation to bid date Jan 06 at 3.5% P.A.	7%	$ 111,058	$ 164,151	$ 256,533	$ 116,352	**$ 648,095**
TOTAL (ANTICIPATED BID COST)		**$ 1,697,604**	**$ 2,509,170**	**$ 3,921,297**	**$ 1,778,524**	**$ 9,906,594**

* Percentage used in these mark ups should be in accordance with the direction from the District

SPECIFICATIONS/DIVISION ESTIMATE

SCHOOL DISTRICT LOS ANGELES UNIFIED SCHOOL DISTRICT	**5 DIGIT DISTRICT CODE** 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	**PROJECT NO.** 56.99999
SCHOOL NAME ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS ABC STREET	**COUNTY** LOS ANGELES
ARCHITECT'S FIRM BEST ARCHITECTURE	**DATE OF ESTIMATE** 1/15/2004

PROJECT SUMMARY (with AE's recommended mark ups)

CSI 16 Divisions		SITE WORK	BUILDING 1 MULTI-PURPOSE	BUILDING 2 CLASSROOM	U. G. PARKING	TOTAL
01 GENERAL REQUIREMENTS		see below	see below	see below	see below	see below
02 SITE WORK		$ 1,288,888	$ 1,981	$ -	$ 200,806	**$ 1,491,675**
03 CONCRETE			$ 136,709	$ 43,374	$ 726,418	**$ 906,501**
04 MASONRY			$ -	$ -	$ 45,234	**$ 45,234**
05 METALS			$ 31,251	$ 74,393	$ 39,236	**$ 144,880**
06 WOOD & PLASTICS			$ 360,640	$ 716,555	$ -	**$ 1,077,196**
07 THERMAL & MOIST. PROTECT.			$ 136,965	$ 156,995	$ 21,502	**$ 315,462**
08 DOORS & WINDOWS			$ 95,302	$ 148,770	$ 23,040	**$ 267,112**
09 FINISHES			$ 325,615	$ 528,459	$ 54,131	**$ 908,205**
10 SPECIALTIES			$ 32,695	$ 105,495	$ 10,001	**$ 148,191**
11 EQUIPMENT			$ 75,728	$ 8,000	$ 10,000	**$ 93,728**
12 FURNISHING			$ 57,927	$ 10,140	$ -	**$ 68,067**
13 SPECIAL CONSTRUCTIONS			$ -	$ -	$ -	**$ -**
14 CONVEYING SYSTEMS			$ 10,000	$ 60,000	$ 30,000	**$ 100,000**
15 MECHANICAL			$ 335,843	$ 615,783	$ 91,072	**$ 1,042,697**
16 ELECTRICAL			$ 219,035	$ 414,774	$ 79,092	**$ 712,901**
25 LOW VOLTAGE SYSTEMS			$ 85,370	$ 94,466	$ 19,795	**$ 199,631**
SUBTOTAL		**$ 1,288,888**	**$ 1,905,061**	**$ 2,977,204**	**$ 1,350,326**	$ 7,521,480
*General Conditions	10%	$ 128,889	$ 190,506	$ 297,720	$ 135,033	**$ 752,148**
*Overhead and Profit	5%	$ 113,422	$ 167,645	$ 261,994	$ 118,829	**$ 661,890**
*Bonds and Insurance	1.5%	$ 22,968	$ 33,948	$ 53,054	$ 24,063	**$ 134,033**
SUBTOTAL		**$ 1,554,167**	**$ 2,297,161**	**$ 3,589,973**	**$ 1,628,250**	$ 9,069,550
*Design Contingency	8%	$ 124,333	$ 183,773	$ 287,198	$ 130,260	**$ 725,564**
TOTAL (current BID COST)		**$ 1,678,501**	**$ 2,480,934**	**$ 3,877,170**	**$ 1,758,510**	$ 9,795,115
*Escalation to bid date Jan 06 at 5% P.A.	10%	$ 167,850	$ 248,093	$ 387,717	$ 175,851	**$ 979,511**
TOTAL (ANTICIPATED BID COST)		**$ 1,846,351**	**$ 2,729,027**	**$ 4,264,888**	**$ 1,934,361**	$ 10,774,626

* Percentage used in these mark ups should be AE's recommended mark ups based on their professional opinion

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
021 SERVICE SITE					
DEMOLITION					
REMOVE EXISTING 5X4X2 BLOCK OF CONCRETE	1	LS	$ 500.00	$ 500	
REMOVE MISC. DEBRIS ACROSS SITE	1	LS	$ 1,000.00	$ 1,000	
EARTHWORKS					
SURVEYING	1.84	ACRE	$ 1,732.50	$ 3,183	
DUST CONTROL	80,035	SF	$ 0.10	$ 8,004	
SITE GRADING (EXCLUDING GARAGE EXCAVATION)					
MULTIPURPOSE PAD OVER EXCAVATION, 5' DEEP	3,040	CY	$ 6.00	$ 18,238	
EXCAVATE DIRT/RUBBLE AT AN AREA APPROX. 85'X85'X3' DEEP	803	CY	$ 6.00	$ 4,817	
BACKFILL AND COMPACTION INCLUDING SHRINKAGE FACTOR OF 10%	3,344	CY	$ 8.00	$ 26,749	
ADDITIONAL SOIL	304	CY	$ 12.00	$ 3,648	
SCARIFY AND RECOMPACT TOP 6" OF EXPOSED SITE AREAS	15,250	SF	$ 0.30	$ 4,575	
ROUGH GRADING	80,035	SF	$ 0.20	$ 16,007	
FINE GRADING	80,035	SF	$ 0.25	$ 20,009	
SUBTOTAL SERVICE SITE				**$ 138,538**	
022 OFF SITE					
ALLOWANCE					
B-PERMIT FEE	1	LS	$ 50,000.00	$ 50,000	
Sidewalk, pavement, trees, etc.					
REMOVE SIDEWALK INCLUDING DISPOSAL	7,072	SF	$ 1.75	$ 12,376	
CURB & GUTTER REMOVAL	503	LF	$ 2.50	$ 1,258	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
AC SAWCUT, MINIMUM 2"	267	LF	$ 3.00	$ 801	
AC SAWCUT, 8" THICK	293	LF	$ 5.00	$ 1,465	
SAWCUT CONCRETE PAVEMENT	21	LF	$ 7.00	$ 147	
REMOVE EXISTING AC PAVING 12" FROM EXISTING GUTTER, 8" THICK	293	LF	$ 5.00	$ 1,465	
REMOVE EXISTING WATER METER AND BOX	8	EA	$ 250.00	$ 2,000	
ADJUST WATER METER TO GRADE	1	EA	$ 250.00	$ 250	
REMOVE STREET TREE	1	EA	$ 300.00	$ 300	
REMOVE STREET SIGN	3	EA	$ 50.00	$ 150	
REMOVE MISC. FENCE	1	LS	$ 500.00	$ 500	
COLD MILL EXISTING AC PAVEMENT	4,502	SF	$ 2.00	$ 9,004	
TREE AND TREE WELL	11	EA	$ 1,000.00	$ 11,000	
NEW CURB ONLY	230	LF	$ 12.00	$ 2,760	
NEW CONCRETE CURB AND GUTTER	270	LF	$ 18.00	$ 4,860	
GRADING AND COMPACTION	9,035	SF	$ 0.50	$ 4,518	
CONCRETE SIDEWALK 4" ON 4" CMB	7,112	SF	$ 4.50	$ 32,004	
EXTRA FOR DRIVEWAY	1,041	SF	$ 4.00	$ 4,164	
AC OVERLAY	4,502	SF	$ 2.00	$ 9,004	
NEW AC PAVING 12" FROM EXISTING GUTTER, 8" THICK	293	LF	$ 7.00	$ 2,051	
CONSTRUCT CURB RAMP	2	EA	$ 1,000.00	$ 2,000	
8" THICK CONCRETE PAVEMENT	1,923	SF	$ 8.00	$ 15,384	
6" BASE	1,923	SF	$ 0.60	$ 1,154	
CATCH BASIN NO. 36	1	EA	$ 2,000.00	$ 2,000	
Street Lighting					
STREET LIGHT	2	EA	$ 5,000.00	$ 10,000	
LUMINAIRE AND LAMPS, 200W	2	EA	$ 2,000.00	$ 4,000	
LUMINAIRE AND LAMPS, 100W	1	EA	$ 1,500.00	$ 1,500	
CONDUIT AND WIRE	500	LF	$ 12.00	$ 6,000	
SUBTOTAL OFF SITE				**$ 192,114**	
023 UTILITIES SITE					
GAS					
GAS SERVICES, 3"	400	LF	$ 20.00	$ 8,000	
GAS METER	1	EA	$ 2,500.00	$ 2,500	
CONNECT TO EXISTING GAS LINE	1	EA	$ 4,000.00	$ 4,000	
EARTHQUAKE VALVE, 3"	1	EA	$ 2,300.00	$ 2,300	
SITE SEWER					
4" VCP	500	LF	$ 26.00	$ 13,000	
CLEANOUT TO GRADE	3	EA	$ 350.00	$ 1,050	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONNECT TO EXISTING	1	EA	$ 5,000.00	$ 5,000	
FIRE/ DOMESTIC WATER SERVICES					
6" FIRE WATER LINE	436	LF	$ 30.00	$ 13,080	
2.5" CU WATER	416	LF	$ 31.50	$ 13,104	
TRUST BLOCKS	8	EA	$ 100.00	$ 800	
FDC, 4- 2 1/2"	1	EA	$ 1,500.00	$ 1,500	
PIV, 6"	1	EA	$ 1,200.00	$ 1,200	
6" FIRE WATER SERVICE AND METER IN CONCRETE VAULT. COORDINATE WITH DWP FOR INSTALLATION AND CONNECTION	1	EA	$ 12,040.00	$ 12,040	
INSTALL DOUBLE CHECK DETECTOR ASSEMBLY, 6"		EA	$ -	Included above	
2" IRRIGATION SERVICE AND METER IN CONCRETE VAULT	1	EA	$ 3,020.00	$ 3,020	
2" DOMESTIC WATER SERVICE AND METER IN VAULT, COORDINATE WITH DWP FOR INSTALLATION AND CONNECTION	1	EA	$ 3,020.00	$ 3,020	
REDUCED PRESSURE BACKFLOW PREVENTOR ON DOMESTIC WATER LINE, 2"	1	EA	$ 1,155.00	$ 1,155	
FIRE HYDRANT ASSEMBLY	1	EA	$ 5,300.00	$ 5,300	
CONNECTION OF WATER SERVICE LINE WITH EXISTING WATER MAIN	1	EA	$ 5,000.00	$ 5,000	
HOT TAP EXISTING WATER LINE, INCLUDING DOMESTIC AND FIRE LINE	1	EA	$ 3,000.00	$ 3,000	
SITE ELECTRICAL					
BARRIER POST FOR NEW POWER POLE, NOTED TO ASSUME 11 EACH	11	EA	$ 350.00	$ 3,850	
POWER POLE POC	1	EA	$ 2,626.50	$ 2,627	
(2) 5" AND (1) 4" CONDUITS CONCRETE ENCASED TO POWER POLE, PRIMARY	60	LF	$ 60.00	$ 3,600	
(6) 5" AND (1) 4" CONDUIT CONCRETE ENCASED, SECONDARY	30	LF	$ 110.00	$ 3,300	
TRANSFORMER PAD/ VAULT, 8' X 10'	1	EA	$ 6,000.00	$ 6,000	
CONCRETE PULL BOX FOR POWER 2' X 3' X 3'	2	EA	$ 1,800.00	$ 3,600	
4" C	600	LF	$ 10.14	$ 6,087	
#1	600	LF	$ 2.02	$ 1,211	
350 MCM	2,400	LF	$ 6.13	$ 14,714	
TRENCHING	67	CY	$ 20.00	$ 1,333	
CONCRETE ENCASEMENT	22	CY	$ 90.00	$ 2,000	
BACKFILLING AND COMPACTION INCLUDING 6" LAYER OF SAND AT THE BOTTOM	44	CY	$ 30.00	$ 1,333	
DISPOSAL OF EXCESS EXCAVATION	22	CY	$ 15.00	$ 333	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
SIGNAL AND COMMUNICATION					
3' X 2' X 3' CONCRETE PULL BOX	2	EA	$ 1,800.00	$ 3,600	
4'X4'X3' CONCRETE PULL BOX	2	EA	$ 2,300.00	$ 4,600	
17"X2.5'X22"D CONCRETE PULL BOX WITH TRAFFIC COVER	1	EA	$ 1,200.00	$ 1,200	
4" C	500	LF	$ 10.14	$ 5,070	
3" C	1,200	LF	$ 7.00	$ 8,400	
2" C	200	LF	$ 4.21	$ 842	
1" C	200	LF	$ 2.60	$ 521	
TRENCHING	135	CY	$ 20.00	$ 2,702	
CONCRETE ENCASEMENT	59	CY	$ 90.00	$ 5,280	
BACKFILLING	76	CY	$ 20.00	$ 1,529	
DISPOSAL OF EXCESS EXCAVATION	59	CY	$ 15.00	$ 880	
CABLES FOR SAFETY AND TECHNOLOGY	2,100	LF	$ 8.00	$ 16,800	
ALLOWANCE					
SEWER CONNECTION FEE	1	LS	$ 15,000.00	$ 15,000	
SUBTOTAL UTILITIES SITE				**$ 214,481**	
024 GENERAL SITE					
PAVING, RAMPS AND STAIR					
STAIR AND RAMP BESIDE KINDERGARTEN					
CONCRETE STAIR ON GRADE	90	LFR	$ 40.00	$ 3,600	
CONCRETE RAMP	500	SF	$ 10.00	$ 5,000	
GUARD RAIL	67	LF	$ 110.00	$ 7,370	
HANDRAIL	166	LF	$ 40.00	$ 6,640	
CONCRETE RETAINING WALL	200	SF	$ 20.00	$ 4,000	
FOUNDATION	7	CY	$ 350.00	$ 2,314	
STAIR TREAD NOSING	90	LF	$ 15.00	$ 1,350	
STAIR AND RAMP BESIDE CLASSROOM					
CONCRETE STAIR ON GRADE	33	LFR	$ 40.00	$ 1,300	
CONCRETE RAMP, COMPLETE	56	LF	$ 260.00	$ 14,560	
GUARD RAIL	8	LF	$ 110.00	$ 880	
HANDRAIL	15	LF	$ 40.00	$ 600	
STAIR TREAD NOSING	39	LF	$ 15.00	$ 585	
CONCRETE PLANTER/BENCH	45	LF	$ 60.00	$ 2,700	
WATERPROOFING AND PROTECTION BOARD FOR ABOVE PLANTER	113	SF	$ 3.50	$ 394	
GRAVEL WRAPPED WITH DRAINAGE FABRIC FOR PLANTER	45	LF	$ 8.00	$ 360	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONCRETE CURB, 6"X12"	371	LF	$ 15.00	$ 5,565	
CONSTRUCT LONGITUDINAL GUTTER	281	LF	$ 15.00	$ 4,215	
CURB AND GUTTER	103	LF	$ 18.00	$ 1,854	
CONCRETE RETAINING WALL, COMPLETE	90	LF	$ 75.00	$ 6,750	
2" AC PAVING ON 4" CMB	9,116	SF	$ 2.50	$ 22,790	
3" AC PAVING ON 4" CMB	10,000	SF	$ 3.50	$ 35,000	
4" AC PAVING ON 6" CMB	1,900	SF	$ 4.60	$ 8,740	
4" REINFORCED CONCRETE PAVING OVER 4" BASE OVER 6" COMPACTED SUBGRADE	9,000	SF	$ 5.00	$ 45,000	
6" THICK CONCRETE SLAB ON GRADE ON 4" AGGREGATE	2,450	SF	$ 6.50	$ 15,925	
WALLS & FENCES					
2" SOLID CONCRETE CAP FOR CMU WALL	528	LF	$ 6.00	$ 3,168	
8" INTEGRAL COLOR SPLIT FACE CMU BLOCK WALL	4,320	SF	$ 18.00	$ 77,760	
FOUND FOR ABOVE CMU BLOCK WALL	71	CY	$ 330.00	$ 23,467	
DAMPROOFING FOR FOUNDATION	2,880	SF	$ 1.20	$ 3,456	
ORNAMENTAL FENCE	180	LF	$ 110.00	$ 19,800	
RETAINING WALL BELOW ORNAMENTAL FENCE, 12" THICK CONCRETE	32	CY	$ 680.00	$ 21,420	
RETAINING WALL FOUNDATION	28	CY	$ 330.00	$ 9,240	
8' CHAIN LINK FENCE	412	LF	$ 25.00	$ 10,300	
6' CHAIN LINK FENCE ABOVE RAMP RETAINING WALL	87	LF	$ 22.00	$ 1,914	
12" THICK LOW WALL BELOW CLF	205	LF	$ 50.00	$ 10,250	
FOUNDATION FOR ABOVE LOW WALL	16	CY	$ 330.00	$ 5,262	
INTEGRAL COLOR CMU BLOCK WALL AT SERVICE AREA	432	SF	$ 18.00	$ 7,776	
CONCRETER CURB	48	LF	$ 16.00	$ 768	
FOUND FOR ABOVE CMU BLOCK WALL	7	CY	$ 330.00	$ 2,464	
12" WIDE CONCRETE STRIP UNDER CLF	207	LF	$ 15.00	$ 3,105	
CHAIN LINK ENCLOSURE FOR WATER SERVICES WITH PAIR OF 3' GATE	1	LS	$ 1,000.00	$ 1,000	
CHAIN LINK AND METAL GATE					
20X8, SLIDING GATE, CL	1	EA	$ 4,000.00	$ 4,000	
PR 6'X8' SERVICE YARD/TRANSFORMER ENCLOSURE	1	EA	$ 2,500.00	$ 2,500	
PR 6'X6' , CL, SWING	2	EA	$ 2,300.00	$ 4,600	
6'X6', CL, SWING	1	EA	$ 1,000.00	$ 1,000	
PR 12'X8', CL SWING	1	EA	$ 4,000.00	$ 4,000	
30'X8', CL, SLIDING	1	EA	$ 7,000.00	$ 7,000	
PR 6'X8' STEEL GATE, SWING	1	EA	$ 5,000.00	$ 5,000	
3'-4"X6', STEEL GATE, SWING	1	EA	$ 3,000.00	$ 3,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
MISC. SITE WORK					
FLAGPOLE, 35' ABOVE FINISHED GRADE	1	EA	$ 4,000.00	$ 4,000	
PIPE BOLLARD, 8" DIAMETER X 8'	1	EA	$ 400.00	$ 400	
STOP SIGN	1	EA	$ 350.00	$ 350	
RAMP TRAFFIC MARKINGS (ENTER AND STOP)	2	SET	$ 100.00	$ 200	
ACCESSIBILITY SIGNAGE	1	SET	$ 350.00	$ 350	
DIRECTIONAL PAVEMENT MARKINGS	2	EA	$ 100.00	$ 200	
STEEL PIPE RAILING	60	LF	$ 90.00	$ 5,400	
PLAYGROUND ISSUES					
PLAYGROUND RUBBER MAT	775	SF	$ 10.00	$ 7,750	
CONCRETE CURB FOR ABOVE	100	LF	$ 15.00	$ 1,500	
PLAY STRUCTURE	1	EA	$ 10,000.00	$ 10,000	
TRICYCLE TRACK	83	LF	$ 5.25	$ 436	
CHINNING BARS	1	EA	$ 1,000.00	$ 1,000	
MISC. GAME MARKINGS	1	LS	$ 3,000.00	$ 3,000	
LANDSCAPING					
24" BOX TREES	19	EA	$ 400.00	$ 7,600	
PROTECT EXISTING TREES	5	EA	$ 200.00	$ 1,000	
5 GAL	204	EA	$ 50.00	$ 10,200	
1 GAL	494	EA	$ 25.00	$ 12,350	
BALL FIELD MIX 3A, EVERGREEN TURF MIX	11,450	SF	$ 1.25	$ 14,313	
GROUND COVER, FLATS 8" OC	3,800	SF	$ 1.75	$ 6,650	
IRRIGATION (INCLUDING STRIP FACTOR)	15,250	SF	$ 2.75	$ 41,938	
SOIL AMENDMENT/FERTILIZER, ROTO-TILL	15,250	SF	$ 0.50	$ 7,625	
90 DAYS MAINTENANCE	3	MO	$ 2,000.00	$ 6,000	
2" THICK BARK MULCH	3,800	SF	$ 0.60	$ 2,280	
STORM DRAINS					
CATCH BASIN	6	EA	$ 1,000.00	$ 6,000	
CLEANOUT TO GRADE	6	EA	$ 500.00	$ 3,000	
PVC SDR 35					
3"	162	LF	$ 20.00	$ 3,240	
6"	52	LF	$ 25.00	$ 1,300	
8"	280	LF	$ 30.00	$ 8,400	
10"	260	LF	$ 42.00	$ 10,920	
CONSTRUCT PARKWAY DRAIN	33	LF	$ 50.00	$ 1,650	
SAFETY SHORING FOR ABOVE DRAIN LINE	100	SF	$ 15.00	$ 1,500	
CONNECTION TO EXISTING MAIN STREET LINE	1	EA	$ 5,000.00	$ 5,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
LUNCH SHELTER					
LIGHTING					
COMPACT FLUORESCENT, EXTERIOR	10	EA	$ 270.00	$ 2,700	
ENTRANCE STRUCTURE					
20 GA. GALV. SHEET METAL FLASHING	138	SF	$ 10.00	$ 1,380	
PYRAMIDAL STEEL STRUCT., 4" DIA. PIPE	1	LS	$ 5,000.00	$ 5,000	
STEEL FRAMING, WF	8	TNS	$ 3,750.00	$ 30,806	
TS	912	LBS	$ 2.00	$ 1,823	
MISC. CONNECTIONS	1,500	LBS	$ 2.50	$ 3,750	
CEMENT PLASTER, VERTICAL SURFACE	1,592	SF	$ 7.00	$ 11,144	
CEMENT PLASTER, SOFFIT	215	SF	$ 10.00	$ 2,150	
20 GA. GALV. SHEET METAL FLASHING	108	SF	$ 6.00	$ 648	
CERAMIC TILE	800	SF	$ 14.00	$ 11,200	
1/2" PLYWOOD SHEATHING	2,053	SF	$ 3.00	$ 6,159	
WOOD FRAMING	2,053	SF	$ 4.00	$ 8,212	
SINGLE PLY SELF ADHESIVE WATERPROOFING MEMBRANE	250	SF	$ 2.00	$ 500	
FOUNDATIONS - GRADE BEAMS	14	CY	$ 350.00	$ 4,900	
ENTRANCE SIGN "SANTA MONICA PRIMARY CENTER"	1	SET	$ 2,160.00	$ 2,160	
PAINTING	1,003	SF	$ 1.00	$ 1,003	
COVERED WALK					
ROOF CONSTRUCTION					
WOOD FRAMING, 2X6 @ 16" OC	802	SF	$ 5.00	$ 4,010	
WOOD BEAMS	800	BF	$ 5.00	$ 4,000	
1/2" PLYWOOD SHEATHING	2,147	SF	$ 2.50	$ 5,368	
BUR	1,164	SF	$ 4.00	$ 4,656	
COPING	181	LF	$ 12.00	$ 2,172	
CONT. CANT STRIP	181	LF	$ 2.00	$ 362	
SOFFIT PLASTERING	802	SF	$ 10.00	$ 8,020	
FASCIA PLASTER	543	SF	$ 7.00	$ 3,801	
PAINTING	1,345	SF	$ 1.00	$ 1,345	
COLUMN					
PIPE COLUMNS, 4" DIA	108	LF	$ 30.00	$ 3,240	
PLASTER PER COLUMN	12	COL	$ 450.00	$ 5,400	
FRAMING PER COLUMN	12	COL	$ 300.00	$ 3,600	
1/2" PLYWOOD SHEATHING PER COLUMN	12	COL	$ 162.00	$ 1,944	
PAINTING PER COLUMN	12	COL	$ 67.50	$ 810	
FOUNDATIONS , 24" DIAMETER X 4' DEEP	12	EA	$ 400.00	$ 4,800	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
LIGHTING					
COMPACT FLUORESCENT, EXTERIOR	21	EA	$ 270.00	$ 5,670	
EXIT SIGNS	2	EA	$ 425.00	$ 850	
SUBTOTAL GENERAL SITE				**$ 768,875**	
Subtotal Division 02					**$ 1,314,008**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
PREPARE BUILDING PAD	9,907	SF	$ 0.20	$ 1,981	
Subtotal Division 02					**$ 1,981**
03 CONCRETE					
SPREAD FOOTING	7	CY	$ 340.00	$ 2,380	
CONTINUOUS FOOTING	70	CY	$ 340.00	$ 23,800	
WALKWAY FOUNDATION, 2' DIAMETER	132	LF	$ 52.00	$ 6,864	
CONCRETE COLUMN 15" DIAMETER	220	CY	$ 55.00	$ 12,100	
DRILLING FOR 15" CONCRETE COLUMN FOUNDATION	10	EA	$ 100.00	$ 1,000	
BACKFILL ON STAGE AREA	74	CY	$ 40.00	$ 2,963	
SLAB ON GRADE, 5" THICK OVER 2" SAND OVER 10 MIL VAPOR BARRIER OVER 2" SAND	9,662	SF	$ 6.00	$ 57,972	
6X6 CONCRETE CURB AT EXTERIOR WALLS	700	LF	$ 13.00	$ 9,100	
SLAB DEPRESSION	1,950	SF	$ 1.00	$ 1,950	
STAIR ON GRADE	132	LF	$ 40.00	$ 5,280	
STAIR ON GRADE, CIRCULAR	155	LF	$ 60.00	$ 9,300	
POLE FOOTING 24" DIAMETER X 4' HIGH	10	EA	$ 400.00	$ 4,000	
Subtotal Division 03					**$ 136,709**
04 MASONRY					
NOT USED					
Subtotal Division 04					**$ -**
05 METALS					
STRUCTURAL STEEL					
COLUMNS					
PIPE COLUMN, 4" DIAMETER, 260 LF	2,145	LBS	$ 2.00	$ 4,290	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
TUBULAR POST	2,621	LBS	$ 2.00	$ 5,241	
MISCELLANEOUS CONNECTIONS FOR POST AND COLUMNS	953	LBS	$ 3.00	$ 2,859	
ROOF STEEL FRAMING					
TS10X6X3/8 CURVED BEAM	3,760	LBS	$ 3.00	$ 11,280	
MISCELLANEOUS CONNECTIONS	752	LBS	$ 2.50	$ 1,880	
MISCELLANEOUS METALS					
STEEL PIPE RAILING	20	LF	$ 100.00	$ 2,000	
HAND RAIL @ PLATFORM	60	LF	$ 45.00	$ 2,700	
ROOF LADDER	1	EA	$ 1,000.00	$ 1,000	
Subtotal Division 05					**$ 31,251**
06 WOOD & PLASTICS					
ROUGH CARPENTRY					
ROOF FRAMING					
18" TJI @24" OC	7,743	SF	$ 7.50	$ 58,073	
EXTRA TRUSS JOIST FOR MECH. EQUIPMENT	800	LF	$ 6.00	$ 4,800	
2X12 @ 24" OC @ LUNCH SHELTER	1,250	SF	$ 7.25	$ 9,063	
2X10 @ 32" OC @ LUNCH SHELTER	524	SF	$ 4.00	$ 2,096	
2X8 @ 16" OC, OVER MULTIPURPOSE ROOM	2,410	SF	$ 5.50	$ 13,255	
2X6 @ 16" OC, OVER COVERED WALK	760	SF	$ 4.00	$ 3,040	
ROOF SHEATHING 5/8" CDX	8,700	SF	$ 2.00	$ 17,400	
ROOF SHEATHING 5/8" CDX, LUNCH SHELTER, SEMI-CIRCLE LAYOUT	1,250	SF	$ 3.00	$ 3,750	
ROOF SHEATHING 1/2, COVERED WALKWAY	760	SF	$ 1.70	$ 1,292	
MISCELLANEOUS BLOCKING, HEADER, ETC	10,391	SF	$ 1.00	$ 10,391	
PARALAM, GLUE LAM AND MICRO LAM	3,118	BF	$ 6.00	$ 18,708	
BEAMS, HEADER	2,800	BF	$ 5.00	$ 14,000	
WALL FRAMING					
EXTERIOR WOOD STUD 2X6	11,969	SF	$ 4.25	$ 50,866	
PLYWOOD SHEATHING, EXTERIOR	10,376	SF	$ 2.50	$ 25,940	
INTERIOR WOOD STUD 2X6	7,851	SF	$ 4.00	$ 31,402	
INTERIOR PLYWOOD FOR SHEAR WALL	4,700	SF	$ 2.50	$ 11,750	
POST	1,731	BF	$ 5.00	$ 8,655	
MISCELLANEOUS HARDWARE	1	LS	$ 14,250.00	$ 14,250	
FINISH CARPENTRY					
FACULTY DINING					
BASE CABINET	6	LF	$ 220.00	$ 1,320	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
WALL CABINET	9	LF	$ 180.00	$ 1,620	
WAITING					
FRONT DESK CASEWORK	15	LF	$ 300.00	$ 4,500	
PLASTIC LAMINATE SWING DOOR	1	EA	$ 400.00	$ 400	
SUPPLY/REPRO ROOM					
PLASTIC LAMINATE LOWER CABINET	30	LF	$ 220.00	$ 6,600	
PLASTIC LAMINATE UPPER CABINET	30	LF	$ 160.00	$ 4,800	
MAILBOXES	8	LF	$ 250.00	$ 2,000	
STORAGE/ WARDROBE CABINET	2	EA	$ 1,600.00	$ 3,200	
NURSE'S OFFICE					
PLASTIC LAMINATE LOWER CABINET	7	LF	$ 220.00	$ 1,540	
PLASTIC LAMINATE UPPER CABINET	7	LF	$ 160.00	$ 1,120	
LIBRARY AND LIBRARY OFFICE, RSP					
PLASTIC LAMINATE LOWER CABINET	7	LF	$ 250.00	$ 1,750	
PLASTIC LAMINATE UPPER CABINET	7	LF	$ 180.00	$ 1,260	
STORAGE/ WARDROBE CABINET	2	EA	$ 1,600.00	$ 3,200	
CIRCULATION DESK	20	LF	$ 300.00	$ 6,000	
7'H X 3'W BOOK SHELVING AGAINST WALL	80	LF	$ 200.00	$ 16,000	
3' HIGH LOW BOOK SHELVING	20	LF	$ 120.00	$ 2,400	
READING STAIR	15	LF	$ 280.00	$ 4,200	
Subtotal Division 06					**$ 360,640**
07 THERMAL& MOISTURE PROTECTION					
ROOF INSULATION	9,930	SF	$ 1.06	$ 10,526	
WATERPROOFING TO RESTROOMS	520	SF	$ 3.50	$ 1,820	
BATT INSULATION TO EXTERIOR WALLS (THERMAL)	10,376	SF	$ 0.80	$ 8,301	
SOUND INSULATION	7,851	SF	$ 0.60	$ 4,710	
3-PLY ROOFING	12,123	SF	$ 4.00	$ 48,492	
ROOFING WALKWAY PAD	288	SF	$ 3.00	$ 863	
CRICKET	1,064	SF	$ 3.00	$ 3,192	
PARAPET COPING	1,044	LF	$ 15.00	$ 15,660	
CANT STRIP, SPRING LOCK FLASHING AND COUNTER FLASHING	1,344	LF	$ 8.00	$ 10,752	
DOWNSPOUT	300	LF	$ 13.00	$ 3,900	
SPLASH PAN	8	EA	$ 40.00	$ 320	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
ROOF HATCH	1	EA	$ 1,100.00	$ 1,100	
ADD FOR FRAME AND COVER FOR HATCH	1	EA	$ 600.00	$ 600	
SCUPPER	21	EA	$ 75.00	$ 1,575	
MISC. SHEET METAL ALLOWANCE	10,391	GSF	$ 0.16	$ 1,638	
MISC. CAULKING AND SEALANT ALLOWANCE	10,391	GSF	$ 0.30	$ 3,117	
MECHANICAL SCREEN WALL AT ROOF, 5'-9" H	170	LF	$ 120.00	$ 20,400	
Subtotal Division 07					**$ 136,965**
08 DOORS & WINDOWS					
DOOR, FRAME AND HARDWARE					
SC WOOD DOOR AND HM FRAME, 3X7	41	EA	$ 600.00	$ 24,600	
EXTRA FOR LOUVER	5	EA	$ 100.00	$ 500	
EXTRA FOR HALF GLASS	2	EA	$ 100.00	$ 200	
EXTRA FOR VISION PANEL	15	EA	$ 100.00	$ 1,500	
HM DOOR AND FRAME, 6X7 WITH A PAIR OF VISION PANEL 8"X2'-6"	3	EA	$ 1,800.00	$ 5,400	
HARDWARE	44	EA	$ 400.00	$ 17,600	
PANIC HARDWARE FOR SINGLE DOORS	10	EA	$ 550.00	$ 5,500	
EXTRA FOR FIRE RATING, 20 MIN	6	EA	$ 25.00	$ 150	
EXTRA FOR FIRE RATING, 60 MIN	3	EA	$ 40.00	$ 120	
COILING DOOR, 16' X 9'	1	EA	$ 5,000.00	$ 5,000	
ACCESS PANEL/DOOR, 2X2	13	EA	$ 260.00	$ 3,380	
WINDOWS					
WINDOWS AND GLAZING - EXTERIOR	681	SF	$ 42.00	$ 28,602	
WINDOWS AND GLAZING - INTERIOR	55	SF	$ 50.00	$ 2,750	
Subtotal Division 08					**$ 95,302**
09 FINISHES					
EXTERIOR FINISHES					
GRAFFITI COATING, 9' HT.	4,500	SF	$ 1.46	$ 6,570	
STUCCO , PAINTED	10,500	SF	$ 6.75	$ 70,875	
INTERIOR SURFACE OF EXTERIOR WALL, 5/8" TYPE 'X' GWB, PAINTED	10,300	SF	$ 2.40	$ 24,720	
CERAMIC TILE	239	SF	$ 15.00	$ 3,585	
INTERIOR WALLS FINISHES					
PAINTED GYPSUM BOARD	15,701	SF	$ 2.40	$ 37,682	
CERAMIC TILE	764	SF	$ 15.00	$ 11,460	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
PAINT DOOR AND FRAME	44	EA	$ 85.00	$ 3,740	
CERAMIC BASE TILE	235	LF	$ 7.00	$ 1,645	
RUBBER BASE	1,000	LF	$ 1.60	$ 1,600	
FRP	855	SF	$ 5.50	$ 4,703	
MISCELLANEOUS PAINTING	10,376	SF	$ 0.20	$ 2,075	
CEILING FINISHES					
DOUBLE LAYER GWB	9,750	SF	$ 2.50	$ 24,375	
PAINTED SUSPENDED GYPBD CEILING	3,200	SF	$ 6.50	$ 20,800	
CEMENT PLASTER SOFFIT	2,520	SF	$ 10.00	$ 25,200	
FRAMING FOR PLASTER SOFFIT	2,520	SF	$ 4.50	$ 11,340	
ACOUSTIC TILE	3,900	SF	$ 2.50	$ 9,750	
ACOUSTIC TILE, 2' X 2'	2,180	SF	$ 2.50	$ 5,450	
PAINT TO CEMENT PLASTER SOFFIT	2,520	SF	$ 0.80	$ 2,016	
FLOOR FINISHES					
CERAMIC TILE	553	SF	$ 14.00	$ 7,742	
MORTAR BED	553	SF	$ 2.56	$ 1,416	
CARPET	2,600	SF	$ 4.44	$ 11,556	
RESILIENT FLOORING	4,310	SF	$ 2.00	$ 8,620	
QUARRY TILE FLOOR	1,810	SF	$ 14.00	$ 25,340	
QUARRY TILE BASE	380	LF	$ 8.00	$ 3,040	
CONCRETE SEALER	300	SF	$ 1.05	$ 315	
Subtotal Division 09					**$ 325,615**
10 SPECIALTIES					
TOILET PARTITIONS, STANDARD	1	EA	$ 900.00	$ 900	
TOILET PARTITIONS, HC	2	EA	$ 1,000.00	$ 2,000	
TOILET ACCESSORIES					
TOILET TISSUE DISPENSER	8	EA	$ 90.00	$ 720	
SEAT COVER DISPENSER	8	EA	$ 125.00	$ 1,000	
SOAP DISPENSER	7	EA	$ 85.00	$ 595	
GRAB BARS	7	EA	$ 180.00	$ 1,260	
MIRRORS	7	EA	$ 150.00	$ 1,050	
PAPER TOWEL DISPENSER	2	EA	$ 300.00	$ 600	
ELECTRIC HAND DRYER	7	EA	$ 600.00	$ 4,200	
SANITARY NAPKIN VENDOR	3	EA	$ 500.00	$ 1,500	
SANITARY NAPKIN DISPOSAL	3	EA	$ 250.00	$ 750	
JANITOR ACCESSORIES	1	EA	$ 1,200.00	$ 1,200	
LOCKERS, 2 TIER	7	EA	$ 175.00	$ 1,225	
BOARDS, SIGNAGE AND GRAPHICS	9,907	SF	$ 1.00	$ 9,907	
FACULTY FOOD SERVICE WINDOW	1	EA	$ 1,575.90	$ 1,576	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
FIRE EXTINGUISHER CABINET	4	EA	$ 350.00	$ 1,400	
FIXED MARKER BOARDS, 4X12	1	EA	$ 825.00	$ 825	
TACK BOARD SURFACE ACOUSTICAL	265	SF	$ 7.50	$ 1,988	
Subtotal Division 10					**$ 32,695**
11 EQUIPMENT					
FOOD SERVICE EQUIPMENT					
EXHAUST HOOD, 12'X5'	1	EA	$ 8,000.00	$ 8,000	
WALK IN REFRIGERATOR	95	SF	$ 200.00	$ 19,000	
GAS RANGE, 2 BURNER	1	EA	$ 3,500.00	$ 3,500	
REACH IN FREEZER (DOUBLE)	1	EA	$ 7,600.00	$ 7,600	
PREPARATION TABLE AND HANGING RACK, 84"X20"	2	EA	$ 3,000.00	$ 6,000	
COUNTER, 12' LONG	1	EA	$ 3,000.00	$ 3,000	
3-COMPARTMENT SINK	1	EA	$ 4,000.00	$ 4,000	
HAND WASHING SINK	1	EA	$ 800.00	$ 800	
METRO SHELVING, 21X48	7	EA	$ 500.00	$ 3,500	
METAL SHELVING	1	EA	$ 800.00	$ 800	
SNEEZE GUARD	1	EA	$ 1,000.00	$ 1,000	
PREP SINK UNIT	1	EA	$ 2,500.00	$ 2,500	
SS POT RACK SHELVES	1	EA	$ 900.00	$ 900	
SS SHELF, 4'	1	EA	$ 300.00	$ 300	
WALL FLASHING, 12' X 10'	1	EA	$ 2,400.00	$ 2,400	
FIRE SUPPRESSION SYSTEM	1	EA	$ 8,000.00	$ 8,000	
PROJECTION SCREEN, ELECTRICALLY OPERATED IN MULTI-PURPOSE	1	EA	$ 4,427.89	$ 4,428	
Subtotal Division 11					**$ 75,728**
12 FURNISHINGS					
CURTAINS	616	SF	$ 29.00	$ 17,864	
CURTAIN TRACK	56	LF	$ 56.00	$ 3,136	
PRIVACY CURTAIN IN NURSE'S OFFICE	10	LF	$ 50.00	$ 500	
FOLDING TABLES AND BENCHES	10	EA	$ 3,200.00	$ 32,000	
WINDOW BLINDS	681	SF	$ 6.50	$ 4,427	
Subtotal Division 12					**$ 57,927**
13 SPECIAL CONSTRUCTION					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
HANDICAPPED LIFT	1	EA	$ 10,000.00	$ 10,000	
Subtotal Division 14					**$ 10,000**
15 MECHANICAL					
PLUMBING WORK					
PLUMBING FIXTURES					
WATER CLOSET	8	EA	$ 683.55	$ 5,468	
DRINKING FOUNTAIN	2	EA	$ 1,200.00	$ 2,400	
URINAL WALL MOUNTED	1	EA	$ 565.00	$ 565	
SINKS	2	EA	$ 680.00	$ 1,360	
LAVATORY	7	EA	$ 401.45	$ 2,810	
SERVICE SINK	3	EA	$ 695.00	$ 2,085	
FLOOR SINK	1	EA	$ 600.00	$ 600	
WATER HEATER, ELECTRIC, 100 GAL, 88MBH	1	EA	$ 2,800.00	$ 2,800	
ROUGH IN FOR THE FIXTURES					
WATER CLOSET	8	EA	$ 439.43	$ 3,515	
DRINKING FOUNTAIN	2	EA	$ 234.00	$ 468	
URINAL WALL MOUNTED	1	EA	$ 396.03	$ 396	
SINKS	2	EA	$ 460.00	$ 920	
LAVATORY	7	EA	$ 670.00	$ 4,690	
SERVICE SINK	3	EA	$ 865.00	$ 2,595	
FLOOR SINK	1	EA	$ 600.00	$ 600	
WATER HEATER, 100 GAL CAPACITY	1	EA	$ 300.00	$ 300	
ROUGH IN FOR THE FIXTURES	25	EA	$ 1,200.00	$ 30,000	
ROUGH IN FOR KITCHEN FIXTURES					
3- COMPARTMENT SINK	1	EA	$ 1,200.00	$ 1,200	
UTENSIL, HAND, AND PREP SINK	3	EA	$ 1,000.00	$ 3,000	
GAS CONNECTION TO KITCHEN EQUIPMENT	3	EA	$ 500.00	$ 1,500	
GREASE INTERCEPTOR, 750 GAL CAP	1	EA	$ 8,000.00	$ 8,000	
FLOOR DRAIN	14	EA	$ 300.00	$ 4,200	
FLOOR CLEANOUT	10	EA	$ 180.00	$ 1,800	
HOSE BIBB	7	EA	$ 300.00	$ 2,100	
RBFP, 3/4"	1	EA	$ 600.00	$ 600	
CONDENSATE DRAIN PIPING, 1" ~11/2"	450	LF	$ 12.00	$ 5,400	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
MISC. VALVES AND SPECIALTIES	10,376	SF	$ 0.30	$ 3,113	
GAS SERVICES	10,376	SF	$ 0.60	$ 6,226	
TEST, PURGE, STERILIZE	10,376	SF	$ 0.40	$ 4,150	
FIRE PROTECTION					
SPRINKLER SYSTEM	10,376	SF	$ 2.25	$ 23,346	
HVAC SYSTEM					
AC-3, 3 TONS	4	EA	$ 5,550.00	$ 22,200	
AC-4, 3.85 TONS	2	EA	$ 7,100.00	$ 14,200	
AC-5, 4.98 TONS	1	EA	$ 7,728.00	$ 7,728	
AC-7.5, 7.29 TONS	2	EA	$ 11,173.13	$ 22,346	
SPLIT UNIT					
3.06 TONS	1	EA	$ 3,518.22	$ 3,754	
2.85 TONS	1	EA	$ 3,266.10	$ 3,485	
EXHAUST FAN					
MAKE-UP AIR UNIT, 2,400 CFM	1	EA	$ 6,500.00	$ 6,500	
AIR CURTAIN	2	EA	$ 1,000.00	$ 2,000	
2400 CFM	1	EA	$ 2,000.00	$ 2,000	
260 CFM	1	EA	$ 300.00	$ 300	
330 CFM	1	EA	$ 495.00	$ 495	
300 CFM	2	EA	$ 450.00	$ 900	
188 CFM	1	EA	$ 282.00	$ 282	
GV, 1,600 CFM	4	EA	$ 1,600.00	$ 6,400	
GV, 3,600 CFM	2	EA	$ 3,600.00	$ 7,200	
AIR DISTRIBUTION					
DUCT WORK	8,301	LBS	$ 6.00	$ 49,805	
DUCT INSULATION, WRAP	5,685	SF	$ 2.00	$ 11,371	
CEILING DIFFUSER, 12X12	39	EA	$ 134.00	$ 5,226	
TR	8	EA	$ 180.00	$ 1,440	
REGISTER/RETURN	36	EA	$ 130.00	$ 4,680	
CG RELIEF	16	EA	$ 100.00	$ 1,600	
FLEXIBLE CONNECTION	75	EA	$ 95.00	$ 7,125	
FIRE DAMPER, TO 2SF	3	EA	$ 141.83	$ 425	
COMB. F/S DAMPER	11	EA	$ 200.00	$ 2,200	
VOLUME DAMPER	83	EA	$ 73.54	$ 6,104	
CONTROL/ BACK DRAFT DAMPER	6	EA	$ 150.00	$ 900	
BY PASS DAMPER, 2400 CFM	1	EA	$ 1,500.00	$ 1,500	
VARIABLE AIR VOLUME TERMINAL BOX	1	EA	$ 1,282.50	$ 1,283	
AIR BALANCE: AIR DISTRIBUTION DEVICES	83	EA	$ 70.00	$ 5,810	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONTROLS	10,376	SF	$ 1.00	$ 10,376	
Subtotal Division 15					**$ 335,843**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
MAIN SWITCHBOARD, MS, 277/480V, ,3P, 4W, 1200A	1	EA	$ 27,732.60	$ 27,733	
DISTRIBUTION PANEL, DBA, 600A, 120/208V, 3P, 4W	1	EA	$ 7,000.00	$ 7,000	
150 KVA TRANSFORMER, 480-208/120V, 3P, 4W	1	EA	$ 8,500.00	$ 8,500	
GROUNDING	10,376	SF	$ 0.35	$ 3,632	
PANEL BD					
225A, 120/208V	1	EA	$ 3,500.00	$ 3,500	
100A, 120/208V	3	EA	$ 2,200.00	$ 6,600	
225A, 480V	2	EA	$ 4,000.00	$ 8,000	
100A, 277/480V	1	EA	$ 2,800.00	$ 2,800	
1LCP	1	EA	$ 1,500.00	$ 1,500	
1EM, EMERGENCY POWER SUPPLY, 2.5 KVA	1	EA	$ 5,630.00	$ 5,630	
SECONDARY FEEDER LINE					
CABLE AND CONDUIT	280	LF	$ 28.00	$ 7,840	
BRANCH POWER SYSTEM					
RECEPTACLES, ALL TYPES	46	EA	$ 135.00	$ 6,210	
SPECIAL PURPOSE RECEPTACLES (FOR KITCHEN EQUIPMENT)	11	EA	$ 200.00	$ 2,200	
WIRE #12/4 THWN/THHN	2,000	LF	$ 2.00	$ 4,000	
EMT CONDUITS WITH FITTINGS	2,000	LF	$ 4.17	$ 8,340	
POWER TO MECHANICAL					
DISCONNECT SWITCH, 30A	12	EA	$ 500.00	$ 6,000	
DISCONNECT SWITCH, 100A	1	EA	$ 1,000.00	$ 1,000	
MISCELLANEOUS MOTOR CONNECTION	12	EA	$ 300.00	$ 3,600	
LIGHTING FIXTURES, TYPE					
2X4, RECESSED FLUORESCENT, 3 LAMP	18	EA	$ 300.00	$ 5,400	
2X4, RECESSED FLUORESCENT, 2 LAMP	37	EA	$ 250.00	$ 9,250	
2X4, RECESSED FLUORESCENT, 2 LAMP, SURFACE MTD	31	EA	$ 250.00	$ 7,750	
COMPACT FLUORESCENT DOWN LIGHT	16	EA	$ 300.00	$ 4,800	
PENDANT MOUNTED COMPACT FLUORESCENT FIXTURE, 8 LAMP	12	EA	$ 600.00	$ 7,200	
EXIT SIGN, SINGLE FACE	9	EA	$ 350.00	$ 3,150	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
FLUOR GENERAL PURPOSE STRIP LIGHT, SINGLE LAMP, SURFACE	10	EA	$ 150.00	$ 1,500	
SURFACE CEILING MTD HIGH ABUSE FLUOR FIXT. 2-LAMP	27	EA	$ 275.00	$ 7,425	
SURFACE CEILING MTD HIGH ABUSE COMPACT FLUOR FIXT. 1-LAMP	1	EA	$ 200.00	$ 200	
COMPACT FLUORESCENT DOWN LIGHT, 2-LAMP	2	EA	$ 200.00	$ 400	
STAGE TRACK LIGHT, 150W, HALOGEN	3	EA	$ 300.00	$ 900	
OCCUPANCY SENSOR	2	EA	$ 250.00	$ 500	
LIGHTING CONTROL PANEL	1	EA	$ 1,000.00	$ 1,000	
SWITCHES	18	EA	$ 92.00	$ 1,656	
MISC. WIRING AND CONDUIT	10,376	SF	$ 0.50	$ 5,188	
CLOCK AND PROGRAM SYSTEM					
MAIN CLOCK	1	EA	$ 1,000.00	$ 1,000	
CLOCK	17	EA	$ 195.00	$ 3,315	
CONDUIT AND WIRE	10,376	SF	$ 0.20	$ 2,075	
FIRE ALARM SYSTEM					
FACP	1	EA	$ 5,000.00	$ 5,000	
FIRE CONTROL COMMUNICATOR	1	EA	$ 600.00	$ 600	
FIRE ALARM BELL	1	EA	$ 195.00	$ 195	
SMOKE DETECTOR	30	EA	$ 190.00	$ 5,700	
MANUAL PULL STATION	6	EA	$ 160.00	$ 960	
STROBE	9	EA	$ 160.00	$ 1,440	
HORN/STROBE	20	EA	$ 200.00	$ 4,000	
WEATHERPROOF FIRE ALARM HORN	7	EA	$ 160.00	$ 1,120	
SYNC. MODULE	2	EA	$ 220.00	$ 440	
MONITOR MODULE	1	EA	$ 200.00	$ 200	
CONTROL MODULE	1	EA	$ 200.00	$ 200	
WATER FLOW	1	EA	$ 130.00	$ 130	
TAMPER SWITCH	1	EA	$ 130.00	$ 130	
HEAT DETECTOR	61	EA	$ 150.00	$ 9,150	
FIRE ALARM CKTS, EMT/ WIRE	10,376	SF	$ 0.63	$ 6,537	
SPARE PARTS: 10% SPARE PULL STATIONS, 10% SPARE SMOKE AND HEAT DETECTOR, 10% SPARE AUDIBLE DEVICES, 10% SPARE STROBE DEVICES	1	LOT	$ 5,000.00	$ 5,000	
PROVIDE 12 HOURS OF SITE INSTRUCTION	12	HR	$ 120.00	$ 1,440	
Subtotal Division 16					**$ 219,035**

