



# **WILDWOOD ELEMENTARY SCHOOL**

**PIEDMONT UNIFIED SCHOOL DISTRICT**

**SEISMIC STRENGTHENING PROGRAM / MEASURE E BOND PROGRAM**

## **INVESTIGATION AND ANALYSIS, AND CONCEPT DESIGN FINAL REPORT**

*March 19, 2008*

***R. P. Gallagher Associates, Inc.***

Structural Engineering

***murakami* / Nelson**  
ARCHITECTURAL CORPORATION

# **WILDWOOD ELEMENTARY SCHOOL**

## **PIEDMONT UNIFIED SCHOOL DISTRICT**

### **SEISMIC STRENGTHENING PROGRAM / MEASURE E BOND PROGRAM**

## **CONCEPT DESIGN**

### **FINAL REPORT**

March 18, 2008



1930s Classroom Wing



Main Entrance



Courtyard

***R. P. Gallagher Associates, Inc.***  
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i. EXECUTIVE SUMMARY

The Concept Designs contained in this report have been developed to address the structural, accessibility and life-safety deficiencies at Wildwood Elementary School. This report follows an investigative report, dated September 6, 2007.

The solutions presented here are designed to mitigate the deficiencies, while preserving the basic functional and architectural character of the school. The design concepts we are proposing for Wildwood School are focused on the original 1930's school building, and consist primarily of small scale, localized upgrades. Unlike some of the other schools we have looked at, these proposals do not require major building demolition and replacement.

In some cases there may be more than one option, or way to approach a problem. In this case, we have identified a recommended solution. Once a design concept is selected, there may be an opportunity to negotiate alternative solutions with DSA (Department of the State Architect), the office having jurisdiction over public school construction.

Seismic strengthening design concepts are illustrated following architectural design solutions. Where structural schemes require modifications to architectural features (primarily removing and replacing existing finishes), those changes are noted on the architectural plans.

A concept cost estimate was developed as part of this phase of work. It is contained under separate cover. While the scope of work addressed by these concept designs is limited, the estimate has assigned values for non-structural seismic hazards, hazardous materials abatement, general modernization, maintenance, sustainable design, etc.

This report will serve as the foundation for the next phase of work which will be to develop a schematic design.

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**A. SUMMARY OF ACCESSIBILITY SCHEMES**

*The following floor plans show how the code deficiencies described in our Investigative Report can be addressed. In many cases, the proposed remediation can be performed with little impact to the surrounding area. For example, replacing door hardware for accessibility, or providing a new accessible sink to replace an existing sink. These items are described in key notes, and their location is shown on the plans. In other cases, the remediation will have more impact on the adjacent area, for example to accommodate an enlarged toilet room, a new ramp, code compliant stairs and landing, or to provide adequate clearances in front of a door. These changes are shown, and highlighted, in the concept plans. Our proposals at Wildwood do not require major building demolition and/or replacement to address accessibility deficiencies.*

**SITE ACCESSIBILITY:**

The main entrance to Wildwood Elementary School is located on Wildwood Avenue. From this side of the school, the buildings appear to be only one story tall. However, at the rear of the school, the site drops steeply downhill, eventually leading to lower level play fields accessible from the school via ramps and stairs. A lower level of classrooms is tucked under the building along this side of the school. These classrooms were not originally accessible, but are now served by a new elevator installed in 1995. The main entrance to the school was also upgraded when the 1995 addition was built, and is largely handicapped accessible. From a drop-off area along Wildwood Avenue, ramps and stairs take you up to the main entrance.

However, deficiencies still exist along the exterior path of travel to the main entrance and the lower level classrooms. Existing accessible parking must be upgraded to meet current code requirements. Minor upgrades are also required at existing gates and handrails. The existing stairs and ramps down to the lower level play fields are not fully code compliant. These required upgrades are indicated in the following Site Concept Plan, and summarized below.

**Site Improvements:**

- Enlarge existing on site parking area, to provide for a minimum of one handicapped parking space that is van accessible. This work will also include space for a dedicated dumpster area, so dumpsters no longer prevent full use of the handicapped parking area.
- Modify existing ramps and stairs to meet code requirements. This includes replacing stairs and ramps with inadequate landings, providing new handrails at existing stairs, etc.
- Replace existing concrete walkways that do not meet code requirements for maximum cross slope, with new code compliant paving along the accessible path of travel.

**MAIN BUILDING ACCESSIBILITY:**

Many of the accessibility deficiencies in the original 1930's building have been addressed as part of the 1995 Renovation Project. These upgrades include new lever door hardware, and upgrades to existing restrooms. However, some deficiencies still remain. Where we expect that upgrades will be triggered by the new work, these items and a proposed solution, are indicated on the plans. Since this is an existing building, the extent of upgrades required is subject to negotiation with DSA. They may not require upgrades at all locations, especially if there is no work in the area. The following accessibility upgrades are likely to be triggered by the new work, and are summarized below:

**Building Improvements:**

- Provide new code compliant single occupancy restroom for Girls. (This restroom is provided in lieu of upgrading the existing Girls Restroom in Building A, that is located on a stair landing, and thus difficult to make accessible.)
- Provide new code compliant accessible staff restroom.
- Upgrade existing doors, stairs and landings for code compliance.
- Replace existing non-compliant sinks and work stations at classrooms and staff kitchen, with new accessible facilities.

SUMMARY OF FIRE AND LIFE SAFETY SCHEMES:

MAIN BUILDING

This building has been determined to meet code limits on floor area, based on its size and occupancy. Code deficiencies at this building are primarily in the older, 1930's portion of the building, where construction along exit pathways does not meet current codes. Due to the large amount of work along the non-compliant main exit corridor of this building, code upgrades for doors and other openings along the existing corridor walls will be required. In addition, based on our preliminary survey information, there are existing exterior walls within 10 feet of the property line. These walls do not meet code requirements for fire rated construction and protection of window openings.

Other issues include the lack of fire sprinklers throughout the building. Current codes require that educational facilities over 20,000 sf be fully sprinklered. Although there are fire sprinklers in the corridor and lower level classrooms (in both the old and new areas of the school), they do not extend throughout the school. When the new addition was constructed, a two hour area separation wall was built that divided the school into two separate areas, each less than 20,000 sf in lieu of providing fire sprinklers. However, there is no fire truck access at the rear of this building. In addition, stages with vertical retracting equipment must be fire sprinklered. For this reason, we anticipate that Fire Department officials may insist on automatic fire sprinklers throughout the building.

In some areas, negotiation with DSA may be possible, and an alternate means of protection may be acceptable in lieu of new fire rated construction. At the existing exterior walls along the property line, we propose the use of fire sprinklers for the protection of existing openings, in lieu of new fire rated construction, with new fire rated windows.

Other considerations in approaching the fire and life safety upgrades include preserving the historic character of this building. In particular, the proposed improvements at the Auditorium are being guided by the Secretary of the Interior's Standards for Historic Preservation. The concept design solutions presented in this report preserve the existing building features, finishes, materials, etc. as much as possible.

Specific locations showing proposed upgrades are shown on the plans. A list of major deficiencies and Fire/Life Safety recommendations to correct them follows:

**Fire and Life Safety Improvements:**

- Provide complete automatic fire sprinkler system throughout. (Also considered: *Provide additional fire sprinklers at the stage area only, but we anticipate that the Fire Department will require fire sprinklers throughout, due to fire truck access problems at the building.*)
- Upgrade or replace the existing fire alarm system.
- Provide deluge sprinklers at existing exterior walls within 10 feet of property line. (Also considered: *Upgrade exterior wall construction and windows for one hour fire rating, but this would require inoperable steel frame, wire glass windows and possible mechanical ventilators of the rooms affected.*)
- Upgrade existing main corridor for a one hour rating. This will require that all non-rated existing doors be replaced with UL rated 20 minute doors and fire exit hardware. That all transom windows be replaced with code compliant steel frame and wire glass windows, etc. Since the structural upgrades require strengthening of these walls, DSA is likely to require these upgrades, and it is logical to correct the deficiencies at the time the walls are opened up.

## CONCEPT DESIGN NOTES:

### GENERAL NOTES:

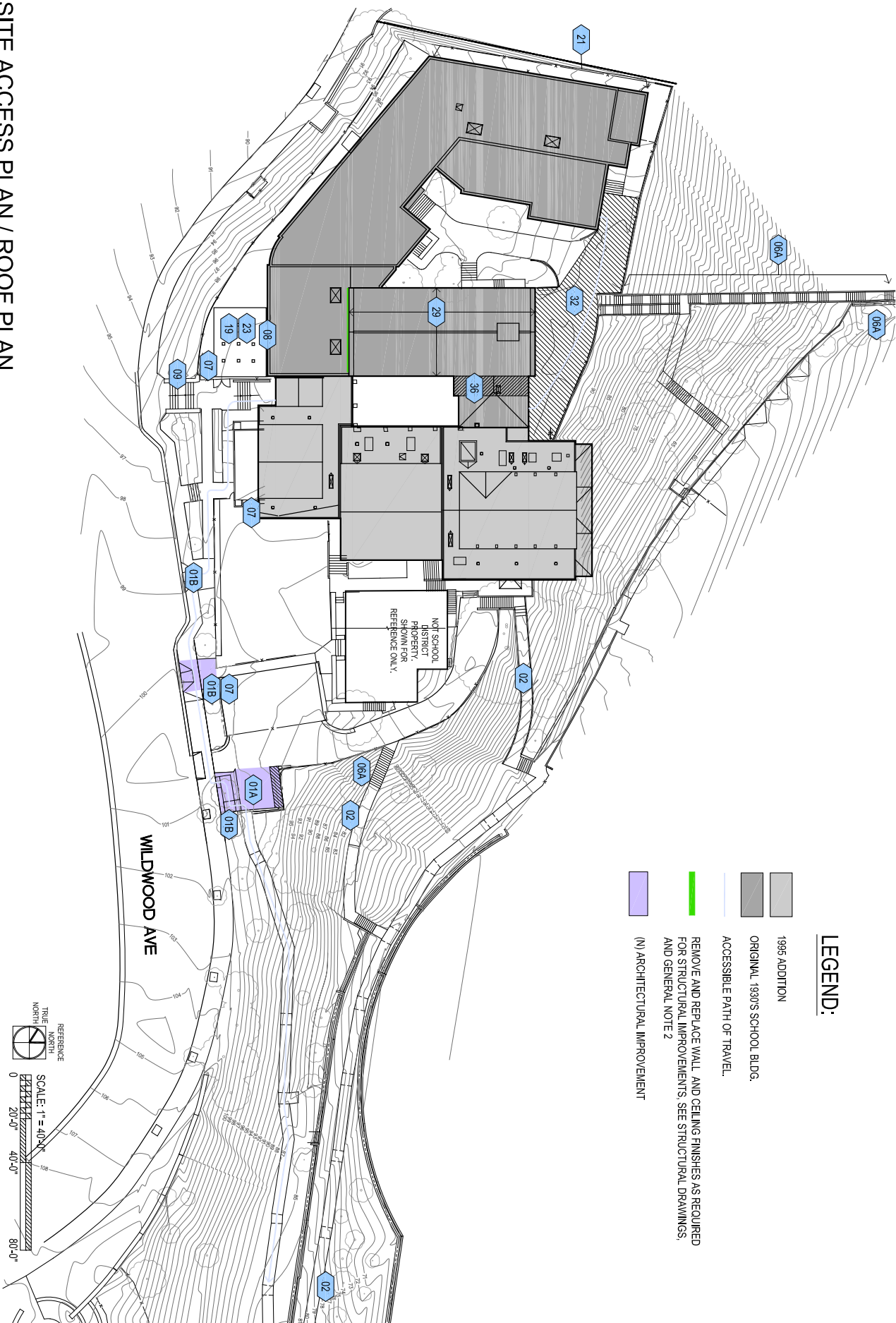
- THE SCOPE OF LIFE SAFETY AND ACCESSIBILITY UPGRADES SHALL INCLUDE THE FOLLOWING:
    - UPGRADE OR REPLACE EXISTING FIRE ALARM SYSTEM. (INCLUDING 1995 ADDITION)
    - PROVIDE NEW CODE COMPLIANT DIRECTIONAL & ROOM IDENTIFICATION SIGNAGE THROUGHOUT SCHOOL. (INCLUDING 1995 ADDITION).
    - PROVIDE PORTABLE FIRE EXTINGUISHER CABINETS AS REQUIRED BY CODE.
    - UPGRADE (E) F.S. SYSTEM TO PROVIDE FIRE SPRINKLERS THROUGHOUT 1990S BLDG & AUDITORIUM.
  - STRUCTURAL IMPROVEMENTS THAT IMPACT (E) ARCHITECTURAL FEATURES ARE INDICATED ON THE PLANS. (SEE LEGEND). REMOVE AND REPLACE (E) FINISHES IMPACTED BY THIS WORK AS FOLLOWS:
    - REPLACE (E) INTERIOR PLASTER FINISH WITH (N)  $\frac{5}{8}$ " GYP. BOARD. TYP.
    - REMOVE (E) WOOD TRIM AND PROVIDE (N) TO MATCH (E).
    - REPLACE EXTERIOR STUCCO IMPACTED BY THE STRUCTURAL WORK TO MATCH (E).
- D. SEE KEY NOTES FOR ADDITIONAL WORK.

- 14 REMOVE SECTION OF (E) WALL. TO PROVIDE ACCESS FOR STRUCTURAL IMPROVEMENTS. REINSTALL UPON COMPLETION OF WORK TO MATCH (E).
- 15 REMOVE (E) FURNACE AND CABINET TO PROVIDE ACCESS FOR STRUCTURAL WORK. REINSTALL EXISTING OR PROVIDE NEW FURNACE AND CABINET UPON COMPLETION.
- 16 REMOVE AND SALVAGE (E) WALL MOUNTED SHELVING, BLACKBOARDS, TACKBOARDS AND/OR FIXTURES. TO PROVIDE ACCESS FOR STRUCTURAL IMPROVEMENTS. REINSTALL UPON COMPLETION OF WORK.
- 17 REMOVE (E) STAIRS AND STAGE LIFT TO PROVIDE ACCESS FOR STRUCTURAL WORK. REMOVE (E) 1-HOUR RATED DUCT SHAFT, AND RECONFIGURE TO ACCOMMODATE (N) 4" CLR STAIR FOR CODE COMPLIANCE. REINSTALL EXISTING STAGE LIFT. (PREVIOUSLY APPROVED BY DSA).
- 18 (N) STAIR WARNING STRIPES FOR EXTERIOR STAIRS.
- 19 PROVIDE DESIGNATED ACCESSIBLE SEATING.
- 20 EXISTING WOODWORK, WOOD STAIRS AND TRIM AT PROCENIUM WALLS SHALL BE CAREFULLY REMOVED AND SALVAGED. TO PROVIDE ACCESS FOR STRUCTURAL IMPROVEMENTS (S.S.D. OPTION 1). REINSTALL UPON COMPLETION OF WORK.
- 21 PROVIDE PROTECTION FOR EXISTING OPENINGS IN EXTERIOR WALL WITHIN 10'-0" OF PROPERTY LINE WITH NEW EXTERIOR SPRINKLER DELUGE SYSTEM
- 22 EXISTING NON-RATED CORRIDOR. UPGRADE EXISTING CORRIDOR WITH NEW FIRE RATED CONSTRUCTION PROVIDE NEW FIRE RATED DOORS, WINDOWS AND FRAMES AT (E) OPENINGS (SEE NOTES 26 & 27).
- 23 REPLACE (E) TRELLIS W/ DSA APPROVED TRELLIS.
- 24 (N) ROOM CAPACITY SIGNAGE.
- 25 (N) ASSISTED LISTENING SYSTEM.
- 26 (N) 20 MIN. RATED DOOR, FRAME AND HARDWARE WITH MAGNETIC HOLD OPENERS @ UPGRADED CORRIDOR.
- 27 REPLACE (E) WOOD WINDOW ABOVE DOOR WITH NEW FIRE RATED WINDOW @ UPGRADED CORRIDOR.
- 28 PROTECT EXISTING PAINTED CEILING PANELS @ CEILING OF AUDITORIUM DURING CONSTRUCTION.
- 29 REMOVE AND SALVAGE (E) CLAY ROOF TILES AT AUDITORIUM ROOF TO PROVIDE ACCESS FOR STRUCTURAL WORK. REINSTALL UPON COMPLETION
- 30 NOT USED
- 31 REMOVE EXISTING CEILING TO PROVIDE ACCESS FOR STRUCTURAL WORK. REPLACE TO MATCH (E) UPON COMPLETION.
- 32 REGRADE AND PROVIDE (N) PAVING W/ MAX 2 % CROSS SLOPE FOR PATH OF TRAVEL TO CLASSROOM 15.
- 33 PROVIDE (N) SMOKE VENTILATOR WITH CODE COMPLIANT OPERATOR.
- 34 REMOVE AND RELOCATE ELECTRICAL SERVICE AND SPRINKLER RISER. REMOVE AND SALVAGE WOOD PANELING. REINSTALL AT SAME LOCATION AFTER STRUCTURAL STRENGTHENING.
- 35 REPLACE SKYLIGHT GLAZING AT CEILING.
- 36 REMOVE AND REINSTALL CLAY TILE ROOFING AFTER SEISMIC STRENGTHENING. INSTALL NEW SEISMIC JOINT.

- 01A EXISTING ACCESSIBLE PARKING. EXPAND SIZE OF PARKING AREA TO PROVIDE 8'-0" AISLE SPACE FOR VAN ACCESSIBILITY AND SEPARATE DUMPSTER AREA. PROVIDE (N) RETAINING WALL AT PERIMETER OF PARKING
- 01B PROVIDE NEW RAMP AND/OR MODIFY EXISTING SIDEWALK AND CURB RAMP TO PROVIDE ACCESSIBLE PATH OF TRAVEL TO EXISTING MAIN ENTRANCE.
- 02 REPLACE (E) NON-COMPLIANT CONCRETE RAMP WITH (N) CODE COMPLIANT RAMP AT 1:12 MAX SLOPE AND LANDINGS, PER CODE REQUIREMENTS.
- 03 (E) RESTROOM IS NOT ACCESSIBLE. (NEW ACCESSIBLE RESTROOM PROVIDED ELSEWHERE.)
- 04 (E) TOILET ROOM IS NOT ACCESSIBLE. PROVIDE (N) ACCESSIBLE TOILET ROOM AT ADJACENT JANITOR ROOM. CONVERT (E) TOILET TO (N) JANITOR ROOM.
- 05A (N) ACCESSIBLE DOOR, FRAME, AND HARDWARE IN NEW OR RESIZED OPENING.
- 05B (N) DOOR HARDWARE PACKAGE INCLUDING: LEVER, LATCH OR PANIC BAR, CLOSER, THRESHOLD, ETC.
- 05C PROVIDE AUTOMATIC DOOR OPENER FOR PAIR OF (E) HISTORIC WOOD DOORS IN (E) 5'-0" OPENING. @ AUDITORIUM. (NOTE: DSA MAY REQUIRE NEW CODE COMPLIANT FIRE RATED DOORS.)
- 06A (N) CODE COMPLIANT STEEL HANDRAILS/ GUARDRAILS.
- 06B (N) 42" HIGH CODE COMPLIANT STEEL GUARDRAILS.
- 07 (N) ACCESSIBLE GATE AND HARDWARE.
- 08 (N) H-LO TYPE DRINKING FOUNTAIN WITH STAINLESS STEEL GUARDRAILS.
- 09 REPLACE EXISTING NON-COMPLIANT EXTERIOR LANDING AND STAIRS WITH NEW CODE COMPLIANT CONCRETE STAIRS, LANDING AND STEEL HANDRAILS/ GUARDRAILS.
- 10 REMOVE EXISTING NON-ACCESSIBLE SINK. MODIFY (E) CASEWORK AS REQUIRED TO PROVIDE ADEQUATE CLEAR SPACE @ SINK PER CODE. PROVIDE (N) ACCESSIBLE SINK, FAUCET AND ACCESSORIES.
- 11 MODIFY (E) RESTROOM TO PROVIDE ACCESSIBILITY. PROVIDE NEW CODE COMPLIANT PLUMBING FIXTURES. DOOR HARDWARE, ACCESSORIES, ETC.
- 12 MODIFY (E) CABINETS, COUNTERS, ETC. TO PROVIDE ACCESSIBLE WORK AREA.
- 13 (E) INTERIOR DOOR AND LANDING DOES NOT MEET CODE FOR PROPER CLEARANCES. MODIFY DOOR SWING AND RELOCATE DOOR OPENING AS REQUIRED TO PROVIDE MINIMUM CLEAR SPACE ON PUSH / PULL SIDE OF DOOR.



SITE ACCESS PLAN / ROOF PLAN



**LEGEND:**

- 1995 ADDITION
- ORIGINAL 1930'S SCHOOL BLDG.
- ACCESSIBLE PATH OF TRAVEL
- REMOVE AND REPLACE WALL AND CEILING FINISHES AS REQUIRED FOR STRUCTURAL IMPROVEMENTS, SEE STRUCTURAL DRAWINGS, AND GENERAL NOTE 2
- (N) ARCHITECTURAL IMPROVEMENT



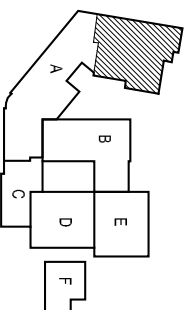
MAIN FLOOR



LOWER LEVEL



KEY PLAN:



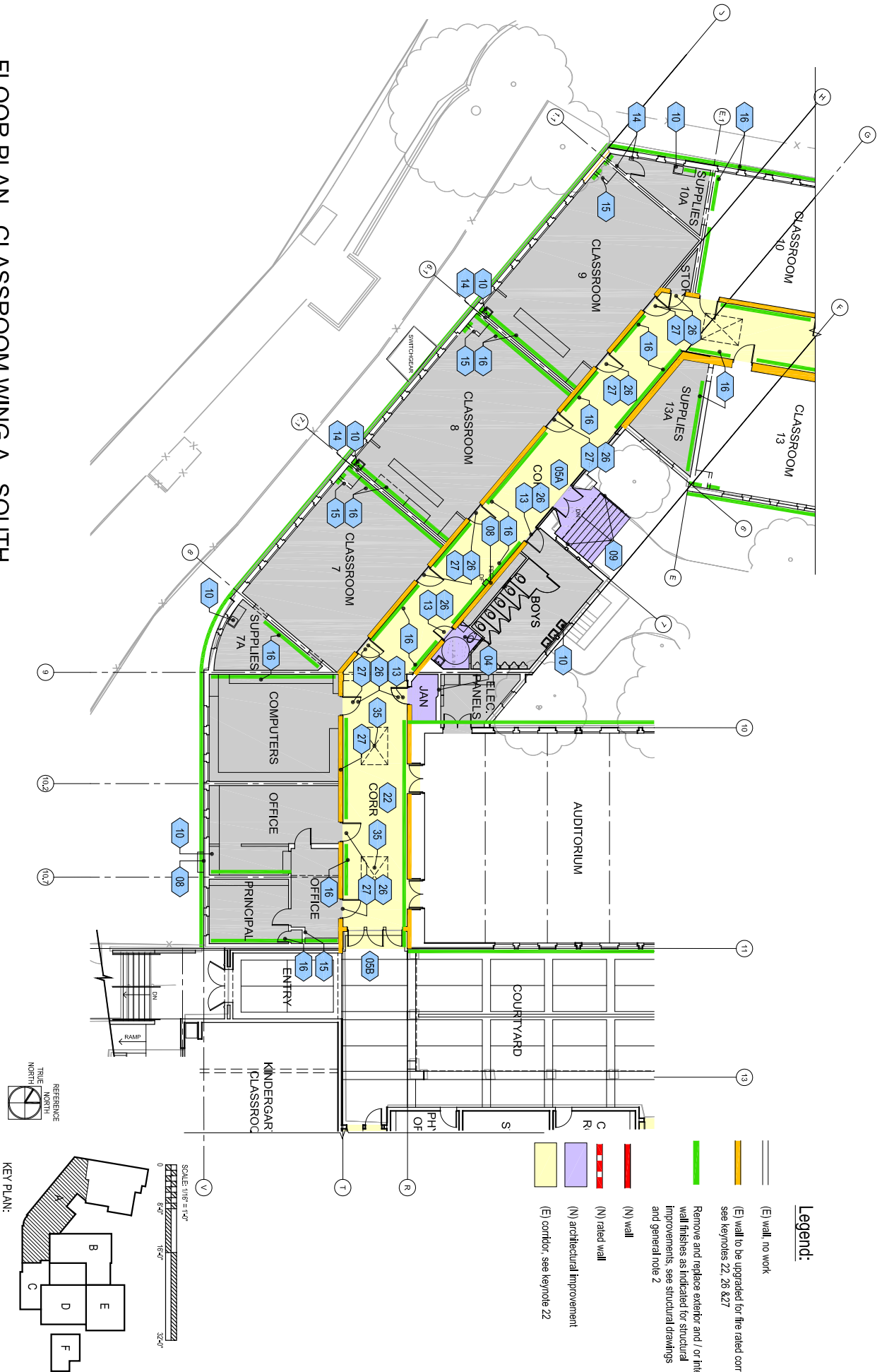
SCALE: 1/8" = 1'-0"  
0 8'-0" 16'-0" 32'-0"

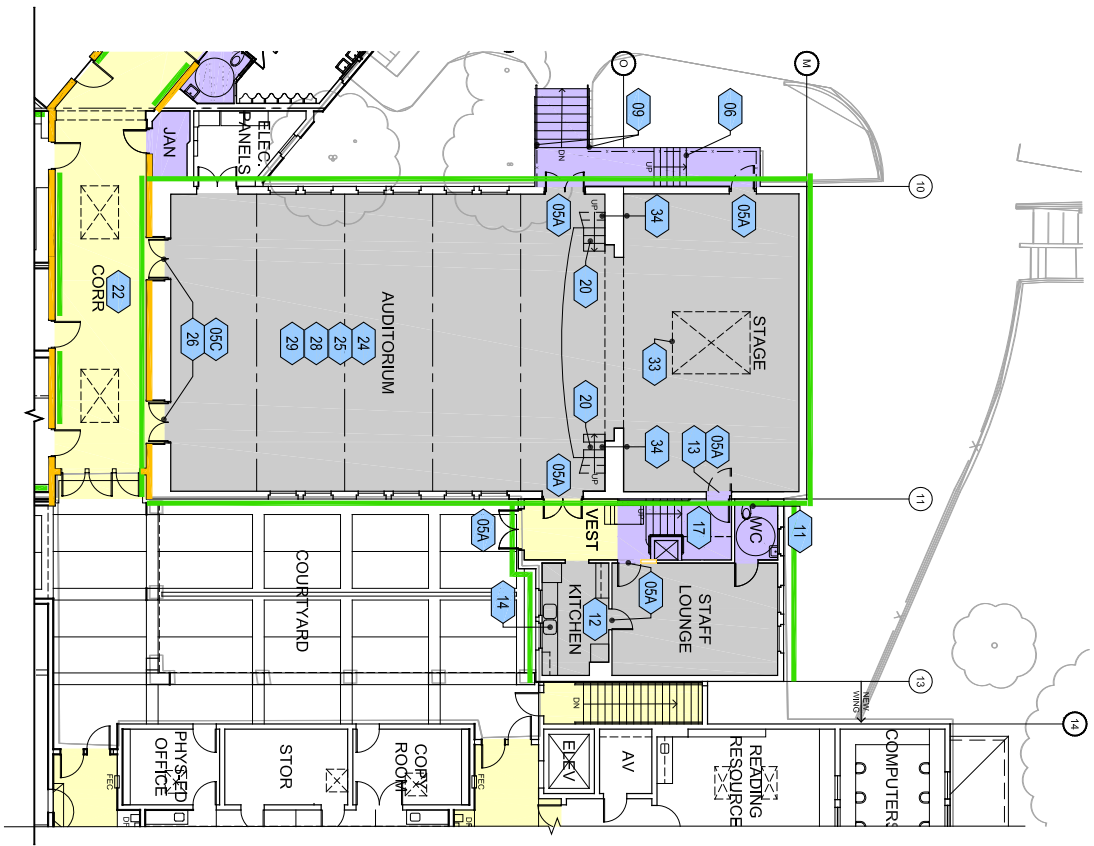
- Legend:**
- (E) wall, no work
  - (E) wall to be upgraded for fire rated corridor, see keynotes 22, 26 & 27
  - Remove and replace exterior and / or interior wall finishes as indicated for structural improvements, see structural drawings and general note 2
  - (N) wall
  - (N) rated wall
  - (N) architectural improvement
  - (E) corridor, see keynote 22

# FLOOR PLANS - CLASSROOM WING A - NORTH

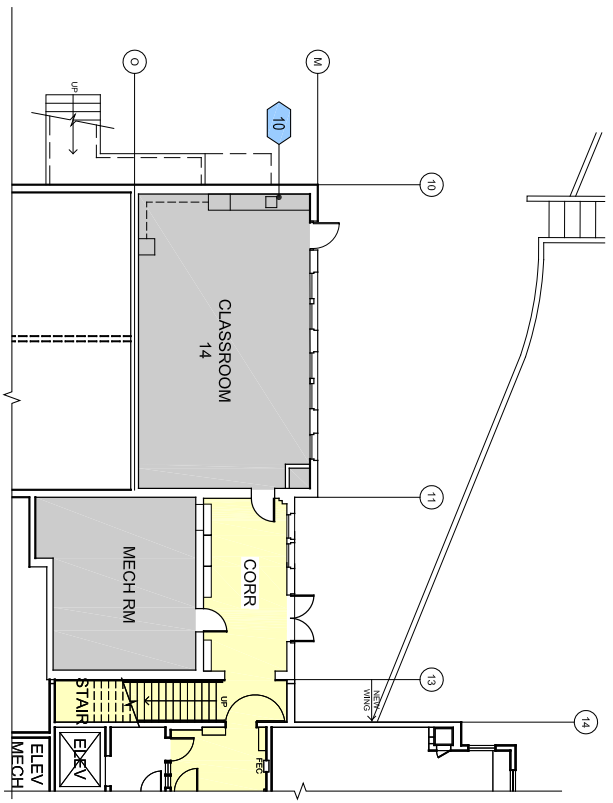


# FLOOR PLAN - CLASSROOM WING A - SOUTH



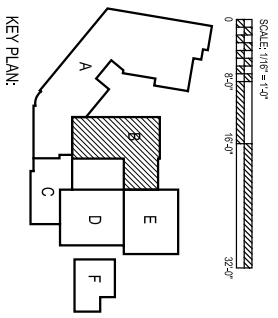


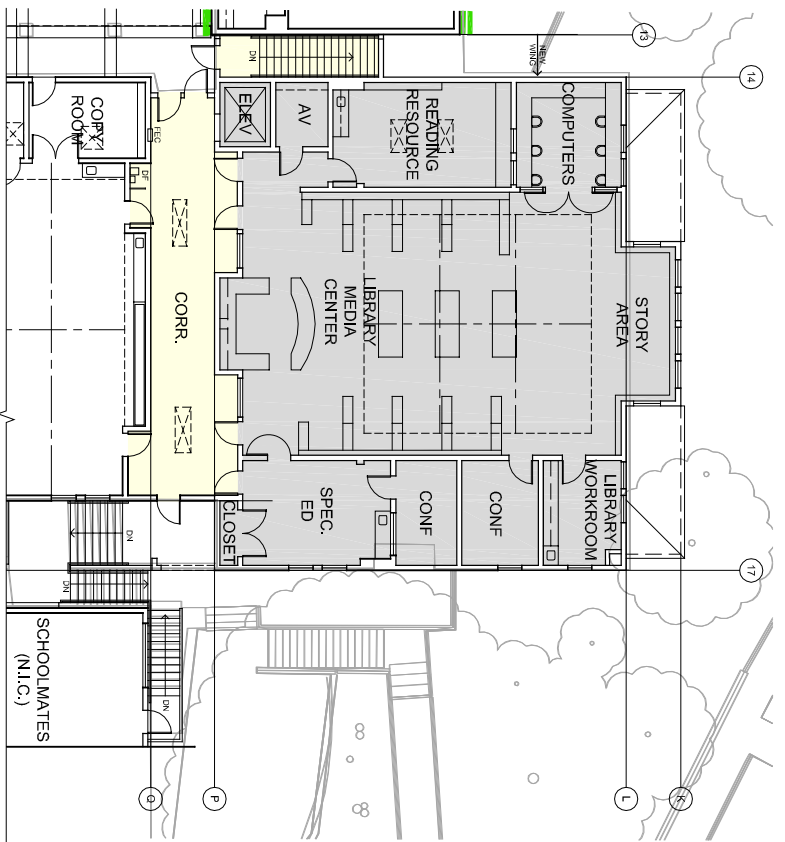
FLOOR PLANS - AUDITORIUM WING B



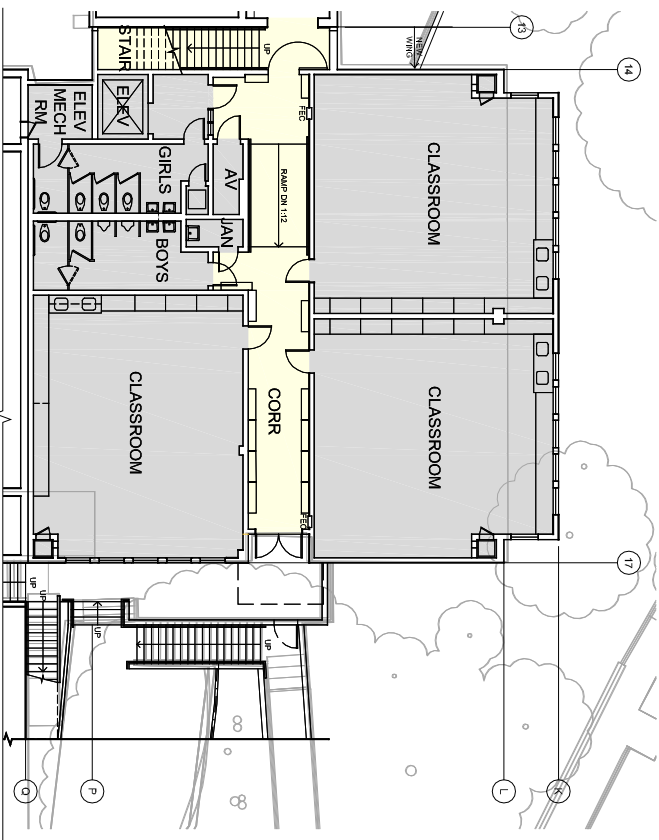
PLAN - LOWER LEVEL B

- Legend:**
- (E) wall, no work
  - (E) wall to be upgraded for fire rated corridor, see keynotes 22, 26 & 27
  - Remove and replace exterior and / or interior wall finishes as indicated for structural improvements, see structural drawings and general note 2
  - (N) wall
  - (N) rated wall
  - (N) architectural improvement
  - (E) corridor





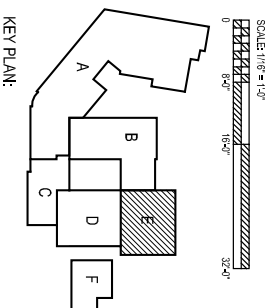
PLAN - LOWER LEVEL E



**Legend:**

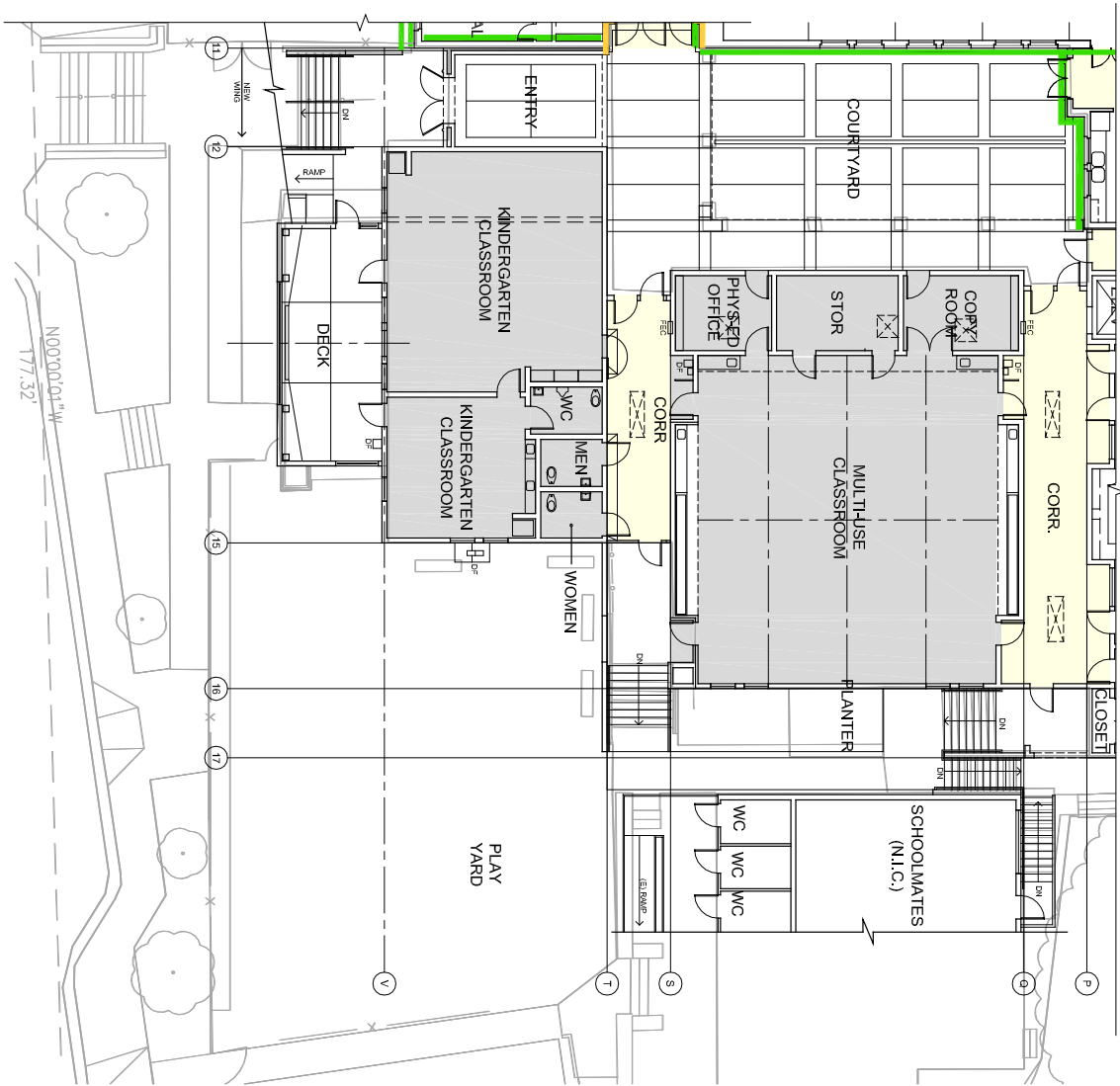
- (E) wall, no work
- (E) wall to be upgraded for fire rated corridor, see keynotes 22, 26 & 27
- Remove and replace exterior and / or interior wall finishes as indicated for structural improvements, see structural drawings and general note 2

- (N) wall
- (N) rated wall
- (N) architectural improvement
- (E) corridor

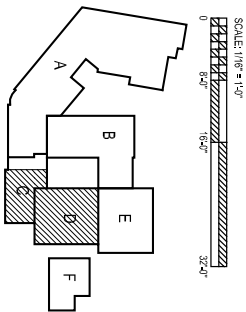


FLOOR PLANS - LIBRARY / CLASSROOM ADDITION E

FLOOR PLANS - KINDERGARTEN/ CLASSROOM ADDITION C & D



KEY PLAN:



- Legend:**
- (E) wall, no work
  - (E) wall to be upgraded for fire rated corridor, see keynotes 22, 26 & 27
  - Remove and replace exterior and / or interior wall finishes as indicated for structural improvements, see structural drawings and general note 2
  - (N) wall
  - (N) rated wall
  - (N) architectural improvement
  - (E) corridor

**Summary of Seismic Strengthening Schemes for  
Buildings A and B at Wildwood Elementary School**

Seismic evaluations of Wildwood Buildings A and B were performed using the Tier 2 procedures of ASCE 31. Significant deficiencies were found, and strengthening concepts have been developed. These are summarized below for each building. Only the major components are presented below, and the actual strengthening of each building will include other lesser yet important components not discussed below.

**Criteria**

The strengthening concepts were developed using the provisions of ASCE 41 for the Life Safety performance level. The BSE-1 site-specific spectra was used as the ground shaking hazard.

**Building A – Classrooms**

The exterior walls are strengthened by addition of steel braced frames hidden in the existing perimeter walls. Interior shearwalls are strengthened by adding plywood and hold-downs. All current windows are maintained. Plywood is added locally to the underside of the ceiling level diagonal sheathing adjacent to some interior walls.

**Building A – Office Area**

The south exterior wall will be strengthened by adding plywood sheathing and hold-downs between the existing windows. Plywood sheathing and hold-downs are added to two existing shearwalls and to the east wall of the Principal's office which is not currently a shearwall. Plywood is added locally to the underside of the roof diagonal sheathing at two locations. The existing roofing and the roof mounted HVAC equipment are not disturbed.

**Building B – Auditorium**

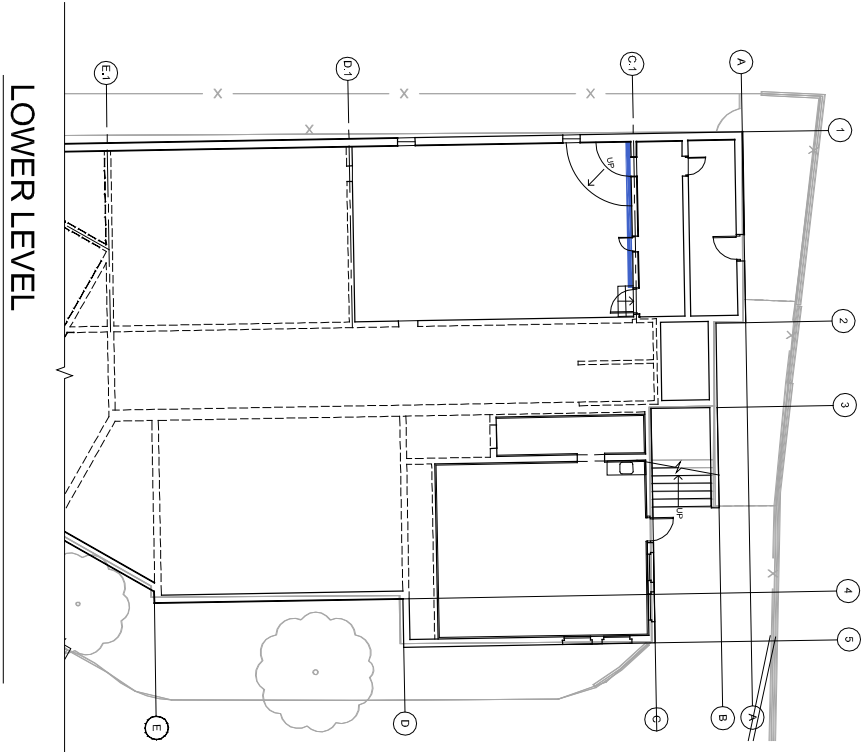
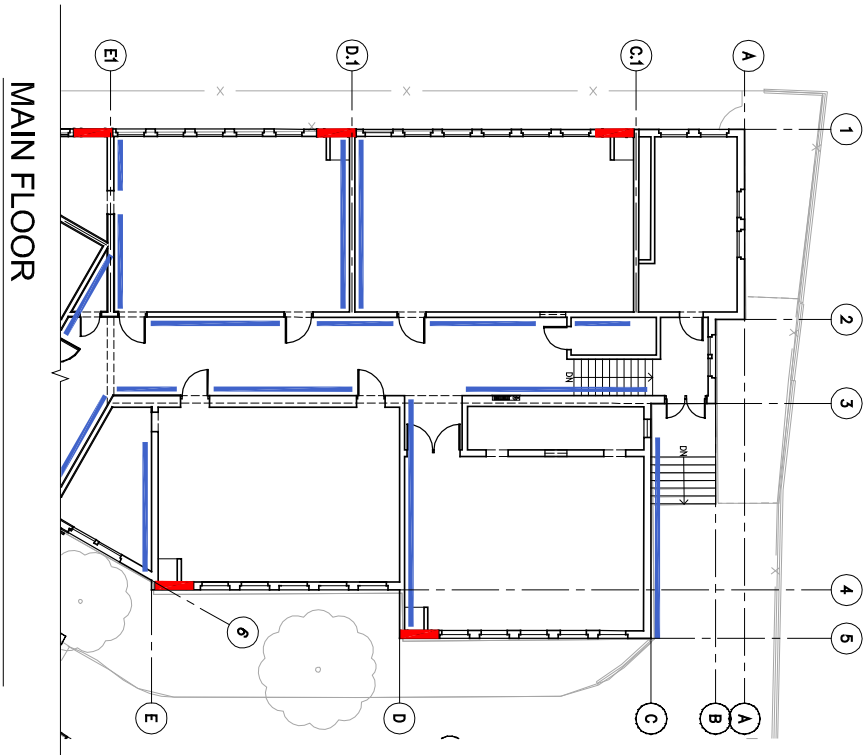
The existing roof diagonal sheathing is to be removed and replaced with new plywood sheathing. The diagonal sheathing on the exterior walls and on the south wall of the auditorium is replaced with new plywood sheathing. New hold-downs and new steel straps are installed with the new wall plywood where required.

**Peer Review**

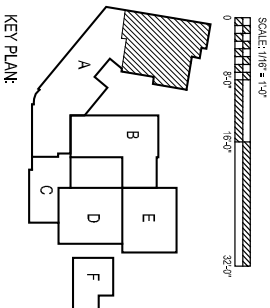
The Peer Reviewer in their November 17, 2007 letter has concurred with the design retrofit options presented in the Concept Design package. He also recommended that two alternatives be studied for Building A – a single exterior brace frame and wider steel brace frames that would close in one window at each classroom. Each of these options has an effect on the appearance of the building. Before the Concept Design is finalized the team will discuss these options with the District and, as directed, design and evaluate the costs of them.



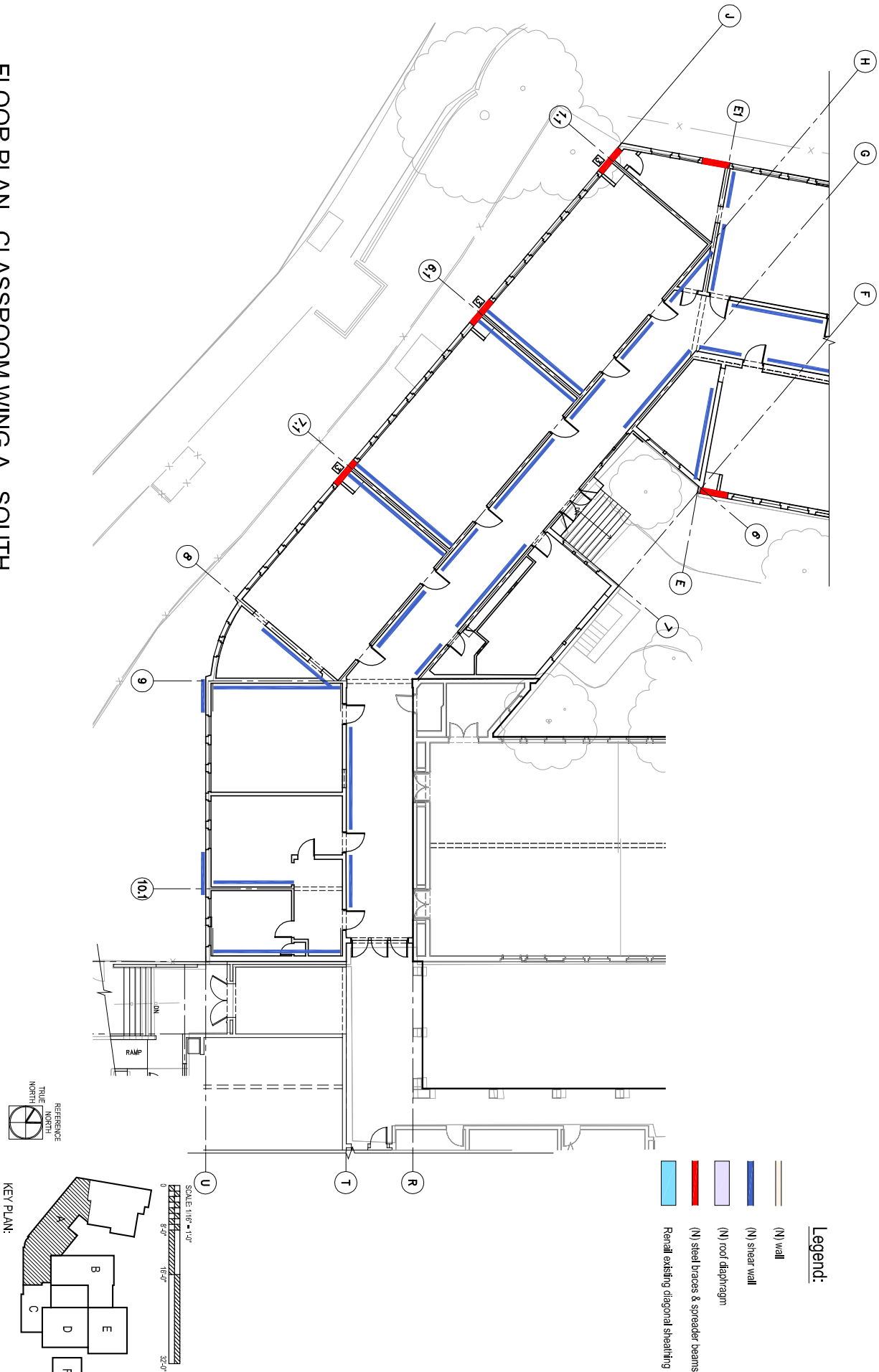
FLOOR PLANS - CLASSROOM WING A - NORTH

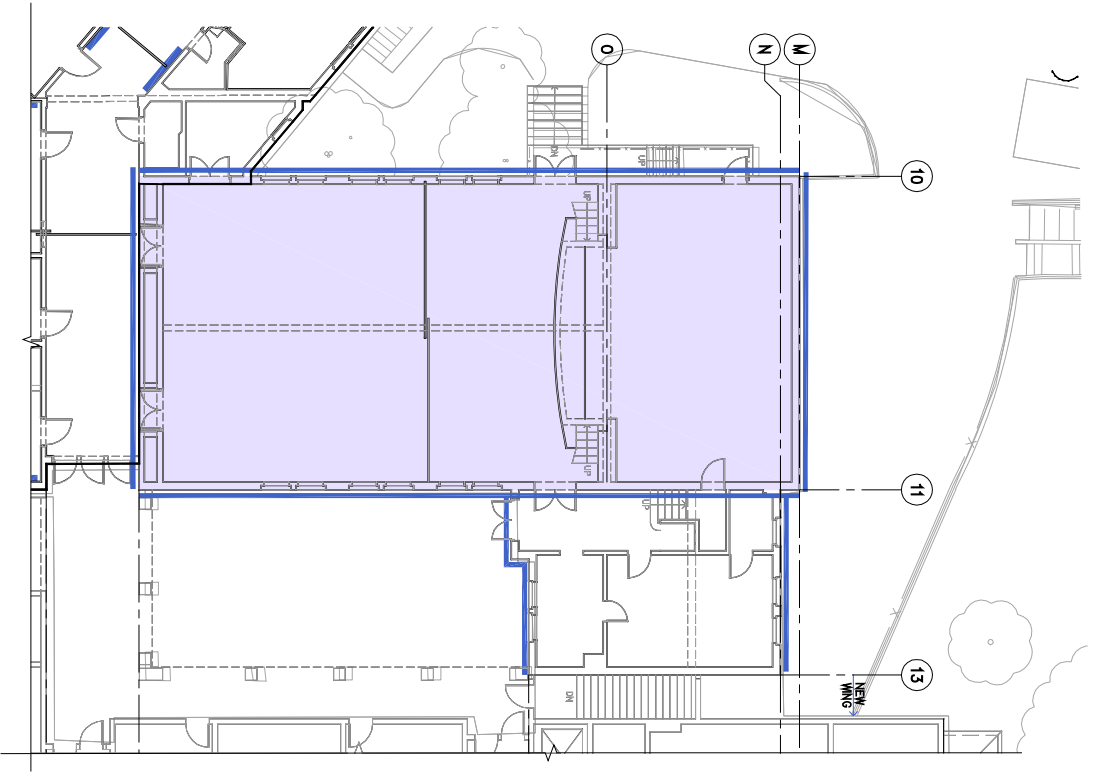


- Legend:**
- (N) wall
  - (N) shear wall
  - (N) roof diaphragm
  - (N) steel braces & spreader beams
  - Reraill existing diagonal sheathing








# FLOOR PLAN - CLASSROOM WING A - SOUTH



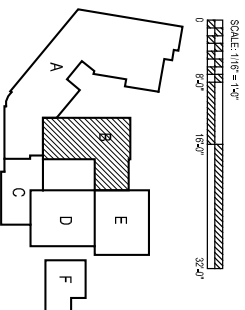


**Legend:**

-  (N) wall
-  (N) shear wall
-  (N) roof diaphragm
-  (N) steel trusses & spreader beams
-  Renal/ existing diagonal sheathing



KEY PLAN:



**FLOOR PLANS - AUDITORIUM WING B**

murakamiNelson Architectural Corp.  
Job No.: 0629 - PUSD Seismic

**LEGEND**



- NEEDED/IN PROGRESS
- YES / OK / COMPLETE
- DO NOT HAVE
- NON CONCLUSIVE
- NOT NECESSARY
- Pending Authorization
- NO

Shaded Area Indicates Tier 2 Scheme Analyst.



**Draft for Review & Comment**  
Preliminary Conceptual Cost Plan  
for  
Wildwood Elementary School  
Piedmont Unified School District

December 4, 2007

   
1900 Powell Street, Suite 470  
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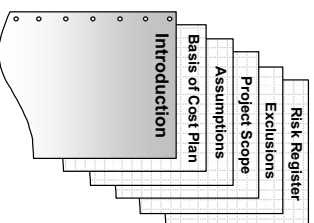
**Draft for Review & Comment**

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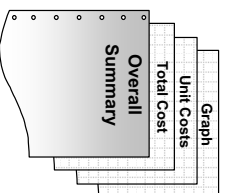
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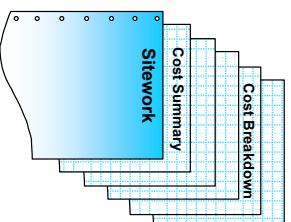
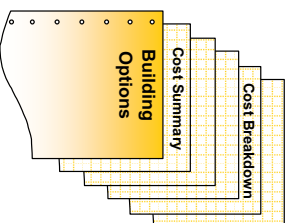


Mack5 was requested to carry out a preliminary Conceptual Cost Estimate for the proposed modernization of Wildwood Elementary School for the Piedmont Unified School District.

The first part of the Report contains the basis of the report, the assumptions made, description of the project scope, the exclusions to the costs and a risk register which contain items that have potential to impact cost at some point in the future.



Each detail section includes a Cost Summary and a Cost Breakdown with the detail of the scope included within the estimate.



**PROJECT INTRODUCTION:**

The project consists of making improvements to the existing Wildwood Elementary School including costs for structural and non-structural seismic hazards and accessibility and fire life safety upgrades.

**ITEMS USED FOR COST PLAN:**

Drawings dated October 19, 2007

civil drawings

None

architectural drawings

By murakami/Nelson, Sheets A-1, A-2 and A-3

structural narrative and sketches

By R.P. Gallagher Associates, Inc., Sheets S-A1 - S-A10 and S-B1, Narrative and Sketches Fax received 10/23/07, and Survey of Non-Structural Seismic Hazards

mechanical narrative and plans

None

electrical narrative and plans

None

telecommunication drawings

None

specifications

None

project team meetings

Site Visit on October 19, 2007

#### ASSUMPTIONS

- (a) The construction start date is unknown
- (b) A construction period of 18 months
- (c) The general contract may be bid or negotiated with qualified contractors.
- (d) The general contractor will not have full access to the site during business hours and will have to coordinate with student and staff occupancy.
- (e) There will be phasing requirements.
- (f) The existing electrical power systems are adequate for the increased loads.
- (g) Owner provide materials in a timely fashion.

#### PROJECT SCOPE

The project consists of making improvements to the existing Wildwood Elementary School including costs for structural and non-structural seismic hazards and accessibility and fire life safety upgrades.

##### modernization

The following contains a general description of the scope of work included in each element of the estimate.

##### substructure

Foundation work is limited to anchoring the wall framing to the existing foundations.

##### structure

Structural work involves removing the roof and adding plywood sheathing in addition to strengthening transverse walls within the building.

##### exterior enclosure

Exterior enclosure work includes patching and repair of finishes disturbed by the structural work and accessibility upgrades to doors as required. Costs are included for replacing the existing window glazing in response to a non-seismic hazard. We have assumed that the new glazing will be insulated with a low e coating.

##### roof

Roofing includes reinstallation of the salvaged roof tile at the auditorium. It is assumed that there will be some breakage of the existing tile, and a premium has been added for infilling new tile that matches the existing. An allowance is also included for remediation of the existing copper gutters and downspouts. Smoke hatches are also replaced at the auditorium.

##### interiors

Interior partitions include new sheathing to walls exposed for structural work, interior doors, frames, and hardware, and interior glazing.

##### finishes

Allowances are included for new floor finishes where disturbed by the structural work, reinstallation and limited replacement of existing wall paneling and trim, paint to new wall sheathing, and new ceilings as required by the structural work.



## equipment

Equipment includes refinishing and reinstallation of existing salvaged casework with limited new casework to match the existing as required for accessibility and an allowance for wall mounted accessories that need to be replaced due to the structural work.

## stairs and vertical transportation

Stairs include modifications to existing stairs for accessibility and new short stair flights as required at the exterior doors.

## plumbing

Plumbing work includes removal and replacement of fixtures as required for structural work and accessibility.

## hvac

HVAC work includes seismic bracing of existing systems, cleaning of existing ductwork, and testing and balancing the system.

## fire protection

A new wet sprinkler system is included throughout the building.