25 LOW VOLTAGE SYSTEMS

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
SECURITY SYSTEM					
MOTION SENSOR	27	EA	$ 200.00	$ 5,400	
MAGNETIC DOOR SWITCH	1	EA	$ 75.00	$ 75	
KEY PAD	2	EA	$ 200.00	$ 400	
CONDUITS AND WIRES	10,376	SF	$ 0.50	$ 5,188	
PULL BOX	1	EA	$ 175.00	$ 175	
SECURITY TERMINAL CABINET, SECTC	1	EA	$ 600.00	$ 600	
TV SYSTEM					
TV OUTLETS	4	EA	$ 206.00	$ 824	
MAIN TV TERMINAL CABINET	1	EA	$ 1,000.00	$ 1,000	
CONDUIT AND CABLE	10,376	SF	$ 0.10	$ 1,038	
PA AND TELEPHONE SYSTEM					
SPEAKERS	29	EA	$ 100.00	$ 2,900	
AUTONOMOUS PA RACK AND AMPLIFIER	1	EA	$ 10,000.00	$ 10,000	
MAIN A/IC/TEL TERMINAL CABINET	1	EA	$ 15,000.00	$ 15,000	
PABX	1	EA	$ 10,000.00	$ 10,000	
MICROPHONE OUTLET	6	EA	$ 150.00	$ 900	
PA TERMINAL CABINET, PATC-4	1	EA	$ 600.00	$ 600	
WIRING AND CONDUIT FOR PA SYSTEM	10,376	SF	$ 0.20	$ 2,075	
TELEPHONE/INTERCOM AND OUTLET	23	EA	$ 300.00	$ 6,900	
WIRING AND CONDUIT FOR TEL SYSTEM	10,376	SF	$ 0.20	$ 2,075	
TELEPHONE TERMINAL CABINET, TLTC-M	1	EA	$ 600.00	$ 600	
DATA SYSTEM					
MAIN DISTRIBUTION FRAME	1	EA	$ 6,000.00	$ 6,000	
COMPUTER OUTLETS	35	EA	$ 100.00	$ 3,500	
LDF	1	EA	$ 2,000.00	$ 2,000	
CAT 5 CABLE	1,000	LF	$ 0.12	$ 120	
FIBER OPTIC CABLE	500	LF	$ 15.00	$ 7,500	
POWER SUPPLY	1	EA	$ 500.00	$ 500	
Subtotal Division 25					**$ 85,370**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
Subtotal Division 02					**$ -**
03 CONCRETE					
EXTRA FOR BLDG FLOOR DEPRESSION	940	SF	$ 1.00	$ 940	
SPREAD FOOTING	0.33	CY	$ 340.00	$ 113	
BLDG. AND REST ROOM PERIMETER CURB	577	LF	$ 12.00	$ 6,924	
1-1/2" THICK CELLULAR CONCRETE WITH WIRE MESH	12,732	SF	$ 2.25	$ 28,647	
FOUNDATIONS , 24" DIAMETER X 6' DEEP	4	EA	$ 450.00	$ 1,800	
CONCRETE TOPPING OVER EXPOSED AREAS OF PARKING ELEVATED SLAB	1,650	SF	$ 3.00	$ 4,950	
Subtotal Division 03					**$ 43,374**
04 MASONRY					
NOT USED					
Subtotal Division 04					**$ -**
05 METALS					
STRUCTURAL STEEL					
STRUCTURAL STEEL, WF	8,015	LBS	$ 2.00	$ 16,030	
PIPE COLUMN 5" DIA	84	LF	$ 41.00	$ 3,444	
PIPE COLUMN 4" DIA AT G/L	56	LF	$ 22.00	$ 1,232	
TS4X4X1/4	338	LF	$ 24.40	$ 8,247	
MISCELLANEOUS METAL CONNECTIONS	3,000	LBS	$ 2.50	$ 7,500	
CONCRETE FILLED METAL FAN STAIR #2	139	LFR	$ 75.00	$ 10,445	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
STAIR #1	156	LFR	$ 75.00	$ 11,700	
EXTRUDED NON-SLIP NOSING	295	LF	$ 15.00	$ 4,429	
STAIR LANDING					
STAIR # 2	32	SF	$ 41.00	$ 1,292	
STAIR # 1	83	SF	$ 41.00	$ 3,415	
MISCELLANEOUS METAL					
WALL MOUNTED HANDRAIL IN STAIR	64	LF	$ 40.00	$ 2,560	
ALUMINUM FIXED VERTICAL LADDER, 31'	1	EA	$ 3,100.00	$ 3,100	
ROOF LADDER	1	EA	$ 1,000.00	$ 1,000	
Subtotal Division 05					**$ 74,393**
06 WOOD & PLASTICS					
ROUGH CARPENTRY					
POST	1,773	BF	$ 5.00	$ 8,863	
PARALAM BEAM	1,924	BF	$ 5.00	$ 9,620	
BEAMS	1,117	BF	$ 4.00	$ 4,468	
FLOOR FRAMING					
FLOOR JOIST	12,740	SF	$ 8.00	$ 101,920	
2X8 FLOOR JOIST @ 16"OC	221	SF	$ 3.50	$ 774	
FLOOR SHEATHING, 3/4" T&G CDX	13,006	SF	$ 1.70	$ 22,110	
ROOF JOIST					
ROOF JOIST	11,138	SF	$ 7.00	$ 77,966	
2X12 @16"OC	67	SF	$ 8.00	$ 536	
2X8 @16"OC	24	SF	$ 6.00	$ 144	
ROOF BEAM/HEADER	771	BF	$ 5.00	$ 3,857	
5/8 P/W SHEATHING	11,138	SF	$ 1.75	$ 19,492	
PARALAM BEAM	400	BF	$ 5.00	$ 2,000	
EXTERIOR WALL FRAMING					
WOOD STUD, 2X6 @ 16" OC	14,937	SF	$ 4.25	$ 63,482	
EXTRA WALL FRAMING FOR DOUBLE WALL ABOVE WINDOWS AND OTHER LOCATIONS	1,500	SF	$ 4.00	$ 6,000	
PLYWOOD SHEATHING INCLUDING SHEAR WALL	16,005	SF	$ 2.50	$ 40,013	
INTERIOR WALL FRAMING					
WOOD STUD, 2X6 @ 16" OC	23,455	SF	$ 4.00	$ 93,820	
SHEAR WALL 1/2" THICK PLYWOOD	9,418	SF	$ 2.50	$ 23,544	
MISCELLANEOUS WOOD BLOCKING	23,620	SF	$ 0.60	$ 14,172	
ROUGH HARDWARE	23,620	SF	$ 0.75	$ 17,715	
FINISH CARPENTRY					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
WORKROOM					
PLASTIC LAMINATE LOWER CABINET	25	LF	$ 220.00	$ 5,390	
PLASTIC LAMINATE UPPER CABINET	12	LF	$ 180.00	$ 2,160	
STORAGE/ WARDROBE CABINET	1	EA	$ 2,000.00	$ 2,000	
CLASSROOMS					
BASE CABINET (SINK)	99	LF	$ 230.00	$ 22,770	
TEACHING LEARNING UNIT, 16' WIDE	16	EA	$ 7,200.00	$ 115,200	
TEACHER'S CABINET/STORAGE	16	EA	$ 1,500.00	$ 24,000	
MEDIA CABINET	16	EA	$ 1,500.00	$ 24,000	
COAT HOOK SHELVES	16	EA	$ 315.00	$ 5,040	
Subtotal Division 06					**$ 716,555**
07 THERMAL& MOISTURE PROTECTION					
ROOFING					
MEMBRANE	12,883	SF	$ 4.00	$ 51,532	
WATERPROOFING UNDER CONCRETE TOPPING	1,650	SF	$ 3.00	$ 4,950	
WATERPROOFING IN RESTROOMS	1,457	SF	$ 4.46	$ 6,498	
INSULATION					
ROOFING	12,883	SF	$ 1.05	$ 13,527	
EXTERIOR WALL	14,937	SF	$ 0.65	$ 9,709	
PARTITIONS	23,455	SF	$ 0.60	$ 14,073	
MECHANICAL SCREEN WALL AT ROOF, 5' 9" HIGH	172	LF	$ 100.00	$ 17,200	
WALKWAY PADS	413	SF	$ 3.00	$ 1,238	
CANTS AND UPSTANDS	651	LF	$ 4.50	$ 2,930	
MISC. SHEET METAL ALLOWANCE	23,620	SF	$ 0.25	$ 5,905	
COPING	651	LF	$ 15.00	$ 9,765	
SCUPPER	5	EA	$ 100.00	$ 500	
GI SHEET METAL DOWNSPOUT	120	LF	$ 15.00	$ 1,800	
ROOF HATCH AND COVER	1	EA	$ 1,000.00	$ 1,000	
CAULKING AND SEALANTS	23,620	SF	$ 0.55	$ 12,991	
PLYWOOD CRICKET	965	SF	$ 3.50	$ 3,378	
Subtotal Division 07					**$ 156,995**
08 DOORS & WINDOWS					
DOOR, FRAME AND HARDWARE					
SC WOOD DOOR AND HM FRAME, 3X7	27	EA	$ 600.00	$ 16,200	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
EXTRA FOR LOUVER	12	EA	$ 100.00	$ 1,200	
EXTRA FOR HALF GLASS	2	EA	$ 100.00	$ 200	
EXTRA FOR VISION PANEL	33	EA	$ 100.00	$ 3,300	
HM DOOR AND HM FRAME, 3X7	28	EA	$ 650.00	$ 18,200	
HM DOOR AND FRAME, 6X7 WITH A PAIR OF VISION PANEL 8"X2'-6"	4	EA	$ 1,800.00	$ 7,200	
HARDWARE	63	EA	$ 400.00	$ 25,200	
PANIC HARDWARE FOR SINGLE DOORS	13	EA	$ 550.00	$ 7,150	
EXTRA FOR FIRE RATING, 20 MIN	20	EA	$ 25.00	$ 500	
EXTRA FOR FIRE RATING, 60 MIN	10	EA	$ 40.00	$ 400	
EXTRA FOR FIRE RATING, 90 MIN	2	EA	$ 50.00	$ 100	
ACCESS PANEL/DOOR, 2X2	9	EA	$ 300.00	$ 2,700	
WINDOWS AND GLAZING - EXTERIOR	1,560	SF	$ 42.00	$ 65,520	
WINDOWS AND GLAZING - INTERIOR	20	SF	$ 45.00	$ 900	
Subtotal Division 08					**$ 148,770**
09 FINISHES					
WALL					
STUCCO	16,005	SF	$ 6.00	$ 96,030	
STUCCO PAINTING	16,005	SF	$ 0.60	$ 9,603	
EXTERIOR CERAMIC WALL TILE	1,200	SF	$ 16.00	$ 19,200	
CERAMIC TILES WAINSCOTING	1,116	SF	$ 15.00	$ 16,740	
5/8" TYPE 'X' GWB TO INTERIOR SURFACE OF EXTERIOR WALL	13,971	SF	$ 1.75	$ 24,449	
5/8" TYPE 'X' GWB TO INTERIOR PARTITION	23,455	SF	$ 1.75	$ 41,046	
CEMENT BOARD IN RESTROOMS	1,116	SF	$ 4.00	$ 4,464	
PAINT NEW GWB	37,426	SF	$ 0.70	$ 26,198	
CERAMIC TILE BASE	200	LF	$ 8.00	$ 1,600	
MISCELLANEOUS PAINTING	23,620	SF	$ 0.25	$ 5,905	
PAINT DOOR AND FRAME	63	EA	$ 95.00	$ 5,985	
GRAFFITI COATING	4,860	SF	$ 1.50	$ 7,290	
INTERIOR CEILING FINISHES					
DOUBLE LAYER GWB	22,442	SF	$ 2.50	$ 56,105	
CEMENT PLASTER SOFFIT	1,810	SF	$ 9.00	$ 16,290	
FRAMING FOR PLASTER SOFFIT	1,810	SF	$ 4.00	$ 7,240	
SUSPENDED GYPSUM BOARD CEILING INCLUDING FRAMING	3,038	SF	$ 6.00	$ 18,228	
GYPSUM BOAR SOFFIT AND FRAMING AT CLASSROOMS	2,092	SF	$ 6.00	$ 12,552	
SUSPENDED ACT	17,701	SF	$ 2.50	$ 44,253	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
1/2" RC CLIP	22,442	SF	$ 1.50	$ 33,663	
CEILING PAINTING	6,940	SF	$ 0.90	$ 6,246	
FLOOR					
CERAMIC TILE TO FLOORS	1,457	SF	$ 14.00	$ 20,398	
MORTAR BED	1,457	SF	$ 3.00	$ 4,371	
CARPET	1,740	SF	$ 4.44	$ 7,733	
SEALER TO FLOORS	230	SF	$ 1.20	$ 276	
VCT FLOORING	17,301	SF	$ 2.24	$ 38,754	
6" RUBBER BASE	2,194	LF	$ 1.75	$ 3,840	
Subtotal Division 9					**$ 528,459**
10 SPECIALTIES					
SIGNAGE	23,620	GSF	$ 1.00	$ 23,620	
TOILET PARTITIONS, STANDARD	10	EA	$ 900.00	$ 9,000	
TOILET PARTITIONS, HC	4	EA	$ 1,000.00	$ 4,000	
SEAT COVER DISPENSER	20	EA	$ 80.00	$ 1,600	
TOILET PAPER DISPENSER	20	EA	$ 50.00	$ 1,000	
PAPER TOWEL DISPENSER	10	EA	$ 450.00	$ 4,500	
ELECTRIC HAND DRYER	10	EA	$ 600.00	$ 6,000	
SOAP DISPENSER	18	EA	$ 50.00	$ 900	
GRAB BARS, SET	10	EA	$ 180.00	$ 1,800	
FIRE EXTINGUISHERS	10	EA	$ 350.00	$ 3,500	
FIXED MARKER BOARDS, 4X8	16	EA	$ 700.00	$ 11,200	
TACK WALL	3,610	SF	$ 7.50	$ 27,075	
SHELVING IN CUSTODIAN	10	LF	$ 120.00	$ 1,200	
MIRRORS	18	EA	$ 200.00	$ 3,600	
PAPER TOWEL DISPENSER WITH DISPOSAL	10	EA	$ 450.00	$ 4,500	
JANITOR ACCESSORIES	2	EA	$ 1,000.00	$ 2,000	
Subtotal Division 10					**$ 105,495**
11 EQUIPMENT					
PROJECTION SCREENS, MANUAL TYPE @ CLASSROOMS	16	EA	$ 500.00	$ 8,000	
Subtotal Division 11					**$ 8,000**
12 FURNISHINGS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
WINDOW BLINDS	1,560	SF	$ 6.50	$ 10,140	
Subtotal Division 12					**$ 10,140**
13 SPECIAL CONSTRUCTION					
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
HYDRAULIC PASSENGER ELEVATOR, 2 STOP (see Parking for 3rd stop)	1	EA	$ 60,000.00	$ 60,000	
Subtotal Division 14					**$ 60,000**
15 MECHANICAL					
PLUMBING WORK					
PLUMBING FIXTURES					
WATER CLOSET	20	EA	$ 753.61	$ 15,072	
DRINKING FOUNTAIN, DF-1, HI-LO	2	EA	$ 1,323.00	$ 2,646	
URINAL WALL MOUNTED	2	EA	$ 622.91	$ 1,246	
SINKS	16	EA	$ 749.70	$ 11,995	
LAVATORY	18	EA	$ 442.60	$ 7,967	
SERVICE SINK	2	EA	$ 766.24	$ 1,532	
WATER HEATER, ELECTRIC, 40 GAL	1	EA	$ 2,625.00	$ 2,625	
ROUGH IN FOR THE FIXTURES					
WATER CLOSET	20	EA	$ 484.47	$ 9,689	
DRINKING FOUNTAIN	2	EA	$ 257.99	$ 516	
URINAL WALL MOUNTED	2	EA	$ 436.62	$ 873	
SINKS	16	EA	$ 507.15	$ 8,114	
LAVATORY	18	EA	$ 738.68	$ 13,296	
SERVICE SINK	2	EA	$ 953.66	$ 1,907	
FLOOR SINK	1	EA	$ 661.50	$ 662	
WATER HEATER	1	EA	$ 330.75	$ 331	
ROUGH IN FOR THE FIXTURES	62	EA	$ 1,200.00	$ 74,400	
FLOOR DRAIN	11	EA	$ 367.50	$ 4,043	
AREA DRAIN	5	EA	$ 367.50	$ 1,838	
WALL CLEAN OUT	7	EA	$ 105.00	$ 735	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
HOSE BIBB	6	EA	$ 525.00	$ 3,150	
BACKFLOW PREVENTER	1	EA	$ 630.00	$ 630	
TRAP PRIMER	7	EA	$ 210.00	$ 1,470	
CONDENSATE DRAIN PIPING, 1" ~11/2"	500	LF	$ 15.75	$ 7,875	
ROOF DRAIN, 4"	6	EA	$ 367.50	$ 2,205	
4" CIP STORM DRAIN LINE	300	LF	$ 27.30	$ 8,190	
MISC. VALVES AND SPECIALTIES	23,620	SF	$ 0.20	$ 4,724	
GAS SERVICES	23,620	SF	$ 0.60	$ 14,172	
TESTING AND STERILIZING	23,620	SF	$ 0.21	$ 4,960	
FIRE PROTECTION					
SPRINKLER SYSTEM	23,620	SF	$ 2.50	$ 59,050	
HVAC SYSTEM					
ROOF TOP AC UNIT GAS/ELECTRIC					
AC-3, 3 TONS	13	EA	$ 5,550.00	$ 72,150	
AC-4, 3.85 TONS	2	EA	$ 7,100.00	$ 14,200	
AC-5, 4.98 TONS	3	EA	$ 7,728.00	$ 23,184	
SPLIT UNIT					
3.06 TONS	1	EA	$ 3,518.22	$ 3,754	
1 .1 TONS	1	EA	$ 1,800.00	$ 1,921	
EXHAUST FAN					
800 CFM	3	EA	$ 1,000.00	$ 3,000	
GRAVITY RELIEF VENT, 18X24	1	EA	$ 1,000.00	$ 1,000	
AIR DISTRIBUTION					
DUCT WORK	13,956	LBS	$ 6.50	$ 90,714	
DUCT INSULATION, WRAP	9,559	SF	$ 2.50	$ 23,897	
CEILING DIFFUSER	81	EA	$ 185.00	$ 14,985	
REGISTER/RETURN	81	EA	$ 154.00	$ 12,474	
CG RELIEF	16	EA	$ 154.00	$ 2,464	
FIRE DAMPER	37	EA	$ 210.00	$ 7,770	
COMB. F/S DAMPER	10	EA	$ 255.00	$ 2,550	
FLEXIBLE CONNECTION	162	EA	$ 98.00	$ 15,876	
VOLUME DAMPER	162	EA	$ 80.00	$ 12,960	
12X12 RELIEF OPENING ABOVE WINDOWS	48	EA	$ 125.00	$ 6,000	
VARIABLE AIR VOLUME TERMINAL BOX	4	EA	$ 1,282.50	$ 5,200	
AIR BALANCE: AIR DISTRIBUTION DEVICES	162	EA	$ 75.00	$ 12,150	
CONTROLS	23,620	SF	$ 1.00	$ 23,620	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
Subtotal Division 15					**$ 615,783**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
GROUNDING	23,620	SF	$ 0.35	$ 8,267	
PULL BOXES	2	EA	$ 1,500.00	$ 3,000	
PANEL BD					
225A, 120/208V	3	EA	$ 3,500.00	$ 10,500	
100A, 120/208V	2	EA	$ 2,200.00	$ 4,400	
225A, 277/480	3	EA	$ 4,422.00	$ 13,266	
EMERGENCY POWER SUPPLY, 5 KVA	1	EA	$ 10,144.75	$ 10,145	
CABLE AND CONDUIT	2,048	LF	$ 18.00	$ 36,855	
BRANCH POWER SYSTEM					
RECEPTACLES DUPLEX	100	EA	$ 120.00	$ 12,058	
RECEPTACLES DUPLEX SURGE PROTECTED	9	EA	$ 130.00	$ 1,182	
QUAD. RECEPTACLES	22	EA	$ 130.00	$ 2,815	
QUAD. RECEPTACLES FOR COMPUTERS	73	EA	$ 135.00	$ 9,823	
WIRE MOLD 5400	265	LF	$ 35.00	$ 9,278	
JUNCTION BOXES	59	EA	$ 25.00	$ 1,483	
BRANCH POWER FEEDERS, EMT/ CU WIRE	2,599	LF	$ 10.00	$ 25,988	
POWER TO MECHANICAL					
STARTER AND FUSED DISCONNECT	2	EA	$ 450.00	$ 780	
DISCONNECT SWITCH, 30A	4	EA	$ 500.00	$ 2,166	
DISCONNECT SWITCH, 60A	13	EA	$ 635.00	$ 8,526	
DISCONNECT SWITCH, 100A	1	EA	$ 680.00	$ 589	
COMBINATION STARTER/DISCONNECT	12	EA	$ 755.00	$ 8,829	
WIRE #12	217	LF	$ 0.43	$ 93	
WIRE #8	433	LF	$ 0.68	$ 295	
WIRE #6	325	LF	$ 0.91	$ 296	
WIRE #4	1,252	LF	$ 1.25	$ 1,565	
WIRE #1/0	78	LF	$ 2.37	$ 185	
3/4" CONDUIT	32	LF	$ 3.52	$ 114	
1" CONDUIT	433	LF	$ 4.26	$ 1,845	
1-1/2" CONDUIT	152	LF	$ 6.05	$ 917	
LIGHTING FIXTURES, TYPE					
TYPE A	301	EA	$ 220.00	$ 66,130	
TYPE B	2	EA	$ 220.00	$ 381	
TYPE C	36	EA	$ 220.00	$ 7,814	
TYPE D	16	EA	$ 180.00	$ 2,807	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
TYPE E	6	EA	$ 180.00	$ 1,091	
TYPE F	7	EA	$ 100.00	$ 693	
TYPE G	5	EA	$ 100.00	$ 520	
TYPE H	8	EA	$ 180.00	$ 1,481	
TYPE L	28	EA	$ 180.00	$ 4,990	
TYPE M	5	EA	$ 360.00	$ 1,871	
JUNCTION BOXES	59	EA	$ 25.00	$ 1,483	
PHOTO SENSORS	19	EA	$ 70.00	$ 1,364	
OCCUPANCY SENSOR, WALL	84	EA	$ 160.00	$ 13,444	
OCCUPANCY SENSOR, ULTRASONIC	17	EA	$ 262.65	$ 4,437	
DIMMING BALLAST FOR TYPE A FIXTURE	194	EA	$ 150.00	$ 29,106	
SWITCHES, SINGLE	20	EA	$ 65.00	$ 1,295	
SWITCHES, AB	22	EA	$ 87.00	$ 1,922	
LIGHTING CONTROL PANEL	1	EA	$ 800.00	$ 1,040	
LIGHTING FEEDERS, EMT W/ CU. WIRES	3,725	LF	$ 6.20	$ 23,094	
SPARE PARTS: 50% SPARE LAMPS, 30% SPARE MOTION DETECTORS, 30% SPARE BALLASTS	1	LOT	$ 4,000.00	$ 4,000	
CLOCK SYSTEM					
CLOCK TERMINAL CABINET	2	EA	$ 500.00	$ 1,000	
CLOCK OUTLETS	22	EA	$ 150.00	$ 3,300	
CONDUIT AND WIRES	23,620	SF	$ 0.10	$ 2,362	
PROVIDE 2 HOURS OF SITE INSTRUCTION	1	HR	$ 150.00	$ 130	
FIRE ALARM SYSTEM					
TERMINAL CABINET	2	EA	$ 650.00	$ 1,300	
SMOKE DETECTOR	52	EA	$ 190.00	$ 9,880	
STROBE	6	EA	$ 160.00	$ 960	
HORN/STROBE	13	EA	$ 200.00	$ 2,600	
WEATHERPROOF FIRE ALARM HORN	10	EA	$ 160.00	$ 1,600	
FIRE ALARM MINI HORN	20	EA	$ 130.00	$ 2,600	
SYNC. MODULE	5	EA	$ 220.00	$ 1,100	
HEAT DETECTOR	77	EA	$ 350.00	$ 26,950	
FIRE ALARM CKTS, EMT/ WIRE	23,620	SF	$ 0.50	$ 11,810	
SPARE PARTS: 10% SPARE PULL STATIONS, 10% SPARE SMOKE AND HEAT DETECTOR, 10% SPARE AUDIBLE DEVICES, 10% SPARE STROBE DEVICES	1	LOT	$ 4,000.00	$ 4,000	
PROVIDE 12 HOURS OF SITE INSTRUCTION	8	HR	$ 120.00	$ 960	
Subtotal Division 16					**$ 414,774**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
25 LOW VOLTAGE SYSTEMS					
SECURITY SYSTEM					
TERMINAL CABINET	2	EA	$ 800.00	$ 1,386	
MOTION DETECTOR	24	EA	$ 200.00	$ 4,800	
KEYPAD	1	EA	$ 300.00	$ 300	
CONDUIT AND CABLE	23,620	SF	$ 0.38	$ 8,976	
TV SYSTEM					
TVTC	2	EA	$ 600.00	$ 1,200	
4 WAY SPLITTER	1	EA	$ 22.00	$ 22	
3 WAY SPLITTER	1	EA	$ 22.00	$ 22	
TV AMPLIFIER	1	EA	$ 721.53	$ 722	
TV OUTLETS	16	EA	$ 206.00	$ 3,296	
CONDUIT AND CABLE	23,620	SF	$ 0.10	$ 2,362	
PA AND TELEPHONE SYSTEM					
SPEAKERS	38	EA	$ 125.00	$ 4,750	
PA TERMINAL CABINET	2	EA	$ 1,500.00	$ 3,000	
WIRING AND CONDUIT	23,620	SF	$ 0.54	$ 12,755	
TELEPHONE/INTERCOM AND OUTLET	22	EA	$ 300.00	$ 6,600	
DATA SYSTEM					
MAIN DISTRIBUTION FRAME	1	EA	$ 2,599.00	$ 2,599	
LOCAL DISTRIBUTION FRAME AT LIBRARY	1	EA	$ 1,299.00	$ 1,299	
INTERMEDIATE DISTRIBUTION FRAME	2	EA	$ 2,500.00	$ 5,000	
CAT 5 CABLE	8,663	LF	$ 0.75	$ 6,497	
COMPUTER OUTLETS	84	EA	$ 150.00	$ 12,600	
1-12 STRAND MULTI MODE FIBER OPTIC	1,040	LF	$ 3.85	$ 4,002	
CABLE TRAY	351	LF	$ 35.00	$ 12,279	
Subtotal Division 25					**$ 94,466**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
BULK EXCAVATION	6,824	CY	$ 6.00	$ 40,946	
BACKFILL AND COMPACTION	1,429	CY	$ 15.00	$ 21,442	
CART AWAY	5,395	CY	$ 12.00	$ 64,738	
SHORING ALONG SOUTH PERIMETER	2,136	SF	$ 30.00	$ 64,080	
4" DIA. PERFORATED FOUNDATION DRAIN SET IN GRAVEL WITH FABRIC MESH	600	LF	$ 16.00	$ 9,600	
Subtotal Division 02					**$ 200,806**
03 CONCRETE					
SPREAD FOOTING	134	CY	$ 340.00	$ 45,696	
RAMP, 5" REINFORCED CONCRETE PAVING OVER 4" SAND LAYER	1,556	SF	$ 8.00	$ 12,444	
CONCRETE CURB AT RAMP, 6" X 12"	84	LF	$ 15.00	$ 1,260	
CONCRETE CURB AT CENTER OF RAMP, 6" X 39-3/4"W	47	LF	$ 25.00	$ 1,175	
CONTINUOUS FOOTING	130	CY	$ 340.00	$ 44,200	
CONCRETE RETAINING WALL	194	CY	$ 680.00	$ 131,614	
RAMP RETAINING WALL	19	CY	$ 735.00	$ 13,657	
FOUNDATION FOR RAMP RETAINING WALL	19	CY	$ 350.00	$ 6,650	
5" SLAB ON GRADE, OVER 2" OF SAND OVER 10 MIL VAPOR BARRIER OVER 2" OF SAND	13,401	SF	$ 6.00	$ 80,406	
REINFORCED CONCRETE COLUMN, 18"X18"	150	LF	$ 78.00	$ 11,700	
DROP PANELS	37	CY	$ 600.00	$ 22,133	
ELEVATED SLAB	581	CY	$ 600.00	$ 348,790	
ELEVATOR PIT	1	LS	$ 5,000.00	$ 5,000	
PRECAST WHEEL STOP, 6'	24	EA	$ 50.00	$ 1,200	
HOUSEKEEPING PAD, 6" THICK	41	SF	$ 12.00	$ 492	
Subtotal Division 03					**$ 726,418**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
04 MASONRY					
REINFORCED CMU WALL					
8" CMU INTERIOR WALL	1,680	SF	$ 18.00	$ 30,240	
12" CMU INTERIOR WALL	714	SF	$ 21.00	$ 14,994	
Subtotal Division 04					**$ 45,234**
05 METALS					
STAIR NO. 2					
STEEL STAIR CONC. FILLED METAL FAN	126	LF	$ 75.00	$ 9,450	
STAIR WALL MOUNTED HANDRAIL	54	LF	$ 40.00	$ 2,160	
EXTRUDED NON-SLIP NOSING	126	LF	$ 12.00	$ 1,512	
STAIR NO. 1					
STEEL STAIR CONC. FILLED METAL FAN	116	LF	$ 75.00	$ 8,693	
STAIR LANDING	82	SF	$ 39.00	$ 3,201	
STAIR WALL MOUNTED HANDRAIL	60	LF	$ 40.00	$ 2,400	
STAIR GUARDRAIL	11	LF	$ 100.00	$ 1,100	
EXTRUDED NON-SLIP NOSING	116	LF	$ 12.00	$ 1,391	
STEEL PIPE BOLLARD, 4" DIAMETER	8	EA	$ 250.00	$ 2,000	
TRENCH DRAIN	30	LF	$ 90.00	$ 2,700	
ELEVATOR PIT LADDER	1	EA	$ 550.00	$ 550	
CORNER GUARD, GI L4X4X3/8X5' HIGH	51	EA	$ 80.00	$ 4,080	
Subtotal Division 05					**$ 39,236**
06 WOOD & PLASTICS					
Subtotal Division 06					**$ -**
07 THERMAL& MOISTURE PROTECTION					
WATERPROOFING MEMBRANE AND PROTECTION BOARD	6,160	SF	$ 3.25	$ 20,020	
WATERPROOFING ELEVATOR PIT	1	EA	$ 600.00	$ 600	
ELASTOMERIC COATING @ STAIRS	126	SF	$ 7.00	$ 882	
Subtotal Division 07					**$ 21,502**
08 DOORS & WINDOWS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
ELECTRICAL OPERATED ROLL-UP GRILLE, 13'-0" X 9'	2	EA	$ 7,000.00	$ 14,000	
INTERIOR DOORS, FRAMES AND HARDWARE	7	EA	$ 1,000.00	$ 7,000	
PANIC HARDWARE	2	EA	$ 550.00	$ 1,100	
EXTRA FOR LOUVERS	7	EA	$ 100.00	$ 700	
EXTRA FOR FIRE RATING, 20 MIN	4	EA	$ 25.00	$ 100	
EXTRA FOR FIRE RATING, 60 MIN	1	EA	$ 40.00	$ 40	
EXTRA FOR FIRE RATING, 90 MIN	2	EA	$ 50.00	$ 100	
Subtotal Division 08					**$ 23,040**
09 FINISHES					
EXTERIOR FINISHES					
CEMENT PLASTER, PAINTED	1,441	SF	$ 6.50	$ 9,367	
INTERIOR FINISHES					
CONCRETE FLOOR SEALER	13,673	SF	$ 1.20	$ 16,408	
CONCRETE CEILING SEALER	13,673	SF	$ 1.40	$ 19,142	
CONCRETE WALL SEALER	5,660	SF	$ 1.20	$ 6,792	
PAINTING TO DOOR AND FRAME	7	EA	$ 95.00	$ 665	
PAINTING TO HANDRAIL	130	LF	$ 3.00	$ 390	
MISC. PAINTING	13,673	SF	$ 0.10	$ 1,367	
Subtotal Division 09					**$ 54,131**
10 SPECIALTIES					
STALL STRIPING, DOUBLE LINES	36	EA	$ 30.00	$ 1,080	
WALKWAY MARKINGS	2,867	SF	$ 0.80	$ 2,294	
H/CAP MARKINGS & SIGNAGE	3	EA	$ 500.00	$ 1,500	
SIGNAGE	17	EA	$ 80.00	$ 1,360	
FIRE EXTINGUISHER	6	EA	$ 300.00	$ 1,800	
MISCELLANEOUS SPECIALTIES	13,673	GSF	$ 0.10	$ 1,367	
FIRE EXTINGUISHER CABINET	2	EA	$ 300.00	$ 600	
Subtotal Division 10					**$ 10,001**
11 EQUIPMENT					
PARKING CONTROL EQUIPMENT	1	LS	$ 10,000.00	$ 10,000	
Subtotal Division 11					**$ 10,000**
12 FURNISHINGS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
NOT USED					
Subtotal Division 12					**$ -**
13 SPECIAL CONSTRUCTION					
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
ELEVATOR, 1 STOP	1	STOP	$ 30,000.00	$ 30,000	
Subtotal Division 14					**$ 30,000**
15 MECHANICAL					
PLUMBING WORK					
BACKWATER VALVE, 4"	1	EA	$ 900.00	$ 900	
BACKWATER VALVE, 3"	1	EA	$ 800.00	$ 800	
VALVE BOX	1	EA	$ 900.00	$ 900	
SUMP PUMP, SP 1 AND 2, 1/2 HP	1	SET	$ 2,000.00	$ 2,000	
SUMP PIT CONTROLS AND PIPING	1	LS	$ 2,500.00	$ 2,500	
DRAIN SYSTEM					
3" CAST IRON PIPE	360	LF	$ 24.00	$ 8,640	
FLOOR DRAIN, 3"	1	EA	$ 300.00	$ 300	
AREA DRAIN, 3"	2	EA	$ 300.00	$ 600	
CLEAN OUT	6	EA	$ 300.00	$ 1,800	
HVAC WORK					
CONDENSATE REMOVAL PUMP	2	EA	$ 300.00	$ 600	
EXHAUST FAN, 20,000 CFM	1	EA	$ 8,200.00	$ 8,200	
FC-1.5, 550 CFM	1	EA	$ 1,185.00	$ 1,185	
FC-4, 1450 CFM	1	EA	$ 2,360.00	$ 2,360	
SUCTION LINES	1	LS	$ 1,000.00	$ 1,000	
DUCT WORK	2,730	LBS	$ 7.00	$ 19,110	
INSECT SCREEN	4	EA	$ 25.00	$ 100	
TR	3	EA	$ 80.00	$ 240	
TG	1	EA	$ 50.00	$ 50	
DUCT MOUNTED SMOKE DETECTOR	1	EA	$ 500.00	$ 500	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CFSD, 52X20	2	EA	$ 600.00	$ 1,200	
VOLUME DAMPER	6	EA	$ 131.33	$ 788	
HVAC CONTROLS	1	EA	$ 2,000.00	$ 2,000	
CO SENSORS	3	EA	$ 300.00	$ 900	
CO AUDIO ALARM	1	EA	$ 400.00	$ 400	
CO PANEL	1	EA	$ 3,500.00	$ 3,500	
MISC. HVAC WORK	13,673	SF	$ 0.05	$ 684	
PERMITS, TESTING & AIR BALANCING	1	LS	$ 2,468.91	$ 2,469	
FIRE PROTECTION					
SPRINKLER SYSTEM	13,673	SF	$ 2.00	$ 27,346	
Subtotal Division 15					**$ 91,072**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
T2, 150 KVA TRANSFORMER, 480V/208V/120V, 3P	1	EA	$ 8,200.00	$ 8,200	
SWBD, DBB, 800 AMP, 480/277V, 3P, 4W	1	EA	$ 8,300.00	$ 8,300	
SWBD, 2DB, 600 AMP, 120/208V, 3P, 4W	1	EA	$ 6,500.00	$ 6,500	
PANEL BPA, 100A, 208/120V, INCLUDING FEEDER LINE	1	EA	$ 2,900.00	$ 2,900	
POWER DISTRIBUTION					
DUPLEX RECEPTACLE, CEILING	4	EA	$ 75.00	$ 300	
DUPLEX RECEPTACLE, GFI	13	EA	$ 85.00	$ 1,105	
MOTOR OUTLET FOR SLIDING GATE	2	EA	$ 300.00	$ 600	
WIRE AND CONDUIT	800	LF	$ 8.00	$ 6,400	
POWER TO MECHANICAL					
DISCONNECT SWITCH, 30A, 1P FOR ELEVATOR CAB	1	EA	$ 600.00	$ 600	
70AF/100AS, 3P, FOR ELEVATOR	1	EA	$ 2,685.38	$ 2,685	
COMBINATION FUSIBLE DISCONNECT SWITCH, 30AS/15AF	5	EA	$ 650.00	$ 3,250	
LIGHTING FIXTURES					
XXE/120, CEILING SURFACE, 100W HPS	6	EA	$ 750.00	$ 4,500	
XX/120, SAME AS ABOVE EXCEPT POWER FROM INVERTOR	5	EA	$ 750.00	$ 3,750	
C/59, 4' LONG WALL MTD FIXTURE, 2 LAMP	11	EA	$ 195.00	$ 2,145	
G1/7, VANDAL RESISTANT LED TYPE EXIT SIGN	2	EA	$ 400.00	$ 800	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
G4/7, SAME AS ABOVE BUT DOUBLE FACE	1	EA	$ 720.00	$ 720	
D1/59, 4'LONG X 16" WIDE INDUSTRIAL FIXTURE	8	EA	$ 250.00	$ 2,000	
D1E/87,	2	EA	$ 250.00	$ 500	
SWITCHES	1	EA	$ 150.00	$ 150	
JUNCTION BOXES	8	EA	$ 25.00	$ 200	
WIRE AND CONDUIT, JUNCTION BOXES ETC.	800	LF	$ 8.00	$ 6,400	
MISC. ELECTRICAL WORKS	13,673	SF	$ 0.10	$ 1,367	
FIRE ALARM SYSTEM					
TERMINAL CABINET	1	EA	$ 650.00	$ 650	
HEAT DETECTOR	18	EA	$ 195.00	$ 3,510	
SMOKE DETECTOR	2	EA	$ 210.00	$ 420	
HORN STROBE, 100 CD	10	EA	$ 195.00	$ 1,950	
SYNCHRONIZE MODULE	1	EA	$ 300.00	$ 300	
MANUAL PULL STATION	1	EA	$ 200.00	$ 200	
FLOW SWITCH	1	EA	$ 500.00	$ 500	
CONDUIT AND WIRE	13,673	SF	$ 0.40	$ 5,469	
PROGRAMMING	1	LS	$ 2,000.00	$ 2,000	
MISC. SIGNAL PULL BOXES					
INDOOR PULL BOX FOR NETWORKING, 24"X24"X6"D	1	EA	$ 350.00	$ 350	
SECURITY INTRUSION PULL BOX, 12X12X4	1	EA	$ 170.00	$ 170	
TV, CLOCK PULL BOX, 6X6X4	2	EA	$ 100.00	$ 200	
Subtotal Division 16					**$ 79,092**
25 LOW VOLTAGE SYSTEMS					
CCTV SYSTEM					
SECURITY CAMERAS IN VANDAL PROOF ENCLOSURE	5	EA	$ 1,500.00	$ 7,500	
MONITOR STATION	1	EA	$ 2,000.00	$ 2,000	
AUDIO SURVEILLANCE SYSTEM					
SPEAKER/MICROPHONE CALL STATION	9	EA	$ 500.00	$ 4,500	
SURVEILLANCE MICROPHONE	5	EA	$ 400.00	$ 2,000	
PA/TEL SYSTEM					
SPEAKER, WALL MOUNTED	3	EA	$ 500.00	$ 1,500	
ELEVATOR PHONE OUTLET AND PHONE DIALER	1	EA	$ 600.00	$ 600	
TELEPHONE AT ELEV. MACHINE ROOM	1	EA	$ 500.00	$ 500	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
WP SPEAKER/MICROPHONE INTERCOM STATION AT GARAGE ENTRANCE	1	EA	$ 1,000.00	$ 1,000	
PA PULL BOX, 12X12X6'D	1	EA	$ 170.00	$ 170	
JUNCTION BOX	1	EA	$ 25.00	$ 25	
Subtotal Division 25					**$ 19,795**

Section 5a: Instruction for the Preparation of Cost Difference Reconciliation

1. Cost Difference Reconciliation from Schematic to Design Development Phase.

   Cost difference, either increase or decrease from Schematic to Design Development phase should be provided with explanation or justification. It should show the list or summary of affected components with corresponding explanation of changes that provided impact to the cost and the approximate difference in cost.