## site preparation

Selective demolition as required for new work. Premiums are included for salvage and storage of historical items and hazardous materials abatement.

## electrical

Electrical includes removal and replacement of existing to facilitate the seismic strengthening and fire rating of the structure, adding light fixtures as required, replacing light specified light fixtures, motor work, and the addition of a code compliant fire alarm system, including door hold connections. Costs are also included for changing the fire alarm system in the newer addition to be compatible with the new system in the classroom and auditorium buildings.

## sitework

Sitework includes modifications to gates, paving, steps, and ramps as required for accessibility.

## site utilities

Site utilities include allowances for modifications to existing and subdrain piping and the addition of fire line service and metering.



## EXCLUSIONS

- (a) Owner supplied and installed furniture, fixtures and equipment
- (b) Security equipment and devices

- (c) Design, testing, inspection or construction management fees

- (d) Utility and connection fees

- (e) Scope change and post contract contingencies

- (f) Assessments, taxes, finance, legal and development charges

- (g) Builder's risk, project wrap-up and other owner provided insurance program

- (h) Telephone / data active equipment and switch, sound systems, audio visual equipment and cabling

- (i) Modification to existing HVAC

- (j) Schedule compression

- (k) Commissioning costs associated with CHPs, LEED Certification, or other programs (construction cost included as required)

- (l) Deferred maintenance

- (m) Programmatic changes

- (n) Complete replacement of building finishes except as specifically noted (costs for selective replacement of finishes as required for seismic work is included in the estimate)

- (o) Interim housing

- (p) Cost escalation



risk register

In the course of preparing the Cost Estimate, the following items were noted as areas of possible exposure.

- (a) The project is relatively small and the scope limited within a larger area. Consequently contractors bids can vary widely.
- (b) Current market conditions are driven by limited supply of metal and consequently cost escalation and bids are unstable.
- (c) The design process is early in the conceptual stage. As ideas are more fully developed there may be scope which was not anticipated in this cost estimate.



BUILDING OPTIONS

| Floors                                 | Enclosed | Covered | Covered<br>(included at 50%) | Sub-Total | GFA       |
|--|----------|---------|------------------------------|-----------|-----------|
| Auditorium                             | 4,304    | 0       | 0                            | 4,304     |           |
| I 1930's Building                      | 10,304   | 0       | 0                            | 10,304    | 14,608 SF |
| New Wing<br>(Main and<br>Lower Levels) | 12,948   | 0       | 0                            | 12,948    |           |
|  |          |         |                              |           | 27,556 SF |

## Overall Summary

M5-07-198  
December 4, 2007

|  | GFA     | \$/SF | \$,000       |
|--|---------|-------|--------------|
| Classrooms                             | 10,328  | 273   | 2,823        |
| Auditorium                             | 4,304   | 257   | 1,106        |
| Sitework                               | 104,400 | 5     | 570          |
| <b>Total Construction and Sitework</b> |         |       | <b>4,499</b> |
| Phasing                                | 5.00%   |       | 225          |
| <b>TOTAL CONSTRUCTION AND SITEWORK</b> |         |       | <b>4,724</b> |

## Classroom Building Summary

M5-07-198  
December 4, 2007

|   | GFA: 10,328 SF        | %           | \$/SF         | \$,000       |
|---|-----------------------|-------------|---------------|--------------|
| Substructure                                  |                       | 0%          | 0.00          | 0            |
| Structure                                     |                       | 14%         | 37.93         | 392          |
| Exterior Enclosure                            |                       | 13%         | 36.04         | 372          |
| Roofing                                       |                       | 1%          | 3.01          | 31           |
| <b>Sub-total - Shell &amp; Core</b>           |                       | <b>28%</b>  | <b>76.99</b>  | <b>795</b>   |
| Interior Walls                                |                       | 7%          | 18.95         | 196          |
| Floor, Wall & Ceiling Finishes                |                       | 3%          | 9.07          | 94           |
| <b>Sub-total - Internal Finishes</b>          |                       | <b>10%</b>  | <b>28.02</b>  | <b>289</b>   |
| Equipment & Specialties                       |                       | 2%          | 6.27          | 65           |
| Stairs & Vertical Transportation              |                       | 1%          | 2.50          | 26           |
| <b>Sub-total - Equipment and Stairs</b>       |                       | <b>3%</b>   | <b>8.77</b>   | <b>91</b>    |
| Plumbing                                      |                       | 2%          | 5.20          | 54           |
| Heating, Ventilating & Air Conditioning       |                       | 3%          | 8.23          | 85           |
| Electrical                                    |                       | 9%          | 24.18         | 250          |
| Fire Protection                               |                       | 3%          | 9.46          | 98           |
| <b>Sub-total - Mechanical and Electrical</b>  |                       | <b>17%</b>  | <b>47.07</b>  | <b>486</b>   |
| <b>Sub-total - Construction</b>               |                       | <b>59%</b>  | <b>160.84</b> | <b>1,661</b> |
| Site Preparation & Demolition                 |                       | 13%         | 36.62         | 378          |
| Site Development                              |                       | 0%          | 0.00          | 0            |
| Site Utilities                                |                       | 0%          | 0.00          | 0            |
| <b>Sub-total - Sitework</b>                   |                       | <b>13%</b>  | <b>36.62</b>  | <b>378</b>   |
| <b>Total - Construction and Sitework</b>      |                       | <b>72%</b>  | <b>197.46</b> | <b>2,039</b> |
| General Conditions                            |                       | 9%          | 24.68         | 255          |
| Contractor's Overhead & Profit or Fee         |                       | 6%          | 15.55         | 161          |
| <b>Sub-total</b>                              |                       | <b>87%</b>  | <b>237.69</b> | <b>2,455</b> |
| Contingency for Design Development            |                       | 13%         | 35.65         | 368          |
| Cost Escalation (to midpoint of construction) |                       | 0%          | 0.00          | 0            |
| <b>TOTAL CONSTRUCTION BUDGET</b>              | <b>December, 2007</b> | <b>100%</b> | <b>273.35</b> | <b>2,823</b> |

NOTE: Inclusions and Exclusions.



|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



| SUBSTRUCTURE | Quantity | Unit | Rate | Total (\$) |
|--------------|----------|------|------|------------|
|--------------|----------|------|------|------------|

No work anticipated

Sub-Total for Substructure:

| STRUCTURE | Quantity | Unit | Rate | Total (\$) |
|-----------|----------|------|------|------------|
|-----------|----------|------|------|------------|

|  |       |     |           |         |
|--|-------|-----|-----------|---------|
| Strengthen existing structure - Classrooms   |       |     |           |         |
| Tie between existing sill and foundation wall below  | 122   | EA  | 150.00    | 18,356  |
| Connect main floor joists to foundation wall below   | 41    | LOC | 100.00    | 4,050   |
| Infill opening in foundation wall  | 6     | LOC | 500.00    | 3,000   |
| Cut access opening in foundation wall  | 6     | EA  | 500.00    | 3,000   |
| New 4x6 posts with holdowns  | 44    | EA  | 250.00    | 11,000  |
| New 2x posts with holdowns   | 32    | EA  | 200.00    | 6,400   |
| Infill opening in wall framing   | 210   | SF  | 10.00     | 2,100   |
| Plywood over existing wall framing, with edge nailing, 3/8", connected to existing sheathing | 8,430 | SF  | 5.00      | 42,150  |
| Extend interior partition from top of ceiling to roof framing                                | 462   | LF  | 50.00     | 23,100  |
| Install continuous strap with new 3x blocking at top of sill                                 | 345   | LF  | 50.00     | 17,250  |
| Splice ceiling joists  | 8     | LOC | 250.00    | 2,000   |
| Anchors at top of wall   | 124   | LOC | 50.00     | 6,175   |
| Add steel braced frame including shoring of existing wall framing                            | 8     | LOC | 25,000.00 | 200,000 |
| Strengthen existing structure - Office   |       |     |           |         |
| Tie between existing sill and foundation wall below  | 42    | EA  | 150.00    | 6,244   |
| New 4x6 posts with holdowns  | 12    | EA  | 250.00    | 3,000   |
| Plywood over existing wall framing, with edge nailing, 3/8", connected to existing sheathing | 800   | SF  | 5.00      | 4,000   |
| Install continuous strap with new 3x blocking at top of sill                                 | 52    | LF  | 50.00     | 2,600   |

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



|   |        |     |        |        |
|---|--------|-----|--------|--------|
| New plywood to underside of rafters, allow for tight quarters | 240    | SF  | 25.00  | 6,000  |
| New rafters tied to existing                                  | 60     | LF  | 20.00  | 1,200  |
| Splice rafters  | 2      | LOC | 250.00 | 500    |
| Modify existing seismic joint and cover                       | 90     | LF  | 100.00 | 9,000  |
| Miscellaneous structural work                                 | 10,328 | SF  | 2.00   | 20,656 |

Sub-Total for Structure:

| EXTERIOR ENCLOSURE | Quantity | Unit | Rate | Total (\$) |
|--------------------|----------|------|------|------------|
|--------------------|----------|------|------|------------|

|   |       |     |           |         |
|---|-------|-----|-----------|---------|
| Exterior walls  |       |     |           |         |
| New plaster wall finish   | 9,000 | SF  | 25.00     | 225,000 |
| Panel behind switchgear - allow   | 1     | LS  | 5,000.00  | 5,000   |
| Reroute or replace amenities at exterior wall such as conduits, light fixtures, gutters, etc. | 1     | LS  | 20,000.00 | 20,000  |
| Guardrails at drinking fountain, stainless steel  | 1     | PR  | 1,200.00  | 1,200   |
| Exterior windows  |       |     |           |         |
| Replace glazing in existing window frames, insulated, low e                                   | 2,112 | SF  | 50.00     | 105,600 |
| Exterior doors  |       |     |           |         |
| New door, frame, and hardware in existing opening   | 5     | LVS | 2,200.00  | 11,000  |
| New hardware to existing door   | 3     | LVS | 850.00    | 2,550   |
| Premium for panic hardware  | 2     | LVS | 950.00    | 1,900   |
| Sub-Total for Exterior Enclosure:   |       |     |           | 372,250 |

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



| ROOFING | Unit | Rate | Total (\$) |
|---------|------|------|------------|
|---------|------|------|------------|

## Roof coverings

Repair or replace to match historic copper gutters and downspouts as required - allow

|     |     |           |        |
|-----|-----|-----------|--------|
| 1   | LOT | 15,000.00 | 15,000 |
| 140 | SF  | 115.00    | 16,100 |

## Sub-Total for Roofing:

31,100

| INTERIOR WALLS | Unit | Rate | Total (\$) |
|----------------|------|------|------------|
|----------------|------|------|------------|

## Interior partitions

|   |       |    |        |        |
|---|-------|----|--------|--------|
| Interior partition framing and sheathing at classroom furnace closets     | 800   | SF | 17.50  | 14,000 |
| Gypsum board partition sheathing to existing framing at corridors, double | 6,720 | SF | 4.50   | 30,240 |
| Gypsum board partition sheathing over new plywood sheathing               | 9,650 | SF | 3.00   | 28,950 |
| Guardrails at drinking fountain   | 1     | PR | 850.00 | 850    |

## Interior glazing

|  |    |    |        |        |
|--|----|----|--------|--------|
| New fire-rated transom glazing in existing opening | 18 | EA | 750.00 | 13,500 |
|--|----|----|--------|--------|

## Interior doors

|  |   |    |          |        |
|--|---|----|----------|--------|
| New door, frame, and hardware                | 6 | EA | 1,750.00 | 10,500 |
| New access door at re-framed furnace closets | 8 | EA | 650.00   | 5,200  |

|  |    |    |          |        |
|--|----|----|----------|--------|
| Rated doors and frames in existing corridor openings, including casing and trim, with magnetic hold open | 26 | EA | 3,500.00 | 91,000 |
| Modify existing door opening   | 3  | EA | 500.00   | 1,500  |

## Sub-Total for Interior Walls:

195,740

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



| FLOOR, WALL & CEILING FINISHES | Unit | Rate | Total (\$) |
|--------------------------------|------|------|------------|
|--------------------------------|------|------|------------|

## Floor finishes

Vinyl composition tile and carpet with wood base to match existing, including preparation of floor to receive new finish

|     |    |       |       |
|-----|----|-------|-------|
| 269 | SF | 7.50  | 2,018 |
| 93  | SF | 25.00 | 2,325 |

## Wall finishes

|                                    |        |    |       |        |
|------------------------------------|--------|----|-------|--------|
| Ceramic wall tile                  | 448    | SF | 14.00 | 6,272  |
| FRP wall panel at janitor's closet | 84     | SF | 6.50  | 546    |
| Paint to walls                     | 17,170 | SF | 1.00  | 17,170 |

## Ceiling finishes

|  |       |    |       |        |
|--|-------|----|-------|--------|
| New classroom ceilings as required to accommodate structural work      | 1,810 | SF | 10.00 | 18,100 |
| Painted gypsum board ceiling at corridor, double layer of gypsum board | 2,360 | SF | 20.00 | 47,200 |

## Sub-Total for Floor, Wall &amp; Ceiling Finishes:

93,631

| EQUIPMENT & SPECIAL TIES | Unit | Rate | Total (\$) |
|--------------------------|------|------|------------|
|--------------------------|------|------|------------|

## Cabinets and casework

|  |    |    |        |        |
|--|----|----|--------|--------|
| New casework, including blocking as necessary, to match existing | 56 | LF | 350.00 | 19,600 |
|--|----|----|--------|--------|

## Toilet partitions and accessories

|                            |   |    |        |     |
|----------------------------|---|----|--------|-----|
| Toilet accessories - allow | 1 | LS | 500.00 | 500 |
| Grab bars                  | 1 | PR | 325.00 | 325 |
| Mirrors                    | 1 | EA | 200.00 | 200 |

## Signage

|  |        |    |          |       |
|--|--------|----|----------|-------|
| Code-required signage throughout building              | 10,328 | SF | 0.40     | 4,131 |
| Code-required signage at Buildings C, D, and E - allow | 1      | LS | 5,000.00 | 5,000 |

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



|  |        |    |           |        |
|--|--------|----|-----------|--------|
| Chalkboards and markerboards   |        |    |           |        |
| Markerboards to replace removed chalkboards                              | 7      | EA | 650.00    | 4,550  |
| Brace and anchor existing cabinets, televisions and speakers as required | 1      | LS | 15,000.00 | 15,000 |
| Miscellaneous equipment and specialties                                  | 10,328 | SF | 1.50      | 15,492 |

**Sub-Total for Equipment & Specialties:****64,798**

| STAIRS & VERTICAL TRANSPORTATION   | Unit | Rate | Total (\$) |
|------------------------------------|------|------|------------|
| Short stair flights                |      |      |            |
| New exit stairs and railings       | 1    | FLT  | 10,000.00  |
| New/modified exit landings         | 214  | SF   | 20.00      |
| New railings at existing stairs    | 54   | LF   | 200.00     |
| Warning stripes to existing stairs | 70   | LF   | 10.00      |

**Sub-Total for Stairs & Vertical Transportation:****25,780**

| PLUMBING   | Unit | Rate | Total (\$) |
|--|------|------|------------|
| Sanitary fixtures, connection piping, including rough-in |      |      |            |
| DF (N) w/(N) rough-in                                    | 2    | EA   | 5,177.28   |
| Classrooms   |      |      |            |
| Sink(N) w/(N) rough-in                                   | 9    | EA   | 2,741.28   |
| Bathroom   |      |      |            |
| WC(N) w/(N) rough-in                                     | 1    | EA   | 5,121.60   |
| LAV(N) w/(N) rough-in                                    | 1    | EA   | 2,456.88   |
| Janitor's closet   |      |      |            |
| Sink(N) w/(N) rough-in                                   | 1    | EA   | 2,741.28   |
| Water heater   | 1    | EA   | 5,000.00   |
| Demolition and cleaning                                  | 1    | LS   | 3,389.76   |

**Sub-Total for Plumbing :****53,736**

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
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| HEATING, VENTILATING & AIR CONDITIONING           | Unit | Rate | Total (\$) |
|---|------|------|------------|
| HVAC - seismic bracing                            | 1    | LS   | 10,000.00  |
| Replace existing furnaces and provide outside air | 1    | LS   | 75,000.00  |

**Sub-Total for Heating, Ventilating & Air Conditioning:****85,000**

| ELECTRICAL  | Unit   | Rate | Total (\$) |
|---|--------|------|------------|
| Electrical work within building   |        |      |            |
| Remove and replace electrical systems to facilitate architectural and structural modifications  | 10,328 | SF   | 2.00       |
| Toilet room and janitor's closet electrical   | 138    | SF   | 10.00      |
| Provide new fire alarm system   | 10,328 | SF   | 3.75       |
| Remove and extend devices to facilitate fire rating of corridors  | 240    | LF   | 23.60      |
| New light fixtures  | 10,328 | SF   | 8.00       |
| Lighted exit signs  | 12     | EA   | 775.00     |
| Door hold connections   | 26     | EA   | 525.00     |
| Provide new fire alarm system in additions - allow (including architectural patch and repair and demolition of existing system as required) | 12,948 | SF   | 6.00       |

**Sub-Total for Electrical:****249,692**

| FIRE PROTECTION                        | Unit   | Rate | Total (\$) |
|--|--------|------|------------|
| Fire sprinklers                        |        |      |            |
| Fire protection system-wet             | 10,328 | SF   | 7.54       |
| Fire protection system riser           | 1      | EA   | 8,305.92   |
| Deluge system at exterior wall - allow | 100    | LF   | 115.00     |

**Sub-Total for Fire Protection:****97,679**

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
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| SITE PREPARATION & DEMOLITION  | Unit  | Rate   | Total (\$)  |
|--|---|--|---|
| Selective demolition and removal<br>Remove existing; recycle<br>For Structural Option 1<br>Ceiling finish as required to<br>accommodate structural work<br>Wall finish as required to<br>accommodate structural work<br>Diagonal wall sheathing<br>Exterior wall finish<br>Skylights<br>Door, frame, and hardware<br>Corridor wood door, frame, and<br>hardware<br>Corridor transom above door<br>Hardware from existing door<br>Interior partition<br>Floor finish<br>Corridor ceiling finish, lath and plaster<br>Chalkboards - allow<br>Casework<br>Wall trim and accessories<br>Wood wall paneling<br>General demolition and preparation<br>Premium for hazmat abatement | SF<br>SF<br>SF<br>SF<br>EA<br>LVS<br>LVS<br>EA<br>LVS<br>LF<br>LF<br>SF<br>SF<br>SF<br>SF<br>SF<br>SF<br>EA<br>LS<br>LF<br>SF<br>SF<br>SF | 4.00<br>3.00<br>3.50<br>15.00<br>250.00<br>115.00<br>115.00<br>100.00<br>100.00<br>25.00<br>2.00<br>5.00<br>35.00<br>1,500.00<br>7.50<br>5.00<br>1.00<br>10.00<br>1.00<br>1.00<br>1.00<br>1.00<br>1.00 | 31,872<br>49,110<br>7,266<br>135,000<br>1,000<br>1,610<br>2,990<br>1,800<br>300<br>300<br>724<br>11,800<br>245<br>1,500<br>7,500<br>11,550<br>10,328<br>103,280<br>10,328<br>10,328<br>10,328<br>10,328<br>10,328 |
| <b>Sub-Total for Site Preparation &amp;<br/>Demolition:</b>  |   |  | <b>378,175</b>  |
| <b>SITE DEVELOPMENT</b>  | Unit  | Rate   | Total (\$)  |
| No work anticipated (see Sitework section)   |   |  |   |
| <b>Sub-Total for Site Development:</b>   |   |  |   |

|                    |                               |
|--------------------|-------------------------------|
| Classroom Building | M5-07-198<br>December 4, 2007 |
|--------------------|-------------------------------|



| SITE UTILITIES                             | Unit | Rate | Total (\$) |
|--|------|------|------------|
| No work anticipated (see Sitework section) |      |      |            |
| <b>Sub-Total for Site Utilities:</b>       |      |      |            |



|   |                       | GFA: 4,304 SF |               |              |  |
|---|-----------------------|---------------|---------------|--------------|--|
|   |                       | %             | \$/SF         | \$,000       |  |
| Substructure                                  |                       | 0%            | 0.00          | 0            |  |
| Structure                                     |                       | 9%            | 23.44         | 101          |  |
| Exterior Enclosure                            |                       | 15%           | 38.12         | 164          |  |
| Roofing                                       |                       | 4%            | 10.73         | 46           |  |
| <b>Sub-total - Shell &amp; Core</b>           |                       | <b>28%</b>    | <b>72.29</b>  | <b>311</b>   |  |
| Interior Walls                                |                       | 1%            | 2.72          | 12           |  |
| Floor, Wall & Ceiling Finishes                |                       | 12%           | 31.30         | 135          |  |
| <b>Sub-total - Internal Finishes</b>          |                       | <b>13%</b>    | <b>34.02</b>  | <b>146</b>   |  |
| Equipment & Specialties                       |                       | 2%            | 5.86          | 25           |  |
| Stairs & Vertical Transportation              |                       | 2%            | 4.18          | 18           |  |
| <b>Sub-total - Equipment and Stairs</b>       |                       | <b>4%</b>     | <b>10.04</b>  | <b>43</b>    |  |
| Plumbing                                      |                       | 1%            | 3.25          | 14           |  |
| Heating, Ventilating & Air Conditioning       |                       | 0%            | 0.58          | 3            |  |
| Electrical                                    |                       | 5%            | 12.72         | 55           |  |
| Fire Protection                               |                       | 1%            | 3.62          | 16           |  |
| <b>Sub-total - Mechanical and Electrical</b>  |                       | <b>6%</b>     | <b>20.16</b>  | <b>87</b>    |  |
| <b>Sub-total - Construction</b>               |                       | <b>53%</b>    | <b>136.51</b> | <b>588</b>   |  |
| Site Preparation & Demolition                 |                       | 19%           | 49.18         | 212          |  |
| Site Development                              |                       | 0%            | 0.00          | 0            |  |
| Site Utilities                                |                       | 0%            | 0.00          | 0            |  |
| <b>Sub-total - Steward</b>                    |                       | <b>19%</b>    | <b>49.18</b>  | <b>212</b>   |  |
| <b>Total - Construction and Steward</b>       |                       | <b>72%</b>    | <b>185.68</b> | <b>799</b>   |  |
| General Conditions                            |                       | 9%            | 23.21         | 100          |  |
| Contractor's Overhead & Profit or Fee         |                       | 6%            | 14.62         | 63           |  |
| <b>Sub-total</b>                              |                       | <b>87%</b>    | <b>223.52</b> | <b>962</b>   |  |
| Contingency for Design Development            |                       | 15.00%        | 33.53         | 144          |  |
| Cost Escalation (to midpoint of construction) |                       | 0.00%         | 0.00          | 0            |  |
| <b>TOTAL CONSTRUCTION BUDGET</b>              | <b>December, 2007</b> | <b>100%</b>   | <b>257.04</b> | <b>1,106</b> |  |

**NOTE:** Inclusions and Exclusions.



| <b>SUBSTRUCTURE</b>   | Quantity | Unit | Rate      | Total (\$)     |
|---|----------|------|-----------|----------------|
| No work anticipated   |          |      |           |                |
| <b>Sub-Total for Substructure:</b>  |          |      |           |                |
| <b>STRUCTURE</b>  | Quantity | Unit | Rate      | Total (\$)     |
| Strengthen existing structure   |          |      |           |                |
| New 4x6 posts with holdowns at auditorium   | 16       | EA   | 350.00    | 5,600          |
| New 4x10 posts with holdowns at auditorium  | 14       | EA   | 500.00    | 7,000          |
| New 6x10 posts with holdowns at auditorium  | 4        | EA   | 650.00    | 2,600          |
| Epoxy bolt in foundation wall   | 6        | EA   | 85.00     | 510            |
| Plywood over existing wall framing, with edge nailing, 3/4", connected to existing sheathing  | 6,436    | SF   | 6.50      | 41,834         |
| Install continuous strap with new 3x blocking at top of sill                                  | 170      | LF   | 50.00     | 8,500          |
| Rerail existing roof sheathing  | 4,304    | SF   | 4.00      | 17,216         |
| Modify existing seismic joint and cover   | 90       | LF   | 100.00    | 9,000          |
| Miscellaneous structural work   | 4,304    | SF   | 2.00      | 8,608          |
| <b>Sub-Total for Structure:</b>   |          |      |           | <b>100,868</b> |
| <b>EXTERIOR ENCLOSURE</b>   | Quantity | Unit | Rate      | Total (\$)     |
| Exterior walls - Structural Option 1  |          |      |           |                |
| Patch plaster finish to match existing where removed for structural work                      | 3,976    | SF   | 25.00     | 99,400         |
| Reroute or replace amenities at exterior wall such as conduits, light fixtures, gutters, etc. | 1        | LS   | 10,000.00 | 10,000         |
| Replicate cornice trim at auditorium  | 212      | LF   | 100.00    | 21,200         |



|            |                  |
|------------|------------------|
| Auditorium | M5-07-198        |
|            | December 4, 2007 |



|   |     |    |        |
|---|-----|----|--------|
| Exterior windows  |     |    |        |
| Replace glazing in existing window frames, insulated, low e | 480 | SF | 50.00  |
|   |     |    | 24,000 |

|   |   |     |          |
|---|---|-----|----------|
| Exterior doors                                    |   |     |          |
| New door, frame, and hardware in existing opening | 3 | LVS | 2,200.00 |
| Premium for panic hardware                        | 3 | LVS | 950.00   |
|   |   |     | 6,600    |
|   |   |     | 2,850    |

**Sub-Total for Exterior Enclosure:****164,050**

| ROOFING | Unit | Rate | Total (\$) |
|---------|------|------|------------|
|---------|------|------|------------|

|   |       |     |           |
|---|-------|-----|-----------|
| Roof coverings  |       |     |           |
| Reinstall salvaged roof tiles at auditorium, allow for 10% breakage                   | 3,900 | SF  | 8.00      |
| Repair or replace to match historic copper gutters and downspouts as required - allow | 1     | LOT | 15,000.00 |
|   |       |     | 15,000    |

**Sub-Total for Roofing:****46,200**

| INTERIOR WALLS | Unit | Rate | Total (\$) |
|----------------|------|------|------------|
|----------------|------|------|------------|

|   |       |    |       |
|---|-------|----|-------|
| Interior partitions   |       |    |       |
| Interior partition framing and sheathing at modified mechanical shaft | 300   | SF | 25.00 |
| Gypsum board partition sheathing over new plywood sheathing           | 1,408 | SF | 3.00  |
|   |       |    | 7,500 |
|   |       |    | 4,224 |

**Sub-Total for Interior Walls:****11,724**

| FLOOR, WALL & CEILING FINISHES | Unit | Rate | Total (\$) |
|--------------------------------|------|------|------------|
|--------------------------------|------|------|------------|

|                                       |       |    |        |
|---------------------------------------|-------|----|--------|
| Wall finishes                         |       |    |        |
| Reinstall salvaged wood wall paneling | 1,798 | SF | 50.00  |
|                                       |       |    | 89,900 |

|            |                  |
|------------|------------------|
| Auditorium | M5-07-198        |
|            | December 4, 2007 |



|                                     |       |    |        |
|-------------------------------------|-------|----|--------|
| Ceiling finishes                    |       |    |        |
| Reinstall auditorium ceiling panels | 2,240 | SF | 20.00  |
|                                     |       |    | 44,800 |

**Sub-Total for Floor, Wall & Ceiling Finishes:****134,700**

| EQUIPMENT & SPECIALTIES | Unit | Rate | Total (\$) |
|-------------------------|------|------|------------|
|-------------------------|------|------|------------|

|  |    |    |        |
|--|----|----|--------|
| Cabinets and casework  |    |    |        |
| New casework, including blocking as necessary, to match existing | 10 | LF | 350.00 |
|  |    |    | 3,500  |

|                                   |   |    |        |
|-----------------------------------|---|----|--------|
| Toilet partitions and accessories |   |    |        |
| Toilet accessories - allow        | 1 | LS | 500.00 |
| Grab bars                         | 1 | PR | 325.00 |
| Mirrors                           | 1 | EA | 200.00 |
|                                   |   |    | 500    |
|                                   |   |    | 325    |
|                                   |   |    | 200    |

|   |       |    |       |
|---|-------|----|-------|
| Signage                                   |       |    |       |
| Code-required signage throughout building | 4,304 | SF | 0.40  |
|   |       |    | 1,722 |

|  |   |    |          |
|--|---|----|----------|
| Brace and anchor existing cabinets, televisions and speakers as required | 1 | LS | 2,500.00 |
|  |   |    | 2,500    |

|                                |   |    |           |
|--------------------------------|---|----|-----------|
| Smoke hatch at theater - allow | 1 | LS | 10,000.00 |
|                                |   |    | 10,000    |

|   |       |    |       |
|---|-------|----|-------|
| Miscellaneous equipment and specialties | 4,304 | SF | 1.50  |
|   |       |    | 6,456 |

**Sub-Total for Equipment & Specialties:****25,203**

| STAIRS & VERTICAL TRANSPORTATION | Unit | Rate | Total (\$) |
|----------------------------------|------|------|------------|
|----------------------------------|------|------|------------|

|  |    |     |           |
|--|----|-----|-----------|
| Short stair flights                                    |    |     |           |
| Modify/widen existing short stair flight at auditorium | 1  | EA  | 3,500.00  |
| New exit stairs and railings                           | 1  | FLT | 10,000.00 |
| New/modified exit landings                             | 50 | SF  | 20.00     |
|  |    |     | 1,000     |

|            |                               |
|------------|-------------------------------|
| Auditorium | M5-07-198<br>December 4, 2007 |
|------------|-------------------------------|



|  |   |    |          |
|--|---|----|----------|
| Elevators and lifts                                      |   |    |          |
| Reinstall salvaged lift at auditorium short stair flight | 1 | EA | 3,500.00 |
|  |   |    | 3,500    |

**Sub-Total for Stairs & Vertical Transportation:** **18,000**

|  |      |      |            |
|--|------|------|------------|
| <b>PLUMBING</b>  | Unit | Rate | Total (\$) |
| Sanitary fixtures, connection piping, including rough-in |      |      |            |
| Kitchen  |      |      |            |
| Sink(N) w/(N) rough-in                                   | 1    | EA   | 3,000.00   |
|  |      |      | 3,000      |
| Bathroom   |      |      |            |
| WC(N) w/(N) rough-in                                     | 1    | EA   | 5,121.60   |
|  |      |      | 5,122      |
| LAV(N) w/(N) rough-in                                    | 1    | EA   | 2,456.88   |
|  |      |      | 2,457      |
| Demolition and cleaning                                  | 1    | LS   | 3,389.76   |
|  |      |      | 3,390      |

**Sub-Total for Plumbing :** **13,968**

|  |      |      |            |
|--|------|------|------------|
| <b>HEATING, VENTILATING &amp; AIR CONDITIONING</b> | Unit | Rate | Total (\$) |
| HVAC - seismic bracing                             | 1    | LS   | 2,500.00   |
|  |      |      | 2,500      |

**Sub-Total for Heating, Ventilating & Air Conditioning:** **2,500**

|  |       |      |            |
|--|-------|------|------------|
| <b>ELECTRICAL</b>  | Unit  | Rate | Total (\$) |
| Electrical work within building  |       |      |            |
| Remove and replace electrical systems to facilitate architectural and structural modifications | 4,304 | SF   | 2.00       |
|  |       |      | 8,608      |
| Provide assisted listening system  | 1     | LS   | 25,000.00  |
|  |       |      | 25,000     |
| Provide new fire alarm system  | 4,304 | SF   | 3.75       |
|  |       |      | 16,140     |
| Brace existing light fixtures  | 1     | LS   | 5,000.00   |
|  |       |      | 5,000      |

**Sub-Total for Electrical:** **54,748**

|            |                               |
|------------|-------------------------------|
| Auditorium | M5-07-198<br>December 4, 2007 |
|------------|-------------------------------|



|                            |       |      |            |
|----------------------------|-------|------|------------|
| <b>FIRE PROTECTION</b>     | Unit  | Rate | Total (\$) |
| Fire sprinklers            |       |      |            |
| Fire protection system-wet | 2,064 | SF   | 7.54       |
|                            |       |      | 15,563     |

**Sub-Total for Fire Protection:** **15,563**

|  |       |      |            |
|--|-------|------|------------|
| <b>SITE PREPARATION &amp; DEMOLITION</b>   | Unit  | Rate | Total (\$) |
| Selective demolition and removal   |       |      |            |
| Remove existing: recycle   |       |      |            |
| For Structural Option 1  |       |      |            |
| Wall finish as required to accommodate structural work                           | 6,436 | SF   | 3.00       |
|  |       |      | 19,308     |
| Diagonal wall sheathing  | 6,436 | SF   | 3.50       |
|  |       |      | 22,526     |
| Exterior wall finish to accommodate structural work                              | 3,976 | SF   | 15.00      |
|  |       |      | 59,640     |
| Casework   | 1     | LS   | 250.00     |
|  |       |      | 250        |
| Wood wall paneling   | 1,798 | SF   | 5.00       |
|  |       |      | 8,990      |
| Remove, salvage, and store existing Auditorium ceiling panels for reinstallation | 2,240 | SF   | 10.00      |
|  |       |      | 22,400     |
| Clay roof tiles for reinstallation   | 3,900 | SF   | 8.00       |
|  |       |      | 31,200     |
| General demolition and preparation   | 4,304 | SF   | 1.00       |
|  |       |      | 4,304      |
| Premium for hazmat abatement   | 4,304 | SF   | 10.00      |
|  |       |      | 43,040     |

**Sub-Total for Site Preparation & Demolition:** **211,658**

|  |      |      |            |
|--|------|------|------------|
| <b>SITE DEVELOPMENT</b>                    | Unit | Rate | Total (\$) |
| No work anticipated (see Sitework section) |      |      |            |
| <b>Sub-Total for Site Development:</b>     |      |      |            |

**SITE UTILITIES**

Unit

Rate

Total (\$)

No work anticipated (see Sitework section)

Sub-Total for Site Utilities:



GFA: 104,400 SF

%

\$/SF

\$ ,000

|   |                       |             |            |
|---|-----------------------|-------------|------------|
| Substructure                                  | 0%                    | 0.00        | 0          |
| Structure                                     | 0%                    | 0.00        | 0          |
| Exterior Enclosure                            | 0%                    | 0.00        | 0          |
| Roofing                                       | 0%                    | 0.00        | 0          |
| <i>Sub-total - Shell &amp; Core</i>           | <i>0%</i>             | <i>0.00</i> | <i>0</i>   |
| Interior Walls                                | 0%                    | 0.00        | 0          |
| Floor, Wall & Ceiling Finishes                | 0%                    | 0.00        | 0          |
| <i>Sub-total - Internal Finishes</i>          | <i>0%</i>             | <i>0.00</i> | <i>0</i>   |
| Equipment & Specialties                       | 0%                    | 0.00        | 0          |
| Stairs & Vertical Transportation              | 0%                    | 0.00        | 0          |
| <i>Sub-total - Equipment and Stairs</i>       | <i>0%</i>             | <i>0.00</i> | <i>0</i>   |
| Plumbing                                      | 0%                    | 0.00        | 0          |
| Heating, Ventilating & Air Conditioning       | 0%                    | 0.00        | 0          |
| Electrical                                    | 0%                    | 0.00        | 0          |
| Fire Protection                               | 0%                    | 0.00        | 0          |
| <i>Sub-total - Mechanical and Electrical</i>  | <i>0%</i>             | <i>0.00</i> | <i>0</i>   |
| <i>Sub-total - Construction</i>               | <i>0%</i>             | <i>0.00</i> | <i>0</i>   |
| Site Preparation & Demolition                 | 2%                    | 0.10        | 10         |
| Landscaping                                   | 54%                   | 2.94        | 306        |
| Site Utilities                                | 17%                   | 0.91        | 95         |
| <i>Sub-total - Sitework</i>                   | <i>72%</i>            | <i>3.94</i> | <i>411</i> |
| <i>Total - Construction and Sitework</i>      | <i>72%</i>            | <i>3.94</i> | <i>411</i> |
| General Conditions                            | 12.50%                | 0.49        | 51         |
| Contractor's Overhead & Profit or Fee         | 7.00%                 | 0.31        | 32         |
| <i>Sub-total</i>                              | <i>87%</i>            | <i>4.74</i> | <i>495</i> |
| Contingency for Design Development            | 15.00%                | 0.71        | 74         |
| Cost Escalation (to midpoint of construction) | 0.00%                 | 0.00        | 0          |
| <b>TOTAL CONSTRUCTION BUDGET</b>              | <b>December, 2007</b> | <b>100%</b> | <b>570</b> |
|   |                       | <b>5.46</b> |            |

**NOTE:** Inclusions and Exclusions.

|         |                  |
|---------|------------------|
| Stework | M5-07-198        |
|         | December 4, 2007 |



| SITE PREPARATION & DEMOLITION                           | Quantity | Unit | Rate      | Total (\$)    |
|---|----------|------|-----------|---------------|
| Site demolition and earthwork                           |          |      |           |               |
| Miscellaneous site demolition - allow                   | 1        | LS   | 10,000.00 | 10,000        |
| <b>Sub-Total for Site Preparation &amp; Demolition:</b> |          |      |           | <b>10,000</b> |

| LANDSCAPING   | Quantity | Unit | Rate      | Total (\$)     |
|---|----------|------|-----------|----------------|
| Vehicular paving and curbs  |          |      |           |                |
| Expand existing accessible parking  | 180      | SF   | 115.00    | 20,700         |
| Retaining wall, including footing   | 200      | SF   | 10.00     | 2,000          |
| Paving to match existing  | 1        | LS   | 500.00    | 500            |
| Signage and striping  |          |      |           |                |
| Pedestrian paving   |          |      |           |                |
| Remove and replace/modify existing sidewalk paving for accessibility                    | 570      | SF   | 12.50     | 7,125          |
| Remove and regrade then repave area to correct cross slopes                             | 2,504    | SF   | 20.00     | 50,080         |
| Remove and replace non-compliant site ramp including footings, stem walls, and railings | 790      | SF   | 150.00    | 118,500        |
| New handrails at existing site stair  | 411      | LF   | 150.00    | 61,650         |
| Site development  |          |      |           |                |
| Modify/rebuild trellis structures as required   | 1        | LS   | 25,000.00 | 25,000         |
| New gate and hardware in existing fence opening, including panic hardware               | 3        | LVS  | 1,800.00  | 5,400          |
| Accessible seating at lunch shelter   | 1        | LS   | 500.00    | 500            |
| Landscaping   |          |      |           |                |
| Patch and repair existing as required   | 1        | LS   | 5,000.00  | 5,000          |
| Miscellaneous accessories   |          |      |           |                |
| Site signage and accessories  | 1        | LS   | 10,000.00 | 10,000         |
| <b>Sub-Total for Landscaping:</b>   |          |      |           | <b>306,455</b> |

|         |                  |
|---------|------------------|
| Stework | M5-07-198        |
|         | December 4, 2007 |



| SITE UTILITIES                       | Quantity | Unit | Rate      | Total (\$)    |
|--------------------------------------|----------|------|-----------|---------------|
| Modify drainage as required          | 1        | LS   | 20,000.00 | 20,000        |
| New fire service and meter           | 1        | LS   | 75,000.00 | 75,000        |
| <b>Sub-Total for Site Utilities:</b> |          |      |           | <b>95,000</b> |

**THEODORE C. ZSUTTY Ph.D.**

STRUCTURAL ENGINEER  
1379 PEREGRINO WAY  
SAN JOSE, CALIFORNIA 95125

TELEPHONE (408) 265-8318

November 17, 2007

Constance Hubbard  
Superintendent  
Piedmont City Unified School District  
760 Magnolia Avenue  
Piedmont, CA 94611

Subject: Peer Review Wildwood Elementary School Seismic Strengthening Concept Study

Dear Ms. Hubbard:

I have completed my peer review of the Wildwood Elementary School Seismic Strengthening Concept Study as prepared by R.P. Gallagher Associates (RPGA). This letter describes the scope of this review of the strengthening options along with my conclusions and recommendations.

**Conduct of Peer Review**

This peer review was conducted according to the applicable independent peer review requirements of the 2001 CBC Division VI-R Section 1649A and Exhibit "A" of my PUSD service agreement.

The purpose of the structural design of the seismic strengthening concept options is to provide a sufficient detail and description of the retrofit options (1) and (2) such that a preliminary cost estimate can be prepared for each option by Murakami/Nelson. The type, configuration, and location of the retrofit elements are to be compatible with A/D/A and fire/life safety requirements. It is understood that the final design may have changes in element positions and the component sizes and connections as shown in the concept design, but these changes are not expected to result in any significant change in the cost estimate.

The scope of this peer review is to verify that the concept design options meet the appropriate requirements of ASCE 41 for Life Safety Performance at the BSE-1 seismic hazard level Site Specific Spectrum, are compatible with the use of the buildings, and are practically feasible.

The following documents, communications and activities served as a basis for this review:

- My Peer Review Letter "Peer Review of Tier 2 Evaluation of Wildwood Elementary School", dated September 25, 2007
- Site visit and discussions with the RPGA Project Engineer, Gary Austin
- ASCE 41-06 Seismic Rehabilitation of Existing Buildings
- Structural Drawings for Concept Phase Wildwood Elementary School, S-A1 to S-A10 for Building A and S-B1 to S-B2 for Building B, by RPGA, Issued 11/8/07.
- Structural Calculations for Retrofit Concept Study Wildwood Elementary school, by RPGA, November 2007

Calculations for each retrofit option were generally reviewed to determine if the concept design was performed in accordance with the selected methodology.

**Peer Review Findings**

**Concept Design Criteria and Methodology**

- 1) I concur with the use of the provisions of ASCE 41 for Life Safety Performance with seismic loading represented by the BSE-1 Site Specific Spectrum.
- 2) The strengthening systems and details were designed using the provisions of Static Procedure.  
In all cases there was sufficient knowledge concerning the construction and condition of the buildings to allow the use of the knowledge factor ( $K_{\text{appa}}$ ) = 1.0.  
The design procedure is judged to be acceptable for the purpose of this retrofit concept study.

**Building Retrofit Options, Conclusions and Recommendations**

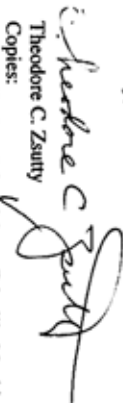
- 1) I concur with the retrofit options presented. The objective is to provide viable and constructible lateral force resisting elements and component details consistent with the ASCE 41 Requirements along with good seismic design practice.
- 2) Reference to Option 2 for Building A, it is recommended that the following alternatives be designed and evaluated for cost considerations:
  - a) Replace Item 3 Steel Braced Frame with a single Exterior Steel Braced Frame on a (N) exterior foundation on lines I and J.
  - b) Replace Item 3 Steel Braced Frame with a wider Steel Braced Frame that results from elimination of one window space per classroom.

While these alternates a) and b) may be undesirable from an architectural view point, their possible cost savings may be useful if there are funding problems.

#### Responsibility

This peer review was undertaken to provide a second opinion regarding the seismic strengthening options for the Wildwood Elementary School. The responsibility for the design remains fully with R. P. Gallagher and Associates, Inc.

Sincerely,



Theodore C. Zsutty

Copies:  
R. P. Gallagher, John Nelson, Priscilla Meckland-Archuleta, Janielle Maftel



# **WILDWOOD ELEMENTARY SCHOOL**

## **PIEDMONT UNIFIED SCHOOL DISTRICT**

### **SEISMIC STRENGTHENING PROGRAM / MEASURE E BOND PROGRAM**

# **INVESTIGATION AND ANALYSIS**

## **FINAL REPORT**

*FEBRUARY 8, 2008*



1930s Classroom Wing



Main Entrance



Courtyard

## EXECUTIVE SUMMARY WILDWOOD ELEMENTARY SCHOOL EVALUATION AND ANALYSIS

*murakami*/Nelson has been retained by the Piedmont Unified School District to evaluate buildings at the five school campuses and district corporation yard for seismic safety and related accessibility and fire & life safety deficiencies, and to design corrections of those deficiencies as part of the Measure E Bond Program. As part of this global objective we have evaluated the buildings at Wildwood Elementary School.

Wildwood Elementary School was originally built in the 1930's, and was substantially modified in the 1990's. The school consists of the original 1930's classroom wing and auditorium, and a new two story addition built in 1995. This addition is connected to the older building by a breezeway and the two buildings surround a small courtyard. Adjacent to the school is a portable building, built in 1990, that is used for childcare activities. However, since this building is not owned by the school district, it is not included in our evaluation.

Our project is divided into three phases - Evaluation and Analysis, Concept Design and Design/Construction Document/Construction. This Evaluation and Analysis phase has identified deficiencies, later phases of the project will conceptualize and design corrections of those deficiencies.

To assist us in this effort we have assembled a consultant team comprised of R. P. Gallagher Associates for structural engineering, Geomatrix for geo-hazard and site spectra analysis, Applied Materials Engineering for materials testing and inspection and Sandis for surveying. We have been assisted by Capital Program Management (CPM), the District's Program Manager, School Superintendent Constance Hubbard and Assistant Superintendent Michael Brady. District staff and maintenance staff. In support of the Bond process we have met with the District's Technical Advisory Committee (TAC), the Structural Subcommittee of the TAC and the Steering Committee. We also have met with the Division of the State Architect (DSA) on a program wide basis, to discuss issues affecting all the school sites.

### SEISMIC EVALUATION

The original 1930's buildings at Wildwood Elementary School were evaluated for life safety risk in a major earthquake. The buildings are Building A (classroom and office wing) and Building B (auditorium wing). The evaluation criteria used was ASCE Standard 31 "Seismic Evaluation of Existing Buildings," published in 2003 by the American Society of Civil Engineers (ASCE). This document is the generally recognized national standard for assessing the life safety risk of existing buildings. A nonstructural seismic hazard survey of the entire school (Buildings A through E) was also performed.

Results of the buildings evaluations and nonstructural survey are summarized as follows:

- (1) Building A (classroom wing) – The building does not meet the ASCE 31 Tier 2 life safety criteria. Many of the shear walls are significantly overstressed in shear. While we do not believe the building is a collapse hazard, it appears to be very damageable. A major contributor to its seismic deficiencies is the fact that its exterior walls have many openings for windows and doors.

- (2) Building B (auditorium) – The auditorium does not meet the ASCE 31 Tier 2 life safety criteria. Its east, west and proscenium shear walls are significantly overstressed. Field investigation revealed an area on the roof having incomplete nailing of the diagonal sheathing, the extent of which needs to be determined by further exploration. This building is also not believed to be a collapse hazard.

- (3) Nonstructural Hazards – The entire school was surveyed for nonstructural seismic hazards. While many tall bookcases and storage cabinets are anchored, there are a number that are not, including several that can block exits. Three classrooms have unanchored gas heaters, and these could cause a postearthquake fire.

### Geo-HAZARDS AND SITE SPECTRA

Geomatrix has conducted a geo-hazards study for all five school campuses. That study states that the Hayward fault "dominates the ground motion hazard for the PUSD school sites." Their report noted that the school sites are all roughly the same distance from that fault and will experience similar ground motions during an earthquake. The sites were evaluated for site stability, liquefaction and surface rupture; none of these failure mechanisms will be a factor at these sites. All the sites have a thin layer of fill or soil deposits over rock; therefore, rock site conditions were used to characterize the ground motions at all sites. Geomatrix also developed site specific spectra for ground motions that will be used in the design of mitigations of the seismic deficiencies.

### ACCESSIBILITY EVALUATION

The school was evaluated for accessibility conformance with the ADA and the related ADAAG regulations, and the 2001 California Building Code. Once the 2007 CBC is adopted, we will re-evaluate the buildings. The evaluation process included review of applicable codes, review of existing documents, and site investigations to verify actual field conditions. A general summary of these findings is as follows:

The school is located on a steeply sloping site, with the ground dropping sharply at the rear of the site. This has resulted in a multi-level school with the top floor close to grade on the street side, and two levels at the rear of the school. Grade changes occur at most building entrances, and along the interior and exterior path of travel. Major access points were upgraded for accessibility during the 1995 project. Access to the lower floor was provided by a new elevator, installed as part of the addition. Some accessibility deficiencies in the older portions of the school still remain.

- Site: Ramps have been added for accessibility at the main entrance and outdoor play areas, during the 1995 modernization project. Minor upgrades are still required in a few locations. The existing off street handicapped parking is not van accessible. Gates to the front playground and outdoor eating area should be upgraded for accessibility. The existing stairs and ramps that lead from the school to the play areas at Witter Field are not fully code compliant.
- Original School Building: Many of the stairs at building entrances and exits do not have code compliant handrails and guardrails. Most door hardware has been upgraded but deficiencies remain in a few locations. At the Auditorium, exit doors are of insufficient width. Stage access is not fully code compliant. The staff kitchen and restroom adjacent to the auditorium is not handicapped accessible. The girls' restroom is not accessible and the boys' restroom needs additional upgrades. Classroom sinks and drinking fountains are not accessible.



- New Classroom Addition: The new addition meets accessibility requirements. A new elevator provides wheelchair access to the lower level classrooms at both the original school and the addition. Accessible restrooms are provided for both students and staff.

#### ***FIRE & LIFE SAFETY EVALUATION***

The buildings were evaluated for life safety in conformance with the 2001 California Building Code, and will eventually be evaluated per the 2007 CBC. This document was published in July 2007 and will be enforceable in January 2008. The evaluation process included review of applicable codes, review of existing documents, and site investigations to verify actual field conditions. In general, the original 1930's school building has a number of life safety deficiencies. These deficiencies are summarized below.

The existing exterior wall of the 1930's classroom wing is within 10'-0" of the property line on the northwest side of the building. Based on the occupancy and construction type for this building, any openings in this wall should be protected. The existing windows are unprotected.

The existing corridor at the old school building also does not meet code requirements for one hour fire rated construction. While the existing plaster walls resemble 1 hour construction, the doors and transom windows in the corridor are not fire rated. The corridor is equipped with fire sprinklers, installed as part of the 1995 project. This may have been added as a mitigation for the lack of a code-compliant one hour corridor. However, it is not certain that DSA will accept this as adequate mitigation for future projects.

There is an existing fire alarm system and fire extinguishers in the corridor. The fire alarm system should be evaluated further, and will likely require upgrading. There are existing fire sprinklers in the corridors, and at the lower level of the addition. This meets fire sprinkler requirements for educational facilities under 20,000 sf. However, there are no fire sprinklers at the stage area as required by code.

#### **CONCLUSIONS**

- It is recommended that the buildings be seismically strengthened to correct the deficiencies found. The criteria of ASCE 41 "Seismic Rehabilitation of Existing Buildings" published by ASCE can be used. This is the recognized standard for strengthening existing buildings.
- New construction to address the structural deficiencies will trigger some level of upgrades to the Accessibility and Life-Safety systems described above. A discussion of these triggers and the scope of upgrades are addressed further in this report.
- Based on structural, accessibility and fire & life safety evaluations, we believe it is feasible to strengthen and mitigate the deficiencies in the buildings and at the same time preserve their basic functional and architectural character. However, the overall feasibility of this approach remains to be evaluated during the next, conceptual design phase of the work.

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## ***1. INTRODUCTION***

1. INTRODUCTION

A. Project Scope

In March of 2006, the City of Piedmont voters passed Measure E.. a \$56 million bond to address seismic safety in the Piedmont Unified School District (PUSD).

To assist the District in managing the seismic program, the PUSD has engaged Capital Program Management, Inc. (CPM), to oversee program planning and implementation. The School Board has formed a Steering Committee to oversee the management of all bond projects and to serve as a communications hub; a Technical Advisory Committee to advise the Steering Committee about the technical aspects of the project; and a Citizens Oversight Committee to ensure that funds are appropriately and prudently spent. Additionally, an extensive public engagement effort has been set up to both educate the community about the progress of the project and to elicit comments and feedback.

*murakami*/Nelson was selected to evaluate the school buildings, develop design solutions, prepare construction documents and oversee construction of the projects. Assisting us in this effort is R. P. Gallagher Associates. This report summarizes the investigative efforts of the design team to understand the existing conditions at Wildwood Elementary School. *murakami*/Nelson has completed measured drawings, reviewed the buildings, and identified accessibility and life safety deficiencies. R. P. Gallagher has completed their Tier 2 seismic and Tier 1 non-structural hazards analysis of these buildings. This report documents our findings.

The basis of this report are existing approved drawings for the 1995 Addition, from the Department of the State Architect (DSA), field investigations conducted by *murakami*/Nelson and R. P. Gallagher Associates, the AT "Accessibility Review" dated 09/01/05 provided by the District, an existing conditions topographic survey by Sandis, a material testing and investigation study by Applied Materials Engineering (AME), and a site hazards study and site specific spectra by Geomatrix..

In addition, since construction documents for the original 1930's school building were unavailable, more extensive field investigations were required to document existing conditions. Field measurements were conducted by *murakami*/Nelson to produce complete measured drawings for the building, comprehensive materials testing and exploration was conducted by Applied Materials Engineering (AME) to identify and document existing building components, and structural drawings of the existing building were produced by R. P. Gallagher Associates. After reviewing this documentation and verifying existing conditions, *murakami*/Nelson created electronic drawing base files to serve as the framework for the project. These drawings were used by R. P. Gallagher to create structural measured drawings.

B. Application of California Building Code

Since there are often code interpretations with use of the California Building Code, the School District engaged DSA in a discussion about the PUSD Voluntary Seismic Upgrade Program. In May 2006 DSA representatives attended a special meeting of the School Board to discuss the District's program and how individual projects would involve compliance with fire, life safety and accessibility requirements of the California Building Code. *murakami*/Nelson continued that discussion with a follow on meeting with DSA on February 9, 2007. At that meeting DSA indicated a willingness to work with the District on the extent of compliance with the current California Building Code. Such determinations would be made on a case by case basis and relate to the specifics of each project.



View from playground



Classroom



Auditorium



Aerial view

### C. *Future Considerations*

During future design phases of the project, programmatic, functional, maintenance and sustainability issues will be considered where those issues can be solved as an integral part of the Bond project. Where those issues are not integrally linked to the seismic work, then the District may decide to use Modernization or other funding sources to solve those problems.

### D. *Wildwood Elementary School*

Wildwood Elementary School was constructed in the 1930's. The original building consisted of a classroom wing, administrative offices and auditorium. In 1995 a major classroom addition was added adjacent to the original school and auditorium. The result was a two story wing that contains additional classrooms, a library, and the kindergarten. The addition is connected to the older building by a breezeway, and the two buildings surround a small courtyard. Other site improvements were also added at this time. There is also a portable building on site, located adjacent to the new classroom wing. It is owned by the City of Piedmont, and used for after school child care programs. This building is not included in our evaluation.

The school is located on a multi level site with a steeply sloped area at the back of the building. The significant change in grade allows for additional classroom space at the lower level. Areas at the front of the building, along Wildwood Ave., are one story high. At the rear of the site, there are additional classrooms below both the original school building, and at the addition. Although the original construction drawings are not available, the original school and auditorium appears to be of the same era, and architect, as the older buildings at Havens and Beach Elementary schools. These schools were all designed in the 1930's by the architect, John Donovan. The auditorium at Wildwood shares similar features to the ones at the other two schools, including a handpainted ceiling, wood trusses, and a Mission Revival style.



View of courtyard in between old and new wing



View from rear of site

## **2. ADA/ ACCESSIBILITY**



## 2. ADA /ACCESSIBILITY.

### Background:

School facilities in California are required by federal and state law to provide equal access for students, teachers, staff and visitors. At the Federal level the empowering legislation is the Americans with Disabilities Act or ADA. Under that law ADAAG regulations were written to describe the accessibility requirements for the entire country. The ADAAG regulations are enforced by civil action. At the State level accessibility is governed by the California Building Code. In the case of public school buildings the California Building Code is enforced by the Division of the State Architect or DSA.

The State of California is in the process of getting the California Building Code certified by the Department of Justice as meeting ADAAG. Until that occurs architects must comply with both the ADAAG and the California Building Code. *murakami/Nelson* has used both documents in evaluating accessibility at Wildwood Elementary School.

The California Building Code requires that whenever more than \$120,000 (*adjusted for inflation each year*) worth of work, other than for maintenance or replacement of finishes, is done in any three year period for an existing building, that access compliance work be included as part of that project. Section 1134B of the California Building Code requires that alteration work within an existing building comply with the current Code and that additional access work, as stipulated in the Code, be done beyond the area of the alteration.

Because seismic upgrade projects often affect areas throughout a school the State Attorney General has issued an interpretation (DSA Document 96-01) that access work triggered by a seismic strengthening project need only provide an accessible primary entrance, sanitary facilities, signs, telephone (if provided), drinking fountain and an accessible path of travel to those facilities, but not a accessible path of travel to the area of all the alterations as Section 1134B.2 of the Building Code requires. Use of this interpretation by DSA on the Piedmont Seismic project remains to be resolved.

In any event the voluntary seismic strengthening work the District is planning will trigger substantial compliance with the access requirements of Section 1134. Furthermore, if State modernization funds are used for the projects, then all the requirements of Section 1134 would be triggered.



Steps to main entrance from Wildwood Ave.

Ramp to main entrance

Main Entrance

### Summary & Analysis

This report has made use of the AT1 report, and its precursor the Hserman & Mead Access Survey, with field verification of existing conditions.

The original 1930s construction at Wildwood Elementary School had significant barriers to accessibility, both from the public way to the school entrances, and within the building itself. With major new construction that occurred in 1995, the accessibility of the site and within the buildings was improved, although accessibility issues do remain, and the site and building are still not fully compliant with current code and ADA requirements.



Handicapped parking

Off street parking

Ramp to Witter Field

### Site:

Wildwood Elementary School site is bounded by Wildwood Avenue to the south, and City play fields to the north and east. From the front of the building along the street, the site drops off steeply, with a lower level tucked underneath the main floor at the rear of the building. Behind the school, the site continues to slope downhill, eventually leading via ramps and stairs to Witter Field. The primary entrance to the school is located at Wildwood Avenue, with a set of stairs leading to the main entry doors. This entrance was upgraded for accessibility in 1995, when a new drop-off area with curb ramp, handicapped parking, and a new ramp up to the main entrance, was constructed.