2. Cost Difference Reconciliation from Design Development to 50% CD and from 50% CD to 100%CD Phases.

   Cost difference, either increase or decrease from these design phases should also be provided with explanation or justification. It should show a list or summary of affected items, trade or scope of work arranged sequentially as in project specifications divisions with corresponding explanation of changes that provided impact to the cost and the approximate difference in cost.

Section 5b: Sample of Cost Difference Reconciliation

ESTIMATE DIFFERENCE RECONCILIATION

SCHOOL DISTRICT	**5 DIGIT DISTRICT CODE**
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.xxxxx
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

COST ESTIMATES COMPARISON

		Design Development 1/15/05			50% CD 3/15/05			COMMENTS
	Building Chargeable area	**68,000**	**SF**		**70,000**	**SF**		increase size of E and M rooms, increase overhang and soffit areas
02	**Site Work**	$2,300,000	$	33.82	$2,700,000	$	38.57	developed information for utilities, add $200k, add retaining wall $150k, add enhanced paving $50k
03	**Concrete**	$700,000	$	10.29	$800,000	$	11.43	developed information for foundation add $100k
04	**Masonry**	$35,000	$	0.51	$35,000	$	0.50	
05	**Metals**	$2,500,000	$	36.76	$2,500,000	$	35.71	reduction in steel framing -$100k, add exterior metal panel add $100k
06	**Wood and Plastics**	$600,000	$	8.82	$650,000	$	9.29	additional casework in admin area add $50k
07	**Thermal/Moisture Protection**	$870,000	$	12.79	$870,000	$	12.43	
08	**Doors and Windows**	$900,000	$	13.24	$900,000	$	12.86	
09	**Finishes**	$3,500,000	$	51.47	$3,320,000	$	47.43	reduce quantity of acoustical panel - $40k, modify ceiling finish to MP -$40k
10	**Specialties**	$250,000	$	3.68	$250,000	$	3.57	
11	**Equipment**	$250,000	$	3.68	$300,000	$	4.29	increase kitchen equipment allowance, add $50k
12	**Furnishings**	$150,000	$	2.21	$150,000	$	2.14	
14	**Conveying System**	$120,000	$	1.76	$120,000	$	1.71	
151	**Plumbing**	$850,000	$	12.50	$910,000	$	13.00	refine quantities of pipe work, add $60k
152	**HVAC**	$1,700,000	$	25.00	$1,945,000	$	27.79	refine quantity of ductwork based on measurement, add $40k, revise control unit cost, add $65k, revise equipment price, add $40k
153	**Fire Protection**	$250,000	$	3.68	$250,000	$	3.57	
16	**Electrical**	$1,700,000	$	25.00	$1,700,000	$	24.29	
25	**Low Voltage Systems**	$680,000	$	10.00	$680,000	$	9.71	
	Subtotal	***$17,355,000***	***$***	***245.22***	***$18,080,000***	***$***	***248.57***	
	GCOHP	$2,990,700	$	43.98	$3,115,636	$	44.51	
	Design Contingencies	$1,017,285	$	14.96	$423,913	$	6.06	reduction in allowance
	Subtotal	***$21,362,985***	***$***	***304.16***	***$21,619,549***	***$***	***299.14***	
	Escalation	$1,495,409	$	21.99	$1,324,197	$	18.92	reduction in escalation period
	TOTAL	***$22,858,394***	***$***	***326.15***	***$22,943,746***	***$***	***318.05***	

Section 6a: Instruction for the Preparation of Site Development Cost Supplement

Site Development Cost Supplement shall be submitted at Design Development, Construction Documentation, and Bid Documentation.

The State Allocation Board will only approve reasonable and appropriate site development work categories which meet common engineering practices and industry standards that are consistent with the specific site conditions and the site development costs. These costs must be consistent with the Saylor Current Construction Costs. An 8% for design cost, 4% for escalation and 15% for General Requirements, General Overhead and Profit and Bond should be included at every section of the supplement. A project size factor should also be added to the site cost. The factor is 35% for all the site work (before mark ups) less than $150,000, 25% for work less than $500,000 and 10% for work less than $1 million.

The commissioned Architect shall be responsible for preparation of Site Development Cost Supplement in the District's and the State's formats. Section 5b contains sample for format and reference. Samples are for illustration purposes only. Quantities and amounts indicated are not to be used to complete actual estimates.

All items listed on the supplement must meet the following definitions (derived from SB-50, section 1859.76):

A - SERVICE SITE DEVELOPMENT

100% of reasonable cost. Include work done by city agency, utility company and contractor to prepare site and structures to accept new construction within the established property line.

1. Site Clearance
   - Removal of trees, brush, debris, etc.
2. Demolition and Removal
   - Demolition and removal of existing buildings and site improvements which lie in the footprint of a proposed building or general site development improvements.
3. Removal and Rerouting of Existing Utility
   - Removal and rerouting of existing utility service which lie in the footprint of a proposed building or proposed site development.
4. Rough Grading
   - Grading of required contours, including cut and fill, leveling and terracing operations required in the design of the project. May include off-site cut and fill operations.
5. Soil Compaction
   - Soil compaction adhering to common engineering practices. Engineered fill required by soils report that is available for review by OPSC.
6. On-Site Drainage
   - On-site drainage facilities including inlets, below grade drainage facilities and retention basins. Retention pond is eligible if public storm drain is not available.
     Note: Does not include the surface drainage of football fields and running tracks.
7. Erosion Control

- Erosion control improvements such as plant material, temporary sprinkler systems, jute mesh and straw, due to embankments having a slope of at least two to one and a vertical height greater than six feet.

8. Outside stairways, ramps, and retaining walls
   - Stairways, handicap ramps and retaining walls due to embankments having a slope of at least two to one and a vertical height greater than six feet.
9. Relocation of Existing Portables
   - Relocation of existing portable buildings which lie in the footprint of a proposed building or proposed site development including the cost for set-up and utilities if the portable will be relocated on the same site. If the portable will be moved to another site, only the costs to move the portable to the new location.
10. Fire Code Requirement (on site that are not a part of the building)
    A. Fire Water Line
       - From service point of connection to 5ft from building perimeter. (5ft within building perimeter are part of base grant)

    B. Fire Hydrants, P.I.V., F.D.C. and related water supply lines/appurtenances.
    C. Fire Lane (not to exceed 20' wide road)
       - 2" asphalt concrete over 6" max. Base.
       - Single use only (dual use is a General Site development cost).

    D. Fire Sprinklers - Building
       - Allowed only in rural area with water well.
11. Multilevel Parking Structures
    - Single floor parking garage in a multi-level building
    - Underground parking garage below a school building
    - Site acreage must be less than 50% of CDE master planned site size.
    - Stalls to be funded not to exceed 2.25 for each elementary / middle and 6 for high school classroom.
    - State grant does not exceed $10,215 per stall (as of 2006 – adjusted annually).

<u>B - OFF-SITE DEVELOPMENT</u> (UP TO 2 IMMEDIATE ADJACENT SIDES OF THE SITE)

1. Curbs, Gutters and Paving of Street
   - Including existing improvements.
   - Paving of street not to exceed one-half the mandated local street code requirements.

   Note: When the existing street are to be widened inward toward the property line from the existing face of the curb, all new street improvements lying within the one-half of mandated street width adjacent to the project.
2. Sidewalks
   - Sidewalks mandated by local ordinances.
3. Street Lighting, Planting Areas, Street signs, Traffic Signals, Trees, and other costs mandated by local ordinance.
   - Eligible only when mandated by local ordinance or is currently so developed.
4. Special District Fees
   - Utility connection fees for water, sewer, gas, electrical, and communications are eligible
   - City and/or county or special district fees pursuant to active ordinances.
5. Storm Drains
   - Reasonable cost for storm drains to point of connection.
6. Safety Path for Pedestrian Use

- Funding for safety paths for pedestrian use beyond two immediately adjacent sides of the site necessary for a safe route to the new school site when the following conditions are met:
  a. The school district governing board has made a finding at a public hearing that pedestrian safety concerns require improvements in the form of safety paths to provide access to the school site, and the Department of Education concurs with that finding.
  b. The improvements are limited to the work necessary to install concrete, asphalt, gravel or other paving necessary to provide the safe paths.
  c. The state grant does not exceed $50,000.00.
  d. The improvements do not include any cost for the acquisition of land, easements or other right-of-way.
  e. The SAB has determined that development of additional pedestrian paths is reasonable.

C - UTILITY SERVICES

1. Water
   - The installation of a water supply line(s) and connection fees from the utility company connection to the meter (domestic and irrigation).
   - Meters not provided by the serving utility.
   - Water mains are also eligible
   - Installation of a domestic water system, to include a well, tank, pump and necessary appurtenances (except a pump house), from the main supply line to the first building lateral.
2. Sewage
   - The installation of main sewage disposal line from the utility company connection to the first building lateral.
   - The installation of a sewage treatment/disposal system and main disposal line from the treatment system to the nearest building lateral of the collection system.
   - Connection fee.
3. Gas
   - The installation of main supply line from utility company to the meter.
   - The installation of meters not provided by the serving utility.
   - Connection of a Liquefied Petroleum Gas (LPG) system from the main supply line to the first building lateral (including storage tank costs if purchase).
   - Connection fee.
4. Electrical
   - The installation of service from the serving utility to the building switchboard. Primary electric service runs from the utility company's point of connection to the transformer. Secondary electric service runs from the transformer to the switchboard. Distribution panels or switchgear are considered building cost items.
   - Transformers, transformer pads and protective bollards.
   - Connection fee.
5. Communication systems
   - The installation of service from the serving company to the nearest distribution center.

Ineligible Utility Services:

The following items are not eligible as utility service improvements:

- Any oversized installation beyond school needs;
- Line installation that is not part of shortest connection from serving utility to school site connection;
- Any portion of a utility that can be supplied by a utility company without charge;
- All heating systems and school communication systems, including public address systems.
- Cable television;
- Fences, or other protective structures relating to utility systems on school grounds;
- Any:
  a) Electrical, water or gas service beyond the meter,
  b) Sewer service beyond the building lateral,
  c) Telephone service beyond the distribution center, (building cost).

Note: Architectural and engineering fees for Site Development work are also eligible

Section 6b: Sample of Site Development Cost Supplement

SITE DEVELOPMENT WORKSHEET FOR ADDITIONAL GRANTS

SCHOOL DISTRICT	*5 DIGIT DISTRICT CODE*
LOS ANGELES UNIFIED SCHOOL DISTRICT	**64733**
SCHOOL NAME	*COUNTY*
ABC SCHOOL	**LOS ANGELES**
ARCHITECTS FIRM	*DATE OF ESTIMATE*
ARCHITECTS FIRM	**04/30/06**

Plan Ref.	Description	Quantity	Unit	Unit Cost	Total	Remark	COMMENTS
	A1. Site Clearance - *Section 1859.76(a)(1)*						
C1.1 &1.4	Clear & grub, brush, turf, roots, with disposal	150,000	SF	0.12	18,000		Saylor 02.2001.011
C1.1 &1.4	Remove tree, 20"-30", off site disposal	5	EA	776.30	3,882		Saylor 02.1104.031
			A1. Site Clearance:		**21,882.00**		
	A2. Demolition and Removal - *Section 1859.76(a)(2)*						
C1.1 & 1.5	Remove pavement, asphalt, 5,000 to 25,000 sqft.	16,600	SF	0.80	13,280		Saylor 02.1101.011
C1.1 & 1.5	Remove concrete slab, 5" max, with rebar	2,000	SF	1.42	2,840		Saylor 02.1101.051
C1.1 & 1.5	Remove concrete curb/gutter, no sawing	125	LF	2.40	300		Saylor 02.1101.081
C1.1 & 1.5	Frame building, single story	4,500	SF	3.43	15,435		Saylor 02.1201.011
			A2. Demolition:		**$ 31,855**		
	A3. Removal and Rerouting Utility Lines - *Section 1859.76(a)(3)*						
C1.1 & 1.5	Remove (E) sewer line, 8" to 12", complete	300	LF	8.72	2,616		Saylor 02.1105.031
			A3. Rerouting Utility		**$ 2,616**		
	A4. Rough Grading - *Section 1859.76(a)(4)*						
C1.1 & 1.5	Site cut, earth, 250,000 & up	20,000	CY	2.16	43,200		Saylor 02.2003.011
C1.1 & 1.5	Building over-cut, 1,000 to 10,000, haul 1 mile	13,000	CY	4.90	63,700		Saylor 02.2004.041
			A4. Rough Grading:		**$ 106,900**		
	A5. Soil Compaction - *Section 1859.76(a)(5)*						
C1.1 & 1.5	Fill w/no compaction, 2,500 to 25,000, on site soi	7,500	CY	4.82	36,150		Saylor 02.2005.061
			A5. Soil Compaction:		**$ 36,150**		
	A6. Storm Drains - *Section 1859.76(a)(6)*						
C1.1 &1.6	Concrete pipe, reinf, class 3, gaskets, 18"	337	LF	64.36	21,689		Saylor 02.5106.031
C1.1 &1.6	Catch basin, 2' x 2' x 4', grate, light duty	5	EA	1,194.29	5,971		Saylor 02.5501.021
C1.1 &1.6	Drop inlet, 12" x 12" x 4"	2	EA	540.24	1,080		Saylor 02.5502.011
C1.1 &1.6	Manhole, 4' dia x 6'-8' deep, lid, rungs	1	EA	2,389.07	2,389		Saylor 02.5504.011
			A6. Storm Drains:		**$ 31,129**		
	A7. Erosion Control - *Section 1857.76(a)(7)*				**N.A.**		
			A7. Erosion Control:		**$ -**		
	A8. Stairs, Ramps, & Retaining Walls - *Section 1859.76(a)(8)*						
C1	CMU, 8x8x16, #4 bar, 32" OCBW, filled	7,170	SF	14.14	101,384		Saylor 04.2001.071
C1	Retaining wall footing forms	2,000	SF	8.04	16,080		Saylor 03.1201 021
C1	Retaining wall footing rebars	15,000	lb	0.94	14,100		Saylor 03.2202 011
C1	Retaining wall footing concrete	185	cy	156.91	29,028		Saylor 03.3101 061
			A8. Stairs, Ramps, &		**$ 101,384**		
	A9. Relocation of Portables - *Section 1859.76(a)(9)*				**N.A.**		
			A9. Relocation of		**$ -**		
	A10. Fire Code Requirements - *Section 1859.76(a)(10)*						
C1	PVC municipal water pipe, 6", '150', C900	1,050	LF	37.60	39,480		Saylor 02.5305.021
C1	Gate valve, iron body, mech joint, 6" complete	1	EA	674.79	675		Saylor 02.5405.041
	Trust block for 6" water pipe	8	EA	278.03	2,224		Saylor 02.5408.091
C1	Post indicator, for valve 6"	1	EA	1,319.32	1,319		Saylor 02.5408.061
			A10. Fire Code		**$ 43,698**		
	A11. Multi-Level Parking - *Section 1859.76(a)(11)*				**N.A.**		
			A11. Multi-Level Parking:		**$ -**		
	A12. Portables Eligible for Replacement - *Section 1859.76(a)(12)*				**N.A.**		
			for Replacement:		**$ -**		
	A13. Others				**N.A.**		
			A13. Others:		**$ -**		

(A) SUB-TOTAL SERVICE SITE DEVELOPMENT :		***$ 375,614.00***
SMALL SIZE PROJECT:	*10%*	***$ 37,561.00***
ESCALATION:	*4%*	***$ 16,527.00***
GENERAL REQUIREMENTS, OVERHEAD AND PROFIT, AND BOND:	*15%*	***$ 64,455.00***
DESIGN COST:	*8%*	***$ 39,533.00***

SITE DEVELOPMENT WORKSHEET FOR ADDITIONAL GRANTS

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
SCHOOL NAME	COUNTY
ABC SCHOOL	LOS ANGELES
ARCHITECTS FIRM	DATE OF ESTIMATE
ARCHITECTS FIRM	04/30/06

Plan Ref.	Description	Quantity	Unit	Unit Cost	Total	Remark	COMMENTS
	(B) OFF-SITE DEVELOPMENT						
	B1. Curbs, Gutters, & Paving - *Section 1859.76(b)(1)*						
C1	Remove pavement, asphalt, 5,000 to 25,000 sqft. (A and B Street)	16,520	SF	0.80	13,216		Saylor 02.1101.011
C1	Remove concrete curb/gutter, no sawing (A and B Street)	500	LF	2.40	1,200		Saylor 02.1101.081
C1	Asphaltic concrete, 2", on 6" base (A and B Street)	16,750	SF	2.91	48,743		Saylor 02.6001.021
C1	Add or deduct per 1" of asphaltic concrete	33,500	INCH	0.46	15,410		Saylor 02.6002.091
C1	5" thick aprons	450	SF	4.04	1,818		Saylor 02.6005.141
		B1. Curbs, Gutters, & Paving:			**$ 80,387**		
	B2. Sidewalk - *Section 1859.76(b)(2)*						
C1	Concrete walk, 4", broom finish	2,500	SF	3.84	9,600		Saylor 02.6006.051
			B2. Sidewalk:		**$ 9,600**		
	B3. Street Lighting, Landscaping, & Signage - *Section 1859.76(b)(3)*				**N.A.**		
			B3. Street Lighting,		**$ -**		
	B4. Special District Fees - *Section 1859.76(b)(4)*				**N.A.**		
			B4. Special District Fees:		**$ -**		
	B5. Storm Drain Costs - *Section 1859.76(b)(5)*				**N.A.**		
			B5. Storm Drain Costs:		**$ -**		
	B6. Safety Paths - *Section 1859.76(b)(6)*				**N.A.**		
			B6. Safety Paths:		**$ -**		
	B7. Others				**N.A.**		
			B7. Others:		**$ -**		
	(B) SUB-TOTAL OFF-SITE DEVELOPMENT :				***$ 89,987.00***		
	SMALL SIZE PROJECT:	*10%*			***$ 8,999.00***		
	ESCALATION:	*4%*			***$ 3,959.00***		
	GENERAL REQUIREMENTS, OVERHEAD AND PROFIT, AND BOND:	*15%*			***$ 15,442.00***		
	DESIGN COST:	*8%*			***$ 9,471.00***		
	(B) TOTAL OFF-SITE DEVELOPMENT :				***$ 127,858.00***		
	STATE'S SHARE 50% OF TOTAL :				***$ 63,929.00***		
	(C) UTILITY SERVICE						
	C1. Water - *Section 1859.76(c)(1)*						
C1.1	PVC municipal water pipe, 8", '150', C900	40	LF	46.74	1,870		Saylor 02.5305.031
C1.1	Connection to existing facility water line including excavation, backfilling in tapping area, cutting and restoration of existing pavement, etc.	1	EA	1,000.00	1,000		Allowance for connection to existing sewer line. Rough Cost breakdown as follows: Backhoe $880, Rammer $100, Concrete Saw $135, 8 man hours of Laborer $280, Asphalt Concrete pavement restoration $300
			C1. Water:		**$ 2,870**		
	C2. Sewer - *Section 1859.76(c)(2)*						
C1.1	Pipe, PVC gravity sewer, 8"	250	LF	30.76	7,690		Saylor 02.5111.031
C1.1	Connection to existing main street line including excavation, backfilling in tapping area, cutting and restoration of existing pavement, traffic controls, etc.	1	EA	5,000.00	5,000		Allowance for connection to main line on street. Rough Cost breakdown as follows: Backhoe $880, Rammer $100, Concrete Saw $135, Hot Tap $1300 to $2000, 16man hours of Laborer $557.60, Asphalt Concrete pavement restoration $1000, Safety shoring rental, steel plates and other incidentals $1000, Flagman $279, Etc. and Overhead and Profit of Subcontractor.
			C2. Sewer:		**$ 12,690**		
	C3. Gas - *Section 1859.76(c)(3)*						
C1.1	Steel gas pipe, 1"	10	LF	10.59	106		Saylor 02.5308.031

SITE DEVELOPMENT WORKSHEET FOR ADDITIONAL GRANTS

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
SCHOOL NAME	**COUNTY**
ABC SCHOOL	LOS ANGELES
ARCHITECTS FIRM	**DATE OF ESTIMATE**
ARCHITECTS FIRM	04/30/06

Plan Ref.	Description	Quantity	Unit	Unit Cost	Total	Remark	COMMENTS
C1.1	Connection to existing main street line including excavation, backfilling in tapping area, cutting and restoration of existing pavement, traffic controls, etc.	1	EA	5,000.00	5,000		Allowance for connection to main line on street. Rough Cost breakdown as follows: Backhoe $880, Rammer $100, Concrete Saw $135, Hot Tap $1300 to $2000, 16man hours of Laborer $557.60, Asphalt Concrete pavement restoration $1000, Safety shoring rental, steel plates and other incidentals $1000, Flagman $279, Etc. and Overhead and Profit of Subcontractor.
			C3. Gas:		**$ 5,106**		
	C4. Electrical - *Section 1859.76(c)(4)*						
C1.1	PVC conduit, schedule 40, trenched & buried in concrete, 1-4"	320	LF	28.44	9,101		Saylor 02.5703.091
C1.1	Transformer pad, 4' x 5'	1	EA	690.85	691		Saylor 02.5708.021
			C4. Electrical:		**$ 9,792**		
	C5. Communications - *Section 1859.76(c)(5)*						
C1.1	PVC conduit, schedule 40, trenched & buried in concrete, 2-4"	150	LF	35.20	5,280		Saylor 02.5703.101
C1.1	Telephone service connection charge	1	EA	2,000.00	2,000		Allowance
			C5. Communications:		**$ 7,280**		
	C6. Others				**N.A.**		
			C6. Others:		**$ -**		

(C) SUB-TOTAL UTILITY SERVICE :		***$ 37,738.00***
SMALL SIZE PROJECT:	*10%*	***$ 3,774.00***
ESCALATION:	*4%*	***$ 1,660.00***
GENERAL REQUIREMENTS, OVERHEAD AND PROFIT, AND BOND:	*15%*	***$ 6,476.00***
DESIGN COST:	*8%*	***$ 3,972.00***
(C) TOTAL UTILITY SERVICE :		***$ 53,620.00***
STATE'S SHARE 50% OF TOTAL :		***$ 26,810.00***
(A-C) GRAND TOTAL :		***$ 715,168.00***
GRAND TOTAL STATE'S SHARE 50% OF TOTAL :		***$ 357,584.00***

Architect Signature

Architect's Name, License Number **DATE**

ARCHITECTS FIRM

Section 7a: Instruction for the Preparation of District/Independent Cost Estimate

---

1. Detailed Specifications Division District/Independent Cost Estimate shall be prepared by District's estimators or their consultants and shall be submitted prior to opening of bid of respective project open for public bidding. Preparation of estimate could start as soon as the final bidding documents (plans and specifications) are available. This estimate should be used in evaluation of outcome of the bid, reference in the review of schedule of values, and other purposes it may serve.

2. All items listed on the cost estimate must be clearly organized into Project Specifications Divisions. Cost estimate shall be prepared on 8-1/2" x 11" sheets, containing the following:

   A. First or cover sheet
      a. Title block indicating
         (1) Name of project
         (2) Project Description
         (3) Date
      b. Notes regarding any information or provisions that were considered during the preparation of estimate
      c. Specifications division summary with subtotal amount for each division

   B. Second sheet
      a. Title block same as above
      b. Specifications division summary of every building, site work, and parking garage (underground or separate parking structure) with respective division total and the overall total.

   B. Additional sheets containing:
      a. Cost breakdowns shall be organized into specifications divisions. All quantities must be derived by take-off from the drawings or as indicated by specifications and/or calculations.
         - Cost breakdowns must be reflecting the plans and specifications.
         - Each line item includes detailed description, quantity, unit, unit cost, and subtotal.
         - Lump sum or square foot allowances will not be acceptable for final estimates.

3. All costs in the Division Cost Estimates shall be independently prepared based on true costs. All construction costs within the scope of the project shall be included to reflect the plans and specifications.

4. If the project has more than one building, a complete estimate of every building and an overall site construction estimate should be prepared. If there is a parking garage, it should also have a separate estimate that will include all work from its foundation to roof or elevated slab. Building estimate/cost will include all work within five feet outside the building perimeter. Site work estimates will be within five feet outside the building perimeter

5. All markups i.e. General Conditions, Bonds, and Design Contingency (if still applicable) must be indicated as such and added to each estimate to arrive at an anticipated current bid cost without escalation. The cost estimate should reflect also the "normal market" condition. Any anticipated adjustments due to recessed or inflated economy or escalation and other factors should then be included in the total current cost to arrive at an anticipated bid cost for the work based on specified bid date.

6. The estimate must be in precise format as required and must be submitted in hard copy as well as in electronic copy that is readable by Microsoft Excel spreadsheet software.