A small playground is located next to the Kindergarten classroom, near the main entrance. There are ramps leading to this playground from both inside and outside the building. There is also an outdoor lunch area, located near the main entrance. Gates at both areas should be upgraded for accessibility. In addition, accessible seating is not clearly identified at the lunch area. Additional play areas are located at the bottom of a steep slope to the rear of the school, at Witter Field. These areas are linked to the school by a series of stairs and ramps, some of which require upgrades to meet code requirements. In addition, the length of travel required for the wheelchair ramp, makes its use difficult for disabled students.

There are two handicapped parking spaces, one located at Wildwood Avenue and the other located inside the school site, next to the addition. The handicapped parking at Wildwood Avenue leads to the main entrance ramp while the other parking space is near the entry to the ramp leading down to the play field. There is no designated van accessible parking.

Throughout the site, there is very little directional or informational signage. There is limited directional signage leading from the HC parking to the primary entrance for physically impaired visitors arriving at the site.

**Buildings:**

The new two story classroom addition was constructed in 1995. As part of that project, many of the major accessibility deficiencies were addressed. A new elevator was provided for handicapped access to the lower level classrooms. This elevator provided access to the lower level for the older, existing classrooms as well. New accessible restrooms were provided for both students and staff. Classroom doors at the main corridor received lever hardware, and the sinks in the new classroom addition are handicapped accessible. However, while the 1995 renovation did address many important deficiencies in the original building, there are some items that remain, particularly in the older sections of the building. A summary of these items is as follows:

- **Path of Travel:** Although the new stairs and ramps at the main entrance meet code requirements, many of the older exterior stairs at the school are not code compliant. Most lack proper code compliant handrails or intermediate railings, handrail extensions, and contrasting stripes on the stair treads. Other barriers to travel within the building include doors that do not have the required clear space, door width and/or door hardware. This problem occurs primarily at the Auditorium where the required exit doors do not meet code minimums for door width. A folding platform lift was installed for stage access in 1995. However, this lift does not meet code requirements for unassisted operation, and the landing at the door to the stage does not have the required clearances.
- **Sanitary Facilities:** Accessible facilities for students and staff were provided as part of the 1995 renovation. However, the girl's restroom at the old wing and the staff toilet room adjacent to the staff dining room are not accessible. The existing girl's restroom is on a landing between two sets of stairs. Due to the difficulty of providing access at this location, DSA may have approved the 1995 project, because there are other accessible facilities on campus. However, these accessible facilities are at the opposite side of the school, at the new addition. Similarly, there are staff restrooms in the new addition for both men and women, which are accessible. A single occupancy toilet in the old wing is close to meeting ADA requirements, but does not actually meet the required clearances. Drinking fountains in the old wing corridor and outdoor lunch area need to be replaced to meet current codes.



Code compliant boys' restroom



Non compliant staff restroom



Code compliant railings



Non compliant railings

- **Signage:** There is very little directional or informational signage throughout the building. Room identification signage that does exist does not meet code requirements for proper location, mounting height, Braille, etc.
- **Additional issues:** Sinks and work areas in the older classrooms, and in the staff kitchen and work areas, are not accessible. Sinks, counters and work surfaces do not provide adequate heights, knee space, etc. Faucets do not have proper lever handles. An Assistive Listening System (ALS) should be provided at the Auditorium.



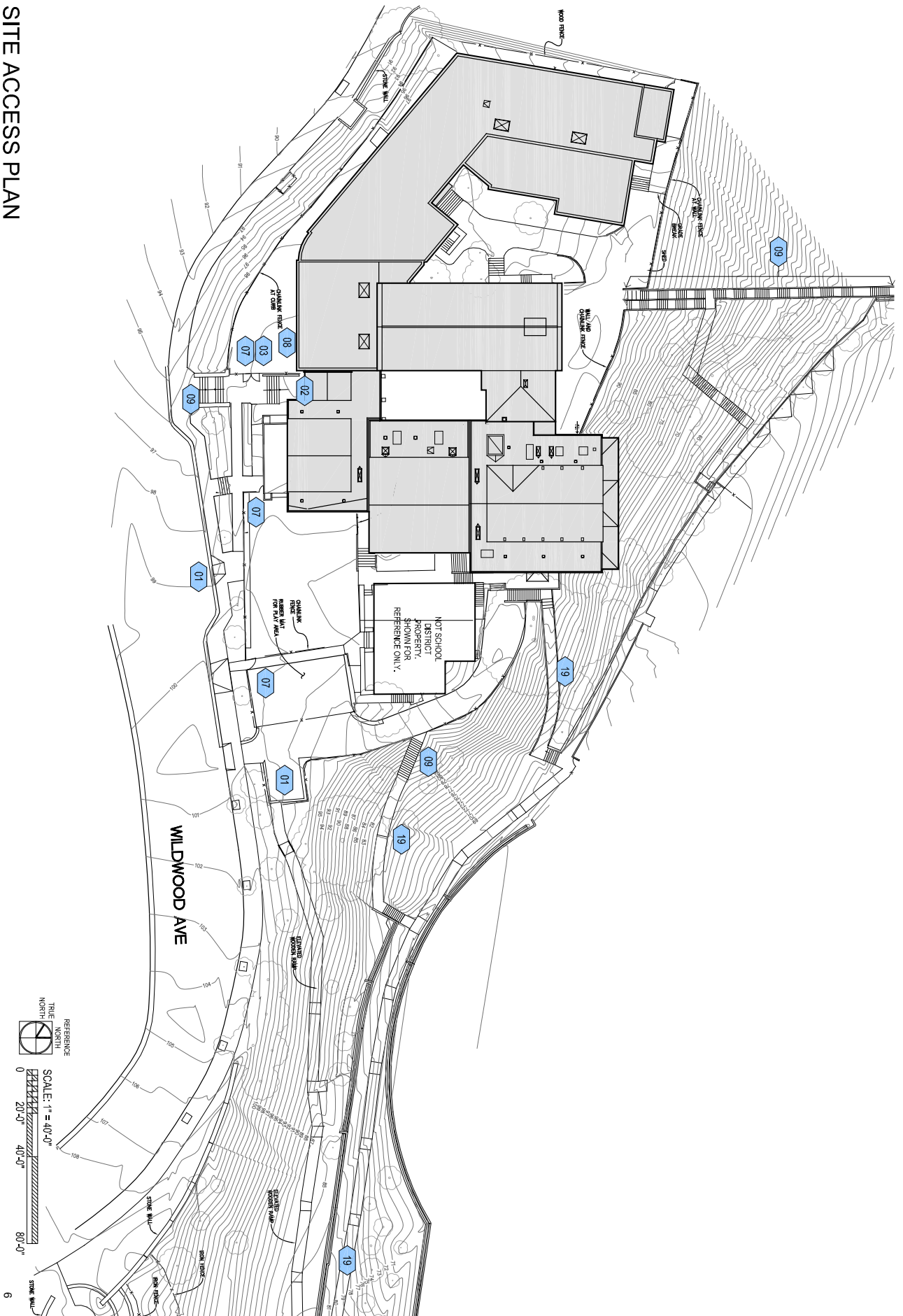
## ACCESSIBILITY NOTES:

GENERAL NOTES:

1. SITE ACCESSIBLE PATH OF TRAVEL TO PRIMARY ENTRANCE IS GENERALLY IN COMPLIANCE, BUT HAS BARRIERS TO ACCESSIBILITY AS INDICATED ON SITE PLAN.
2. SIGNAGE THROUGHOUT IS NOT COMPLIANT. NO DIRECTIONAL SIGNAGE OR CODE COMPLIANT ROOM IDENTIFICATION SIGNAGE.

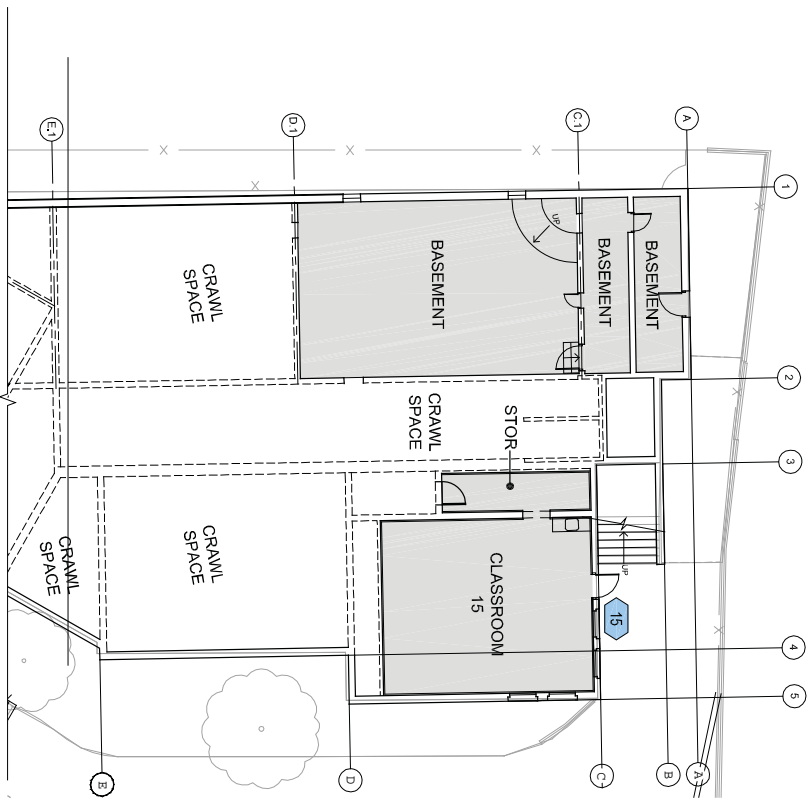
- ◀ 01 ▶ EXISTING ACCESSIBLE PARKING. NEED ADA SIGNAGE AND RESTRIPING FOR VAN ACCESSIBLE PARKING (MIN. ONE LOCATION)
- ◀ 02 ▶ NO DIRECTIONAL SIGNAGE/ ACCESSIBILITY SITE SIGNAGE.
- ◀ 03 ▶ NO DESIGNATED ACCESSIBLE SEATING AT LUNCH AREA
- ◀ 04 ▶ NO ACCESSIBLE ROUTE TO THIS AREA.
- ◀ 05a ▶ ENTRANCE / EXIT DOOR ASSEMBLY NOT ACCESSIBLE: MAJOR BARRIERS SUCH AS INSUFFICIENT WIDTH OF DOOR OPENING, INSUFFICIENT CLEAR SPACE, ETC./ MAY ALSO INCLUDE 05b DEFICIENCIES.
- ◀ 05b ▶ ENTRANCE / EXIT DOOR ASSEMBLY NOT ACCESSIBLE: MINOR BARRIER SUCH AS OPERATING HARDWARE, EXCESSIVE CLOSING FORCE, THRESHOLD, ETC.
- ◀ 06 ▶ HANDRAILS NOT CODE COMPLIANT.
- ◀ 07 ▶ GATE NOT ACCESSIBLE.
- ◀ 08 ▶ DRINKING FOUNTAIN NOT CODE COMPLIANT.
- ◀ 09 ▶ STAIR NOT ACCESSIBLE; LANDING TOO SMALL, HANDRAILS NOT CODE COMPLIANT, ETC.
- ◀ 10 ▶ NO ACCESSIBLE WORK AREA.
- ◀ 11 ▶ TOILET ROOM NOT ACCESSIBLE. DOES NOT MEET REQUIRED CLEARANCES, ETC.
- ◀ 12 ▶ KITCHEN NOT ACCESSIBLE.
- ◀ 13 ▶ NO CODE COMPLIANT DIRECTIONAL SIGNAGE.
- ◀ 14 ▶ SINK NOT ACCESSIBLE.
- ◀ 15 ▶ NO CODE COMPLIANT ROOM IDENTIFICATION SIGNAGE.
- ◀ 16 ▶ NO ASSISTED LISTENING SYSTEM.
- ◀ 17 ▶ STAGE LIFT DOES NOT PROVIDE UNASSISTED ACCESS (WAS DSA APPROVED IN 1995).
- ◀ 18 ▶ LACKING OR WORN STAIR WARNING STRIPES AT TOP AND BOTTOM TREADS.
- ◀ 19 ▶ NON-COMPLIANT RAMP

# SITE ACCESS PLAN





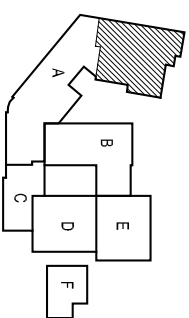
MAIN FLOOR



LOWER LEVEL

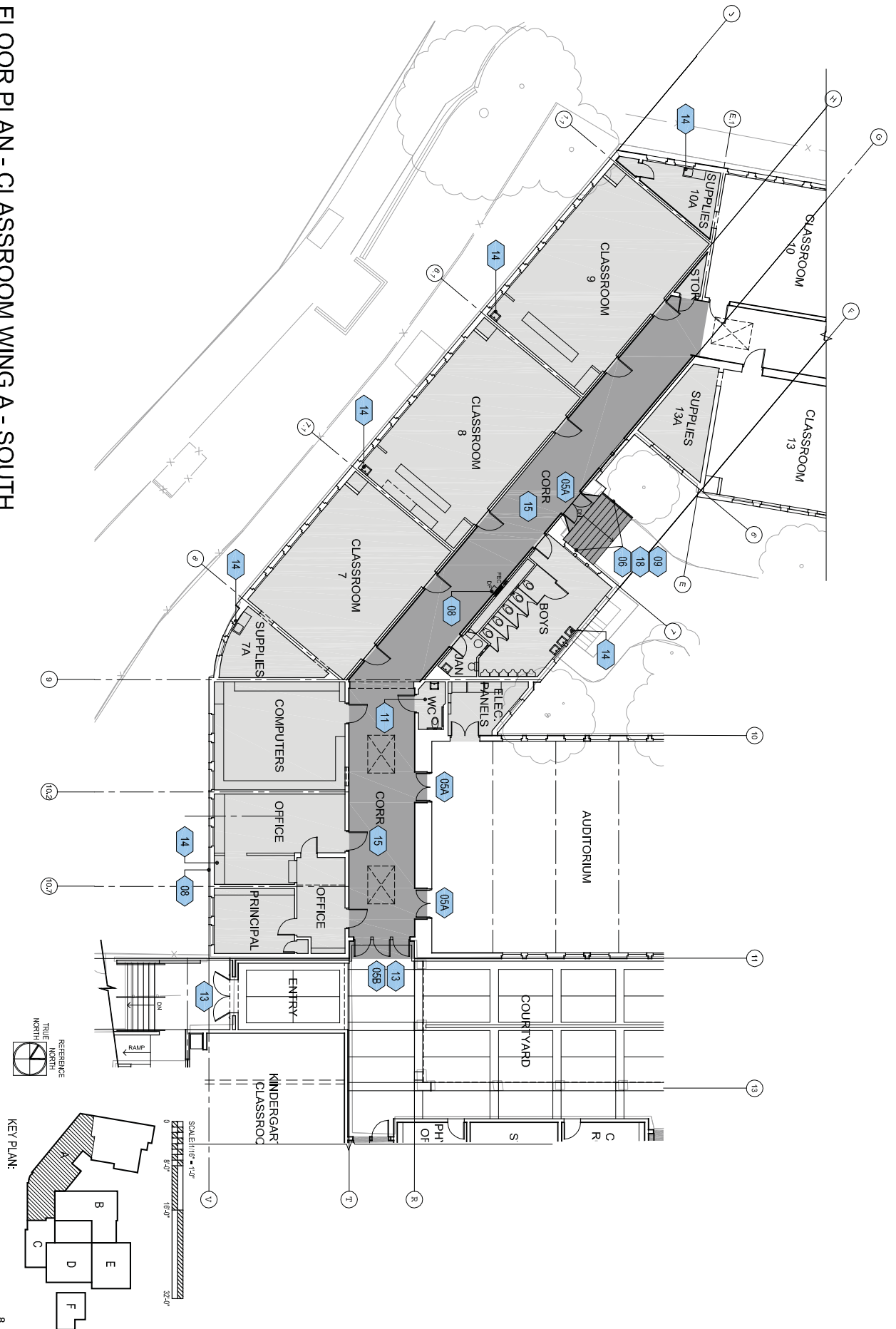


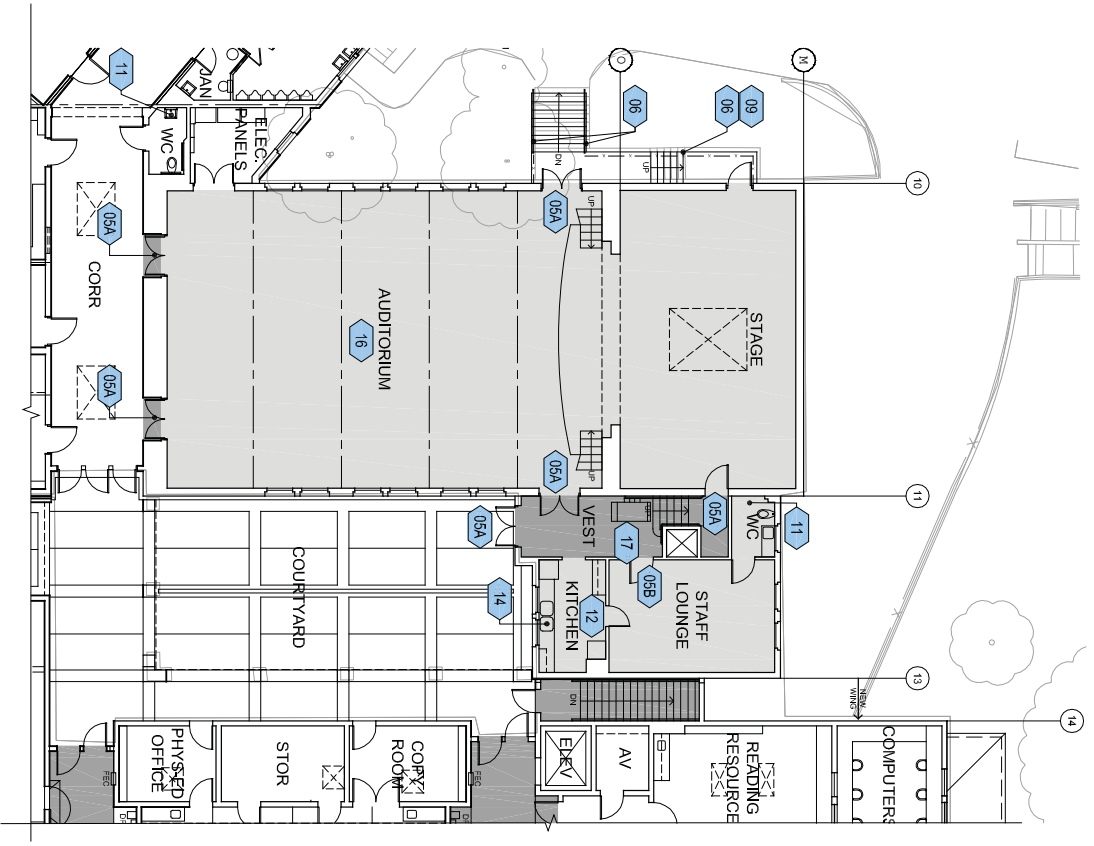
KEY PLAN:



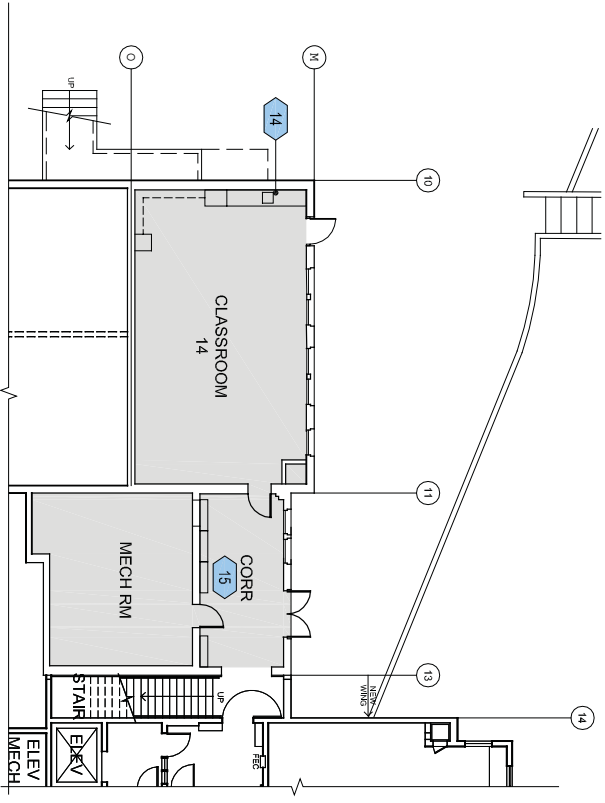
FLOOR PLANS - CLASSROOM WING A - NORTH

# FLOOR PLAN - CLASSROOM WING A - SOUTH





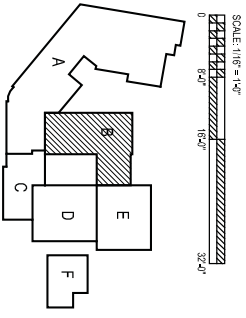
FLOOR PLANS - AUDITORIUM WING B



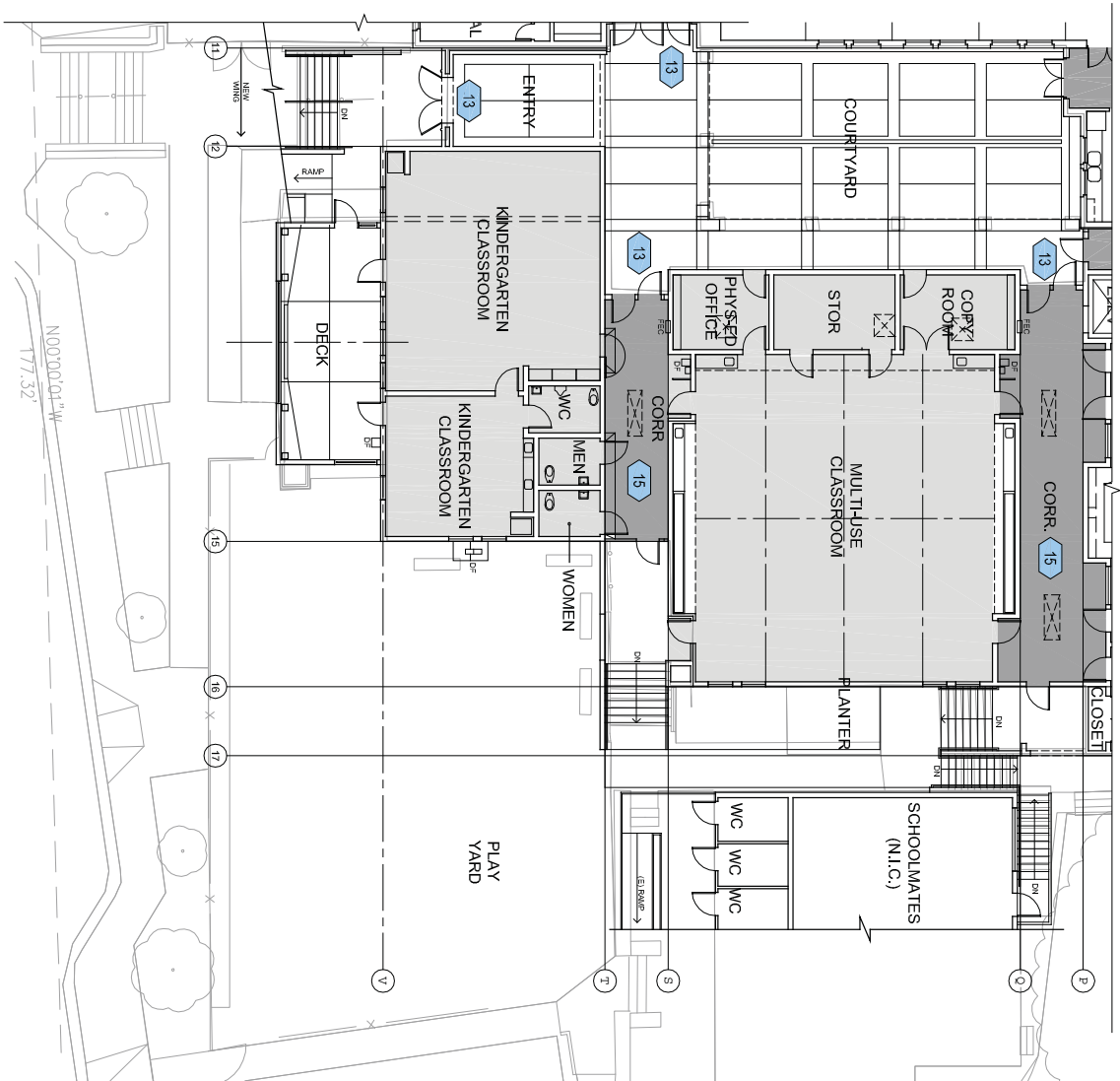
PLAN - LOWER LEVEL B



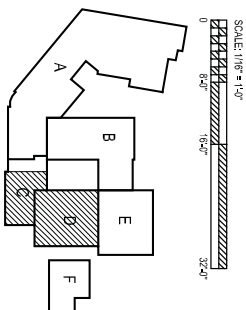
KEY PLAN:

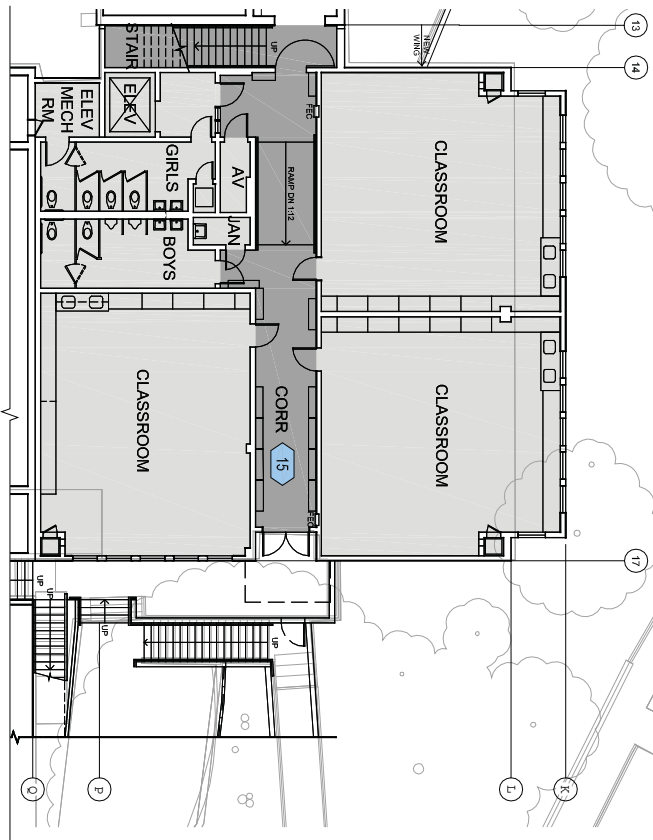
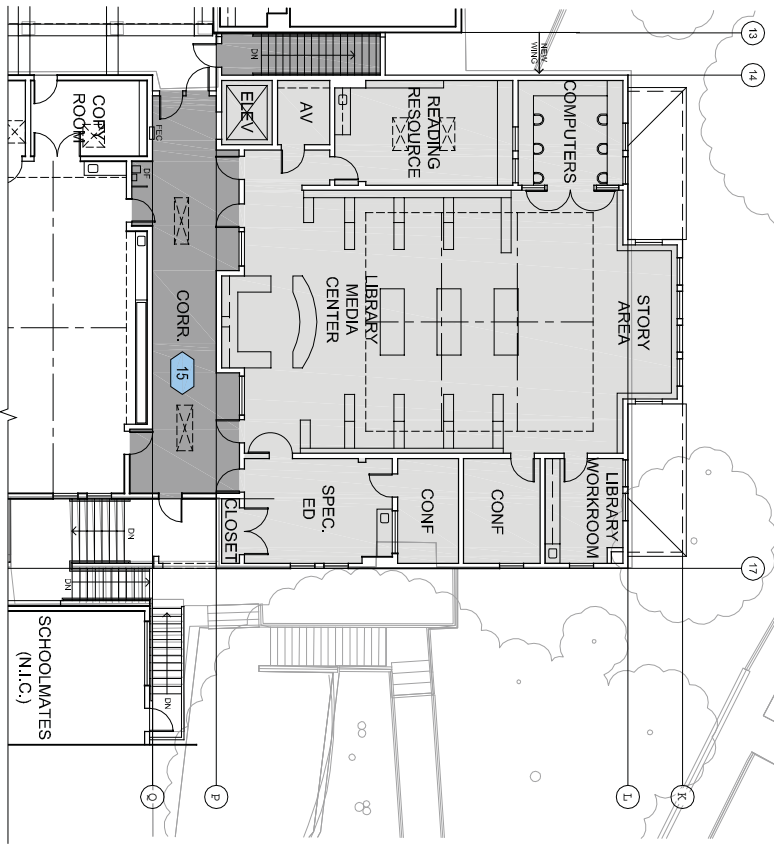


# FLOOR PLANS - KINDERGARTEN/ CLASSROOM ADDITION C & D



KEY PLAN:



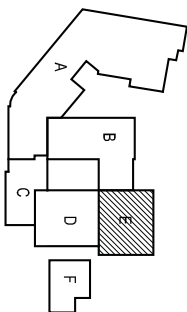


PLAN - LOWER LEVEL E

FLOOR PLANS - LIBRARY / CLASSROOM ADDITION E



KEY PLAN:



SCALE: 1/8" = 1'-0"  
0'-0" 6'-0" 12'-0" 32'-0"

### **3. FIRE/ LIFE SAFETY**



3. FIRE/LIFE- SAFETY

A. Background:

As with accessibility, fire and life-safety is governed by the California Building Code and is enforced by the Division of the State Architect (DSA). Unlike the accessibility regulations the fire and life-safety regulations are spread throughout the Code; however, most of the pertinent regulations are in Chapters 5 and 10. There is no overarching life safety regulation like ADAAG for fire and life safety. Life Safety is not an area where the School District, the design professional or DSA would compromise, however, there will be areas of negotiation about what is acceptable given the fact that the existing buildings may be constructed differently from what would be built today under current codes. Nonetheless, a primary objective of the project, in addition to seismic safety and accessibility will be to increase fire and life-safety at the schools.

B. Summary & Analysis

The buildings at Wildwood Elementary School were also analyzed for fire/life safety code compliance. These findings are summarized in *Appendix B: Code Analysis*, as well as on the drawings in this section. This report identifies deficiencies. The next phase of the project will offer conceptual solutions to these deficiencies.

Of critical importance are construction type and allowable floor areas, individual and cumulative occupancies and occupant loads, which determine exiting requirements and area separations. Overall, the floor areas for both the original school building and the new addition meet allowable limits for their identified type of construction. The new construction, done as part of the 1995 Addition and Renovation Project, conforms to code requirements. However, there are a number of fire and life safety issues in the original 1930's building that still may need to be addressed.

The Buildings

Based on size and occupancy, the building (both the original school building and the new addition) has been classified as Type V-1 hour construction. The new construction, done as part of the 1995 Addition and Renovation Project, conforms to code requirements for this type of construction. We do not have the original construction drawings for the 1930's school building, but the original stucco wall construction is similar to one hour construction. A new two hour area separation wall was also constructed as part of the new addition, and it separates this portion of the school from the original building. This allowed the two areas to be treated as two separate buildings for the purposes calculating maximum floor areas, and other fire/life safety issues. With this area separation, the two buildings each meet the allowable floor area limits for their identified construction type. However, additional upgrades may be triggered by the new work in this area, even though these deficiencies were accepted by DSA when the 1995 project was approved.

Of primary concern is the fact that the northwest exterior wall of the 1930's classroom wing is within 10'-0" of the property line. Table 5-A requires that openings within 10'-0" of the property line are protected. There are existing windows in this wall that are not protected. In addition, the main corridor in the old classroom wing, built in the 1930's, is not code compliant. This corridor, which provides the primary exit pathway for the classrooms in this area, was never brought up to the required one hour fire rating. The doors to the classrooms are non-rated wood doors and frames. Openings to the corridor here are non-rated as well. Fire sprinklers were added in this corridor when the 1995 project was built,



View of exterior wall



Non-compliant corridor



Non-compliant door & transom

to mitigate this condition. Based on the extent of the new work in this area, and other factors, DSA may require this corridor to be upgraded to meet current codes.

Wildwood School is close to complying with the code requirement for fire sprinklers at public school buildings. Section 904.2.4.1 of the 2001 California Building Code requires that all educational facilities of a certain size (E-1 occupancies) have an automatic fire sprinkler system throughout. However, this requirement does not apply for buildings under 20,000 square feet in area. Wildwood is over 20,000 sf, but since a new area separation wall was constructed when the new addition was built in 1995, the school can be considered as two separate buildings, each under 20,000 sf. In addition, fire sprinklers were added at the lower level to comply with the requirement for fire sprinklers below the level of exit discharge.

The existing stage area is not equipped with fire sprinklers. due to the presence of vertical retracting equipment, this area is required to be sprinklered.

A fire alarm system was installed in this building as part of the 1995 project. We will need to assess the adequacy of the system, and whether agencies having jurisdiction will require any modifications or changes.

#### The Site

Fire Department access into the site is limited. Fire trucks may pull up to the school along Wildwood Avenue, at the front of the building, but access at the west side, and at the rear of the building is limited. We will be meeting with the Piedmont Fire Department to review the school for fire department access, as well as any other concerns of the Fire Department.

**LIFE SAFETY NOTES:**

GENERAL NOTES:

1. BUILDING IS PARTIALLY COVERED BY FIRE SPRINKLER SYSTEM. ADDITIONAL AREAS ARE REQUIRED.

2. MAIN CORRIDOR DOES NOT MEET REQUIREMENTS FOR 1-HOUR RATING. MANY NON-RATED DOOR AND WINDOW OPENINGS, HOLD OPENS AT DOORS, ETC.

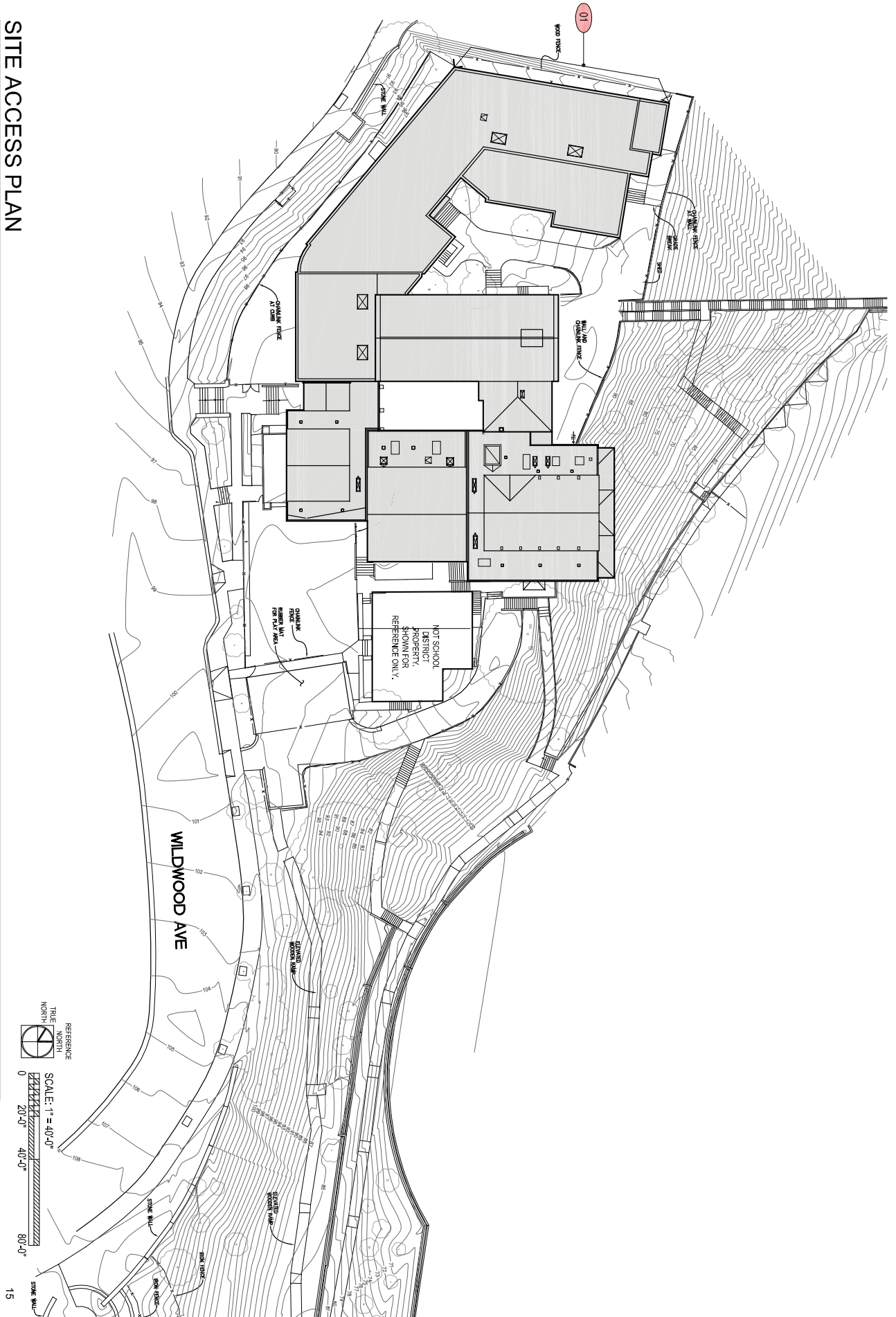
- 01 EXTERIOR WALLS APPEAR TO BE WITHIN 10 FT. OF PROPERTY LINE REQUIRING ONE-HOUR CONSTRUCTION AND PROTECTED OPENINGS. PROPERTY LINE LOCATION TO BE CONFIRMED BY TITLE REPORT.
- 02 FIRE SPRINKLERS REQUIRED AT STAGE AREA.
- 03 NOT A RATED CORRIDOR.
- 04 NO PANIC HARDWARE PROVIDED.
- 05 DOOR (OR GATE) DOES NOT SWING IN DIRECTION OF EXIT.
- 06 NO PORTABLE FIRE EXTINGUISHER PROVIDED. (MAXIMUM TRAVEL DISTANCE IS 75 FT. FROM ANY LOCATION.)
- 07 OPENING WIDTH LESS THAN REQUIRED MINIMUM (3 FT.).
- 08 HANDRAIL/GUARDRAIL NOT TO CODE.
- 09 EXIT NOT TO CODE. INSUFFICIENT CLEARANCE, LANDINGS, ETC.
- 10 NOT USED
- 11 NON-RATED DOOR/WINDOW AT CORRIDOR.
- 12 NO ROOM CAPACITY SIGNAGE.

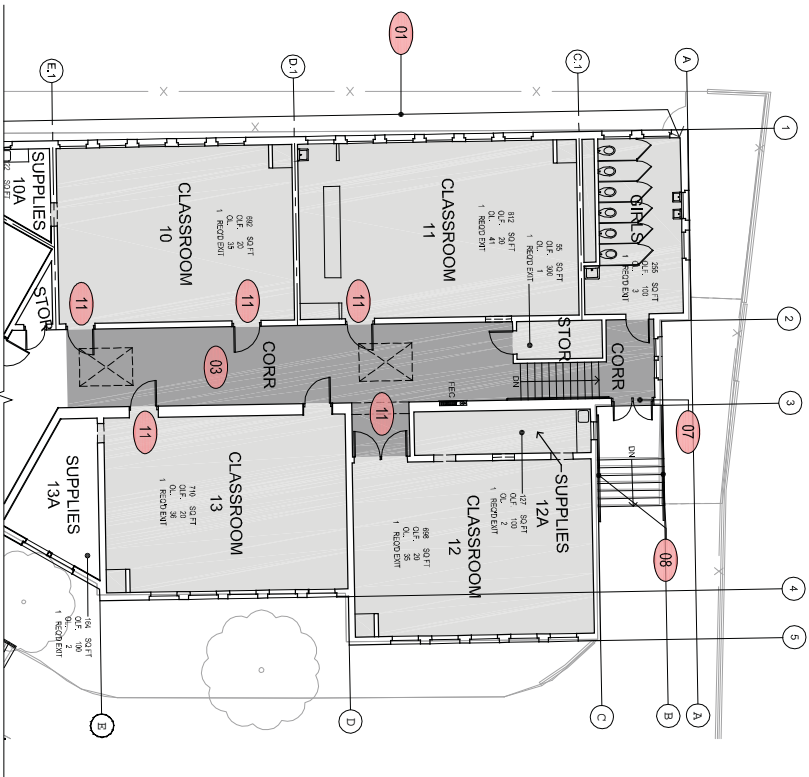
**ABBREVIATIONS:**

F.E. EXISTING FIRE EXTINGUISHER

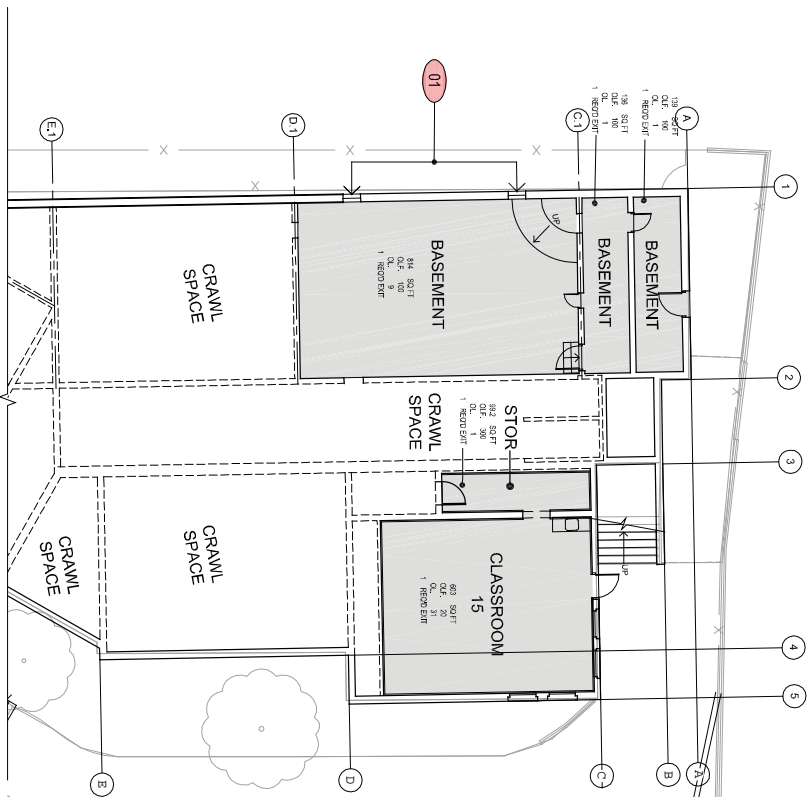
P.H. EXISTING PANIC HARDWARE

# SITE ACCESS PLAN





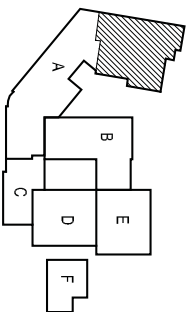
MAIN FLOOR



LOWER LEVEL



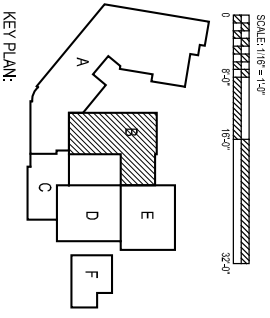
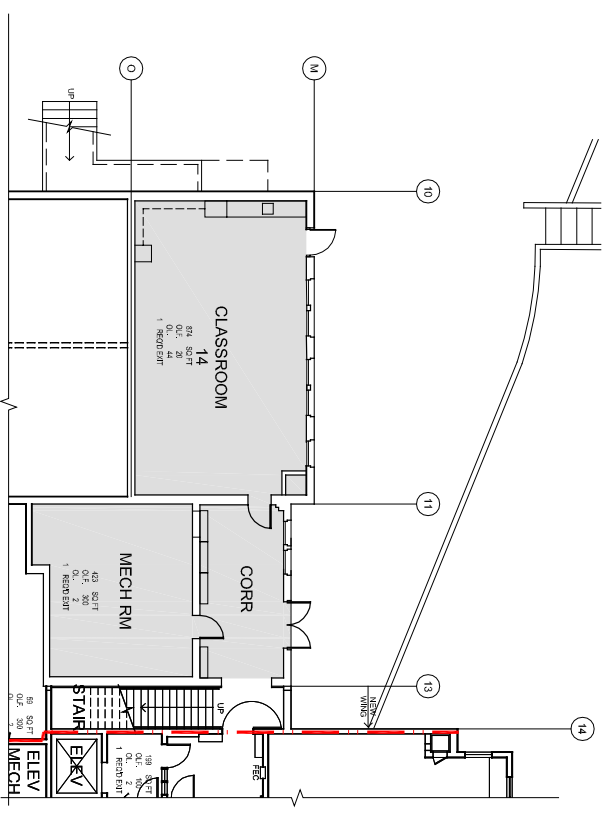
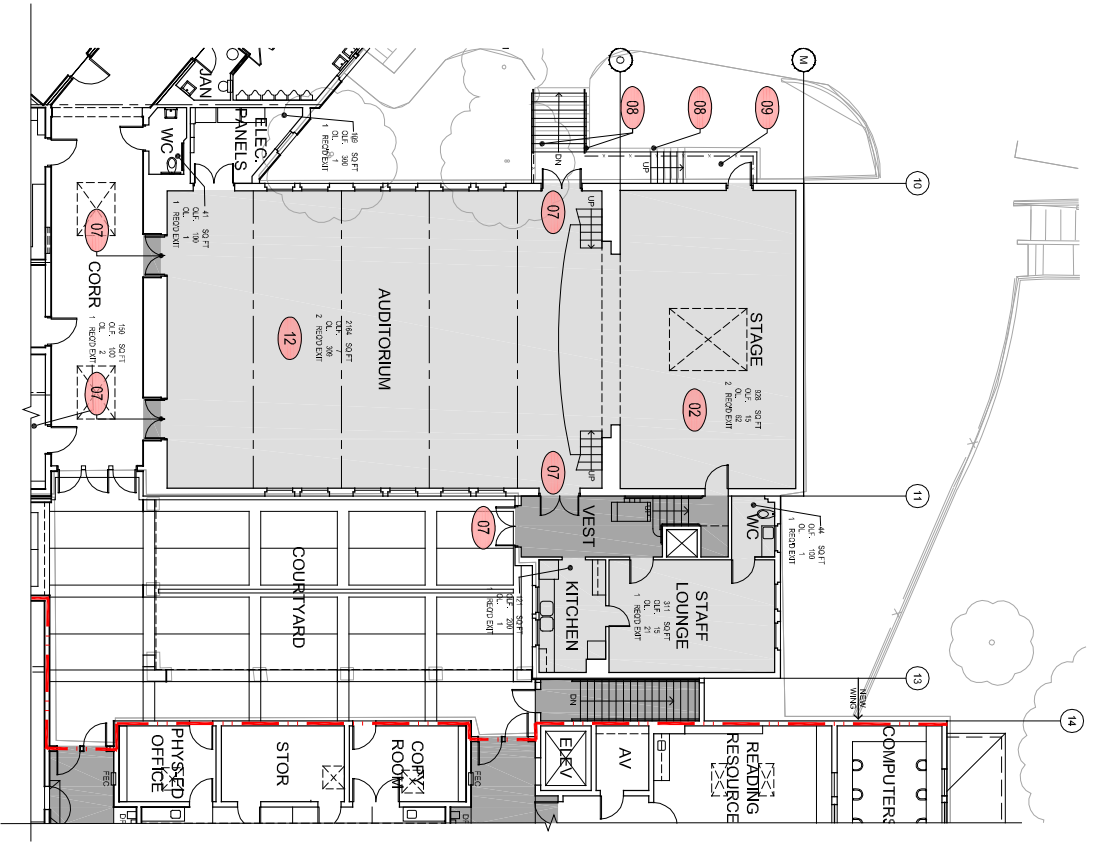
KEY PLAN:



FLOOR PLANS - CLASSROOM WING A - NORTH

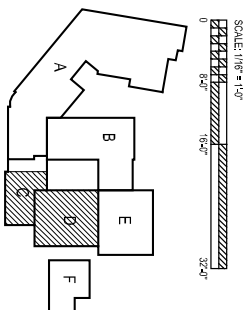
## 17



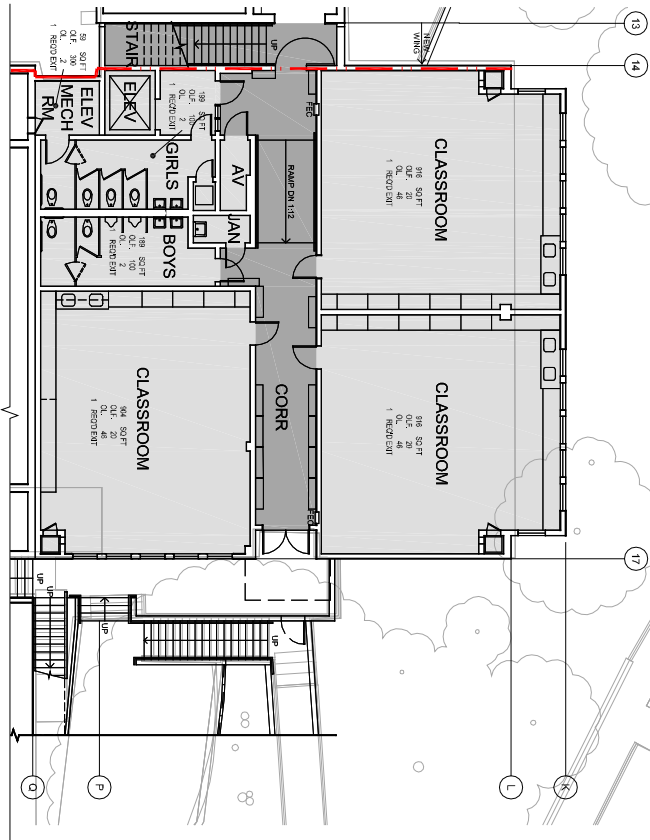
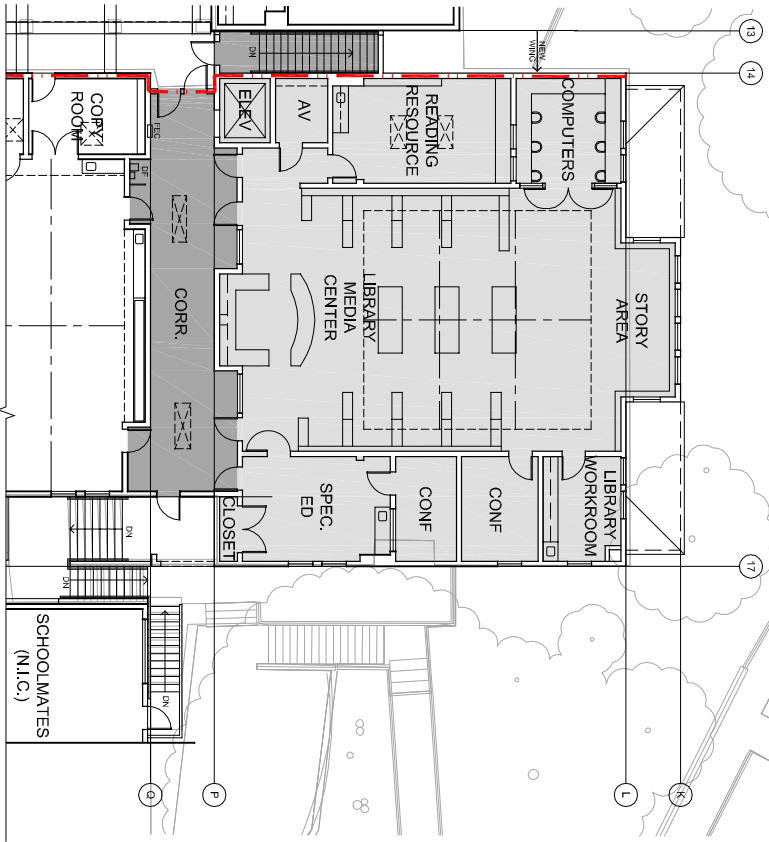


**FLOOR PLANS - AUDITORIUM WING B**





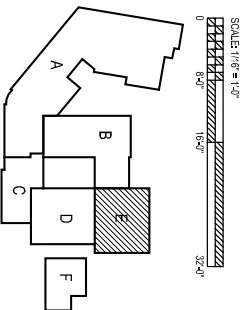




PLAN - LOWER LEVEL E



KEY PLAN:



FLOOR PLANS - LIBRARY / CLASSROOM ADDITION E

#### **4. STRUCTURAL TIER 2 REPORT**

# Seismic Evaluation of the Original Buildings at Wildwood Elementary School, Piedmont Piedmont Unified School District

Prepared for  
murakami/Nelson Architects, Inc.  
Oakland, CA

January 3, 2008

Prepared by  
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## Executive Summary

The original 1930's buildings at Wildwood Elementary School were evaluated for life safety risk in a major earthquake. The buildings are Building A (classroom and office wing) and Building B (auditorium wing). The evaluation criteria used was ASCE Standard 31 "Seismic Evaluation of Existing Buildings," published in 2003 by the American Society of Civil Engineers (ASCE). This document is the generally recognized national standard for assessing the life safety risk of existing buildings. A nonstructural seismic hazard survey of the entire school (Buildings A through E) was also performed.

Results of the buildings evaluations and nonstructural survey are summarized as follows:

- (1) Building A (classroom wing) – The building does not meet the ASCE 31 Tier 2 life safety criteria. Many of the shear walls are significantly overstressed in shear. While we do not believe the building is a collapse hazard, it appears to be very damageable. A major contributor to its seismic deficiencies is the fact that its exterior walls have many openings for windows and doors.
- (2) Building B (auditorium) – The auditorium does not meet the ASCE 31 Tier 2 life safety criteria. Its east, west and proscenium shear walls are significantly overstressed. Field investigation revealed an area on the roof having incomplete nailing of the diagonal sheathing, the extent of which needs to be determined by further exploration. This building is also not believed to be a collapse hazard.
- (3) Nonstructural Hazards – The entire school was surveyed for nonstructural seismic hazards. While many tall bookcases and storage cabinets are anchored, there are a number that are not, including several that can block exits. Three classrooms have unanchored gas heaters, and these could cause a postearthquake fire.

It is recommended that the buildings be seismically strengthened to correct the deficiencies found. The criteria of ASCE 41 "Seismic Rehabilitation of Existing Buildings" published by ASCE can be used. This is the recognized standard for strengthening existing buildings.

Based on structural considerations alone, we believe it is economically feasible to strengthen Buildings A and B and at the same time preserve their basic functional and architectural character. However, the overall feasibility of this project remains to be evaluated during the next, conceptual design phase of the work.

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1. Introduction

This report summarizes the seismic evaluation of the original 1930's buildings at Wildwood Elementary School. The school is located at 301 Wildwood Avenue in Piedmont. The purpose of the study was to assess the vulnerability of the buildings for life safety risk in a major earthquake. The school consists of the original buildings (Buildings A and B) and additions to the main building built in the 1990's (Buildings, C, D and E). The latter were not studied in the work reported here, except that they were surveyed for nonstructural hazards.

The construction of the original 1930's buildings is believed to have been done under the jurisdiction of the California Division of State Architect (DSA) and after passage of the landmark 1933 Field Act by the California legislature.

The Field Act required that the buildings be designed for seismic forces. Since enactment of the Act, and particularly since the 1971 San Fernando, CA earthquake, the state-of-the-art of seismic design has improved substantially with contributions from new research, better materials, improved training of structural engineers, and knowledge gained from investigations of earthquake damaged buildings. It is now recognized that many older buildings, even post Field Act California school buildings, are seismically vulnerable.

The evaluations summarized in this report represent an assessment of the two 1930's buildings using the latest seismic evaluation methodology. The study consisted of an ASCE 31 Tier 2 evaluation. A Tier 2 evaluation includes preparation of structural calculations and evaluation of the capability of a building's structural system to withstand a major earthquake without collapse or creation of a serious life safety risk.

The work presented in this report also includes a survey of nonstructural hazards. The purpose of this was to identify potential falling and other hazards that may be triggered by a major earthquake. The nonstructural survey included a survey of the 1990's additions as well as the original 1930's buildings.

The report is organized as follows. The criteria used in the evaluations are described in Section 2. A description of the 1930's buildings and the results of the evaluation are presented in Section 3. Nonstructural hazards are discussed in Section 4. Section 5 provides a summary and recommendations.

2. Evaluation Criteria

Buildings

The original building was evaluated using the criteria of ASCE Standard 31-03 "Seismic Evaluation of Existing Buildings" (Ref. 1). This is the state-of-the-art criteria used for the seismic evaluation of existing buildings. It is used to establish whether there is a significant life safety risk.

The buildings were given a Tier 2 evaluation for the Life Safety performance level using the Linear Static Procedure (LSP). This requires a detailed seismic analysis of a building's structural system. In this approach, the ground shaking hazard at the site is first determined, and then the building is evaluated for its ability to withstand these motions without unacceptable behavior.

Nonstructural Components

Nonstructural elements and equipment were also investigated. These were evaluated in a site survey using the Tier 1 criteria of ASCE 31, supplemented by additional guidance developed by DSA and other state agencies (Ref. 2).

Earthquake Ground Motions

Earthquake ground motions for the site were obtained from the seismic ground shaking maps found on the CD-ROM Seismic Design Parameters (Ref. 3). These ground shaking maps were developed by the U.S. Geological Survey under the National Earthquake Hazards Reduction Program (NEHRP). Ground motions at the site were determined for the Maximum Considered Earthquake (MCE). This represents an earthquake with only 2-percent chance of being exceeded in 50 years (i.e., an earthquake with a 2,500 year return period). At this location, the MCE has a peak ground acceleration of 0.77g; however, only 2/3 of this level of motion (0.51g) is required to be used in the evaluations done under ASCE 31. Site class D (default class) was used.

The school is located approximately 1 mile west of the Hayward fault. This is a large fault and believed capable of a magnitude 7.0 or larger earthquake. This would produce very strong shaking at the site.