Section 7b: Sample of District/Independent Cost Estimate

DISTRICT/INDEPENDENT ESTIMATE

SCHOOL DISTRICT	**5 DIGIT DISTRICT CODE**
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

PROJECT SUMMARY

CSI 16 Divisions		SITE WORK	BUILDING 1 MULTI-PURPOSE	BUILDING 2 CLASSROOM	U. G. PARKING	TOTAL
01 GENERAL REQUIREMENTS		see below	see below	see below	see below	see below
02 SITE WORK		$ 1,288,888	$ 1,981	$ -	$ 200,806	**$ 1,491,675**
03 CONCRETE			$ 136,709	$ 43,374	$ 726,418	**$ 906,501**
04 MASONRY			$ -	$ -	$ 45,234	**$ 45,234**
05 METALS			$ 31,251	$ 74,393	$ 39,236	**$ 144,880**
06 WOOD & PLASTICS			$ 360,640	$ 716,555	$ -	**$ 1,077,196**
07 THERMAL & MOIST. PROTECT.			$ 136,965	$ 156,995	$ 21,502	**$ 315,462**
08 DOORS & WINDOWS			$ 95,302	$ 148,770	$ 23,040	**$ 267,112**
09 FINISHES			$ 325,615	$ 528,459	$ 54,131	**$ 908,205**
10 SPECIALTIES			$ 32,695	$ 105,495	$ 10,001	**$ 148,191**
11 EQUIPMENT			$ 75,728	$ 8,000	$ 10,000	**$ 93,728**
12 FURNISHING			$ 57,927	$ 10,140	$ -	**$ 68,067**
13 SPECIAL CONSTRUCTIONS			$ -	$ -	$ -	**$ -**
14 CONVEYING SYSTEMS			$ 10,000	$ 60,000	$ 30,000	**$ 100,000**
15 MECHANICAL			$ 335,843	$ 615,783	$ 91,072	**$ 1,042,697**
16 ELECTRICAL			$ 219,035	$ 414,774	$ 79,092	**$ 712,901**
25 LOW VOLTAGE SYSTEMS			$ 85,370	$ 90,524	$ 19,795	**$ 195,689**
SUBTOTAL		**$ 1,288,888**	**$ 1,905,061**	**$ 2,973,262**	**$ 1,350,326**	$ 7,517,538
*General Conditions	10%	$ 128,889	$ 190,506	$ 297,326	$ 135,033	**$ 751,754**
*Overhead and Profit	5%	$ -	$ -	$ -	$ -	**$ -**
*Bonds and Insurance	1.5%	$ 21,267	$ 31,434	$ 49,059	$ 22,280	**$ 124,039**
SUBTOTAL		**$ 1,439,044**	**$ 2,127,001**	**$ 3,319,648**	**$ 1,507,639**	$ 8,393,331
*Design Contingency	0%	$ -	$ -	$ -	$ -	**$ -**
TOTAL (current BID COST)		**$ 1,439,044**	**$ 2,127,001**	**$ 3,319,648**	**$ 1,507,639**	$ 8,393,331
*Escalation to bid date Feb 04	0%	$ -	$ -	$ -	$ -	**$ -**
TOTAL (ANTICIPATED BID COST)		**$ 1,439,044**	**$ 2,127,001**	**$ 3,319,648**	**$ 1,507,639**	$ 8,393,331

* Percentage used in these mark ups should be AE's recommended mark ups based on current market conditions

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
ALLOWANCE					
B-PERMIT FEE	1	LS	$ 50,000.00	$ 50,000	
SEWER CONNECTION FEE	1	LS	$ 15,000.00	$ 15,000	
GENERAL SITE DEVELOPMENT					
DEMOLITION					
REMOVE EXISTING 5X4X2 BLOCK OF CONCRETE	1	LS	$ 500.00	$ 500	
REMOVE MISC. DEBRIS ACROSS SITE	1	LS	$ 1,000.00	$ 1,000	
EARTHWORKS					
SURVEYING	1.84	ACRE	$ 1,732.50	$ 3,183	
DUST CONTROL	80,035	SF	$ 0.10	$ 8,004	
SITE GRADING (EXCLUDING GARAGE EXCAVATION)					
MULTIPURPOSE PAD OVER EXCAVATION, 5' DEEP	3,040	CY	$ 6.00	$ 18,238	
EXCAVATE DIRT/RUBBLE AT AN AREA APPROX. 85'X85'X3' DEEP	803	CY	$ 6.00	$ 4,817	
EXPORTATION OF ABOVE EXCAVATED MATERIALS	1,028	CY	$ 12.00	$ 12,331	
BACKFILL AND COMPACTION INCLUDING SHRINKAGE FACTOR OF 10%	3,344	CY	$ 8.00	$ 26,749	
ADDITIONAL SOIL	304	CY	$ 12.00	$ 3,648	
SCARIFY AND RECOMPACT TOP 6" OF EXPOSED SITE AREAS	15,250	SF	$ 0.30	$ 4,575	
SCARIFY AND RECOMPACT TOP 12" OF SITE AREAS UNDER SITE FLATWORKS	32,466	SF	$ 0.60	$ 19,480	
ROUGH GRADING	80,035	SF	$ 0.20	$ 16,007	
FINE GRADING	80,035	SF	$ 0.25	$ 20,009	
PAVING, RAMPS AND STAIR					
STAIR AND RAMP BESIDE KINDERGARTEN					
CONCRETE STAIR ON GRADE	90	LFR	$ 40.00	$ 3,600	
CONCRETE RAMP	500	SF	$ 10.00	$ 5,000	
GUARD RAIL	67	LF	$ 110.00	$ 7,370	
HANDRAIL	166	LF	$ 40.00	$ 6,640	

DISTRICT/INDEPENDENT ESTIMATE

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONCRETE RETAINING WALL	200	SF	$ 20.00	$ 4,000	
FOUNDATION	7	CY	$ 350.00	$ 2,314	
STAIR TREAD NOSING	90	LF	$ 15.00	$ 1,350	
STAIR AND RAMP BESIDE CLASSROOM					
CONCRETE STAIR ON GRADE	33	LFR	$ 40.00	$ 1,300	
CONCRETE RAMP, COMPLETE	56	LF	$ 260.00	$ 14,560	
GUARD RAIL	8	LF	$ 110.00	$ 880	
HANDRAIL	15	LF	$ 40.00	$ 600	
STAIR TREAD NOSING	39	LF	$ 15.00	$ 585	
CONCRETE PLANTER/BENCH	45	LF	$ 60.00	$ 2,700	
WATERPROOFING AND PROTECTION BOARD FOR ABOVE PLANTER	113	SF	$ 3.50	$ 394	
GRAVEL WRAPPED WITH DRAINAGE FABRIC FOR PLANTER	45	LF	$ 8.00	$ 360	
CONCRETE CURB, 6"X12"	371	LF	$ 15.00	$ 5,565	
CONSTRUCT LONGITUDINAL GUTTER	281	LF	$ 15.00	$ 4,215	
CURB AND GUTTER	103	LF	$ 18.00	$ 1,854	
CONCRETE RETAINING WALL, COMPLETE	90	LF	$ 75.00	$ 6,750	
2" AC PAVING ON 4" CMB	9,116	SF	$ 2.50	$ 22,790	
3" AC PAVING ON 4" CMB	10,000	SF	$ 3.50	$ 35,000	
4" AC PAVING ON 6" CMB	1,900	SF	$ 4.60	$ 8,740	
4" REINFORCED CONCRETE PAVING OVER 4" BASE OVER 6" COMPACTED SUBGRADE	9,000	SF	$ 5.00	$ 45,000	
6" THICK CONCRETE SLAB ON GRADE ON 4" AGGREGATE	2,450	SF	$ 6.50	$ 15,925	
WALLS & FENCES					
2" SOLID CONCRETE CAP FOR CMU WALL	528	LF	$ 6.00	$ 3,168	
8" INTEGRAL COLOR SPLIT FACE CMU BLOCK WALL	4,320	SF	$ 18.00	$ 77,760	
FOUND FOR ABOVE CMU BLOCK WALL	71	CY	$ 330.00	$ 23,467	
DAMPROOFING FOR FOUNDATION	2,880	SF	$ 1.20	$ 3,456	
ORNAMENTAL FENCE	180	LF	$ 110.00	$ 19,800	
RETAINING WALL BELOW ORNAMENTAL FENCE, 12" THICK CONCRETE	32	CY	$ 680.00	$ 21,420	
RETAINING WALL FOUNDATION	28	CY	$ 330.00	$ 9,240	
8' CHAIN LINK FENCE	412	LF	$ 25.00	$ 10,300	
6' CHAIN LINK FENCE ABOVE RAMP RETAINING WALL	87	LF	$ 22.00	$ 1,914	
12" THICK LOW WALL BELOW CLF	205	LF	$ 50.00	$ 10,250	
FOUNDATION FOR ABOVE LOW WALL	16	CY	$ 330.00	$ 5,262	
INTEGRAL COLOR CMU BLOCK WALL AT SERVICE AREA	432	SF	$ 18.00	$ 7,776	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONCRETER CURB	48	LF	$ 16.00	$ 768	
FOUND FOR ABOVE CMU BLOCK WALL	7	CY	$ 330.00	$ 2,464	
12" WIDE CONCRETE STRIP UNDER CLF	207	LF	$ 15.00	$ 3,105	
CHAIN LINK ENCLOSURE FOR WATER SERVICES WITH PAIR OF 3' GATE	1	LS	$ 1,000.00	$ 1,000	
CHAIN LINK AND METAL GATE					
20X8, SLIDING GATE, CL	1	EA	$ 4,000.00	$ 4,000	
PR 6'X8' SERVICE YARD/TRANSFORMER ENCLOSURE	1	EA	$ 2,500.00	$ 2,500	
PR 6'X6' , CL, SWING	2	EA	$ 2,300.00	$ 4,600	
6'X6', CL, SWING	1	EA	$ 1,000.00	$ 1,000	
PR 12'X8', CL SWING	1	EA	$ 4,000.00	$ 4,000	
30'X8', CL, SLIDING	1	EA	$ 7,000.00	$ 7,000	
PR 6'X8' STEEL GATE, SWING	1	EA	$ 5,000.00	$ 5,000	
3'-4"X6', STEEL GATE, SWING	1	EA	$ 3,000.00	$ 3,000	
MISC. SITE WORK					
FLAGPOLE, 35' ABOVE FINISHED GRADE	1	EA	$ 4,000.00	$ 4,000	
PIPE BOLLARD, 8" DIAMETER X 8'	1	EA	$ 400.00	$ 400	
STOP SIGN	1	EA	$ 350.00	$ 350	
RAMP TRAFFIC MARKINGS (ENTER AND STOP)	2	SET	$ 100.00	$ 200	
ACCESSIBILITY SIGNAGE	1	SET	$ 350.00	$ 350	
DIRECTIONAL PAVEMENT MARKINGS	2	EA	$ 100.00	$ 200	
STEEL PIPE RAILING	60	LF	$ 90.00	$ 5,400	
PLAYGROUND ISSUES					
PLAYGROUND RUBBER MAT	775	SF	$ 10.00	$ 7,750	
CONCRETE CURB FOR ABOVE	100	LF	$ 15.00	$ 1,500	
PLAY STRUCTURE	1	EA	$ 10,000.00	$ 10,000	
TRICYCLE TRACK	83	LF	$ 5.25	$ 436	
CHINNING BARS	1	EA	$ 1,000.00	$ 1,000	
MISC. GAME MARKINGS	1	LS	$ 3,000.00	$ 3,000	
LANDSCAPING					
24" BOX TREES	19	EA	$ 400.00	$ 7,600	
PROTECT EXISTING TREES	5	EA	$ 200.00	$ 1,000	
5 GAL	204	EA	$ 50.00	$ 10,200	
1 GAL	494	EA	$ 25.00	$ 12,350	
BALL FIELD MIX 3A, EVERGREEN TURF MIX	11,450	SF	$ 1.25	$ 14,313	
GROUND COVER, FLATS 8" OC	3,800	SF	$ 1.75	$ 6,650	
IRRIGATION (INCLUDING STRIP FACTOR)	15,250	SF	$ 2.75	$ 41,938	
SOIL AMENDMENT/FERTILIZER, ROTO-TILL	15,250	SF	$ 0.50	$ 7,625	
90 DAYS MAINTENANCE	3	MO	$ 2,000.00	$ 6,000	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
2" THICK BARK MULCH	3,800	SF	$ 0.60	$ 2,280	
STORM DRAINS					
CATCH BASIN	6	EA	$ 1,000.00	$ 6,000	
CLEANOUT TO GRADE	6	EA	$ 500.00	$ 3,000	
PVC SDR 35					
3"	162	LF	$ 20.00	$ 3,240	
6"	52	LF	$ 25.00	$ 1,300	
8"	280	LF	$ 30.00	$ 8,400	
10"	260	LF	$ 42.00	$ 10,920	
CONSTRUCT PARKWAY DRAIN	33	LF	$ 50.00	$ 1,650	
SAFETY SHORING FOR ABOVE DRAIN LINE	100	SF	$ 15.00	$ 1,500	
CONNECTION TO EXISTING MAIN STREET LINE	1	EA	$ 5,000.00	$ 5,000	
UTILITY SERVICE					
GAS					
GAS SERVICES, 3"	400	LF	$ 20.00	$ 8,000	
GAS METER	1	EA	$ 2,500.00	$ 2,500	
CONNECT TO EXISTING GAS LINE	1	EA	$ 4,000.00	$ 4,000	
EARTHQUAKE VALVE, 3"	1	EA	$ 2,300.00	$ 2,300	
SITE SEWER					
4" VCP	500	LF	$ 26.00	$ 13,000	
CLEANOUT TO GRADE	3	EA	$ 350.00	$ 1,050	
CONNECT TO EXISTING	1	EA	$ 5,000.00	$ 5,000	
FIRE/ DOMESTIC WATER SERVICES					
6" FIRE WATER LINE	436	LF	$ 30.00	$ 13,080	
2.5" CU WATER	416	LF	$ 31.50	$ 13,104	
TRUST BLOCKS	8	EA	$ 100.00	$ 800	
FDC, 4- 2 1/2"	1	EA	$ 1,500.00	$ 1,500	
PIV, 6"	1	EA	$ 1,200.00	$ 1,200	
6" FIRE WATER SERVICE AND METER IN CONCRETE VAULT. COORDINATE WITH DWP FOR INSTALLATION AND CONNECTION	1	EA	$ 12,040.00	$ 12,040	
INSTALL DOUBLE CHECK DETECTOR ASSEMBLY, 6"		EA	$ -	Included above	
2" IRRIGATION SERVICE AND METER IN CONCRETE VAULT	1	EA	$ 3,020.00	$ 3,020	
2" DOMESTIC WATER SERVICE AND METER IN VAULT, COORDINATE WITH DWP FOR INSTALLATION AND CONNECTION	1	EA	$ 3,020.00	$ 3,020	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
REDUCED PRESSURE BACKFLOW PREVENTOR ON DOMESTIC WATER LINE, 2"	1	EA	$ 1,155.00	$ 1,155	
FIRE HYDRANT ASSEMBLY	1	EA	$ 5,300.00	$ 5,300	
CONNECTION OF WATER SERVICE LINE WITH EXISTING WATER MAIN	1	EA	$ 5,000.00	$ 5,000	
HOT TAP EXISTING WATER LINE, INCLUDING DOMESTIC AND FIRE LINE	1	EA	$ 3,000.00	$ 3,000	
SITE ELECTRICAL					
BARRIER POST FOR NEW POWER POLE, NOTED TO ASSUME 11 EACH	11	EA	$ 350.00	$ 3,850	
POWER POLE POC	1	EA	$ 2,626.50	$ 2,627	
(2) 5" AND (1) 4" CONDUITS CONCRETE ENCASED TO POWER POLE, PRIMARY	60	LF	$ 60.00	$ 3,600	
(6) 5" AND (1) 4" CONDUIT CONCRETE ENCASED, SECONDARY	30	LF	$ 110.00	$ 3,300	
TRANSFORMER PAD/ VAULT, 8' X 10'	1	EA	$ 6,000.00	$ 6,000	
CONCRETE PULL BOX FOR POWER 2' X 3' X 3'	2	EA	$ 1,800.00	$ 3,600	
4" C	600	LF	$ 10.14	$ 6,087	
#1	600	LF	$ 2.02	$ 1,211	
350 MCM	2,400	LF	$ 6.13	$ 14,714	
TRENCHING	67	CY	$ 20.00	$ 1,333	
CONCRETE ENCASEMENT	22	CY	$ 90.00	$ 2,000	
BACKFILLING AND COMPACTION INCLUDING 6" LAYER OF SAND AT THE BOTTOM	44	CY	$ 30.00	$ 1,333	
DISPOSAL OF EXCESS EXCAVATION	22	CY	$ 15.00	$ 333	
SIGNAL AND COMMUNICATION					
3' X 2' X 3' CONCRETE PULL BOX	2	EA	$ 1,800.00	$ 3,600	
4'X4'X3' CONCRETE PULL BOX	2	EA	$ 2,300.00	$ 4,600	
17"X2.5'X22"D CONCRETE PULL BOX WITH TRAFFIC COVER	1	EA	$ 1,200.00	$ 1,200	
4" C	500	LF	$ 10.14	$ 5,070	
3" C	1,200	LF	$ 7.00	$ 8,400	
2" C	200	LF	$ 4.21	$ 842	
1" C	200	LF	$ 2.60	$ 521	
TRENCHING	135	CY	$ 20.00	$ 2,702	
CONCRETE ENCASEMENT	59	CY	$ 90.00	$ 5,280	
BACKFILLING	76	CY	$ 20.00	$ 1,529	
DISPOSAL OF EXCESS EXCAVATION	59	CY	$ 15.00	$ 880	
CABLES FOR SAFETY AND TECHNOLOGY	2,100	LF	$ 8.00	$ 16,800	
OFFSITE WORK					
Sidewalk, pavement, trees, etc.					

DISTRICT/INDEPENDENT ESTIMATE

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
REMOVE SIDEWALK INCLUDING DISPOSAL	7,072	SF	$ 1.75	$ 12,376	
CURB & GUTTER REMOVAL	503	LF	$ 2.50	$ 1,258	
AC SAWCUT, MINIMUM 2"	267	LF	$ 3.00	$ 801	
AC SAWCUT, 8" THICK	293	LF	$ 5.00	$ 1,465	
SAWCUT CONCRETE PAVEMENT	21	LF	$ 7.00	$ 147	
REMOVE EXISTING AC PAVING 12" FROM EXISTING GUTTER, 8" THICK	293	LF	$ 5.00	$ 1,465	
REMOVE EXISTING WATER METER AND BOX	8	EA	$ 250.00	$ 2,000	
ADJUST WATER METER TO GRADE	1	EA	$ 250.00	$ 250	
REMOVE STREET TREE	1	EA	$ 300.00	$ 300	
REMOVE STREET SIGN	3	EA	$ 50.00	$ 150	
REMOVE MISC. FENCE	1	LS	$ 500.00	$ 500	
COLD MILL EXISTING AC PAVEMENT	4,502	SF	$ 2.00	$ 9,004	
TREE AND TREE WELL	11	EA	$ 1,000.00	$ 11,000	
NEW CURB ONLY	230	LF	$ 12.00	$ 2,760	
NEW CONCRETE CURB AND GUTTER	270	LF	$ 18.00	$ 4,860	
GRADING AND COMPACTION	9,035	SF	$ 0.50	$ 4,518	
CONCRETE SIDEWALK 4" ON 4" CMB	7,112	SF	$ 4.50	$ 32,004	
EXTRA FOR DRIVEWAY	1,041	SF	$ 4.00	$ 4,164	
AC OVERLAY	4,502	SF	$ 2.00	$ 9,004	
NEW AC PAVING 12" FROM EXISTING GUTTER, 8" THICK	293	LF	$ 7.00	$ 2,051	
CONSTRUCT CURB RAMP	2	EA	$ 1,000.00	$ 2,000	
8" THICK CONCRETE PAVEMENT	1,923	SF	$ 8.00	$ 15,384	
6" BASE	1,923	SF	$ 0.60	$ 1,154	
CATCH BASIN NO. 36	1	EA	$ 2,000.00	$ 2,000	
Street Lighting					
STREET LIGHT	2	EA	$ 5,000.00	$ 10,000	
LUMINAIRE AND LAMPS, 200W	2	EA	$ 2,000.00	$ 4,000	
LUMINAIRE AND LAMPS, 100W	1	EA	$ 1,500.00	$ 1,500	
CONDUIT AND WIRE	500	LF	$ 12.00	$ 6,000	
LUNCH SHELTER					
LIGHTING					
COMPACT FLUORESCENT, EXTERIOR	10	EA	$ 270.00	$ 2,700	
ENTRANCE STRUCTURE					
20 GA. GALV. SHEET METAL FLASHING	138	SF	$ 10.00	$ 1,380	
PYRAMIDAL STEEL STRUCT., 4" DIA. PIPE	1	LS	$ 5,000.00	$ 5,000	
STEEL FRAMING, WF	8	TNS	$ 3,750.00	$ 30,806	
TS	912	LBS	$ 2.00	$ 1,823	
MISC. CONNECTIONS	1,500	LBS	$ 2.50	$ 3,750	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Site Work