Demand-Capacity Ratios

Results of the evaluation of each building are presented as demand to capacity ratios (D/C). These are provided for the main structural elements (i.e., structural members and connections) that make up the seismic force-resisting system of each building. A D/C ratio of 1.0 or less indicates that the element satisfies the ASCE 31 criteria. Demand is the combined earthquake and gravity load forces applied to a structural element, and capacity is the element's usable strength. D/C ratios greater than about 1.1 to 1.2 indicate a deficient element that may need to be strengthened or replaced. Elements with D/C ratios of 2.0 or greater are considered seriously overstressed. Generally, such large D/C ratios indicate a serious deficiency unless there are other structural elements present that can take up the slack when the element with the high D/C ratio fails or is no longer effective.

3. Buildings A and B

Description

Wildwood Elementary School consists of Buildings A, B, C, D, and E and is built on the top and one side of a hill. Buildings A and B are the original school buildings and are believed to have been built in the 1930's. These buildings are structurally interconnected and act as a single structure, however they are discussed separately in this report. They are structurally separated from Buildings C, D, and E by a seismic separation joint.

The evaluation presented is limited to Buildings A and B (Buildings C, D and E were recently constructed to DSA seismic standards). . A plan of the buildings is shown on Figure 1. Building B is east of Line 10 and north of Line R. Figures 2 through 5 show views of the buildings.

Drawings for the original buildings were not available, and before the Tier 2 evaluations could be performed, as-built drawings had to be developed. This is described later in the section.

Building A. This includes the original classroom and office areas of the school. It is basically a single story wood frame structure with a flat roof over a wood framed floor with concrete strip footings and a crawl space underneath. Exceptions to the wood frame floor occur at the boy's and girl's rooms. These have concrete slab floors above the crawl space.

The top of grade in the crawl space varies from 3'-8" to 10'-10" below the main floor. The higher crawl space occurs at the northwest end of the building. At this end, below Classroom 12, there is a partial lower level containing one classroom and two storage areas. This level has concrete walls. A girl's room, also located at the northwest end of the building, is built on an intermediate level, halfway between the main floor and the lower level.

The ceiling joists of the main story are 2 x 16 at 16" o.c. with 1 x 6 diagonal sheathing on top of the joists. The roof rafters are 2 x 8 at 32" o.c. and are located approximately 18" above the ceiling joists. Walls are 2 x 4 to 2 x 10 studs with plaster finish on the interior and stucco on the exterior. Roofing consists of an asphalt membrane.

Lateral forces in both directions are resisted by shear walls consisting of 1 x 6 diagonal sheathing on wood studs.

Building B. This includes the theater, consisting of the stage and auditorium areas, and the teacher's lounge and kitchen area on the main floor. There is a lower level area below the stage and teacher's lounge containing a classroom, a mechanical equipment room, and a corridor leading to Building E.

Above the main floor level, the building has wood frame construction with pitched roofs and Spanish tile roofing. The roof over the auditorium is supported by four heavy timber trusses that span 40-feet. Walls are 2 x 6 and 2 x 10 studs with plaster on the interior and stucco on the exterior. The auditorium floor has wood frame construction over a crawl space. The stage and staff lounge floors are concrete. In effect, the lower level classroom, the mechanical room, and the corridor are a single story concrete structure with wood framing above them.

Lateral forces in both directions are resisted by shear walls sheathed with 1 x 6 diagonal sheathing on wood studs. Roof diaphragms have 1 x 6 diagonal sheathing on wood rafters.

**Site Visit.** Structural engineers from our office inspected both buildings on several occasions in the spring and summer of 2007. The buildings appear to be in good condition for their age, and no obvious structural distress or deterioration was observed.

#### As-built Information

Measured drawings were prepared by Murakami/Nelson showing floor and roof plans and wall elevations (Ref. 4). During the 2007 spring break and the subsequent summer recess, a testing laboratory conducted an exploration of the original building. The purpose of this work was to obtain structural information needed for the Tier 2 evaluations.

Information was obtained by making exploration holes and taking field measurements to determine such things as size and spacing of roof, floor and wall framing, details of the construction of the auditorium trusses, type and size of sheathing on diaphragms and shear walls, configuration and sizes of footings and foundation walls, and the strength of concrete. This information is summarized in the exploration report (Ref. 5).

"As-built" structural drawings were prepared by our firm from the information given on the measured drawings and the exploration report. This information was transferred to AutoCad drawings (Ref. 6) prepared for use in the seismic evaluations.

During the preparation of the as-built structural drawings, similarities were noted between the Wildwood construction and the construction of parts of the Havens and Beach Elementary Schools. It is our understanding that these were designed by the same architect and built at about the same time.

Because of these similarities, we have based portions of our evaluation on the assumption that certain construction details are similar to those shown on the original design drawings for Havens and Beach Elementary Schools. These assumptions (see Table 1) remain to be verified. Whenever the results given are based on these assumptions, this is noted in the text.

#### Results of Evaluation

**Building A.** The horizontal diaphragm does not occur at the roof level. Instead, the ceiling framing is sheathed with 1 x 6 diagonal sheathing that interconnects the tops of the shear walls and serves as the "roof" diaphragm. The diaphragm was checked using the flexible diaphragm assumption. The shear strength of the ceiling diaphragm diagonal sheathing was found to be generally adequate. D/C ratios ranged from 0.60 to 0.88. If the diaphragm between Lines 9 and 11 does not extend from Lines U to R, as assumed, but extends only between Lines U and T, the D/C ratio for the ceiling diaphragm at this location would be 1.27. This represents a relatively slight deficiency.

The D/C ratios for the shear walls are shown in Figure 1. A number of the diagonally sheathed shear walls are overstressed. Due to the large number of windows in Lines 1, 4, 5, J, and U, there is very little shear-resisting capacity. The D/C ratio for the single layer of 1 x 6 diagonal sheathing on these walls varies from 2.36 to 4.58. These walls are seriously deficient.

The D/C ratios for the remaining first story shear walls with diagonal sheathing vary from 0.57 to 1.62. Some of these ratios are high enough to be considered deficient.

These values are based on the assumption that plaster walls along Lines 2 and H are ineffective. The D/C ratios for the plaster walls along Lines 2 and H would be 3.52 and 3.43, respectively, if they were included.

We believe that all shear walls lack hold-downs to resisting overturning. ASCE 31 does not require these for the life safety performance level. However, lack of hold-downs can lead to significant increases in structural damage during large earthquakes.

Foundation anchor bolts were evaluated for representative walls based on the assumptions given in Table 1. Based on those assumptions, the D/C ratios for anchor bolts along Lines C and D are 1.93 and 2.70, respectively. Anchor bolts are thus significantly deficient. Anchor bolts along other walls had D/C ratios varying between 0.47 and 1.41. Some of the ratios are high enough to be considered deficient.

The diaphragm chord splices over the office area, based on assumed construction details, have a D/C ratio between 2.38 and 3.58 depending on diaphragm extent across Line T. These splices are thus significantly deficient. Diaphragm chord splices along Lines 1 and J had D/C ratios of 1.51 and 1.74, respectively. These represent deficient conditions.

Foundation soil pressure was evaluated at Line C between Lines 3 and 3.4 and at Line 7.1 between Lines H and J. The highest foundation pressure was found to be 4,490 psf at C/3.4 with seismic forces acting to the east. Foundation pressure for Line C with seismic forces acting to the west was 2,490 psf. Foundation pressure for Line 7.1 was 2,370 psf. The actual allowable soil pressure is not known, but the above pressures should not cause any significant problems.

Foundation strength was evaluated at Line 7.1 based on the assumed amount of reinforcing given in Table 1. The D/C ratio was found to be 0.96.

The first floor diaphragm in Classroom 12, located at the northwest portion of the building, is required to brace the upper portion of the lower level concrete walls along Lines 3, 3.2, 4, 5, C, and D. The D/C ratio for the shear strength of the diagonal sheathing is 1.08. The assumed reinforcing (Table 1) would provide adequate chord strength at solid walls. Reinforcing over windows should be evaluated but is probably adequate. When information becomes available, the connections between the wood floor framing and the tops of the concrete walls must be evaluated for their ability to transfer diaphragm shear forces and to anchor the concrete walls to the wood floor.

**Building B.** Provided the missing nailing is installed (see Figures 6 and 7), the shear strength of the diagonally sheathed roof diaphragms was found to be adequate. The D/C ratios varied from 0.36 to 0.92. These numbers are based upon the assumption that the proscenium wall on Line O is effective in resisting seismic forces. The diaphragm chord construction is not known, so their capacities could not be evaluated. At Beach and Havens Auditoriums the chord D/C's along the sides were 1.1 and 2.0 respectively. So they do not offer any guidance for an estimate at Wildwood.

The D/C ratios for the diagonal sheathing on the walls are shown on Figure 1. In general, walls with windows are not adequate. The side walls of the auditorium on Lines 10 and

11, respectively, have D/C's of 2.51 and 2.14. The proscenium wall on Line O has a D/C of 1.77. The two stud walls on Line R have a D/C of 1.09, but this number assumes that the two walls, each with a layer of sheathing, will act as a unit to resist seismic forces.

No investigation was made to determine the presence or absence of hold-downs; however we do not believe that they are present. ASCE 31 does not require them for the life safety performance level.

Sill bolts were evaluated based upon the assumptions presented in Table 1. At the proscenium wall on Line O, the D/C ratio is 2.34. At the side walls of the auditorium the D/C is 1.5. At the walls on Line R the D/C is 1.26. At the kitchen wall on Line P the D/C is 1.26. Other walls have D/C ratios from 0.71 to 0.93

Below the main level of Building B, the foundations and walls of the rooms below the stage area are reinforced concrete continuous foundations and walls, some with window openings. The configuration is very similar to Beach School where drawings were available and calculations have indicated the structure to be adequate.

## Discussion of Results

Verification of Construction. Table 1 lists assumptions made to complete the Tier 2 evaluation. These and other aspects of the existing construction must be further determined to verify the assumptions made, to determine the extent of deficiencies already determined, and to permit review of items which have not yet been reviewed. This will require additional destructive opening of architectural finishes and possibly limited removal of some existing structural members.

Building A. Building A does not comply with the ASCE 31 Tier 2 life safety criteria. The most serious deficiencies are the overstressed shear walls along Lines 1, 2, 4, 5, H, J, and U. These deficiencies, due to the many window and door openings, can lead to severe damage under strong seismic shaking. Windows may break and doors may become inoperable. Damage to the walls on Lines 1, 4, 5, J, and U could be made worse by overstressed chord/collector splices, depending on the actual location of those splices. Damage to Lines C and D could be made worse by overstressed anchor bolts. Other overstressed shear walls would suffer lesser damage. All shear wall damage is made worse by the lack of hold-downs.

Fixing these deficiencies would first require a decision on the method of strengthening the walls. Lines 1, 4, 5, J, and U which have many windows. Alternates would include closing some of the windows to create additional shear resisting panels, adding braced steel frames, or strengthening other parts of the building so that these walls are not needed. The last option could be accomplished by adding plywood, anchor bolts, and hold-downs to walls along Lines 2, H, and G and providing necessary structural strengthening to the ceiling diaphragm. Walls on Lines 2, H, and G will require the most strengthening regardless of the methods chosen for walls on Lines 1, 4, 5, J, and U. Other overstressed shear walls can be repaired by adding plywood and anchor bolts as required. Overstressed diaphragm chords and collectors should be strengthened.

Building B. Building B does not comply with the ASCE 31 Tier 2 life safety criteria. The major deficiencies occur in the side walls and proscenium wall at the auditorium. These walls have limited strength due to the large openings and numerous doors and windows. Significant

damage is expected in these walls during a major earthquake. The connections between the trusses and their support columns appear adequate.

The walls on Line R of the auditorium appear adequate but further investigation is required in a later portion of this project to verify the connections both above and below the floor level.

If the missing nailing is installed, the auditorium roof diaphragm is in conformance with ASCE 31 requirements. This assumes that the proscenium wall is effective as a shear wall, which it is not without strengthening. The chords and collectors along the sides of the auditorium are not included in this evaluation. The details of these important elements must be field determined in a later phase of the project.

The sparseness of sill bolts and the assumed absence of hold-downs are both likely sources of additional damage in this building.

Strengthening of this building is most easily done with the introduction of plywood sheathing throughout together with strengthened sill bolts and a complete system of wall hold-downs. At exterior walls this can be done on the inside or the outside of the wall.

Table 1 – Assumptions about Original Construction

| No.  | Building | Item   | Assumed Construction  |
|------|----------|--|---|
| (1)  | A        | Anchor bolts at interior transverse walls with diagonal sheathing on both sides. | 5/8" bolts @ 16" o.c.   |
| (2)  | A        | Anchor bolts at walls with diagonal sheathing on one side                        | 5/8" bolts @ 4'-0" o.c.   |
| (3)  | A        | Chord splices  | 2x chords with 5-20d nails  |
| (4)  | A        | Non-bearing foundations  | 18" wide  |
| (5)  | A        | Bearing foundations  | 24" wide  |
| (6)  | A        | Foundation reinforcing   | 2 #5, top and bottom, # 4 @ 12" horizontal, and # 4 @ 16" vertical. |
| (7)  | B        | Anchor bolts everywhere, except proscenium wall                                  | 5/8" bolts @ 4'-0" o.c. in 3x redwood sill                          |
| (8)  | B        | Anchor bolts at proscenium wall  | 5/8" bolts @ 2'-0" o.c. in 3x redwood sill                          |
| (9)  | A & B    | Diagonal sheathing nailing   | 3-8d at ends and 2-8d at all other bearings                         |
| (10) | B        | Roof diagonal sheathing nailing to proscenium wall                               | Two rows of 2-8d nails per board                                    |

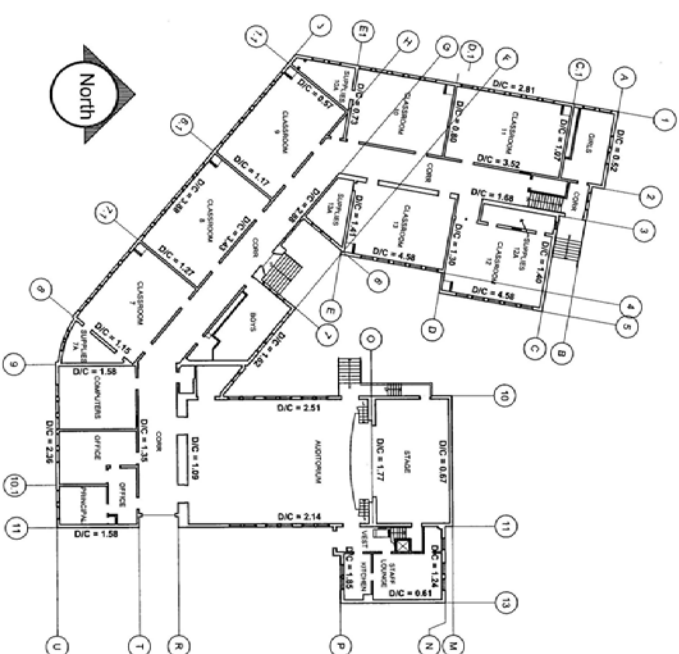


Figure 1 – Plan showing the original 1930's building (Buildings A and B) at Wildwood School. Demand to capacity ratios ( $D/C$ ) for the shear walls are also shown.





Figure 2 – Overview of Wildwood Elementary School. The near portions are the 1990's additions.



Figure 3 – Main entrance to the school on Wildwood Avenue.



Figure 4 – Area between classroom wing and auditorium in original (1930's) buildings.



Figure 5 – The classroom located beneath the auditorium has concrete construction. The area above has wood frame construction.



Figure 6 – Exploration opening in the roof of the auditorium.



Figure 7 – Detail of edge nailing of 1 x 6 diagonal sheathing. Only one nail per board (nails are clinched) was found. Three are required. This is a serious deficiency and needs to be investigated further.

#### 4. Nonstructural Hazard Survey

##### Survey Methodology

This section describes the survey conducted for nonstructural seismic hazards and presents the results. The purpose of the survey was to identify potential falling and other hazards that may be caused by earthquake shaking.

Nonstructural components consist of things that are brought into a building after it has been constructed (e.g., furnishings, bookshelves, and building contents) as well as items that were installed when the building was built (e.g., mechanical and electrical equipment and fixtures, ceilings, and partitions). These can become hazards when they break, fall, slide or overturn. When this happens they can cause injury, block exits, and create secondary hazards such as chemical spills, gas leaks and postearthquake fires.

A nonstructural hazard survey of the entire school was done using ASCE 31 Tier 1 procedures. The Basic and Intermediate Nonstructural Component Checklists were used. The survey involved a room-by-room inspection of all buildings by a structural engineer experienced in seismic design. The survey was conducted on July 6 and August 8, 9 and 20, 2007.

Table 2 summarizes results for the roofs of the original (1930's) buildings and the 1990's buildings. Tables 3 and 4 cover Buildings A and B, respectively, and Table 5 covers Buildings C, D, and E. The tables identify the items examined, the estimated vulnerability of the item, and observations about each. The survey was entirely visual, and no drawings were reviewed or calculations prepared. The levels of vulnerability used are defined as follows:

| <u>Vulnerability</u> | <u>Characteristics</u>  |
|----------------------|---|
| High (H)             | Noncompliant under ASCE 31 Tier 1 procedures. Possesses little or no seismic resistance; item may break, fall, slide or overturn during strong shaking. High probability of damage under strong shaking. May cause injury to persons in vicinity. |
| Moderate (M)         | Possesses some seismic resistance, but not as much as an item rated low.  |
| Low (L)              | Compliant under ASCE 31 Tier 1 procedures. Possesses good seismic resistance, should resist moderate shaking without damage. Low probability of damage under strong shaking. Unlikely to cause injury to persons in vicinity.                     |

##### Building Contents on Tables and Shelves

In addition to the survey results given in Tables 3, 4 and 5 it should be noted that in virtually all areas of the school there are unrestrained contents (see Figures 8, 9 and 10 for some examples). These include such things as stored materials and books on shelves, and computer monitors on desks. While these are a threat to fall to the floor and may result in economic loss, they are generally not considered serious life-safety-hazards. Exceptions are

unrestrained relatively heavy items stored overhead, pointed or sharp objects that can easily topple, and items that can impede or block exits.

Contents spillage is a recognized problem. The DSA Northridge report (Ref. 7) stated: ***“Public school officials that did not actively pursue efforts to anchor and brace bookshelves, library shelving, file cabinets, televisions, aquariums and other objects that would fall or topple during strong ground shaking found that the costs and efforts they faced for clean-up were significantly greater than those that prepared for the inevitable earthquake.”***

#### **Bookcases and Storage Cabinets**

There are bookcases and storage cabinets located throughout the school. Most of these are secured to walls and are unlikely to overturn, although contents may fall out. A few cabinets and bookcases are free-standing and unanchored (see Figures 11 and 12). Those over 4 feet tall with height to depth ratios of 3.0 or greater are considered a hazard to overturn under ASCE 31 criteria (Ref. 1). It should be noted that the State of California recommends a different height criteria. It recommends that bookcases more than three feet high be placed back to back and fastened together or be secured to a wall (Ref. 2).

#### **Ceilings**

Ceilings in the older Buildings A and B are mostly plaster. The corridor ceiling at the main level is plaster on metal lath. The lath is wired to 1-inch channels, and the channels are supported by heavy gage wire connected to the roof joists (Figures 14 and 15). While this does not meet ASCE 31 Tier 1 criteria because it is not braced every 12 feet, the risk of the ceiling falling is believed to be low.

Ceilings in the new Buildings C, D, and E are wallboard or plaster. These are considered low risk because of their relatively recent construction and the fact that they were plan reviewed by DSA.

#### **File Cabinets**

There are file cabinets located throughout the building. Many of these are four drawer cabinets with locks on the drawers. There are a few cabinets without drawer locks, and these are a definite hazard to overturn when the drawers shift outward. These were rated as high risk (H) because of the overturning hazard.

Many file cabinets (but not all) are situated where they are a low risk of injury to persons in the vicinity or are “wedged in” or otherwise placed such that it is very unlikely that they will overturn. Some can overturn and block exits (Figure 13). The ASCE 31 Tier 1 Supplemental Nonstructural Checklist (not used) requires that “file cabinets arrange in groups shall be attached to one another.” This requirement, however, is for the immediate Occupancy (I/O) performance level. None of the file cabinets we observed were connected together.

#### **Emergency Gas Shutoff**

The buildings have gas lines that supply gas to roof top HVAC units (Figure 16), heaters in classrooms, oven/ranges, and boilers. The roof top lines are generally anchored to the roof, but the provision for relative movements at building seismic separation joints may be

questionable (see Figure 17). Other than the lines on the roof, we were unable to observe most lines because they are concealed. The lines on the roof range in size from 1 to 2-1/2 inches in diameter.

While the buildings have fire sprinklers in corridors, it would be desirable to install an earthquake-activated gas shutoff valve at the PG&E meter. This would automatically shutoff the flow of gas and could prevent a postearthquake fire.

#### **Light Fixtures**

Overhead fluorescent light fixtures with heavy ballasts can be a falling hazard if not adequately secured. As part of the nonstructural survey, fixtures in each room were examined. The school has several different types of fixtures. Ceiling-mounted fixtures (Figure 18) are considered low risk. Cable-hung fixtures (Figure 19) are also considered low risk. Pendant-type large incandescent or gas vapor fixtures (Figure 20) can be a hazard if they are not restrained or are not resistant to shaking.

Rigid stem pendant-type fluorescent light fixtures can be a serious falling hazard. Many of these have fallen in school buildings in past earthquakes. Fortunately, none of these were observed at Wildwood school.

#### **Sprinklers**

Buildings C, D, and E have sprinklers in corridors, and these probably conform to Tier 1 requirements, which require that the sprinkler bracing conform to 1996 NFPA-13 requirements. Buildings A and B have limited sprinklered areas. It does not appear that any of the sprinkler piping in Buildings A and B is a falling hazard, although this is based on limited observations. However, if the sprinkler piping breaks, the sprinkler system will not be available for fire suppression and water damage may result.

#### **Television Sets**

Most TV's in the school are wall-mounted. These were installed by the District's maintenance staff. It is our understanding that the staff secures the frames holding the TV's to wall studs, and the TV's are strapped to the frames. Consequently, we believe the wall-mounted TV's to be low risk.

Those on stands are generally strapped to the stands, and the stands are on rollers. There is some possibility that the stands could over turn, although these generally have a H/D (height/depth) ratio less than the 3.0 that ASCE 31 requires for storage cabinets. It should be noted that the State of California recommends that mobile TV stands be tethered to walls if the height of the stand exceeds two-thirds its depth (Ref. 2). This corresponds to a H/D ratio of 0.67, which seems conservative.

#### **Trellises**

The school has two trellises. One is located adjacent the south side of the Kindergarten. This appears to have engineered construction and to be low risk. The other is located over the

dining area benches near the entrance to the school (Figure 21). It is not known if this was engineered. It was reported to have been built by the Dad's club.

The construction drawings for both should be obtained and reviewed to verify that the design of each was reviewed by DSA.

**Windows**

Glass in Buildings A and B is ordinary glass and only 1/8-inch thick. In a number of places it has been covered by plastic film to reduce sunlight exposure. There are some places where ordinary glass is located more than 10 feet above walkways. According to ASCE 31 Tier 1 requirements, this is noncompliant and would be rated high (H) risk. It is difficult to assess whether the glass is a serious hazard. The size of the windows is relatively small, and most seem unlikely to break under moderate building racking. There are, however, several shear walls where the D/C ratios are much greater than 3.0. Walls on Lines 4, 5 and J have D/C ratios of 4.58, 4.58 and 3.88, respectively. These strongly imply that story drifts of several inches or more will occur, and drifts of this magnitude would likely cause glass breakage.

Window glass in Buildings C, D and E is tempered. Tempered glass shatters into many small pieces and is considered much less hazardous than ordinary glass, which can break into much larger dangerous pieces.

**Table 2 – Nonstructural Survey Results for the  
Roof of Buildings A, B, C, D and E**

| Item  | Vulnerability | Comments   |
|---|---------------|--|
| <b><u>Roof of Original (1930's) Buildings<br/>A and B</u></b> |               |  |
| 1. Carrier HVAC units   | L             | Two units, anchored to roof with seismic-resistant vibration mounts. Units have flexible gas   |
| 2. Ducts  | L             | 18" x 18" and smaller.   |
| 3. Gas lines  | L             | Main line is 4-inch, and smallest is 1-inch. Lines anchored to roof.   |
| 4. Sprinkler piping   | L             | Mostly braced, but may not meet today's requirements.  |
| 5. Skylights  | L             | Four of these, plastic glazing.  |
| 6. Roof tile  | L             | Tiles wired to nails in roof sheathing.  |
| <b><u>Roof of New (1990's) Buildings<br/>C, D, and E</u></b>  |               |  |
| 1. Carrier HVAC units   | L             | Four units, anchored to roof within seismic-resistant vibration mounts. Units have flexible gas lines.   |
| 2. Ducts  | L             | Mostly 16" x 16" in size, some slightly larger.  |
| 3. Gas lines  | L-M           | Main line is 2-1/2 inch, and smallest is 1 inch. Lines anchored to roof, but in two places lines are not connected to anchorage. Provision at separation joint maybe questionable. |

| Table 3 - Nonstructural Survey Results<br>for Building A |               |  |
|--|---------------|--|
| Item   | Vulnerability | Comments   |
| 4. Sprinkler piping                                      | L-M           | Mostly braced, but may not meet today's requirements. Provision for relative movement at the seismic separation joint is questionable. |
| 5. Skylights   | L             | Seven of these, various sizes, all have tempered glass.  |

| Item  | Vulnerability | Comments   |
|---|---------------|--|
| <b><u>Principal's Office (Main Level)</u></b>           |               |  |
| 1. Fluorescent light fixtures                           | L             | Ceiling-mounted.   |
| 2. Lateral file   | H             | One 4-drawer lateral file without drawer locks. 52"H x 36" W x 18D. H/D = 2.9. |
| 3. Ceiling  | L             | Probably plaster.  |
| <b><u>Secretary's Office and Lobby (Main Level)</u></b> |               |  |
| 1. Fluorescent light fixtures                           | L             | Ceiling-mounted.   |
| 2. Lateral file   | H             | One 4-drawer lateral file without drawer locks.                                |
| 3. TV   | L             | Wall-mounted.  |
| 4. Windows over door                                    | H             | Ordinary glass.  |
| 5. Ceiling  | L             | Acoustic tile.   |
| <b><u>Computer Room (Main Level)</u></b>                |               |  |
| 1. Fluorescent light fixtures                           | L             | Ceiling-mounted.   |
| 2. Wood storage cabinet                                 | L             | Secured to wall.   |
| 3. Wood bookcase  | L             | Secured to wall.   |
| 4. Ceiling  | L             | Acoustic tile, probably on plaster.  |
| <b><u>Classrooms 7,8,9,10,11,12,13 (Main Level)</u></b> |               |  |
| 1. Fluorescent light fixtures                           | L             | Ceiling-mounted.   |
| 2. Ceiling  | L             | Acoustic tile.   |
| 3. Wood storage cabinets                                | L             | Secured to wall.   |
| 4. Wood bookcases                                       | L             | Secured to wall.   |

| Item                                   | Vulnerability | Comments  |
|--|---------------|---|
| 5. TV (Rms. 7,8,9,10,12)               | L             | Wall-mounted.   |
| 6. File cabinet (Rm. 7)                | H             | Small 4-drawer unit without drawer locks. 52" H x 15" W x 18" D, H/D =3.5.                      |
| 7. File cabinets (Rms. 8,9)            | M             | 4-drawer units with drawer locks.   |
| 8. File cabinet (Rm. 10)               | H             | One 4-drawer unit without drawer locks.   |
| 9. Heaters (Rms. 7,8,10)               | L             | Gas-fired units in closet, anchored, have flexible gas lines.                                   |
| 10. Heaters (Rms. 11,12,13)            | H             | Unanchored units. (Unit in Rm. 9 was not checked).  |
| 11. Wood file cabinet                  | M-H           | Old 4-drawer unit without drawer locks, but drawer friction high.                               |
| 12. TV (Rm. 13)                        | M-H           | TV strapped to stand, but stand on rollers.   |
| 13. Windows                            | L-H           | Most appear to be film covered glass. Some ordinary glass without film. See discussion in text. |
| 14. Windows over doors (Rms. 10,11,12) | H             | Ordinary glass.   |
| 15. Map rack (Rm. 12)                  | L             | Secured to wall.  |
| 16. Small wood bookcase (Rm. 8)        | H             | Unsecured bookcase can overturn. Unit 48" H x 36" W x 9.5" D, H/D = 5.1.                        |
| 17. Small wood bookcase (Rm.)          | H             | Unsecured bookcase can overturn and block exit. Unit 48" H x 30" W x 11" D, H/D = 4.4.          |
| 18. Refrigerator (Rm. 12)              | H             | Small unrestrained unit sitting on counter.   |