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CEMENT PLASTER, VERTICAL SURFACE	1,592	SF	$ 7.00	$ 11,144	
CEMENT PLASTER, SOFFIT	215	SF	$ 10.00	$ 2,150	
20 GA. GALV. SHEET METAL FLASHING	108	SF	$ 6.00	$ 648	
CERAMIC TILE	800	SF	$ 14.00	$ 11,200	
1/2" PLYWOOD SHEATHING	2,053	SF	$ 3.00	$ 6,159	
WOOD FRAMING	2,053	SF	$ 4.00	$ 8,212	
SINGLE PLY SELF ADHESIVE WATERPROOFING MEMBRANE	250	SF	$ 2.00	$ 500	
FOUNDATIONS - GRADE BEAMS	14	CY	$ 350.00	$ 4,900	
ENTRANCE SIGN "SANTA MONICA PRIMARY CENTER"	1	SET	$ 2,160.00	$ 2,160	
PAINTING	1,003	SF	$ 1.00	$ 1,003	
COVERED WALK					
ROOF CONSTRUCTION					
WOOD FRAMING, 2X6 @ 16" OC	802	SF	$ 5.00	$ 4,010	
WOOD BEAMS	800	BF	$ 5.00	$ 4,000	
1/2" PLYWOOD SHEATHING	2,147	SF	$ 2.50	$ 5,368	
BUR	1,164	SF	$ 4.00	$ 4,656	
COPING	181	LF	$ 12.00	$ 2,172	
CONT. CANT STRIP	181	LF	$ 2.00	$ 362	
SOFFIT PLASTERING	802	SF	$ 10.00	$ 8,020	
FASCIA PLASTER	543	SF	$ 7.00	$ 3,801	
PAINTING	1,345	SF	$ 1.00	$ 1,345	
COLUMN					
PIPE COLUMNS, 4" DIA	108	LF	$ 30.00	$ 3,240	
PLASTER PER COLUMN	12	COL	$ 450.00	$ 5,400	
FRAMING PER COLUMN	12	COL	$ 300.00	$ 3,600	
1/2" PLYWOOD SHEATHING PER COLUMN	12	COL	$ 162.00	$ 1,944	
PAINTING PER COLUMN	12	COL	$ 67.50	$ 810	
FOUNDATIONS , 24" DIAMETER X 4' DEEP	12	EA	$ 400.00	$ 4,800	
LIGHTING					
COMPACT FLUORESCENT, EXTERIOR	21	EA	$ 270.00	$ 5,670	
EXIT SIGNS	2	EA	$ 425.00	$ 850	
Subtotal Division 02					**$ 1,288,888**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
PREPARE BUILDING PAD	9,907	SF	$ 0.20	$ 1,981	
Subtotal Division 02					**$ 1,981**
03 CONCRETE					
SPREAD FOOTING	7	CY	$ 340.00	$ 2,380	
CONTINUOUS FOOTING	70	CY	$ 340.00	$ 23,800	
WALKWAY FOUNDATION, 2' DIAMETER	132	LF	$ 52.00	$ 6,864	
CONCRETE COLUMN 15" DIAMETER	220	CY	$ 55.00	$ 12,100	
DRILLING FOR 15" CONCRETE COLUMN FOUNDATION	10	EA	$ 100.00	$ 1,000	
BACKFILL ON STAGE AREA	74	CY	$ 40.00	$ 2,963	
SLAB ON GRADE, 5" THICK OVER 2" SAND OVER 10 MIL VAPOR BARRIER OVER 2" SAND	9,662	SF	$ 6.00	$ 57,972	
6X6 CONCRETE CURB AT EXTERIOR WALLS	700	LF	$ 13.00	$ 9,100	
SLAB DEPRESSION	1,950	SF	$ 1.00	$ 1,950	
STAIR ON GRADE	132	LF	$ 40.00	$ 5,280	
STAIR ON GRADE, CIRCULAR	155	LF	$ 60.00	$ 9,300	
POLE FOOTING 24" DIAMETER X 4' HIGH	10	EA	$ 400.00	$ 4,000	
Subtotal Division 03					**$ 136,709**
04 MASONRY					
NOT USED					
Subtotal Division 04					**$ -**
05 METALS					
STRUCTURAL STEEL					
COLUMNS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
PIPE COLUMN, 4" DIAMETER, 260 LF	2,145	LBS	$ 2.00	$ 4,290	
TUBULAR POST	2,621	LBS	$ 2.00	$ 5,241	
MISCELLANEOUS CONNECTIONS FOR POST AND COLUMNS	953	LBS	$ 3.00	$ 2,859	
ROOF STEEL FRAMING					
TS10X6X3/8 CURVED BEAM	3,760	LBS	$ 3.00	$ 11,280	
MISCELLANEOUS CONNECTIONS	752	LBS	$ 2.50	$ 1,880	
MISCELLANEOUS METALS					
STEEL PIPE RAILING	20	LF	$ 100.00	$ 2,000	
HAND RAIL @ PLATFORM	60	LF	$ 45.00	$ 2,700	
ROOF LADDER	1	EA	$ 1,000.00	$ 1,000	
Subtotal Division 05					**$ 31,251**
06 WOOD & PLASTICS					
ROUGH CARPENTRY					
ROOF FRAMING					
18" TJI @24" OC	7,743	SF	$ 7.50	$ 58,073	
EXTRA TRUSS JOIST FOR MECH. EQUIPMENT	800	LF	$ 6.00	$ 4,800	
2X12 @ 24" OC @ LUNCH SHELTER	1,250	SF	$ 7.25	$ 9,063	
2X10 @ 32" OC @ LUNCH SHELTER	524	SF	$ 4.00	$ 2,096	
2X8 @ 16" OC, OVER MULTIPURPOSE ROOM	2,410	SF	$ 5.50	$ 13,255	
2X6 @ 16" OC, OVER COVERED WALK	760	SF	$ 4.00	$ 3,040	
ROOF SHEATHING 5/8" CDX	8,700	SF	$ 2.00	$ 17,400	
ROOF SHEATHING 5/8" CDX, LUNCH SHELTER, SEMI-CIRCLE LAYOUT	1,250	SF	$ 3.00	$ 3,750	
ROOF SHEATHING 1/2, COVERED WALKWAY	760	SF	$ 1.70	$ 1,292	
MISCELLANEOUS BLOCKING, HEADER, ETC	10,391	SF	$ 1.00	$ 10,391	
PARALAM, GLUE LAM AND MICRO LAM	3,118	BF	$ 6.00	$ 18,708	
BEAMS, HEADER	2,800	BF	$ 5.00	$ 14,000	
WALL FRAMING					
EXTERIOR WOOD STUD 2X6	11,969	SF	$ 4.25	$ 50,866	
PLYWOOD SHEATHING, EXTERIOR	10,376	SF	$ 2.50	$ 25,940	
INTERIOR WOOD STUD 2X6	7,851	SF	$ 4.00	$ 31,402	
INTERIOR PLYWOOD FOR SHEAR WALL	4,700	SF	$ 2.50	$ 11,750	
POST	1,731	BF	$ 5.00	$ 8,655	
MISCELLANEOUS HARDWARE	1	LS	$ 14,250.00	$ 14,250	
FINISH CARPENTRY					
FACULTY DINING					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
BASE CABINET	6	LF	$ 220.00	$ 1,320	
WALL CABINET	9	LF	$ 180.00	$ 1,620	
WAITING					
FRONT DESK CASEWORK	15	LF	$ 300.00	$ 4,500	
PLASTIC LAMINATE SWING DOOR	1	EA	$ 400.00	$ 400	
SUPPLY/REPRO ROOM					
PLASTIC LAMINATE LOWER CABINET	30	LF	$ 220.00	$ 6,600	
PLASTIC LAMINATE UPPER CABINET	30	LF	$ 160.00	$ 4,800	
MAILBOXES	8	LF	$ 250.00	$ 2,000	
STORAGE/ WARDROBE CABINET	2	EA	$ 1,600.00	$ 3,200	
NURSE'S OFFICE					
PLASTIC LAMINATE LOWER CABINET	7	LF	$ 220.00	$ 1,540	
PLASTIC LAMINATE UPPER CABINET	7	LF	$ 160.00	$ 1,120	
LIBRARY AND LIBRARY OFFICE, RSP					
PLASTIC LAMINATE LOWER CABINET	7	LF	$ 250.00	$ 1,750	
PLASTIC LAMINATE UPPER CABINET	7	LF	$ 180.00	$ 1,260	
STORAGE/ WARDROBE CABINET	2	EA	$ 1,600.00	$ 3,200	
CIRCULATION DESK	20	LF	$ 300.00	$ 6,000	
7'H X 3'W BOOK SHELVING AGAINST WALL	80	LF	$ 200.00	$ 16,000	
3' HIGH LOW BOOK SHELVING	20	LF	$ 120.00	$ 2,400	
READING STAIR	15	LF	$ 280.00	$ 4,200	
Subtotal Division 06					**$ 360,640**
07 THERMAL& MOISTURE PROTECTION					
ROOF INSULATION	9,930	SF	$ 1.06	$ 10,526	
WATERPROOFING TO RESTROOMS	520	SF	$ 3.50	$ 1,820	
BATT INSULATION TO EXTERIOR WALLS (THERMAL)	10,376	SF	$ 0.80	$ 8,301	
SOUND INSULATION	7,851	SF	$ 0.60	$ 4,710	
3-PLY ROOFING	12,123	SF	$ 4.00	$ 48,492	
ROOFING WALKWAY PAD	288	SF	$ 3.00	$ 863	
CRICKET	1,064	SF	$ 3.00	$ 3,192	
PARAPET COPING	1,044	LF	$ 15.00	$ 15,660	
CANT STRIP, SPRING LOCK FLASHING AND COUNTER FLASHING	1,344	LF	$ 8.00	$ 10,752	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
DOWNSPOUT	300	LF	$ 13.00	$ 3,900	
SPLASH PAN	8	EA	$ 40.00	$ 320	
ROOF HATCH	1	EA	$ 1,100.00	$ 1,100	
ADD FOR FRAME AND COVER FOR HATCH	1	EA	$ 600.00	$ 600	
SCUPPER	21	EA	$ 75.00	$ 1,575	
MISC. SHEET METAL ALLOWANCE	10,391	GSF	$ 0.16	$ 1,638	
MISC. CAULKING AND SEALANT ALLOWANCE	10,391	GSF	$ 0.30	$ 3,117	
MECHANICAL SCREEN WALL AT ROOF, 5'-9" H	170	LF	$ 120.00	$ 20,400	
Subtotal Division 07					**$ 136,965**
08 DOORS & WINDOWS					
DOOR, FRAME AND HARDWARE					
SC WOOD DOOR AND HM FRAME, 3X7	41	EA	$ 600.00	$ 24,600	
EXTRA FOR LOUVER	5	EA	$ 100.00	$ 500	
EXTRA FOR HALF GLASS	2	EA	$ 100.00	$ 200	
EXTRA FOR VISION PANEL	15	EA	$ 100.00	$ 1,500	
HM DOOR AND FRAME, 6X7 WITH A PAIR OF VISION PANEL 8"X2'-6"	3	EA	$ 1,800.00	$ 5,400	
HARDWARE	44	EA	$ 400.00	$ 17,600	
PANIC HARDWARE FOR SINGLE DOORS	10	EA	$ 550.00	$ 5,500	
EXTRA FOR FIRE RATING, 20 MIN	6	EA	$ 25.00	$ 150	
EXTRA FOR FIRE RATING, 60 MIN	3	EA	$ 40.00	$ 120	
COILING DOOR, 16' X 9'	1	EA	$ 5,000.00	$ 5,000	
ACCESS PANEL/DOOR, 2X2	13	EA	$ 260.00	$ 3,380	
WINDOWS					
WINDOWS AND GLAZING - EXTERIOR	681	SF	$ 42.00	$ 28,602	
WINDOWS AND GLAZING - INTERIOR	55	SF	$ 50.00	$ 2,750	
Subtotal Division 08					**$ 95,302**
09 FINISHES					
EXTERIOR FINISHES					
GRAFFITI COATING, 9' HT.	4,500	SF	$ 1.46	$ 6,570	
STUCCO , PAINTED	10,500	SF	$ 6.75	$ 70,875	
INTERIOR SURFACE OF EXTERIOR WALL, 5/8" TYPE 'X' GWB, PAINTED	10,300	SF	$ 2.40	$ 24,720	
CERAMIC TILE	239	SF	$ 15.00	$ 3,585	
INTERIOR WALLS FINISHES					
PAINTED GYPSUM BOARD	15,701	SF	$ 2.40	$ 37,682	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CERAMIC TILE	764	SF	$ 15.00	$ 11,460	
PAINT DOOR AND FRAME	44	EA	$ 85.00	$ 3,740	
CERAMIC BASE TILE	235	LF	$ 7.00	$ 1,645	
RUBBER BASE	1,000	LF	$ 1.60	$ 1,600	
FRP	855	SF	$ 5.50	$ 4,703	
MISCELLANEOUS PAINTING	10,376	SF	$ 0.20	$ 2,075	
CEILING FINISHES					
DOUBLE LAYER GWB	9,750	SF	$ 2.50	$ 24,375	
PAINTED SUSPENDED GYPBD CEILING	3,200	SF	$ 6.50	$ 20,800	
CEMENT PLASTER SOFFIT	2,520	SF	$ 10.00	$ 25,200	
FRAMING FOR PLASTER SOFFIT	2,520	SF	$ 4.50	$ 11,340	
ACOUSTIC TILE	3,900	SF	$ 2.50	$ 9,750	
ACOUSTIC TILE, 2' X 2'	2,180	SF	$ 2.50	$ 5,450	
PAINT TO CEMENT PLASTER SOFFIT	2,520	SF	$ 0.80	$ 2,016	
FLOOR FINISHES					
CERAMIC TILE	553	SF	$ 14.00	$ 7,742	
MORTAR BED	553	SF	$ 2.56	$ 1,416	
CARPET	2,600	SF	$ 4.44	$ 11,556	
RESILIENT FLOORING	4,310	SF	$ 2.00	$ 8,620	
QUARRY TILE FLOOR	1,810	SF	$ 14.00	$ 25,340	
QUARRY TILE BASE	380	LF	$ 8.00	$ 3,040	
CONCRETE SEALER	300	SF	$ 1.05	$ 315	
Subtotal Division 09					**$ 325,615**
10 SPECIALTIES					
TOILET PARTITIONS, STANDARD	1	EA	$ 900.00	$ 900	
TOILET PARTITIONS, HC	2	EA	$ 1,000.00	$ 2,000	
TOILET ACCESSORIES					
TOILET TISSUE DISPENSER	8	EA	$ 90.00	$ 720	
SEAT COVER DISPENSER	8	EA	$ 125.00	$ 1,000	
SOAP DISPENSER	7	EA	$ 85.00	$ 595	
GRAB BARS	7	EA	$ 180.00	$ 1,260	
MIRRORS	7	EA	$ 150.00	$ 1,050	
PAPER TOWEL DISPENSER	2	EA	$ 300.00	$ 600	
ELECTRIC HAND DRYER	7	EA	$ 600.00	$ 4,200	
SANITARY NAPKIN VENDOR	3	EA	$ 500.00	$ 1,500	
SANITARY NAPKIN DISPOSAL	3	EA	$ 250.00	$ 750	
JANITOR ACCESSORIES	1	EA	$ 1,200.00	$ 1,200	
LOCKERS, 2 TIER	7	EA	$ 175.00	$ 1,225	
BOARDS, SIGNAGE AND GRAPHICS	9,907	SF	$ 1.00	$ 9,907	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
FACULTY FOOD SERVICE WINDOW	1	EA	$ 1,575.90	$ 1,576	
FIRE EXTINGUISHER CABINET	4	EA	$ 350.00	$ 1,400	
FIXED MARKER BOARDS, 4X12	1	EA	$ 825.00	$ 825	
TACK BOARD SURFACE ACOUSTICAL	265	SF	$ 7.50	$ 1,988	
Subtotal Division 10					**$ 32,695**
11 EQUIPMENT					
FOOD SERVICE EQUIPMENT					
EXHAUST HOOD, 12'X5'	1	EA	$ 8,000.00	$ 8,000	
WALK IN REFRIGERATOR	95	SF	$ 200.00	$ 19,000	
GAS RANGE, 2 BURNER	1	EA	$ 3,500.00	$ 3,500	
REACH IN FREEZER (DOUBLE)	1	EA	$ 7,600.00	$ 7,600	
PREPARATION TABLE AND HANGING RACK, 84"X20"	2	EA	$ 3,000.00	$ 6,000	
COUNTER, 12' LONG	1	EA	$ 3,000.00	$ 3,000	
3-COMPARTMENT SINK	1	EA	$ 4,000.00	$ 4,000	
HAND WASHING SINK	1	EA	$ 800.00	$ 800	
METRO SHELVING, 21X48	7	EA	$ 500.00	$ 3,500	
METAL SHELVING	1	EA	$ 800.00	$ 800	
SNEEZE GUARD	1	EA	$ 1,000.00	$ 1,000	
PREP SINK UNIT	1	EA	$ 2,500.00	$ 2,500	
SS POT RACK SHELVES	1	EA	$ 900.00	$ 900	
SS SHELF, 4'	1	EA	$ 300.00	$ 300	
WALL FLASHING, 12' X 10'	1	EA	$ 2,400.00	$ 2,400	
FIRE SUPPRESSION SYSTEM	1	EA	$ 8,000.00	$ 8,000	
PROJECTION SCREEN, ELECTRICALLY OPERATED IN MULTI-PURPOSE	1	EA	$ 4,427.89	$ 4,428	
Subtotal Division 11					**$ 75,728**
12 FURNISHINGS					
CURTAINS	616	SF	$ 29.00	$ 17,864	
CURTAIN TRACK	56	LF	$ 56.00	$ 3,136	
PRIVACY CURTAIN IN NURSE'S OFFICE	10	LF	$ 50.00	$ 500	
FOLDING TABLES AND BENCHES	10	EA	$ 3,200.00	$ 32,000	
WINDOW BLINDS	681	SF	$ 6.50	$ 4,427	
Subtotal Division 12					**$ 57,927**
13 SPECIAL CONSTRUCTION					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
HANDICAPPED LIFT	1	EA	$ 10,000.00	$ 10,000	
Subtotal Division 14					**$ 10,000**
15 MECHANICAL					
PLUMBING WORK					
PLUMBING FIXTURES					
WATER CLOSET	8	EA	683.55	$ 5,468	
DRINKING FOUNTAIN	2	EA	1,200.00	$ 2,400	
URINAL WALL MOUNTED	1	EA	565.00	$ 565	
SINKS	2	EA	680.00	$ 1,360	
LAVATORY	7	EA	401.45	$ 2,810	
SERVICE SINK	3	EA	695.00	$ 2,085	
FLOOR SINK	1	EA	600.00	$ 600	
WATER HEATER, ELECTRIC, 100 GAL, 88MBH	1	EA	2,800.00	$ 2,800	
ROUGH IN FOR THE FIXTURES					
WATER CLOSET	8	EA	439.43	$ 3,515	
DRINKING FOUNTAIN	2	EA	234.00	$ 468	
URINAL WALL MOUNTED	1	EA	396.03	$ 396	
SINKS	2	EA	460.00	$ 920	
LAVATORY	7	EA	670.00	$ 4,690	
SERVICE SINK	3	EA	865.00	$ 2,595	
FLOOR SINK	1	EA	600.00	$ 600	
WATER HEATER, 100 GAL CAPACITY	1	EA	300.00	$ 300	
ROUGH IN FOR THE FIXTURES	25	EA	1,200.00	$ 30,000	
ROUGH IN FOR KITCHEN FIXTURES					
3- COMPARTMENT SINK	1	EA	1,200.00	$ 1,200	
UTENSIL, HAND, AND PREP SINK	3	EA	1,000.00	$ 3,000	
GAS CONNECTION TO KITCHEN EQUIPMENT	3	EA	500.00	$ 1,500	
GREASE INTERCEPTOR, 750 GAL CAP	1	EA	8,000.00	$ 8,000	
FLOOR DRAIN	14	EA	300.00	$ 4,200	
FLOOR CLEANOUT	10	EA	180.00	$ 1,800	
HOSE BIBB	7	EA	300.00	$ 2,100	
RBFP, 3/4"	1	EA	600.00	$ 600	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
CONDENSATE DRAIN PIPING, 1" ~11/2"	450	LF	12.00	$ 5,400	
MISC. VALVES AND SPECIALTIES	10,376	SF	0.30	$ 3,113	
GAS SERVICES	10,376	SF	0.60	$ 6,226	
TEST, PURGE, STERILIZE	10,376	SF	$ 0.40	$ 4,150	
FIRE PROTECTION					
SPRINKLER SYSTEM	10,376	SF	$ 2.25	$ 23,346	
HVAC SYSTEM					
AC-3, 3 TONS	4	EA	$ 5,550.00	$ 22,200	
AC-4, 3.85 TONS	2	EA	$ 7,100.00	$ 14,200	
AC-5, 4.98 TONS	1	EA	$ 7,728.00	$ 7,728	
AC-7.5, 7.29 TONS	2	EA	$ 11,173.13	$ 22,346	
SPLIT UNIT					
3.06 TONS	1	EA	$ 3,518.22	$ 3,754	
2.85 TONS	1	EA	$ 3,266.10	$ 3,485	
EXHAUST FAN					
MAKE-UP AIR UNIT, 2,400 CFM	1	EA	$ 6,500.00	$ 6,500	
AIR CURTAIN	2	EA	$ 1,000.00	$ 2,000	
2400 CFM	1	EA	$ 2,000.00	$ 2,000	
260 CFM	1	EA	$ 300.00	$ 300	
330 CFM	1	EA	$ 495.00	$ 495	
300 CFM	2	EA	$ 450.00	$ 900	
188 CFM	1	EA	$ 282.00	$ 282	
GV, 1,600 CFM	4	EA	$ 1,600.00	$ 6,400	
GV, 3,600 CFM	2	EA	$ 3,600.00	$ 7,200	
AIR DISTRIBUTION					
DUCT WORK	8,301	LBS	$ 6.00	$ 49,805	
DUCT INSULATION, WRAP	5,685	SF	$ 2.00	$ 11,371	
CEILING DIFFUSER, 12X12	39	EA	$ 134.00	$ 5,226	
TR	8	EA	$ 180.00	$ 1,440	
REGISTER/RETURN	36	EA	$ 130.00	$ 4,680	
CG RELIEF	16	EA	$ 100.00	$ 1,600	
FLEXIBLE CONNECTION	75	EA	$ 95.00	$ 7,125	
FIRE DAMPER, TO 2SF	3	EA	$ 141.83	$ 425	
COMB. F/S DAMPER	11	EA	$ 200.00	$ 2,200	
VOLUME DAMPER	83	EA	$ 73.54	$ 6,104	
CONTROL/ BACK DRAFT DAMPER	6	EA	$ 150.00	$ 900	
BY PASS DAMPER, 2400 CFM	1	EA	$ 1,500.00	$ 1,500	
VARIABLE AIR VOLUME TERMINAL BOX	1	EA	$ 1,282.50	$ 1,283	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
AIR BALANCE: AIR DISTRIBUTION DEVICES	83	EA	$ 70.00	$ 5,810	
CONTROLS	10,376	SF	$ 1.00	$ 10,376	
Subtotal Division 15					**$ 335,843**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
MAIN SWITCHBOARD, MS, 277/480V, ,3P, 4W, 1200A	1	EA	$ 27,732.60	$ 27,733	
DISTRIBUTION PANEL, DBA, 600A, 120/208V, 3P, 4W	1	EA	$ 7,000.00	$ 7,000	
150 KVA TRANSFORMER, 480-208/120V, 3P, 4W	1	EA	$ 8,500.00	$ 8,500	
GROUNDING	10,376	SF	$ 0.35	$ 3,632	
PANEL BD					
225A, 120/208V	1	EA	$ 3,500.00	$ 3,500	
100A, 120/208V	3	EA	$ 2,200.00	$ 6,600	
225A, 480V	2	EA	$ 4,000.00	$ 8,000	
100A, 277/480V	1	EA	$ 2,800.00	$ 2,800	
1LCP	1	EA	$ 1,500.00	$ 1,500	
1EM, EMERGENCY POWER SUPPLY, 2.5 KVA	1	EA	$ 5,630.00	$ 5,630	
SECONDARY FEEDER LINE					
CABLE AND CONDUIT	280	LF	$ 28.00	$ 7,840	
BRANCH POWER SYSTEM					
RECEPTACLES, ALL TYPES	46	EA	$ 135.00	$ 6,210	
SPECIAL PURPOSE RECEPTACLES (FOR KITCHEN EQUIPMENT)	11	EA	$ 200.00	$ 2,200	
WIRE #12/4 THWN/THHN	2,000	LF	$ 2.00	$ 4,000	
EMT CONDUITS WITH FITTINGS	2,000	LF	$ 4.17	$ 8,340	
POWER TO MECHANICAL					
DISCONNECT SWITCH, 30A	12	EA	$ 500.00	$ 6,000	
DISCONNECT SWITCH, 100A	1	EA	$ 1,000.00	$ 1,000	
MISCELLANEOUS MOTOR CONNECTION	12	EA	$ 300.00	$ 3,600	
LIGHTING FIXTURES, TYPE					
2X4, RECESSED FLUORESCENT, 3 LAMP	18	EA	$ 300.00	$ 5,400	
2X4, RECESSED FLUORESCENT, 2 LAMP	37	EA	$ 250.00	$ 9,250	
2X4, RECESSED FLUORESCENT, 2 LAMP, SURFACE MTD	31	EA	$ 250.00	$ 7,750	
COMPACT FLUORESCENT DOWN LIGHT	16	EA	$ 300.00	$ 4,800	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
PENDANT MOUNTED COMPACT FLUORESCENT FIXTURE, 8 LAMP	12	EA	$ 600.00	$ 7,200	
EXIT SIGN, SINGLE FACE	9	EA	$ 350.00	$ 3,150	
FLUOR GENERAL PURPOSE STRIP LIGHT, SINGLE LAMP, SURFACE	10	EA	$ 150.00	$ 1,500	
SURFACE CEILING MTD HIGH ABUSE FLUOR FIXT. 2-LAMP	27	EA	$ 275.00	$ 7,425	
SURFACE CEILING MTD HIGH ABUSE COMPACT FLUOR FIXT. 1-LAMP	1	EA	$ 200.00	$ 200	
COMPACT FLUORESCENT DOWN LIGHT, 2-LAMP	2	EA	$ 200.00	$ 400	
STAGE TRACK LIGHT, 150W, HALOGEN	3	EA	$ 300.00	$ 900	
OCCUPANCY SENSOR	2	EA	$ 250.00	$ 500	
LIGHTING CONTROL PANEL	1	EA	$ 1,000.00	$ 1,000	
SWITCHES	18	EA	$ 92.00	$ 1,656	
MISC. WIRING AND CONDUIT	10,376	SF	$ 0.50	$ 5,188	
CLOCK AND PROGRAM SYSTEM					
MAIN CLOCK	1	EA	$ 1,000.00	$ 1,000	
CLOCK	17	EA	$ 195.00	$ 3,315	
CONDUIT AND WIRE	10,376	SF	$ 0.20	$ 2,075	
FIRE ALARM SYSTEM					
FACP	1	EA	$ 5,000.00	$ 5,000	
FIRE CONTROL COMMUNICATOR	1	EA	$ 600.00	$ 600	
FIRE ALARM BELL	1	EA	$ 195.00	$ 195	
SMOKE DETECTOR	30	EA	$ 190.00	$ 5,700	
MANUAL PULL STATION	6	EA	$ 160.00	$ 960	
STROBE	9	EA	$ 160.00	$ 1,440	
HORN/STROBE	20	EA	$ 200.00	$ 4,000	
WEATHERPROOF FIRE ALARM HORN	7	EA	$ 160.00	$ 1,120	
SYNC. MODULE	2	EA	$ 220.00	$ 440	
MONITOR MODULE	1	EA	$ 200.00	$ 200	
CONTROL MODULE	1	EA	$ 200.00	$ 200	
WATER FLOW	1	EA	$ 130.00	$ 130	
TAMPER SWITCH	1	EA	$ 130.00	$ 130	
HEAT DETECTOR	61	EA	$ 150.00	$ 9,150	
FIRE ALARM CKTS, EMT/ WIRE	10,376	SF	$ 0.63	$ 6,537	
SPARE PARTS: 10% SPARE PULL STATIONS, 10% SPARE SMOKE AND HEAT DETECTOR, 10% SPARE AUDIBLE DEVICES, 10% SPARE STROBE DEVICES	1	LOT	$ 5,000.00	$ 5,000	
PROVIDE 12 HOURS OF SITE INSTRUCTION	12	HR	$ 120.00	$ 1,440	
Subtotal Division 16					**$ 219,035**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 1 (Multi-Purpose)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
25 LOW VOLTAGE SYSTEMS					
SECURITY SYSTEM					
MOTION SENSOR	27	EA	$ 200.00	$ 5,400	
MAGNETIC DOOR SWITCH	1	EA	$ 75.00	$ 75	
KEY PAD	2	EA	$ 200.00	$ 400	
CONDUITS AND WIRES	10,376	SF	$ 0.50	$ 5,188	
PULL BOX	1	EA	$ 175.00	$ 175	
SECURITY TERMINAL CABINET, SECTC	1	EA	$ 600.00	$ 600	
TV SYSTEM					
TV OUTLETS	4	EA	$ 206.00	$ 824	
MAIN TV TERMINAL CABINET	1	EA	$ 1,000.00	$ 1,000	
CONDUIT AND CABLE	10,376	SF	$ 0.10	$ 1,038	
PA AND TELEPHONE SYSTEM					
SPEAKERS	29	EA	$ 100.00	$ 2,900	
AUTONOMOUS PA RACK AND AMPLIFIER	1	EA	$ 10,000.00	$ 10,000	
MAIN A/IC/TEL TERMINAL CABINET	1	EA	$ 15,000.00	$ 15,000	
PABX	1	EA	$ 10,000.00	$ 10,000	
MICROPHONE OUTLET	6	EA	$ 150.00	$ 900	
PA TERMINAL CABINET, PATC-4	1	EA	$ 600.00	$ 600	
WIRING AND CONDUIT FOR PA SYSTEM	10,376	SF	$ 0.20	$ 2,075	
TELEPHONE/INTERCOM AND OUTLET	23	EA	$ 300.00	$ 6,900	
WIRING AND CONDUIT FOR TEL SYSTEM	10,376	SF	$ 0.20	$ 2,075	
TELEPHONE TERMINAL CABINET, TLTC-M	1	EA	$ 600.00	$ 600	
DATA SYSTEM					
MAIN DISTRIBUTION FRAME	1	EA	$ 6,000.00	$ 6,000	
COMPUTER OUTLETS	35	EA	$ 100.00	$ 3,500	
LDF	1	EA	$ 2,000.00	$ 2,000	
CAT 5 CABLE	1,000	LF	$ 0.12	$ 120	
FIBER OPTIC CABLE	500	LF	$ 15.00	$ 7,500	
POWER SUPPLY	1	EA	$ 500.00	$ 500	
Subtotal Division 25					**$ 85,370**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
Subtotal Division 02					**$ -**
03 CONCRETE					
EXTRA FOR BLDG FLOOR DEPRESSION	940	SF	$ 1.00	$ 940	
SPREAD FOOTING	0.33	CY	$ 340.00	$ 113	
BLDG. AND REST ROOM PERIMETER CURB	577	LF	$ 12.00	$ 6,924	
1-1/2" THICK CELLULAR CONCRETE WITH WIRE MESH	12,732	SF	$ 2.25	$ 28,647	
FOUNDATIONS , 24" DIAMETER X 6' DEEP	4	EA	$ 450.00	$ 1,800	
CONCRETE TOPPING OVER EXPOSED AREAS OF PARKING ELEVATED SLAB	1,650	SF	$ 3.00	$ 4,950	
Subtotal Division 03					**$ 43,374**
04 MASONRY					
NOT USED					
Subtotal Division 04					**$ -**
05 METALS					
STRUCTURAL STEEL					
STRUCTURAL STEEL, WF	8,015	LBS	$ 2.00	$ 16,030	
PIPE COLUMN 5" DIA	84	LF	$ 41.00	$ 3,444	
PIPE COLUMN 4" DIA AT G/L	56	LF	$ 22.00	$ 1,232	
TS4X4X1/4	338	LF	$ 24.40	$ 8,247	
MISCELLANEOUS METAL CONNECTIONS	3,000	LBS	$ 2.50	$ 7,500	
CONCRETE FILLED METAL FAN STAIR #2	139	LFR	$ 75.00	$ 10,445	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
STAIR #1	156	LFR	$ 75.00	$ 11,700	
EXTRUDED NON-SLIP NOSING	295	LF	$ 15.00	$ 4,429	
STAIR LANDING					
STAIR # 2	32	SF	$ 41.00	$ 1,292	
STAIR # 1	83	SF	$ 41.00	$ 3,415	
MISCELLANEOUS METAL					
WALL MOUNTED HANDRAIL IN STAIR	64	LF	$ 40.00	$ 2,560	
ALUMINUM FIXED VERTICAL LADDER, 31'	1	EA	$ 3,100.00	$ 3,100	
ROOF LADDER	1	EA	$ 1,000.00	$ 1,000	
Subtotal Division 05					**$ 74,393**
06 WOOD & PLASTICS					
ROUGH CARPENTRY					
POST	1,773	BF	$ 5.00	$ 8,863	
PARALAM BEAM	1,924	BF	$ 5.00	$ 9,620	
BEAMS	1,117	BF	$ 4.00	$ 4,468	
FLOOR FRAMING					
FLOOR JOIST	12,740	SF	$ 8.00	$ 101,920	
2X8 FLOOR JOIST @ 16"OC	221	SF	$ 3.50	$ 774	
FLOOR SHEATHING, 3/4" T&G CDX	13,006	SF	$ 1.70	$ 22,110	
ROOF JOIST					
ROOF JOIST	11,138	SF	$ 7.00	$ 77,966	
2X12 @16"OC	67	SF	$ 8.00	$ 536	
2X8 @16"OC	24	SF	$ 6.00	$ 144	
ROOF BEAM/HEADER	771	BF	$ 5.00	$ 3,857	
CANOPY RAFTER/ROOF JOIST, 2X12 @ 16" ON CENTER		SF	$ 7.22		
5/8 P/W SHEATHING	11,138	SF	$ 1.75	$ 19,492	
PARALAM BEAM	400	BF	$ 5.00	$ 2,000	
EXTERIOR WALL FRAMING					
WOOD STUD, 2X6 @ 16" OC	14,937	SF	$ 4.25	$ 63,482	
EXTRA WALL FRAMING FOR DOUBLE WALL ABOVE WINDOWS AND OTHER LOCATIONS	1,500	SF	$ 4.00	$ 6,000	
PLYWOOD SHEATHING INCLUDING SHEAR WALL	16,005	SF	$ 2.50	$ 40,013	
INTERIOR WALL FRAMING					
WOOD STUD, 2X6 @ 16" OC	23,455	SF	$ 4.00	$ 93,820	
SHEAR WALL 1/2" THICK PLYWOOD	9,418	SF	$ 2.50	$ 23,544	
MISCELLANEOUS WOOD BLOCKING	23,620	SF	$ 0.60	$ 14,172	
ROUGH HARDWARE	23,620	SF	$ 0.75	$ 17,715	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
FINISH CARPENTRY					
WORKROOM					
PLASTIC LAMINATE LOWER CABINET	25	LF	$ 220.00	$ 5,390	
PLASTIC LAMINATE UPPER CABINET	12	LF	$ 180.00	$ 2,160	
STORAGE/ WARDROBE CABINET	1	EA	$ 2,000.00	$ 2,000	
CLASSROOMS					
BASE CABINET (SINK)	99	LF	$ 230.00	$ 22,770	
TEACHING LEARNING UNIT, 16' WIDE	16	EA	$ 7,200.00	$ 115,200	
TEACHER'S CABINET/STORAGE	16	EA	$ 1,500.00	$ 24,000	
MEDIA CABINET	16	EA	$ 1,500.00	$ 24,000	
COAT HOOK SHELVES	16	EA	$ 315.00	$ 5,040	
Subtotal Division 06					**$ 716,555**
07 THERMAL& MOISTURE PROTECTION					
ROOFING					
MEMBRANE	12,883	SF	$ 4.00	$ 51,532	
WATERPROOFING UNDER CONCRETE TOPPING	1,650	SF	$ 3.00	$ 4,950	
WATERPROOFING IN RESTROOMS	1,457	SF	$ 4.46	$ 6,498	
INSULATION					
ROOFING	12,883	SF	$ 1.05	$ 13,527	
EXTERIOR WALL	14,937	SF	$ 0.65	$ 9,709	
PARTITIONS	23,455	SF	$ 0.60	$ 14,073	
MECHANICAL SCREEN WALL AT ROOF, 5' 9" HIGH	172	LF	$ 100.00	$ 17,200	
WALKWAY PADS	413	SF	$ 3.00	$ 1,238	
CANTS AND UPSTANDS	651	LF	$ 4.50	$ 2,930	
MISC. SHEET METAL ALLOWANCE	23,620	SF	$ 0.25	$ 5,905	
COPING	651	LF	$ 15.00	$ 9,765	
SCUPPER	5	EA	$ 100.00	$ 500	
GI SHEET METAL DOWNSPOUT	120	LF	$ 15.00	$ 1,800	
ROOF HATCH AND COVER	1	EA	$ 1,000.00	$ 1,000	
CAULKING AND SEALANTS	23,620	SF	$ 0.55	$ 12,991	
PLYWOOD CRICKET	965	SF	$ 3.50	$ 3,378	
Subtotal Division 07					**$ 156,995**
08 DOORS & WINDOWS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
DOOR, FRAME AND HARDWARE					
SC WOOD DOOR AND HM FRAME, 3X7	27	EA	$ 600.00	$ 16,200	
EXTRA FOR LOUVER	12	EA	$ 100.00	$ 1,200	
EXTRA FOR HALF GLASS	2	EA	$ 100.00	$ 200	
EXTRA FOR VISION PANEL	33	EA	$ 100.00	$ 3,300	
HM DOOR AND HM FRAME, 3X7	28	EA	$ 650.00	$ 18,200	
HM DOOR AND FRAME, 6X7 WITH A PAIR OF VISION PANEL 8"X2'-6"	4	EA	$ 1,800.00	$ 7,200	
HARDWARE	63	EA	$ 400.00	$ 25,200	
PANIC HARDWARE FOR SINGLE DOORS	13	EA	$ 550.00	$ 7,150	
EXTRA FOR FIRE RATING, 20 MIN	20	EA	$ 25.00	$ 500	
EXTRA FOR FIRE RATING, 60 MIN	10	EA	$ 40.00	$ 400	
EXTRA FOR FIRE RATING, 90 MIN	2	EA	$ 50.00	$ 100	
ACCESS PANEL/DOOR, 2X2	9	EA	$ 300.00	$ 2,700	
WINDOWS AND GLAZING - EXTERIOR	1,560	SF	$ 42.00	$ 65,520	
WINDOWS AND GLAZING - INTERIOR	20	SF	$ 45.00	$ 900	
Subtotal Division 08					**$ 148,770**
09 FINISHES					
WALL					
STUCCO	16,005	SF	$ 6.00	$ 96,030	
STUCCO PAINTING	16,005	SF	$ 0.60	$ 9,603	
EXTERIOR CERAMIC WALL TILE	1,200	SF	$ 16.00	$ 19,200	
CERAMIC TILES WAINSCOTING	1,116	SF	$ 15.00	$ 16,740	
5/8" TYPE 'X' GWB TO INTERIOR SURFACE OF EXTERIOR WALL	13,971	SF	$ 1.75	$ 24,449	
5/8" TYPE 'X' GWB TO INTERIOR PARTITION	23,455	SF	$ 1.75	$ 41,046	
CEMENT BOARD IN RESTROOMS	1,116	SF	$ 4.00	$ 4,464	
PAINT NEW GWB	37,426	SF	$ 0.70	$ 26,198	
CERAMIC TILE BASE	200	LF	$ 8.00	$ 1,600	
MISCELLANEOUS PAINTING	23,620	SF	$ 0.25	$ 5,905	
PAINT DOOR AND FRAME	63	EA	$ 95.00	$ 5,985	
GRAFFITI COATING	4,860	SF	$ 1.50	$ 7,290	
INTERIOR CEILING FINISHES					
DOUBLE LAYER GWB	22,442	SF	$ 2.50	$ 56,105	
CEMENT PLASTER SOFFIT	1,810	SF	$ 9.00	$ 16,290	
FRAMING FOR PLASTER SOFFIT	1,810	SF	$ 4.00	$ 7,240	
SUSPENDED GYPSUM BOARD CEILING INCLUDING FRAMING	3,038	SF	$ 6.00	$ 18,228	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
GYPSUM BOAR SOFFIT AND FRAMING AT CLASSROOMS	2,092	SF	$ 6.00	$ 12,552	
SUSPENDED ACT	17,701	SF	$ 2.50	$ 44,253	
1/2" RC CLIP	22,442	SF	$ 1.50	$ 33,663	
CEILING PAINTING	6,940	SF	$ 0.90	$ 6,246	
FLOOR					
CERAMIC TILE TO FLOORS	1,457	SF	$ 14.00	$ 20,398	
MORTAR BED	1,457	SF	$ 3.00	$ 4,371	
CARPET	1,740	SF	$ 4.44	$ 7,733	
SEALER TO FLOORS	230	SF	$ 1.20	$ 276	
VCT FLOORING	17,301	SF	$ 2.24	$ 38,754	
6" RUBBER BASE	2,194	LF	$ 1.75	$ 3,840	
Subtotal Division 9					**$ 528,459**
10 SPECIALTIES					
SIGNAGE	23,620	GSF	$ 1.00	$ 23,620	
TOILET PARTITIONS, STANDARD	10	EA	$ 900.00	$ 9,000	
TOILET PARTITIONS, HC	4	EA	$ 1,000.00	$ 4,000	
SEAT COVER DISPENSER	20	EA	$ 80.00	$ 1,600	
TOILET PAPER DISPENSER	20	EA	$ 50.00	$ 1,000	
PAPER TOWEL DISPENSER	10	EA	$ 450.00	$ 4,500	
ELECTRIC HAND DRYER	10	EA	$ 600.00	$ 6,000	
SOAP DISPENSER	18	EA	$ 50.00	$ 900	
GRAB BARS, SET	10	EA	$ 180.00	$ 1,800	
FIRE EXTINGUISHERS	10	EA	$ 350.00	$ 3,500	
FIXED MARKER BOARDS, 4X8	16	EA	$ 700.00	$ 11,200	
TACK WALL	3,610	SF	$ 7.50	$ 27,075	
SHELVING IN CUSTODIAN	10	LF	$ 120.00	$ 1,200	
MIRRORS	18	EA	$ 200.00	$ 3,600	
PAPER TOWEL DISPENSER WITH DISPOSAL	10	EA	$ 450.00	$ 4,500	
JANITOR ACCESSORIES	2	EA	$ 1,000.00	$ 2,000	
Subtotal Division 10					**$ 105,495**
11 EQUIPMENT					
PROJECTION SCREENS, MANUAL TYPE @ CLASSROOMS	16	EA	$ 500.00	$ 8,000	
Subtotal Division 11					**$ 8,000**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
12 FURNISHINGS					
WINDOW BLINDS	1,560	SF	$ 6.50	$ 10,140	
Subtotal Division 12					**$ 10,140**
13 SPECIAL CONSTRUCTION					
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
HYDRAULIC PASSENGER ELEVATOR, 2 STOP (see Parking for 3rd stop)	1	EA	$ 60,000.00	$ 60,000	
Subtotal Division 14					**$ 60,000**
15 MECHANICAL					
PLUMBING WORK					
PLUMBING FIXTURES					
WATER CLOSET	20	EA	$ 753.61	$ 15,072	
DRINKING FOUNTAIN, DF-1, HI-LO	2	EA	$ 1,323.00	$ 2,646	
URINAL WALL MOUNTED	2	EA	$ 622.91	$ 1,246	
SINKS	16	EA	$ 749.70	$ 11,995	
LAVATORY	18	EA	$ 442.60	$ 7,967	
SERVICE SINK	2	EA	$ 766.24	$ 1,532	
WATER HEATER, ELECTRIC, 40 GAL	1	EA	$ 2,625.00	$ 2,625	
ROUGH IN FOR THE FIXTURES					
WATER CLOSET	20	EA	$ 484.47	$ 9,689	
DRINKING FOUNTAIN	2	EA	$ 257.99	$ 516	
URINAL WALL MOUNTED	2	EA	$ 436.62	$ 873	
SINKS	16	EA	$ 507.15	$ 8,114	
LAVATORY	18	EA	$ 738.68	$ 13,296	
SERVICE SINK	2	EA	$ 953.66	$ 1,907	
FLOOR SINK	1	EA	$ 661.50	$ 662	
WATER HEATER	1	EA	$ 330.75	$ 331	
ROUGH IN FOR THE FIXTURES	62	EA	$ 1,200.00	$ 74,400	
FLOOR DRAIN	11	EA	$ 367.50	$ 4,043	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
AREA DRAIN	5	EA	$ 367.50	$ 1,838	
WALL CLEAN OUT	7	EA	$ 105.00	$ 735	
HOSE BIBB	6	EA	$ 525.00	$ 3,150	
BACKFLOW PREVENTER	1	EA	$ 630.00	$ 630	
TRAP PRIMER	7	EA	$ 210.00	$ 1,470	
CONDENSATE DRAIN PIPING, 1" ~11/2"	500	LF	$ 15.75	$ 7,875	
ROOF DRAIN, 4"	6	EA	$ 367.50	$ 2,205	
4" CIP STORM DRAIN LINE	300	LF	$ 27.30	$ 8,190	
MISC. VALVES AND SPECIALTIES	23,620	SF	$ 0.20	$ 4,724	
GAS SERVICES	23,620	SF	$ 0.60	$ 14,172	
TESTING AND STERILIZING	23,620	SF	$ 0.21	$ 4,960	
FIRE PROTECTION					
SPRINKLER SYSTEM	23,620	SF	$ 2.50	$ 59,050	
HVAC SYSTEM					
ROOF TOP AC UNIT GAS/ELECTRIC					
AC-3, 3 TONS	13	EA	$ 5,550.00	$ 72,150	
AC-4, 3.85 TONS	2	EA	$ 7,100.00	$ 14,200	
AC-5, 4.98 TONS	3	EA	$ 7,728.00	$ 23,184	
SPLIT UNIT					
3.06 TONS	1	EA	$ 3,518.22	$ 3,754	
1 .1 TONS	1	EA	$ 1,800.00	$ 1,921	
EXHAUST FAN					
800 CFM	3	EA	$ 1,000.00	$ 3,000	
GRAVITY RELIEF VENT, 18X24	1	EA	$ 1,000.00	$ 1,000	
AIR DISTRIBUTION					
DUCT WORK	13,956	LBS	$ 6.50	$ 90,714	
DUCT INSULATION, WRAP	9,559	SF	$ 2.50	$ 23,897	
CEILING DIFFUSER	81	EA	$ 185.00	$ 14,985	
REGISTER/RETURN	81	EA	$ 154.00	$ 12,474	
CG RELIEF	16	EA	$ 154.00	$ 2,464	
FIRE DAMPER	37	EA	$ 210.00	$ 7,770	
COMB. F/S DAMPER	10	EA	$ 255.00	$ 2,550	
FLEXIBLE CONNECTION	162	EA	$ 98.00	$ 15,876	
VOLUME DAMPER	162	EA	$ 80.00	$ 12,960	
12X12 RELIEF OPENING ABOVE WINDOWS	48	EA	$ 125.00	$ 6,000	
VARIABLE AIR VOLUME TERMINAL BOX	4	EA	$ 1,282.50	$ 5,200	
AIR BALANCE: AIR DISTRIBUTION DEVICES	162	EA	$ 75.00	$ 12,150	
CONTROLS	23,620	SF	$ 1.00	$ 23,620	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
Subtotal Division 15					**$ 615,783**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
GROUNDING	23,620	SF	$ 0.35	$ 8,267	
PULL BOXES	2	EA	$ 1,500.00	$ 3,000	
PANEL BD					
225A, 120/208V	3	EA	$ 3,500.00	$ 10,500	
100A, 120/208V	2	EA	$ 2,200.00	$ 4,400	
225A, 277/480	3	EA	$ 4,422.00	$ 13,266	
EMERGENCY POWER SUPPLY, 5 KVA	1	EA	$ 10,144.75	$ 10,145	
CABLE AND CONDUIT	2,048	LF	$ 18.00	$ 36,855	
BRANCH POWER SYSTEM					
RECEPTACLES DUPLEX	100	EA	$ 120.00	$ 12,058	
RECEPTACLES DUPLEX SURGE PROTECTED	9	EA	$ 130.00	$ 1,182	
QUAD. RECEPTACLES	22	EA	$ 130.00	$ 2,815	
QUAD. RECEPTACLES FOR COMPUTERS	73	EA	$ 135.00	$ 9,823	
WIREMOLD 5400	265	LF	$ 35.00	$ 9,278	
JUNCTION BOXES	59	EA	$ 25.00	$ 1,483	
BRANCH POWER FEEDERS, EMT/ CU WIRE	2,599	LF	$ 10.00	$ 25,988	
POWER TO MECHANICAL					
STARTER AND FUSED DISCONNECT	2	EA	$ 450.00	$ 780	
DISCONNECT SWITCH, 30A	4	EA	$ 500.00	$ 2,166	
DISCONNECT SWITCH, 60A	13	EA	$ 635.00	$ 8,526	
DISCONNECT SWITCH, 100A	1	EA	$ 680.00	$ 589	
COMBINATION STARTER/DISCONNECT	12	EA	$ 755.00	$ 8,829	
WIRE #12	217	LF	$ 0.43	$ 93	
WIRE #8	433	LF	$ 0.68	$ 295	
WIRE #6	325	LF	$ 0.91	$ 296	
WIRE #4	1,252	LF	$ 1.25	$ 1,565	
WIRE #1/0	78	LF	$ 2.37	$ 185	
3/4" CONDUIT	32	LF	$ 3.52	$ 114	
1" CONDUIT	433	LF	$ 4.26	$ 1,845	
1-1/2" CONDUIT	152	LF	$ 6.05	$ 917	
LIGHTING FIXTURES, TYPE					
TYPE A	301	EA	$ 220.00	$ 66,130	
TYPE B	2	EA	$ 220.00	$ 381	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
TYPE C	36	EA	$ 220.00	$ 7,814	
TYPE D	16	EA	$ 180.00	$ 2,807	
TYPE E	6	EA	$ 180.00	$ 1,091	
TYPE F	7	EA	$ 100.00	$ 693	
TYPE G	5	EA	$ 100.00	$ 520	
TYPE H	8	EA	$ 180.00	$ 1,481	
TYPE L	28	EA	$ 180.00	$ 4,990	
TYPE M	5	EA	$ 360.00	$ 1,871	
JUNCTION BOXES	59	EA	$ 25.00	$ 1,483	
PHOTO SENSORS	19	EA	$ 70.00	$ 1,364	
OCCUPANCY SENSOR, WALL	84	EA	$ 160.00	$ 13,444	
OCCUPANCY SENSOR, ULTRASONIC	17	EA	$ 262.65	$ 4,437	
DIMMING BALLAST FOR TYPE A FIXTURE	194	EA	$ 150.00	$ 29,106	
SWITCHES, SINGLE	20	EA	$ 65.00	$ 1,295	
SWITCHES, AB	22	EA	$ 87.00	$ 1,922	
LIGHTING CONTROL PANEL	1	EA	$ 800.00	$ 1,040	
LIGHTING FEEDERS, EMT W/ CU. WIRES	3,725	LF	$ 6.20	$ 23,094	
SPARE PARTS: 50% SPARE LAMPS, 30% SPARE MOTION DETECTORS, 30% SPARE BALLASTS	1	LOT	$ 4,000.00	$ 4,000	
CLOCK SYSTEM					
CLOCK TERMINAL CABINET	2	EA	$ 500.00	$ 1,000	
CLOCK OUTLETS	22	EA	$ 150.00	$ 3,300	
CONDUIT AND WIRES	23,620	SF	$ 0.10	$ 2,362	
PROVIDE 2 HOURS OF SITE INSTRUCTION	1	HR	$ 150.00	$ 130	
FIRE ALARM SYSTEM					
TERMINAL CABINET	2	EA	$ 650.00	$ 1,300	
SMOKE DETECTOR	52	EA	$ 190.00	$ 9,880	
STROBE	6	EA	$ 160.00	$ 960	
HORN/STROBE	13	EA	$ 200.00	$ 2,600	
WEATHERPROOF FIRE ALARM HORN	10	EA	$ 160.00	$ 1,600	
FIRE ALARM MINI HORN	20	EA	$ 130.00	$ 2,600	
SYNC. MODULE	5	EA	$ 220.00	$ 1,100	
HEAT DETECTOR	77	EA	$ 350.00	$ 26,950	
FIRE ALARM CKTS, EMT/ WIRE	23,620	SF	$ 0.50	$ 11,810	
SPARE PARTS: 10% SPARE PULL STATIONS, 10% SPARE SMOKE AND HEAT DETECTOR, 10% SPARE AUDIBLE DEVICES, 10% SPARE STROBE DEVICES	1	LOT	$ 4,000.00	$ 4,000	
PROVIDE 12 HOURS OF SITE INSTRUCTION	8	HR	$ 120.00	$ 960	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - Building 2 (Classroom)

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
Subtotal Division 16					**$ 414,774**
25 LOW VOLTAGE SYSTEMS					
SECURITY SYSTEM					
TERMINAL CABINET	2	EA	$ 800.00	$ 1,386	
MOTION DETECTOR	24	EA	$ 200.00	$ 4,800	
KEYPAD	1	EA	$ 300.00	$ 300	
CONDUIT AND CABLE	23,620	SF	$ 0.38	$ 8,976	
TV SYSTEM					
TVTC	2	EA	$ 600.00	$ 1,200	
TV AMPLIFIER	1	EA	$ 721.53	$ 722	
TV OUTLETS	16	EA	$ 206.00	$ 3,296	
CONDUIT AND CABLE	23,620	SF	$ 0.10	$ 2,362	
PA AND TELEPHONE SYSTEM					
SPEAKERS	38	EA	$ 125.00	$ 4,750	
PA TERMINAL CABINET	2	EA	$ 1,500.00	$ 3,000	
WIRING AND CONDUIT	23,620	SF	$ 0.54	$ 12,755	
TELEPHONE/INTERCOM AND OUTLET	22	EA	$ 300.00	$ 6,600	
DATA SYSTEM					
INTERMEDIATE DISTRIBUTION FRAME	2	EA	$ 2,500.00	$ 5,000	
CAT 5 CABLE	8,663	LF	$ 0.75	$ 6,497	
COMPUTER OUTLETS	84	EA	$ 150.00	$ 12,600	
1-12 STRAND MULTI MODE FIBER OPTIC	1,040	LF	$ 3.85	$ 4,002	
CABLE TRAY	351	LF	$ 35.00	$ 12,279	
Subtotal Division 25					**$ 90,524**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
01 GENERAL REQUIREMENT					
GENERAL CONDITIONS				see summary	
OVERHEAD AND PROFIT				see summary	
BONDS AND INSURANCE				see summary	
Subtotal Division 01					**$ -**
02 SITE WORK					
BULK EXCAVATION	6,824	CY	$ 6.00	$ 40,946	
BACKFILL AND COMPACTION	1,429	CY	$ 15.00	$ 21,442	
CART AWAY	5,395	CY	$ 12.00	$ 64,738	
SHORING ALONG SOUTH PERIMETER	2,136	SF	$ 30.00	$ 64,080	
4" DIA. PERFORATED FOUNDATION DRAIN SET IN GRAVEL WITH FABRIC MESH	600	LF	$ 16.00	$ 9,600	
Subtotal Division 02					**$ 200,806**
03 CONCRETE					
SPREAD FOOTING	134	CY	$ 340.00	$ 45,696	
RAMP, 5" REINFORCED CONCRETE PAVING OVER 4" SAND LAYER	1,556	SF	$ 8.00	$ 12,444	
CONCRETE CURB AT RAMP, 6" X 12"	84	LF	$ 15.00	$ 1,260	
CONCRETE CURB AT CENTER OF RAMP, 6" X 39-3/4"W	47	LF	$ 25.00	$ 1,175	
CONTINUOUS FOOTING	130	CY	$ 340.00	$ 44,200	
CONCRETE RETAINING WALL	194	CY	$ 680.00	$ 131,614	
RAMP RETAINING WALL	19	CY	$ 735.00	$ 13,657	
FOUNDATION FOR RAMP RETAINING WALL	19	CY	$ 350.00	$ 6,650	
5" SLAB ON GRADE, OVER 2" OF SAND OVER 10 MIL VAPOR BARRIER OVER 2" OF SAND	13,401	SF	$ 6.00	$ 80,406	
REINFORCED CONCRETE COLUMN, 18"X18"	150	LF	$ 78.00	$ 11,700	
DROP PANELS	37	CY	$ 600.00	$ 22,133	
ELEVATED SLAB	581	CY	$ 600.00	$ 348,790	
ELEVATOR PIT	1	LS	$ 5,000.00	$ 5,000	
PRECAST WHEEL STOP, 6'	24	EA	$ 50.00	$ 1,200	
HOUSEKEEPING PAD, 6" THICK	41	SF	$ 12.00	$ 492	
Subtotal Division 03					**$ 726,418**

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
04 MASONRY					
REINFORCED CMU WALL					
8" CMU INTERIOR WALL	1,680	SF	$ 18.00	$ 30,240	
12" CMU INTERIOR WALL	714	SF	$ 21.00	$ 14,994	
Subtotal Division 04					**$ 45,234**
05 METALS					
STAIR NO. 2					
STEEL STAIR CONC. FILLED METAL FAN	126	LF	$ 75.00	$ 9,450	
STAIR WALL MOUNTED HANDRAIL	54	LF	$ 40.00	$ 2,160	
EXTRUDED NON-SLIP NOSING	126	LF	$ 12.00	$ 1,512	
STAIR NO. 1					
STEEL STAIR CONC. FILLED METAL FAN	116	LF	$ 75.00	$ 8,693	
STAIR LANDING	82	SF	$ 39.00	$ 3,201	
STAIR WALL MOUNTED HANDRAIL	60	LF	$ 40.00	$ 2,400	
STAIR GUARDRAIL	11	LF	$ 100.00	$ 1,100	
EXTRUDED NON-SLIP NOSING	116	LF	$ 12.00	$ 1,391	
STEEL PIPE BOLLARD, 4" DIAMETER	8	EA	$ 250.00	$ 2,000	
TRENCH DRAIN	30	LF	$ 90.00	$ 2,700	
ELEVATOR PIT LADDER	1	EA	$ 550.00	$ 550	
CORNER GUARD, GI L4X4X3/8X5' HIGH	51	EA	$ 80.00	$ 4,080	
Subtotal Division 05					**$ 39,236**
06 WOOD & PLASTICS					
Subtotal Division 06					**$ -**
07 THERMAL& MOISTURE PROTECTION					
WATERPROOFING MEMBRANE AND PROTECTION BOARD	6,160	SF	$ 3.25	$ 20,020	
WATERPROOFING ELEVATOR PIT	1	EA	$ 600.00	$ 600	
ELASTOMERIC COATING @ STAIRS	126	SF	$ 7.00	$ 882	
Subtotal Division 07					**$ 21,502**
08 DOORS & WINDOWS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
ELECTRICAL OPERATED ROLL-UP GRILLE, 13'-0" X 9'	2	EA	$ 7,000.00	$ 14,000	
INTERIOR DOORS, FRAMES AND HARDWARE	7	EA	$ 1,000.00	$ 7,000	
PANIC HARDWARE	2	EA	$ 550.00	$ 1,100	
EXTRA FOR LOUVERS	7	EA	$ 100.00	$ 700	
EXTRA FOR FIRE RATING, 20 MIN	4	EA	$ 25.00	$ 100	
EXTRA FOR FIRE RATING, 60 MIN	1	EA	$ 40.00	$ 40	
EXTRA FOR FIRE RATING, 90 MIN	2	EA	$ 50.00	$ 100	
Subtotal Division 08					**$ 23,040**
09 FINISHES					
EXTERIOR FINISHES					
CEMENT PLASTER, PAINTED	1,441	SF	$ 6.50	$ 9,367	
INTERIOR FINISHES					
CONCRETE FLOOR SEALER	13,673	SF	$ 1.20	$ 16,408	
CONCRETE CEILING SEALER	13,673	SF	$ 1.40	$ 19,142	
CONCRETE WALL SEALER	5,660	SF	$ 1.20	$ 6,792	
PAINTING TO DOOR AND FRAME	7	EA	$ 95.00	$ 665	
PAINTING TO HANDRAIL	130	LF	$ 3.00	$ 390	
MISC. PAINTING	13,673	SF	$ 0.10	$ 1,367	
Subtotal Division 09					**$ 54,131**
10 SPECIALTIES					
STALL STRIPING, DOUBLE LINES	36	EA	$ 30.00	$ 1,080	
WALKWAY MARKINGS	2,867	SF	$ 0.80	$ 2,294	
H/CAP MARKINGS & SIGNAGE	3	EA	$ 500.00	$ 1,500	
SIGNAGE	17	EA	$ 80.00	$ 1,360	
FIRE EXTINGUISHER	6	EA	$ 300.00	$ 1,800	
MISCELLANEOUS SPECIALTIES	13,673	GSF	$ 0.10	$ 1,367	
FIRE EXTINGUISHER CABINET	2	EA	$ 300.00	$ 600	
Subtotal Division 10					**$ 10,001**
11 EQUIPMENT					
PARKING CONTROL EQUIPMENT	1	LS	$ 10,000.00	$ 10,000	
Subtotal Division 11					**$ 10,000**
12 FURNISHINGS					

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
NOT USED					
Subtotal Division 12					**$ -**
13 SPECIAL CONSTRUCTION					
NOT USED					
Subtotal Division 13					**$ -**
14 CONVEYING SYSTEMS					
ELEVATOR, 1 STOP	1	STOP	$ 30,000.00	$ 30,000	
Subtotal Division 14					**$ 30,000**
15 MECHANICAL					
PLUMBING WORK					
BACKWATER VALVE, 4"	1	EA	$ 900.00	$ 900	
BACKWATER VALVE, 3"	1	EA	$ 800.00	$ 800	
VALVE BOX	1	EA	$ 900.00	$ 900	
SUMP PUMP, SP 1 AND 2, 1/2 HP	1	SET	$ 2,000.00	$ 2,000	
SUMP PIT CONTROLS AND PIPING	1	LS	$ 2,500.00	$ 2,500	
DRAIN SYSTEM					
3" CAST IRON PIPE	360	LF	$ 24.00	$ 8,640	
FLOOR DRAIN, 3"	1	EA	$ 300.00	$ 300	
AREA DRAIN, 3"	2	EA	$ 300.00	$ 600	
CLEAN OUT	6	EA	$ 300.00	$ 1,800	
HVAC WORK					
CONDENSATE REMOVAL PUMP	2	EA	$ 300.00	$ 600	
EXHAUST FAN, 20,000 CFM	1	EA	$ 8,200.00	$ 8,200	
FC-1.5, 550 CFM	1	EA	$ 1,185.00	$ 1,185	
FC-4, 1450 CFM	1	EA	$ 2,360.00	$ 2,360	
SUCTION LINES	1	LS	$ 1,000.00	$ 1,000	
DUCT WORK	2,730	LBS	$ 7.00	$ 19,110	
INSECT SCREEN	4	EA	$ 25.00	$ 100	
TR	3	EA	$ 80.00	$ 240	
TG	1	EA	$ 50.00	$ 50	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
DUCT MOUNTED SMOKE DETECTOR	1	EA	$ 500.00	$ 500	
CFSD, 52X20	2	EA	$ 600.00	$ 1,200	
VOLUME DAMPER	6	EA	$ 131.33	$ 788	
HVAC CONTROLS	1	EA	$ 2,000.00	$ 2,000	
CO SENSORS	3	EA	$ 300.00	$ 900	
CO AUDIO ALARM	1	EA	$ 400.00	$ 400	
CO PANEL	1	EA	$ 3,500.00	$ 3,500	
MISC. HVAC WORK	13,673	SF	$ 0.05	$ 684	
PERMITS, TESTING & AIR BALANCING	1	LS	$ 2,468.91	$ 2,469	
FIRE PROTECTION					
SPRINKLER SYSTEM	13,673	SF	$ 2.00	$ 27,346	
Subtotal Division 15					**$ 91,072**
16 ELECTRICAL					
ELECTRICAL EQUIPMENT					
T2, 150 KVA TRANSFORMER, 480V/208V/120V, 3P	1	EA	$ 8,200.00	$ 8,200	
SWBD, DBB, 800 AMP, 480/277V, 3P, 4W	1	EA	$ 8,300.00	$ 8,300	
SWBD, 2DB, 600 AMP, 120/208V, 3P, 4W	1	EA	$ 6,500.00	$ 6,500	
PANEL BPA, 100A, 208/120V, INCLUDING FEEDER LINE	1	EA	$ 2,900.00	$ 2,900	
POWER DISTRIBUTION					
DUPLEX RECEPTACLE, CEILING	4	EA	$ 75.00	$ 300	
DUPLEX RECEPTACLE, GFI	13	EA	$ 85.00	$ 1,105	
MOTOR OUTLET FOR SLIDING GATE	2	EA	$ 300.00	$ 600	
WIRE AND CONDUIT	800	LF	$ 8.00	$ 6,400	
POWER TO MECHANICAL					
DISCONNECT SWITCH, 30A, 1P FOR ELEVATOR CAB	1	EA	$ 600.00	$ 600	
70AF/100AS, 3P, FOR ELEVATOR	1	EA	$ 2,685.38	$ 2,685	
COMBINATION FUSIBLE DISCONNECT SWITCH, 30AS/15AF	5	EA	$ 650.00	$ 3,250	
LIGHTING FIXTURES					
XXE/120, CEILING SURFACE, 100W HPS	6	EA	$ 750.00	$ 4,500	
XX/120, SAME AS ABOVE EXCEPT POWER FROM INVERTOR	5	EA	$ 750.00	$ 3,750	

SCHOOL DISTRICT	5 DIGIT DISTRICT CODE
LOS ANGELES UNIFIED SCHOOL DISTRICT	64733
PROJECT DESCRIPTION	**PROJECT NO.**
NEW ELEMENTARY SCHOOL	56.99999
SCHOOL NAME	
ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS	**COUNTY**
ABC STREET, LOS ANGELES	LOS ANGELES
ARCHITECT'S FIRM	**DATE OF ESTIMATE**
BEST ARCHITECTURE	1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
C/59, 4' LONG WALL MTD FIXTURE, 2 LAMP	11	EA	$ 195.00	$ 2,145	
G1/7, VANDAL RESISTANT LED TYPE EXIT SIGN	2	EA	$ 400.00	$ 800	
G4/7, SAME AS ABOVE BUT DOUBLE FACE	1	EA	$ 720.00	$ 720	
D1/59, 4'LONG X 16" WIDE INDUSTRIAL FIXTURE	8	EA	$ 250.00	$ 2,000	
D1E/87,	2	EA	$ 250.00	$ 500	
SWITCHES	1	EA	$ 150.00	$ 150	
JUNCTION BOXES	8	EA	$ 25.00	$ 200	
WIRE AND CONDUIT, JUNCTION BOXES ETC.	800	LF	$ 8.00	$ 6,400	
MISC. ELECTRICAL WORKS	13,673	SF	$ 0.10	$ 1,367	
FIRE ALARM SYSTEM					
TERMINAL CABINET	1	EA	$ 650.00	$ 650	
HEAT DETECTOR	18	EA	$ 195.00	$ 3,510	
SMOKE DETECTOR	2	EA	$ 210.00	$ 420	
HORN STROBE, 100 CD	10	EA	$ 195.00	$ 1,950	
SYNCHRONIZE MODULE	1	EA	$ 300.00	$ 300	
MANUAL PULL STATION	1	EA	$ 200.00	$ 200	
FLOW SWITCH	1	EA	$ 500.00	$ 500	
CONDUIT AND WIRE	13,673	SF	$ 0.40	$ 5,469	
PROGRAMMING	1	LS	$ 2,000.00	$ 2,000	
MISC. SIGNAL PULL BOXES					
INDOOR PULL BOX FOR NETWORKING, 24"X24"X6"D	1	EA	$ 350.00	$ 350	
SECURITY INTRUSION PULL BOX, 12X12X4	1	EA	$ 170.00	$ 170	
TV, CLOCK PULL BOX, 6X6X4	2	EA	$ 100.00	$ 200	
Subtotal Division 16					**$ 79,092**
25 LOW VOLTAGE SYSTEMS					
CCTV SYSTEM					
SECURITY CAMERAS IN VANDAL PROOF ENCLOSURE	5	EA	$ 1,500.00	$ 7,500	
MONITOR STATION	1	EA	$ 2,000.00	$ 2,000	
AUDIO SURVEILLANCE SYSTEM					
SPEAKER/MICROPHONE CALL STATION	9	EA	$ 500.00	$ 4,500	
SURVEILLANCE MICROPHONE	5	EA	$ 400.00	$ 2,000	
PA/TEL SYSTEM					
SPEAKER, WALL MOUNTED	3	EA	$ 500.00	$ 1,500	

DISTRICT/INDEPENDENT ESTIMATE

SCHOOL DISTRICT LOS ANGELES UNIFIED SCHOOL DISTRICT	**5 DIGIT DISTRICT CODE** 64733
PROJECT DESCRIPTION NEW ELEMENTARY SCHOOL	**PROJECT NO.** 56.99999
SCHOOL NAME ABC ELEMENTARY SCHOOL	
SCHOOL ADDRESS ABC STREET, LOS ANGELES	**COUNTY** LOS ANGELES
ARCHITECT'S FIRM BEST ARCHITECTURE	**DATE OF ESTIMATE** 1/15/2004

Detailed Estimate - U. G. Parking

ITEM	QTY	UNIT	UNIT COST	SUBTOTAL	DIVISION TOTAL
ELEVATOR PHONE OUTLET AND PHONE DIALER	1	EA	$ 600.00	$ 600	
TELEPHONE AT ELEV. MACHINE ROOM	1	EA	$ 500.00	$ 500	
WP SPEAKER/MICROPHONE INTERCOM STATION AT GARAGE ENTRANCE	1	EA	$ 1,000.00	$ 1,000	
PA PULL BOX, 12X12X6'D	1	EA	$ 170.00	$ 170	
JUNCTION BOX	1	EA	$ 25.00	$ 25	
Subtotal Division 25					**$ 19,795**

Section 8: Instruction for Preparation and Review of Change Order Estimate

---

1. **COP Form and Related Items to COP Amount**
   a. COP cost that exceeds **$25,000** should be forwarded to Project Estimator/Estimating Unit for independent estimate and analysis
   b. For **new construction Work** where COP cost individually exceed 10% of the original contract amount must be bid as a separate Contract per Public Contract Code, Section 20018.4
   c. For Owner-Initiated extra work or scope change, **Recommended Owner Scope Change Request form** should be used and should refer to OAR Manual for detailed procedure.
   d. For contracts involving demolition, **reconstruction or rehabilitation Work of existing structures**, Change Orders that exceed ten percent (10%), but do not exceed twenty-five percent (25%) of the original price, justification must confirm that the change is necessary and integral part of the work under the original contract and taking bids would delay the completion of contract; Documentation must be provided on the **Justification on Modification form**
   e. Change Order form signatory requirements should be referred to Section 14.17.8 of District's Standard Procedure
   f. COP should be recorded or input by OAR in Expedition or another Division approved tracking system within 2 days of issuance
   g. All heading information should be properly filled-out. School Name, Project Number, COP Number and date of submission checked for accuracy.
   h. Submittal should include the description of Work item matching the corresponding Request for Proposal (RFP) and detailed description (revised or mark-up drawings, specifications, or sketches) of the extra scope of work
   i. The corresponding Contractor's Fee should be per Section 11.7 of General Conditions where the Prime @ 5%; and for Subcontractor, if one or more tiers are involved, 15% for who actually performs the work, and 5% for next higher tier.
   j. Bond premium should match the percentage of premium of the payment and performance bond of the contract (It should be verified with Contractor's bonding company if not available in contract document)

2. **COP Pricing Sheet.** Change Order Proposal Pricing Sheet should be prepared, reviewed and complied with the item listed hereunder:
   A. General/Miscellaneous
      a. Material, Labor & Equipment quantities should be expressed in respective applicable standard unit of measurement such as linear footage, unit, man hours, equipment hours, etc.
      b. Second-Tier/Other Subcontractor quotes or cost proposals should be supported with verifiable documents such as invoices, quotations, receipts, etc.
      c. Any Credit Due should be broken down as per item b
      d. State tax should be applied to materials and consumable items only
      e. Inaccurate entries should be marked up appropriately in Contractor COP submittal
   B. Labor
      a. Labor rates must comply with State Prevailing Wage Rate per classification that includes a) fringe benefits (health and welfare, pension,

vacation/holiday, training and other payments) and b) payroll taxes (FICA, Medicare, Federal and State Unemployment)

b. Contractor Wage Rate Calculation Breakdown should be analyze for rate disagreement if there is any
c. Verify exclusion of worker's compensation as this is usually included in the coverage of (OCIP) Owner Controlled Insurance Program
d. Verify "Certified Payroll" for disputes on labor rates (if any)
e. Labor Craft Category/Classification should be indicated including Equipment Operator Group Classification and it should match the required additional Work
f. Verify Trade Productivity Calculation or actual material-labor-equipment output ratio
g. Shop or engineering labor for steel fabricators, sheet metal fabricators, and other off-site fabricators not subject to prevailing wage rates

C. Materials

a. Verifiable material quotes, invoices, receipts, etc. from Contractor's supplier should be included in the proposal

D. Equipment

a. Equipment Model, Type, Capacity, Rating including equipment attachment & accessories should be indicated and verifiable copies of actual paid invoices or rental costs should be included
b. Verify if Equipment is necessary for the Work

E. Contractor's Fee

a. Corresponding Contractor's Fee should be 5 % for Prime Contractor; and Subcontractor, if one or more tiers, 15% for who actually performs the work, 5% for next higher tier); Refer to Section 11.7 of General Conditions for further details
b. There should be No Fee for Supplemental Cost that includes the following: 1) transportation, delivery and storage of materials, supplies, equipment, machinery, appliances, office and temporary facilities on site, and hand tools; 2) equipment; 3) sales, consumer, use and/or similar taxes related to Work; 4) royalty payments and fees for permits and licenses; 5) cost of utilities, fuel and sanitary facilities on site; and 6) cost premiums for additional bonds required for changes in the Work
c. Contractor's Fee for any change which results in a net decrease will be 5%.

3. Alternate Means for COP Pricing

A. Unit Pricing

a. Verify unit prices as contained in project's contract documents if there is any (per GC 11.9 through 11.11). **Make note that contract unit costs were requested during bidding for information or budgeting only and, do not automatically lock-in the unit prices for the change order – negotiation to adjust unit prices should be sought depending on volume, complexity, etc. of the scope.**
b. Verify principal scope/work items involved including complete description (i.e. type, brand, manufacturer, size, weight, etc. of material and incidental work associated with the scope change (i.e. excavation, concreting, patching, etc.)

B. Time & Material Basis

a. Time and Material Work primarily for single trade work and for Work which can be completed in 10 days
b. Daily Time & Material Record must be duly signed by both IOR and Contractor
c. Applicable material delivery tickets including applicable quantities (no lump sum) should be attached, verified, and signed at the close of each day by both IOR and Contractor
d. Complete listing of workers including employee names, wage classification, hours worked, date, and location of the affected work verified and signed at the close of each day by both IOR and Contractor should also be included.
e. Complete listing of equipment size, capacity/rating, type, model and identification number, hours of operation, date and location of the affected work verified and signed at the close of each day by both IOR and Contractor.
f. Construction Directive including the "Not-To-Exceed" Amount should be included (Verify if the estimated amount is within the construction contingency). **For dispute or claims, it should be referred to Section 14.18, Claims & Mandatory Dispute Resolution of the OAR Manual.**

4. **Additional/Incidental Documentations Required.** These additional/Incidental documentations are important to be included as these could facilitate the verification of merit of change order.
   a. Request for Clarification (RFC), Request for Proposal (RFP), Construction Directives, project memorandum/correspondence
   b. Owner-Initiated Scope Change to include Approved Directives duly signed by the Chief Facilities Executive
   c. City Public Works jurisdiction standard regional requirement
   d. Applicable contract documents such as copy of plan details/drawings, applicable specifications, catalog sheets, etc. attached
   e. Revised drawing, specifications, sketches, directives, etc including revised schedule indicating the excess days for the change.

5. **Owner's Cost Estimate and Review to Contractor's COP.** Owner should prepare its own probable opinion of cost of change order incorporating above guidelines wherever applicable.
   a. Owner's detailed cost breakdown
   b. Narrative Comment Summary pertaining to Contractor's change order proposal /submittal/cost detail breakdown will be prepared in accordance to this guidelines and bidding documents

6. **Claims & Dispute**
   a. **Refer to Items 3.3 and 3.14 of Section 00700 of the General Condition**. To reiterate, for contract conflicts, specifications govern and/or resolution is intended to more stringent, higher level of quality and greater quantity shall prevail.
   b. **Refer to Section 14.18, Claims & Mandatory Dispute Resolution of the OAR Manual.**

7. Funding Verification

a OAR to verify availability of funds in IFS

b. If Change Order cost exceeds project contingency, Budget Modification Form should be prepared/processed. Refer to OAR Manual for complete details.

8. Turn Around

a. Monitor Contractor response to the RFP no more than fourteen (10) days, but OAR may ask for a response in less than 10 days if necessary

b. Required Signatories and Change Order Processing Unit Procedure Protocol refer to Section 14.17 of Change Order Procedures/OAR Manual

Change Order Estimating

Change Order Estimating

- Applicable Forms
- Overview of General Conditions
- Tools & Resources for C/O Cost Components
- COP Document Check
- Example and Demonstration

Applicable Forms

Change Order Estimating

SECTION 1

Applicable Forms

The following forms are listed in Section 01020 of the General Conditions, which are utilized in the administration of the change order work (OAR may approve the use of alternate forms. Forms listed in red are included in this presentation):

- *Allowance Disbursement Authorization (01020-06)*
- *Change Order (2 pages)*
- *Change Order Proposal (01020-15)*
- *Change Order Proposal Detail Sheets (2 pages) (01020-16 & 17)*
- *Change Order Proposal Instructions (2 pages) (01020-19 & 20)*
- *Change Order Proposal – Labor Rate Calculation Form:* ***Request Rate Higher Than Fully Burdened Labor Rates (01020-21)***
- *Construction Directive (01020-23)*
- *Daily Time and Material Record (01020-26)*
- *Request for Clarification (01020-39)*
- *Request for Proposal (01020-40)*

Change Order Proposal

Los Angeles Unified School District

Facilities Services Division

CHANGE ORDER PROPOSAL (COP)

School Name: _____ **Date:** _____ **CD No:** _____

Project Name: _____ **Project Number:** _____ **RFP No:** _____

To: _____ **COP Number:** _____ **RFC No:** _____

From (Contractor): _____ **Contract Number:** _____

Description of Work:
Enter Scope from CD, RFP or as perceived. Include Pricing and Productivity Assumptions.

Cost of Work:

Proposal from:	Unit Price Work (A)	Constr. Equipment Owned (B)	Constr. Equipment Rented (C)	Material (D)	Field Labor Straight Time & Overtime (E)	Non-Feeable Labor Cost (F)	Sub-Contract Amount (H)	TOTAL (Sum A Thru F Plus H) (I)
Enter Name							Prop $ Amt	Prop $ Amt
Enter Name							Prop $ Amt	Prop $ Amt
Enter Name							Prop $ Amt	Prop $ Amt
Sub-Totals	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

Misc. Notes, Comments or Other Information:

(J) CONTRACTOR FEE- OH&P ON MATERIALS AND FIELD LABOR (As per section 11.7 of the GCs)	**If GC 11.7.4 is in contract, enter Capital "T"**	**15%**	X (D+E) =	$0.00
(K) CONTRACTOR FEE - OH&P ON RENTED EQUIPMENT		**0%**	X (C) =	$0.00
(L) GENERAL/PRIME CONTRACTOR FEE ON SUBCONTRACTOR WORK		**5%**	X (H) =	$0.00
(M) CONTRACTOR FEE - OH&P FOR COMPENSABLE DELAY COSTS		**0%**	**$0.00**	$0.00
(N) SALES TAX		**8.25%**	X (D) =	$0.00
(O) TOTAL FEE *(J + K+L+M+N)*				$0.00
(P) SUB TOTAL WITH FEE				$0.00
(Q) PREMIUMS FOR ADDITIONAL BONDS (%) **(For Prime Contractor Only)**		**0.00%**	X (P) =	$0.00
(R) GRAND TOTAL *(P+Q)*			=	**$0.00**

☐ **The proposal would** ☐ **Increase** ☐ **Decrease** **the Milestones and/or Contract Time by** _____ **calendar days.**

Note: Submit detailed schedule analysis demonstrating the impact on the project critical path to substantiate requests for contract time extensions

☐ **The proposal does NOT affect the Milestones and/or Contract Time.**

Contractor Signature _____ Title _____ Date _____

By signing this Change Order Proposal, CONTRACTOR agrees the proposed adjustments to the Contract Amount shall cover any and all costs, delays and damages to CONTRACTOR associated with the changed Work. CONTRACTOR shall follow all applicable procedures and provide all appropriate documentation as required by General Conditions Sections 10, 11 and/or 12.

Change Order Proposal Detail Sheets

CHANGE ORDER PROPOSAL DETAIL SHEET

Contract No: _____ School Name: _____ Prime/General Contractor: _____ CD No: _____ COP No: _____

RFP No: _____

Project No: _____ Project Name: _____ Preparing Contractor: _____ RFC No: _____ Date: _____

Item No.	Description/ Drawing No.	Unit of Measure	Enter Quantity of Units for: (A) Unit Price Work	(B) Owned Const. Equip.	(C) Rented Const. Equip.	(D) Installed Mat'l/ Equip	Unit Price or Equip Rate	Billable Costs for: -- A -- Unit Price Work	-- B -- Owned Const. Equip.*	-- C -- Rented Const. Equip.	Installed* Material/Equip. Mat'l Unit Price (Excluding Taxes)	-- D -- Cost of Mat'l Used	Field Labor* (Use Separate Lines for Staight and/or Overtime Work) Craft Ident	Enter M-H/Unit If Applicable	Total Hours (Straight/ Overtime)	Hourly Rate - w/ *Full Burden* - (Straight/ Overtime)	Total Labor Cost (Straight/ Overtime)	Non-Feeable Labor Costs: Labor Hours - w/ No Mark-Up Fee -	Rate/ Hour - w/ No Mark-Up Fee -	Total Labor Cost - w/ no Mark-Up Fee -
1.1																				
1.2																				
1.3																				
1.4																				
1.5																				
1.6																				
1.7																				
1.8																				
1.9																				
1.10																				
1.11																				
1.12																				
1.13																				
1.14																				
1.15																				
1.16																				
1.17																				
1.18																				
1.19																				
1.20																				
1.21																				
1.22																				
1.23																				
1.24																				
1.25																				
1.26																				
1.27																				
1.28																				
1.29																				
1.30																				
1.31																				
1.32																				
1.33																				
1.34																				
1.35																				
Page 1 Item Total																				

Labor Rate Calculation Form

CHANGES IN THE WORK - LABOR RATE SHEET
REQUEST FOR RATE HIGHER THAN BURDENED PREVAILING WAGE RATE

NOTE: The contractor is required to complete one form for each craft/trade/classification for which they request a rate higher than the FSD published burdened Prevailing Wage Rate and attach the supporting documents.

PERFORMING CONTRACTOR _____ DATE _____

PROJECT _____ CONTRACT #. _____

PRIME CONTRACTOR _____ CONTRACTOR JOB #. _____

LOCAL UNION ☐ YES ☐ NO #. _____ PHONE ( ) _____ P.S.A. ☐ YES ☐ NO

CRAFT / TRADE _____ CLASSIFICATION _____ O.C.I.P. ☐ YES ☐ NO

WORKERS COMP. CLASS CODE _____ DATE WAGE EXPIRES _____

		STRAIGHT TIME Daily	OVERTIME Daily or Saturday	OVERTIME Sunday/Holiday
(A) BASIC HOURLY RATE				
FRINGES (EMPLOYER PAYMENTS)				
Health & Welfare	/Hr	$0.00	$0.00	$0.00
Pension	/Hr	$0.00	$0.00	$0.00
Vacation / Holiday	/Hr	$0.00	$0.00	$0.00
Training	/Hr	$0.00	$0.00	$0.00
Other Payments	/Hr	$0.00	$0.00	$0.00
Other (specify): National Emp. Benefit Board	/Hr	$0.00	$0.00	$0.00
(B) Total Fringes		$0.00	$0.00	$0.00
(C) TOTAL PREVAILING WAGE (A+B)		$0.00	$0.00	$0.00
(D) PAYROLL TAXES & WORKERS' COMPENSATION				
F.I.C.A./Medicare	7.65 %			
F.U.T.A.	0.134 %			
S.U.T.A.	0.73 %			
E.T.T.	0.017 %			
Other (specify)	0.469 %			
Sub Total	**9.00** %			
Adder				
Workers' Comp. *	0 %			
(E) Total	**9.00** x (A)	$0.00	$0.00	$0.00
TOTAL - HOURLY LABOR RATE (C+E)		$0.00	$0.00	$0.00

* This amount will be zero if an Owner-Controlled Insurance Program ("OCIP") is in effect

Note: If the actual numbers for payroll taxes are greater than 9%, please submit proper documents to justify the higher rate.

Overview of General Conditions

Change Order Estimating
SECTION 2

Overview of General Conditions

- **Rules of Contract Document Interpretation** (Article 3.14)
- **Changes in the Work** (Article 10)
- **Change of Contract Amount** (Article 11)

Rules of Contract Document Interpretation

- **In the event of conflict between the various sections of the Contract Documents, the following order of priority shall govern:**
  - *Bid and Acceptance Form*
  - *Addenda*
  - *Supplementary General Conditions*
  - *General Conditions*
  - *Division 01 General Requirements*
  - *Divisions 02 – 16 and 25*

Rules of Contract Document Interpretation

- **In the event of conflict between the Drawings and Specifications:**
  - *The Specifications generally govern quality of materials, workmanship, and execution;*
  - *The Drawings generally govern dimensions, elevations, workmanship, and layout of the Work;*
  - *It is the intent of the Contract Documents that the more stringent, higher quality of material and/or workmanship, and/or greater quantities shall be provided by the Contractor into the Work.*

Rules of Contract Document Interpretation

- **In the event of conflict between the Drawings:**
  - *Specific notes govern other notes;*
  - *General notes to be applied and incorporated into other portions of drawings;*
  - *Schedules are complimentary with other notes and other portions of Drawings;*
  - *Larger scale Drawings govern over smaller scale Drawings;*
  - *Calculated, derived, or numerical dimensions govern over dimensions obtained by scaling.*

Changes in the Work

- **Request for Proposal (RFP) – Article 10.3**
  - *Issued by OAR to Contractor*
  - *Contractor submits Change Order Proposal (COP) within 10 days upon receipt of RFP.*
  - *COP contains adjustments to the Contract Amount, Milestones and/or Contract Time reflective of RFP.*

Changes in the Work

- **Construction Directive (CD) – Articles 10.4 thru 10.6**
  - *CD does not adjust the Contract Amount, Milestones and/or Contract Time; but may lead to a COP.*
  - *Contractor complies promptly with directives in a CD.*
  - *If Contractor believes the CD establishes a basis for an adjustment, he shall submit a COP within 10 days.*

Changes in the Work

- **Change Order Proposal (COP) – Articles 10.7 thru 10.17**
  - *COP includes all estimates, breakdowns, costs, data, and/or information required for validation*
  - *Contractor is not entitled to any adjustment for preparing a COP whether ultimately accepted or not.*
  - *If Contractor and OAR agree to all the proposed adjustments, OAR issues a CO for mutual execution.*
  - *If Contractor and OAR agree partially on the proposed adjustments, OAR issues a (expedited) CO for mutual execution setting forth those undisputed adjustments. Contractor has 10 days (upon issuance of the CO) to give written notice if Contractor intends to seek further relief under Article 16.*
  - *Contractor required to submit a time impact evaluation with a COP.*

Changes in the Work

- **Change Order Proposal (COP) – cont'd**
  - *If OAR rejects a COP in its entirety, Contractor has 10 days (upon issuance of the written rejection) to give written notice if Contractor intends to seek further relief under Article 16.*
  - *If Contractor proposes no adjustments or insufficient adjustments, OAR shall give a written notice* if Owner *intends to seek further relief under Article 16.*
  - *Contractor shall use and submit COP forms in Section 01020 with all supporting documents and data.*
  - *Contractors shall verify **all** tiers of Subcontractor costs and time have been accounted for prior to any COP submission.*

Changes in the Work

- **Change Order Proposal (COP) – cont'd**
  - *Contractors can not use the Schedule of Values by itself to determine proposed adjustment.*
  - *The proposed adjustments shall cover any and all costs including impact costs for delay and disruption, etc.*
  - *The OAR has the right to require Contractor to revise and resubmit a non-compliance COP; Contractor has 10 days to resubmit the COP and is responsible for all costs, delays and/or damages resulting from the re-submittal of the COP.*

Copy of Exh C 14.17 Change Order Proposal WEB.xls

Changes in the Work

- **Change Order**
  - *A CO can not have any reservation of rights and/or qualifying language placed on it by the Contractor.*
  - *OAR and Contractor shall execute appropriate COs.*
  - *If Contractor fails or refuses to execute a CO within 10 days of OAR issuance, Contractor shall give written notice in accordance with Article 16 and proceed with the work as set forth in Article 6.54.*
  - *Owner reserves the right to process the CO without Contractor's signature.*

Change of Contract Amount

- **The contract amount can only be changed by change order**
- **COP and CO value to be determined as follows:**
  - *Mutually agreed-upon sum based on the cost of the work plus fee per Article 11.7, if unit price provisions not contained within the contract documents*
  - *Unit price, if contained within the contract documents (fee is included in unit price).*
  - *T&M per Article 11.8 plus fee per Article 11.7, if unit price is not specified in the contract documents and no agreement is reached for mutual sum.*

Change of Contract Amount

- **Cost of the Work – Articles 11.5 thru 11.6**
  - *Actual payroll costs;*
  - *Cost of all materials and equipment;*
  - *Payments made by Contractor to Subcontractor;*
  - ***Supplemental costs (note: No markups for supplemental costs):***
    1. *Transportation, delivery and storage, and hand tools not owned by the workers.*
    2. *Contractor owned equipment and machinery.*
    3. *Sales, consumer, use and/or similar taxes.*
    4. *Permits and licenses.*
    5. *Utilities, fuel and sanitary facilities.*
    6. *Premiums due to additional bonds for c/o work.*
    7. *Consultants such as surveyors, testing agencies and engineers.*
  - ***Rental $ for equipment and machinery shall be based on actual use.***

Change of Contract Amount

- **Cost of the Work – (cont'd)**
  - ***The following are part of Contractor's overhead and profit and are <u>not</u> allowed in the cost of the work:***
    1. *Contractor's project manager, superintendents, project engineers, officers, executives, principals, owners, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed whether at the Project site or in Contractor office for general administration of the work.*
    2. *Contractor off-site and on-site offices.*
    3. *Contractor capital expenses;*
    4. *All bonds and insurance except for the premiums due to additional bonds required because of c/o work;*

Change of Contract Amount

- **Cost of the Work – (cont'd)**
  - ***The following are part of Contractor's overhead and profit and are <u>not</u> allowed in the cost of the work: (cont'd)***
    5. *Costs due to negligence, act or failure to act of Contractor and contractors;*
    6. *Consumable materials, such as drill bits, abrasive discs, gloves, rags, rope, welding tips, etc;*
    7. *Tools and equipment with original costs of less than $1,000.00;*
    8. *Other overhead or general expense costs of any kind and the costs not set forth in Article 11.5.*
  - ***Applying a % of labor to cover these costs is <u>not</u> allowed.***

Change of Contract Amount

- **Contractor Overhead and Profit -- Article 11.7**
  - *15% for work performed directly by Contractor.*
  - *When multiple tiers of Subcontractors are included in the change:*
    - *15% for Subcontractor who performs or furnishes the work*
    - *5% for any higher subcontractor and contractor;*
  - *No fee for Supplemental Costs and costs deemed to be part of overhead and profit ;*
  - *5% for rented equipment (no fee for owned equipment);*

Change of Contract Amount

- **Contractor Overhead and Profit – cont'd**
  - *Deduct 5% from General Contractor and subcontractors not actually performing the work for only the portion of the net decrease in costs exceeding $100,000.00;*

    Example: For a c/o with a net decrease in costs of $90,000, the credit amount would be $90,000 (no overhead and profit deduction)

    *For a c/o with a net decrease in costs of $110,000, the credit amount would be $110,500 ($110,000 + ($110,000 - $100,000)*5%)*
  - *Deduct 5% from Subcontractor actually performing the work for the net decrease in costs;*

    *Example: For a c/o with a net decrease in costs of $10,000, the credit amount would be $10,500 ($10,000 + $10,000*5% = $10,500)*

Change of Contract Amount

- **Time and Material – Article 11.8 (Procedural note: T&M is primarily intended for single trade work that can be completed in less than 10 days)**
  - *At the close of each work day, Contractor shall submit a daily T&M record together with applicable delivery tickets, listing all labor, employee names, hours worked, wage classifications, materials, quantities, equipment size, type and ID number, and supplies involved for said work day, the location of the affected portion of the work, for services and expenditures.*
  - *Contractor and OAR* shall sign daily T&M record. (*Daily T&M Record Form designates IOR as the signatory however the OAR is required by Article 11.8 to sign the form, not the IOR.)*

Change of Contract Amount

- **Unit Prices – Articles 11.9 thru 11.11**
  - *Applicable where the work involved is covered by unit prices contained within the contract documents;*
  - *The estimated quantities of items of unit price work are not guaranteed and solely for the purpose of comparison of bids and determining an initial contract amount.*
  - *Each unit price covers all overhead and profit*
  - *Unit costs can be adjusted if quantity and scope differ materially and significantly from the estimated quantity and intended scope of such item indicated in the contract.*

Tools & Resources for C/O Cost Components

Change Order Estimating

SECTION 3

Tools & Resources for C/O Cost Components

- Labor
  - Fully Burdened Prevailing Wages
  - Workers' Compensation Insurance
- Man Hours Determination
- Materials
- Equipment
- Bond
- Insurance

Labor – Fully Burdened Prevailing Wages

Fully burdened prevailing wages consist of:

- Basic hourly rate
- Fringe benefits
- Payroll taxes
  - FICA
  - SUTA
  - FUTA
  - ETT

Labor – Fully Burdened Prevailing Wages

(If Contractor requests labor rate higher than the fully burdened prevailing wages, a Labor Rate Calculation Form: Request Rate Higher than Fully Burdened Labor Rates (01020-21) must be submitted for approval).

- **Prevailing wages** (note: rates effective at the time of work shall be paid; fully burdened prevailing wage table can be viewed on http://www.laschools.org/contractor/cc/contractor-project-forms)
  - ***Basic hourly rate***: *Determined by Director of Industrial Relations using established union wages in accordance with craft classifications for journeyman & apprentice.*
    - ***Journeyman rates*** *are listed in fully burdened prevailing wage table.*
    - ***Apprentice rates*** *are a percentage of the Journeyman rates, which are based on periodic wage percentage progressions of individual craft classification. These rates can be viewed on DIR website. http://www.dir.ca.gov/dlsr/PWD/Apprentice.htm*
    - ***Foreman rates*** *are not determined by DIR. Foreman rates vary among craft classifications; they are typically up to $4.00 higher than journeyman rates.*

Labor - Prevailing Wages (cont'd)

- ***Fringe benefits***: *Determined using established union benefit for each craft classification, which typically includes Health and Welfare, Pension, Vacation/Holiday, Training and/or Other, etc.*
- ***Payroll Taxes***:
  - ***FICA (Federal Insurance Contributions Act):*** *FICA tax is a combination of a 6.2% social security tax and a 1.45% Medicare tax.*
  - ***FUTA (Federal Unemployment Tax Act):*** *The net effective FUTA rate for most employers is 0.8% on the first $7,000 of wages paid to each employee in a calendar year. Contractors will stop paying FUTA for each employee once his or her wages exceed $7,000 for the year.*
  - ***SUTA (State Unemployment Tax Act):*** *Generally, SUTA tax rate is based on the amount of unemployment claims that are filed by employees terminated by the company. When the business is new, the SUTA tax rate starts at the maximum and declines once the company builds a history of few claims. The rate varies from 1.5% to 6.2%. The taxable wage limit remains at $7,000 per employee. For new employers the tax rate is 3.4% for up to three years.*
  - ***ETT (Employment Training Tax):*** *The ETT rate is 0.1%. The taxable wage limit remains at $7,000 per employee.*

Prevailing Wage TABLE 06-2008.pdf
Payroll Taxes Explanation sheet.pdf

Labor – Workers' Compensation Insurance

- **Workers' Compensation Insurance**: Applicable to non-OCIP projects (demolition and hazardous abatement projects are typically not covered under OCIP)
  - Base premium x Experience Modification Rate = Effective Rate
    - *Base Premium (aka Interim Rate) = Pure premium established for each class code by the Insurance Commissioner plus the approved factor and multiplier*
    - *Experience Mod varies based on history of claims*
    - *Effective Rate is the rate paid*
  - For verification of workers' compensation rate, ask contractor to provide the Workers' Compensation Insurance Payroll Report, which contains the Interim Rates and Experience Modification rate.

workers comp ins.pdf

Man Hours Determination

- Actual
- Historical data and experience
- NECA (for electrical trade) NECA.pdf
- MCAA (for HVAC trade)
- R.S. Means RS Means 2008.pdf

http://ncws01.lausd.net/Citrix/MetaFrame/auth/login.aspx

Materials

- Invoices / quotations
- Suppliers
- Via telephone
- Via website (Google names of suppliers, i.e. Home Depot, Lowes, McMaster, Grainger, etc).
- Historical data from previous change orders
  - Tra-Ser Premier (for MEP work)

Equipment

- **CalTrans:** Labor Surcharge and Equipment Rental Rates

  cost of equipment ownership Book_2008.pdf

  which list hourly rates that consist of:
  - *Cost of owning and operating the equipment (likely to be lower than rented equipment);*
  - *15% markups;*
- **Rental Rate Blue Book**, the industry guide for determining equipment 'reimbursement rates', which consist of:
  - *Ownership costs*
  - *Hourly operating costs*
  - *Online access:* www.equipmentwatch.com

    User name: luther.luu@lausd.net

    Password: 123estimating

    (Note: Only one person can be logged in at a time – log off when finished.)

    Rental Rate Blue Book.pdf

Bond

- Premium % can be established upfront: premium of the Faithful Performance Bond of the contract divide by the contract amount. Bond premium.pdf

  ex. $319,811 ÷ $33,373,000 = 0.96%

- Premium for open bid projects can generally be found on:

  http://www.laschools.org/employee/contract/cd-link-db/

Insurance

- All insurance are deemed to be part of Contractor's overhead and profit. (see Article 11.6.4)
- Insurance is **not** allowed in the cost of the work and should never be paid as part of a change order.

COP Document Check

Change Order Estimating

SECTION 4

COP Document Check

- **Is the COP valid, e. g. is the contractor entitled to be paid by the contract**
- **Is the COP complete and reviewable?**

Is the COP valid?

- **Who caused the change?**
  - __ *Contractor defective work correction*
  - __ *Architect change; RFC, ASI, etc*
  - __ *DSA required change*
  - __ *LAUSD desired change*
- *Use the spreadsheet template provided in the Justification for Change Orders presentation to assist in this determination*

Is the COP valid? (cont'd)

- **Is it part of the original contract?**
  - __ **Order of precedence in the contract:** *the more stringent prevails and controls.*
  - __ **Intent of contract documents:** *all aspect of the work shall be provided by contractor whether or not such aspects of the work are expressly covered in the drawings or specifications.*
  - __ **Conflict between drawings and specifications:** *Specifications generally govern as to quality of materials, workmanship, and execution whereas drawings generally govern dimensions, elevations, and layout of work.*
  - __ **Conflict between drawings:** specific notes govern over *all other notes; general notes shall be incorporated into other portions of drawings; schedules are complementary with other notes and other portions of drawings including those identified as general notes; larger scale drawing govern over smaller scale drawings, calculated, derived, or numerical dimensions govern over scaled dimensions.*

Is the COP complete and Reviewable?

- **Sufficient backup for quantities and costs to be added and/or credited?**
  - *__ Revised drawings, sketches, etc. showing the changes.*
  - *__ Verifiable material quotes, invoices, receipts, etc. from supplier.*
  - *__ Equipment Model, Type, Capacity, Rating, etc.*
  - *__ Changes outlined in COP are reflective of RFC, RFP, CD, COP, etc.*

Is the COP complete and Reviewable? (cont'd)

- **How does it change? (Any positive impact to the work?)**
  - __ *Change in material type.*
  - __ *Change in quantity.*
  - __ *Change in method of construction.*
  - __ *Others.*

Is the COP complete and Reviewable? (cont'd)

- **Still need additional information to understand the scope?**
  - __ *Get input from OAR and Field Engineers.*
  - __ *Get input from A/E.*
  - __ *Get input from IOR*
  - __ *Get input from contractor*
  - __ *Do your homework*

Example and Demonstration

Change Order Estimating

SECTION 5

Example and Demonstration

- **COP cost exceeds $25,000**
  - Independent estimate and analysis shall be prepared by a professional Project Estimator / Estimating Unit
  - Example COP example over 25k.pdf

Example and Demonstration

- **COP cost between $5,000 & $25,000**
  - OAR or its appointee shall prepare a Fair Cost Estimate.
    - OAR may use their own personal judgment in determining the manner in which an FCE is prepared.
    - A contractor's COP may be reviewed in detail and marked-up as an FCE. The marked-up COP must be labeled as an FCE and signed and dated by the OAR.
    - Continued…

Example and Demonstration

- **COP cost between $5,000 & $25,000**
  - It is STRONGLY recommended the official FCE spreadsheet be used in the preparation of the FCE.
    - The spreadsheet helps allocate costs to the correct mark-up categories & in calculating the markup; it is helpful even when marking-up up a contractor's COP.
  - Example COP sample under 25000.pdf

Example and Demonstration

- **COP cost under $5,000**
  - A detailed estimate need not be prepared. However;
    - OAR must evaluate the cost of the changed scope of work and confirm the price is reasonable.
    - OAR must include documentation in the change order file that it has reviewed the COP and found it reasonable.
  - Example COP sample under 5000.pdf