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| Item   | Vulnerability | Comments  |
|--|---------------|---|
| 19. Microwave (Rm. 12)                                   | H             | Small unrestrained unit atop unrestrained small refrigerator. |
| <b><u>Supply Rooms 7A,10A,12A,13A (Main Level)</u></b>   |               |   |
| 1. Fluorescent light fixtures                            | L             | Ceiling-mounted.  |
| 2. Metal storage cabinet (Rm. 7A)                        | L             | Secured to wall.  |
| 3. Wood bookcases  | L             | Secured to wall.  |
| 4. Wood storage cabinets                                 | L             | Secured to wall.  |
| 5. File cabinet (Rm.13A)                                 | L             | 4-drawer unit with drawer locks.                              |
| 6. Wall-mounted bookcases (Rm.13A)                       | L             | Secured to wall.  |
| <b><u>Boy's Restroom Room (Main Level)</u></b>           |               |   |
| 1. Fluorescent light fixtures                            | L             | Ceiling-mounted.  |
| 2. Wood storage cabinet                                  | H             | Large unanchored unit 89" H x 68" W x 25" D, H/D = 3.6.       |
| <b><u>Girl's Restroom (Main Level)</u></b>               |               |   |
| 1. Fluorescent light fixtures                            | L             | Ceiling-mounted.  |
| <b><u>Janitor's Closet (Main Level)</u></b>              |               |   |
| 1. Light   | L             | Single fixture.   |
| 2. Water heater  | H             | Small electric unit on floor, unrestrained.                   |
| <b><u>Staff Restroom (Main Level)</u></b>                |               |   |
| 1. Fluorescent light fixtures                            | L             | Ceiling-mounted.  |
| <b><u>Storage Closet (off Hallway at Main Level)</u></b> |               |   |
| 1. Light   | L             | Single ceiling-mounted fixture.                               |
| 2. Wood storage shelves                                  | L             | Secured to wall.  |

**Table 4 - Nonstructural Survey Results  
for Building B**

| Item   | Vulnerability | Comments  |
|--|---------------|---|
| <b><u>Corridor (Main Level)</u></b>                        |               |   |
| 1. Fluorescent light fixtures                              | L             | Ceiling-mounted.  |
| 2. Ceiling   | L             | Plaster ceiling on metal lath, lath wired to small channels that are supported by heavy gage wire looped through 2x roof joists.  |
| 3. Skylight glazing in ceiling                             | H             | Large roof top skylights have glass glazing at ceiling level. Glass well-secured in frame, but glass does not appear to be tempered and is over main corridor.              |
| <b><u>Classroom 15 (Lower Level)</u></b>                   |               |   |
| 1. Fluorescent light fixtures                              | L             | Ceiling-mounted.  |
| 2. Ceiling   | L             | Wallboard or plaster.   |
| 3. Heater  | L             | Low floor-mounted electric unit.  |
| 4. File cabinet  | M             | 4-drawer unit with drawer locks.  |
| 5. TV  | L             | Wall-mounted.   |
| 6. Wood bookcase   | H             | Unrestrained unit 78" H x 34" W x 10" D, H/D = 7.8.   |
| 7. Wood storage shelving                                   | H             | Unrestrained unit 69" H x 35" W x 13" D H/D = 5.3.  |
| 8. Moveable blackboard                                     | M             | On wheels, 79" H x 76" W x 20" D, H/D = 4.0.  |
| <b><u>Exterior</u></b>                                     |               |   |
| 1. Westinghouse switch boards                              | L             | Two units, both anchored.   |
| <b><u>Auditorium (Main Level)</u></b>                      |               |   |
| 1. Light fixtures  | Unknown       | Four large fixtures supported on chains. Could not closely examine anchorage of chains to ceiling and fixtures. These appear to be low risk.                                |
| 2. Spot lights   | L             | A number of these all secured to the bottom chord of truss.   |
| 3. JBL speakers  | H             | Two of these. At the time of the inspection, these were on the stage floor, but it appears they are normally placed unsecured on small shelves on either side of the stage. |
| 4. Windows   | H             | 1/8-inch thick ordinary glass more than 10 feet overhead.   |
| <b><u>Stage Area (Main Level)</u></b>                      |               |   |
| 1. Fluorescent light fixtures                              | M             | Four chain-hung fixtures, two fixtures can impact long row of stage lights.   |
| 2. Metal storage shelving                                  | L             | Secured to wall.  |
| 3. Wood storage shelving                                   | L             | Secured to wall.  |
| 4. Stage curtain and lights                                |               | Not rated.  |
| 5. Refrigerator  | M             | Located in stairwell off of stage, unrestrained unit 66" H x 32" W x 29" D, H/D = 2.3.  |
| 6. Shelving for musical instruments                        | L             | Secured to wall.  |
| <b><u>Electrical Room (Main Level, off Auditorium)</u></b> |               |   |
| 1. Fluorescent light fixtures                              | L             | Ceiling-mounted.  |

| Item                                     | Vulnerability | Comments  |
|--|---------------|---|
| 2. Telecom rack                          | L             | Wall-mounted.   |
| 3. Equipment in telecom rack             | H             | Some equipment is unsecured and can fall out.   |
| 4. File cabinets                         | M             | Two unrestrained 4-drawer units with drawer locks.  |
| 5. Wood storage cabinet                  | L             | Secured to wall.  |
| <b><u>Kitchen (Main Level)</u></b>       |               |   |
| 1. Fluorescent light fixtures            | L             | Ceiling-mounted.  |
| 2. Refrigerator                          | M             | Unrestrained unit, 61" H x 28" W x 29" D, H/D = 2.2.  |
| 3. Wood cabinets                         | L             | Built-in  |
| 4. Metal storage shelf                   | L             | Secured to wall (located between kitchen and Auditorium).   |
| 5. Range                                 | M             | Unrestrained electric range.  |
| <b><u>Staff Lounge (Main Level)</u></b>  |               |   |
| 1. Fluorescent light fixtures            | L             | Ceiling-mounted.  |
| 2. Heater                                | L             | Small gas unit secured to wall, has flexible gas line.  |
| 3. Door                                  | H             | Appears to have ordinary glass.   |
| <b><u>Boiler Room (Lower Level)</u></b>  |               |   |
| 1. Fluorescent light fixtures            | L-M           | Chain-hung  |
| 2. Carrier air-handling unit             | L             | Anchored to house-keeping pad.  |
| 3. Sterling heat exchanger               | H             | Braced from ceiling but does not have a flexible gas line.  |
| 4. Ducts                                 | L             | Hung from ceiling or connected to equipment, does not seem to be a hazard.  |
| 24                                       |               |   |
| Item                                     | Vulnerability | Comments  |
| 5. Electrical panels                     | L             | Secured to wall.  |
| <b><u>Classroom 14 (Lower Level)</u></b> |               |   |
| 1. Fluorescent light fixtures            | L             | Ceiling-mounted.  |
| 2. Door                                  | L             | Wire glass used.  |
| 3. Wood bookcases                        | L             | 7' high, secured to walls.  |
| 4. Wood bookcases                        | H             | Two small bookcases at doorway, 36" H x 36" W x 12" D, H/D = 3.0. Units can overturn and block exit from classroom. |
| 5. Wood bookcase                         | H             | Bookcase against wall, unanchored, 42" H x 32" W x 11" D, H/D=3.8.  |
| 6. File cabinet                          | M             | 4-drawer unit with drawer locks.  |
| 7. Wood storage cabinet                  | L             | Built-in unit.  |
| 8. Ad hoc shelving                       | H             | The two concrete blocks that provide supports for the top shelf are unrestrained and a falling hazard.              |
| 9. Heater                                | L             | Gas-fired unit located in closet anchored, has flexible gas line.   |
| 10. Ceiling                              | L             | Acoustic tile.  |
| <b><u>Corridor (Lower Level)</u></b>     |               |   |
| 1. Ceiling                               | L             | Two layers of 5/8-inch wallboard, could not view attachment, but unlikely to be a hazard.                           |
| 25                                       |               |   |



| Item                           | Vulnerability | Comments   |
|--------------------------------|---------------|--|
| 2. Light fixtures              | M-H           | Spring-loaded fixtures in ceiling. Glass lenses do not fit properly in fixtures because of double thickness of wallboard. Lenses are a potential falling hazard. |
| 3. Wood "cubby hole" cabinets. | H             | A number of the unrestrained units in corridor. Units 52" H x 14" D, H/D = 3.7. These can fall over and block exit way.  |
| 4. Doors                       | L             | Tempered glass used.   |
| 5. Windows                     | L             | Tempered glass used.   |

**Table 5 - Nonstructural Survey Results  
for Buildings C, D and E**

| Item   | Vulnerability | Comments   |
|--|---------------|--|
| <b><u>Classrooms 3, 4, and 5<br/>(Lower Level)</u></b> |               |  |
| 1. Fluorescent light fixtures                          | L             | Relatively new fixtures, cable-hung.   |
| 2. Heaters   | L             | Gas heaters located in closets, units are braced and have flexible gas lines.  |
| 3. Wood storage cabinets                               | L             | 7' high, secured to walls.   |
| 4. Projector screen (Rm. 5)                            | L             | Wall-mounted.  |
| 5. TV  | M-H           | Strapped to stand, but stand on rollers.   |
| 6. Wood bookcase (Rm. 3)                               | L             | 7' high, secured to wall.  |
| 7. Small wood bookcase (Rm. 3)                         | H             | Unrestrained unit 60" H x 13" W x 10" D, H/D = 6.0.  |
| 8. Windows   | L             | Tempered glass used.   |
| <b><u>Corridor (Lower Level)</u></b>                   |               |  |
| 1. Light fixtures                                      | M-H           | Spring-loaded fixtures in ceiling. Glass lenses do not fit properly in fixtures because of double thickness of wallboard. Lenses are a potential falling hazard. |
| 2. Wood "cubby hole" cabinets                          | H             | Quite a number of these, all are unrestrained. Units 52" H x 14" D, H/D = 3.7. These can fall over and block exit way.   |
| 3. Doors   | L             | Tempered glass used.   |
| 4. Ceiling   | L             | Two layers of 5/8-inch wallboard.  |

| Item   | Vulnerability | Comments   |
|--|---------------|--|
| <b><u>Boy's Room (Lower Level)</u></b>                           |               |  |
| 1. Lights  | M-H           | Similar to fixtures in corridor.   |
| <b><u>Girl's Room (Lower Level)</u></b>                          |               |  |
| 1. Light fixtures  | M-H           | Similar to fixtures in corridor.   |
| 2. Heater  | L-M           | Small gas unit with flexible gas line, strapped somewhat to wall.            |
| <b><u>Elevator and Elevator Pump Room (Lower Level)</u></b>      |               |  |
| 1. Elevator  | L             | Hydraulic elevator, considered low risk.                                     |
| 2. Pump and tank   | L             | Anchored   |
| 3. Electrical panels   | L             | Secured to wall.   |
| 4. Fluorescent light fixtures                                    | L             | Mounted to underside of metal deck.  |
| <b><u>Janitor's Closet (Lower level)</u></b>                     |               |  |
| 1. Light fixtures  | M-H           | Similar to fixtures in corridor.   |
| 2. Water heater  | H             | Small electric unit, unanchored.   |
| <b><u>Library (Main Level)</u></b>                               |               |  |
| 1. Fluorescent light fixtures                                    | L             | New cable-hung fixtures.   |
| 2. Fluorescent light fixtures                                    | L             | Ceiling-mount fixtures near north windows and main desk.                     |
| 3. Bookshelves   | L             | 5' high units either secured to wall or back-to-back units secured to floor. |
| 4. Bookcases   | L             | Wall-mounted units behind main desk.   |
| 5. Doors   | L             | Wire glass used.   |
| 28   |               |  |
| Item   | Vulnerability | Comments   |
| 6. Windows   | L             | Tempered glass used.   |
| <b><u>Computer Room (Main Level, off Library)</u></b>            |               |  |
| 1. Fluorescent light fixtures                                    | L             | New cable-hung fixtures.   |
| 2. TV  | L             | Wall-mounted.  |
| 3. Bookshelf   | L             | Bracket and board unit secured to wall.                                      |
| 4. Doors   | L             | Tempered glass used.   |
| <b><u>Library Workroom (Main Level, off Library)</u></b>         |               |  |
| 1. Fluorescent light fixtures                                    | L             | New cable-hung fixtures.   |
| 2. Wood bookshelves  | L             | Secured to wall.   |
| 3. File cabinets   | M             | Two 4-drawer units with drawer locks.  |
| 4. Wood storage cabinets   | L             | 8' high unit, secured to wall.   |
| 5. Refrigerator  | H             | Small unanchored unit on top of file cabinet.                                |
| <b><u>Speech and Language Room (Main Level, off Library)</u></b> |               |  |
| 1. Fluorescent light fixtures                                    | L             | New cable-hung fixtures.   |
| 2. Wood bookcases  | L             | Secured to wall.   |
| <b><u>Learning Center (Main Level, off Library)</u></b>          |               |  |
| 1. Fluorescent light fixtures                                    | L             | New cable-hung fixtures.   |
| 2. File cabinets   | M             | Three 4-drawer units with drawer locks.                                      |
| 3. Wood bookcase   | L             | Secured to wall.   |
| 4. Book shelves (in closet)                                      | L             | Bracket and board type secured to wall.                                      |
| 29   |               |  |

| Item  | Vulnerability | Comments  |
|---|---------------|---|
| 5. Door   | L             | Wire glass.   |
| <b><u>Server Room (Main Level, off Library)</u></b>                 |               |   |
| 1. Fluorescent light fixtures                                       | L             | Ceiling-mounted.  |
| 2. Wood bookcases   | L             | Secured to wall.  |
| <b><u>Library Center (Main Level, off Library)</u></b>              |               |   |
| 1. Fluorescent light fixtures                                       | L             | New cable-hung fixtures.  |
| 2. Wood storage cabinets  | L             | Two types, both secured to wall.  |
| 3. Bookshelves  | L             | Bracket and board type, secured to wall.  |
| 4. File cabinet   | H             | 4-drawer unit with drawer locks, can tip over and block exit way, 52" H x 18" W x 26" D, H/D = 2.9.   |
| <b><u>Corridor (Main Level, outside Library)</u></b>                |               |   |
| 1. Ceiling  | L             | Plaster ceiling, relatively new construction.   |
| 2. Lights   | M-H           | Spring-loaded fixtures in ceiling. Glass lenses do not fit properly in fixtures because of double thickness of wallboard. Lenses are a potential falling hazard.              |
| 3. Metal storage cabinet  | L             | 78" high, secured to wall.  |
| <b><u>Multi-Purpose Room (Upper Level)</u></b>                      |               |   |
| 1. Light fixtures   | L             | Large fixtures hung on rods from ceiling. Orthogonally placed cables used to interconnect fixtures to each other and to walls. Fixtures seem to be well braced.               |
| 2. Wood storage cabinets  | L             | Built-in units secured to wall with angles.   |
| 3. Wood bookcases   | H             | Two types, both unrestrained. One similar to "cubby hole" type found in corridors. Other 7'1" H x 32" W x 1'1" D, H/D = 6.5. Both are not loaded (may be temporary location). |
| <b><u>Corridor (Main Level, South of Multi-Purpose Room)</u></b>    |               |   |
| 1. Ceiling  | L             | Plaster ceiling, relatively new construction.   |
| 2. Lights   | L             | Built into ceiling believed to be low risk.   |
| <b><u>Art Storage Room (Main level, off Multi-Purpose Room)</u></b> |               |   |
| 1. Fluorescent light fixtures                                       | L             | Ceiling-mounted.  |
| 2. Kiln   | H             | Unanchored.   |
| 3. Metal shelving   | H             | 6.5' high, unrestrained.  |
| 4. File cabinet   | M             | 4-drawer unit with drawer locks.  |
| <b><u>PE Office (off Multi-Purpose Room)</u></b>                    |               |   |
| 1. Fluorescent light fixtures                                       | L             | New cable-hung fixtures, also braced to wall.   |
| 2. File cabinet   | M             | 4-drawer unit with drawer locks.  |

| Item   | Vulnerability | Comments  |
|--|---------------|---|
| 3. Wood storage shelves                                    | L             | 7' high, secured to wall.   |
| <b><u>Copy Room (off Multi-Purpose Room)</u></b>           |               |   |
| 1. Fluorescent light fixtures                              | L             | New cable-hung fixtures   |
| 2. Wood storage shelves                                    | L             | 7' high, secured to wall.   |
| <b><u>Kindergarten and Adjacent Room (Upper Level)</u></b> |               |   |
| 1. Fluorescent light fixtures                              | L             | Cable-hung.   |
| 2. Ceiling   | L             | Acoustic tile.  |
| 3. Heaters   | L             | Gas heaters located in closets, units are braced and have flexible gas lines. |
| 4. TV  | L             | Wall-mounted.   |
| 5. Wood storage cabinet                                    | L             | Secured to wall.  |
| 6. Wood bookcases  | L             | 6' high, secured to wall.   |
| 7. Wood bookcase   | H             | One unanchored 6' high unit.  |
| <b><u>Entrance</u></b>                                     |               |   |
| 1. Door  | L             | Tempered glass used.  |
| 2. Light fixture   | L             | Single chain-hung fixture.  |
| <b><u>Exterior</u></b>                                     |               |   |
| 1. Trellis adjacent Kindergarten                           |               | See discussion in text.   |
| 2. Trellis over dining area benches                        |               | See discussion in text.   |



Figure 8 – “Ad hoc” storage in a classroom. The two storage boxes to left of corner are resting on a board supported by two unrestrained concrete blocks.



Figure 9 – An unrestrained small refrigerator on top of file cabinets in the Library workstation. This can easily fall off.



Figure 10 – Unanchored computers in the computer room.



Figure 11 – Unanchored tall bookcase in Classroom 15.

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Figure 12 – These wood "cubby hole" cabinets are not anchored to the walls and may fall over in an earthquake, blocking the exit way from the lower level of Building C.



Figure 13 – This file cabinet can easily tip over and block the exit from the room.

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Figure 14 – View of plaster ceiling construction above the corridor at the main level in Building A. Ceiling is connected to roof joists by hanger wires spaced at approximately 4 feet on center.



Figure 15 – Close-up of attachment of metal lath to 1-inch channels.



Figure 16 – Mechanical units on the roof are anchored and have flexible gas lines.



Figure 17 – The gas line (at top) and the sprinkler line (bottom) pass over seismic separation joint on the roof. The provision for relative movement between the two structures may be questionable, particularly for the gas line.



Figure 18 – Ceiling-mount fluorescent light fixtures. These are typically secured directly to wallboard or plaster. There have been few reports of these falling in an earthquake.



Figure 19 – Examples of new cable-hung fluorescent fixtures in the Multi-Purpose room.



Figure 20 – Well-restrained light fixture in the Multi-Purpose room.



Figure 21 – Trellis over dining benches at the front of the school.

5. Summary and Recommendations

Summary

Buildings A and B, the original 1930's buildings at Wildwood Elementary School, were given an ASCE 31 Tier 2 seismic evaluation for the Life Safety performance level. In addition, a nonstructural seismic hazard survey of the entire school (Buildings A through E) was also performed using the ASCE 31 Tier 1 criteria. Results are summarized below.

Building A (classroom wing). The building does not meet Tier 2 life safety requirements. Many of the exterior shear walls, and a few of its interior shear walls, are significantly overstressed in shear. A number have demand to capacity ratios (D/C) exceeding 3.0. While we do not believe the building is a collapse hazard, it can be significantly damaged by a magnitude 6.0 or larger earthquake on the northern segment of the Hayward fault. Extensive damage to exterior walls is likely to occur in the areas with many windows.

Building B (auditorium wing). The auditorium structure does not meet Tier 2 life safety requirements. The east and west shear walls are significantly overstressed in shear with D/C ratios exceeding 2.0. The proscenium wall is also significantly overstressed. Part of one side of the roof diaphragm was found to be inadequately nailed. The extent of the deficient nailing must be determined, and repairs made. While the deficiencies of the auditorium are serious, we do not believe it is a collapse hazard.

Nonstructural Survey. While a number of nonstructural hazards were found, many nonstructural elements in the school are anchored. For example, the majority of tall bookcases and storage cabinets located throughout the school are secured against overturning. There are, however, some significant hazards. These include three unanchored gas heaters in Building A classrooms, a number of unrestrained wood "cubby hole" cabinets that can block exits, and some small bookcases (3' high) and one large 4-drawer file cabinet that can overturn and block exits. A number of building contents are unsecured, and these can topple to the floor. The life safety risk associated with most of these, however, is believed to be small.

Recommendations

To mitigate the seismic and structural deficiencies found, we recommend that the following be done:

- (1) Buildings A and B should be strengthened to the Life Safety performance level of ASCE 41 "Seismic Rehabilitation of Existing Buildings" (Ref. 8). This is the accepted standard for the seismic rehabilitation of existing buildings and has been accepted by DSA in the past (when it was designated FEMA 356). The document represents the next step in an evaluation and rehabilitation process that starts with an ASCE 31 evaluation.
- (2) The nonstructural hazards identified in Tables 2 through 5 should be given a Tier 2 evaluation and/or abated, particularly those items designated as having a high (H) vulnerability that can cause injury to persons in the vicinity. Additionally, small cabinets and bookshelves that can block exits should be restrained even though these are less than the 4-foot height criteria of ASCE 31.
- (3) Additional exploration work needs to be done to obtain or verify construction information on Table 1 that was assumed for purposes of completing the evaluation.

- (4) Drawings for the two trellises should be found and reviewed to confirm that the designs have been reviewed by DSA.

Finally, it should be noted that the above recommendations will need to be considered in light of ADA and fire and safety considerations. These were not studied or considered in the work summarized in this report. These evaluations are being conducted by the architect for the project.

Based on structural considerations alone, we believe it is economically feasible to strengthen the 1930's buildings and at the same time preserve their basic functional and architectural character.



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## **5. SOILS ENGINEER'S DESIGN RESPONSE SPECTRA REPORT**

## Memorandum

**TO:** John Nelson  
murakami/Nelson

**DATE:** May 10, 2007

**FROM:** John Egan

**PROJECT NO.:** 12941.000

**CC:**

**PROJECT NAME:** Piedmont Schools  
Seismic Evaluation

**SUBJECT:** Earthquake Design Response Spectra and Geohazards Assessment

### SUMMARY

Earthquake ground shaking hazard at Piedmont Unified School District (PUSD) school sites was assessed for possible future earthquakes on active faults in the San Francisco Bay region. The Hayward fault, situated approximately  $1\frac{1}{4}$  to  $2\frac{1}{4}$  km [1 to  $1\frac{1}{4}$  miles] east-northeast of the PUSD school sites dominates the earthquake ground shaking hazard; at this proximity to the fault, differences in the ground motion hazard amongst the school sites are not significant. Design-level response spectra were developed in general accordance with the structural design criteria level implemented by the PUSD for this project. For the design basis earthquake ground shaking level (designated as BSE-1), the response spectrum is characterized by a peak horizontal ground acceleration (PGA) of  $0.67g$ . In comparison, we note that ground shaking recorded at the Piedmont Middle School during the  $M_w$  6.9 1989 Loma Prieta earthquake was characterized by peak horizontal ground accelerations almost an order of magnitude lower than that of the BSE-1 level (i.e., PGAs of  $0.07g$  to  $0.08g$ ).

In addition to earthquake ground shaking hazard, geologic hazards involving ground failure, including the potential for surface fault rupture, soil liquefaction, and slope instability, were assessed during this study for the PUSD school sites. This assessment is based on our interpretation of conditions at the school sites from published maps and data relevant to the sites, including information on topography, geology, seismicity, and faults, and unpublished geotechnical investigation reports prepared by others, as well as our ground reconnaissance of the sites conducted during the present study. Based on the available information and observations, we are of the opinion that hazard to the PUSD schools due to surface fault rupture, soil liquefaction, and site instability is very low to negligible.

### INTRODUCTION

This memorandum presents recommendations for design-level response spectra for utilization in seismic safety and retrofit evaluations of Piedmont Unified School District (PUSD) school buildings being conducted by the murakami/Nelson team for future earthquakes in the

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Page 2

San Francisco Bay region. We also have assessed the potential for experiencing effects at the school sites associated with earthquake-related geologic and geotechnical hazards (e.g., surface fault rupture, liquefaction-related phenomena, site instability).

Conditions at the school sites were interpreted based on available geologic and geotechnical information for the sites and vicinity, as well as ground reconnaissance of the sites conducted during our study. We reviewed published maps and data relevant to the sites, including information on topography, geology, seismicity, and faults, and unpublished geotechnical investigation reports by others provided by PUSD through murakami/Nelson; these latter reports included logs of exploratory borings drilled at some of the sites. Reports of ground shaking effects in the Piedmont vicinity from historical earthquakes in the region were also reviewed.

### GENERAL APPROACH

We have developed design-level response spectra, designated as BSE-2 and BSE-1, to be in general accordance with the structural design criteria being implemented by the School District for this project; those criteria were provided to us by fax on January 18, 2007. In developing these spectra, we have considered results from both probabilistic ground motion analysis (commonly referred to as a probabilistic seismic hazard assessment or PSHA) and deterministic ground motion analysis. These analyses analytically combine information on the locations and geometries of the school sites relative to potential seismic sources (i.e., faults) in the San Francisco Bay region, the maximum earthquake magnitude capabilities interpreted for those seismic sources, spatial and temporal characteristics of earthquake occurrence on the sources, and source-to-site ground motion attenuation (based on published empirical relationships) appropriate to the tectonic environment and interpreted subsurface conditions at the sites, as well as uncertainties associated with each of these components.

### REGIONAL FAULTS

The San Francisco Bay region is considered one of the more seismically active regions of the world, based on its record of historical earthquakes and its position astride the North American-Pacific plate boundary (i.e., the San Andreas fault zone and other active faults). The major faults that comprise the 80-km [50-mile] -wide plate boundary include, from west to east, the Seal Cove-San Gregorio, San Andreas, Hayward-Rodgers Creek, and Calaveras faults (see Figure 1). Each of these faults is a potential source of earthquakes that could produce significant ground shaking at the PUSD school sites. Other Holocene faults that may be sources for earthquakes capable of producing ground shaking at the sites include the Concord-Green Valley, Clayton-Marsh Creek-Greenville, and West Napa faults, as well as the Mount Diablo Thrust.

The Hayward fault, situated approximately  $1\frac{1}{4}$  to  $2\frac{1}{4}$  km [1 to  $1\frac{1}{4}$  miles] to the east-northeast (see Figure 2), dominates earthquake ground motion hazard for the PUSD school sites. The San Andreas fault, situated approximately 27 km [17 miles] to the west-southwest of the site, also contributes significantly to seismic hazard at the sites because of its larger earthquake

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magnitude capability and longer duration ground shaking associated with those larger magnitude events.

## HISTORICAL SEISMICITY

During the past 200 years, numerous small-magnitude and at least fifteen moderate- to large-magnitude (i.e., M6+) earthquakes have occurred in the San Francisco Bay region (Topozada and Parke, 1982a, 1982b; Ellsworth, 1990; Working Group on Northern California Earthquake Potential [WGNEP], 1996; Working Group on California Earthquake Probabilities [WGCEP], 1999, 2003). Ground shaking experienced in Piedmont from most of the historic earthquakes in the region has been of generally imperceptible or quite small amplitude and produced effects observed in the Piedmont vicinity that may be categorized as I through V on the Modified Mercalli Intensity (MMI) scale. There have been, however, more than a dozen events in the region that have produced ground shaking strong enough in Piedmont to produce MMI effects greater than V (MMI VI corresponds to the lowest intensity level with which some damage (slight) is associated, although fragile contents may be broken at MMI V).

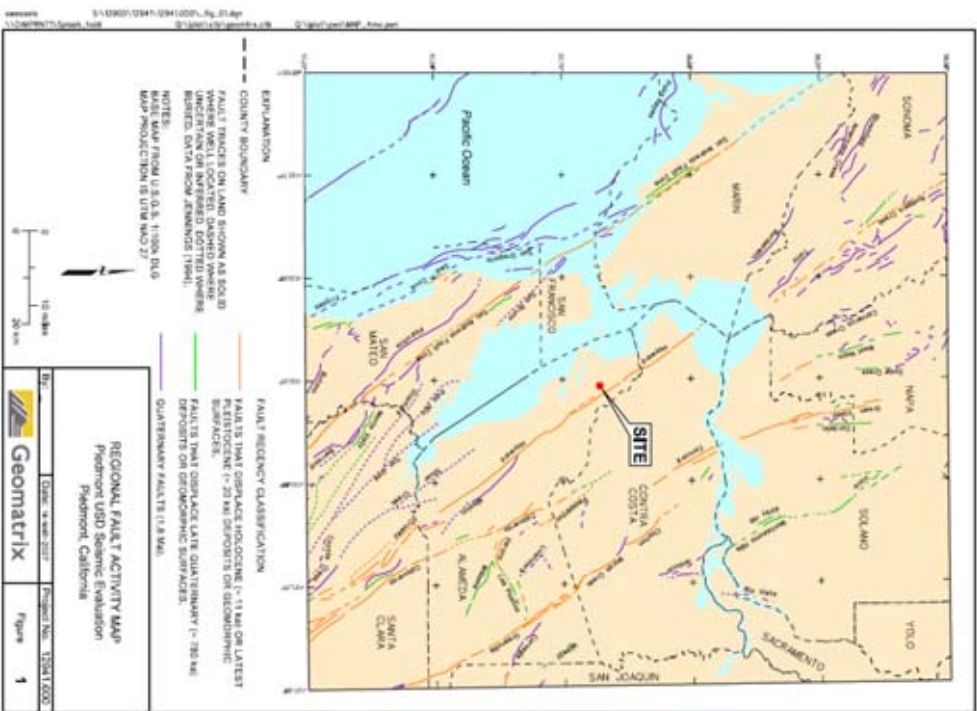
The first significant earthquake reported to have affected the region had a magnitude of approximately 7.5 (estimated from felt intensities), occurring on the Peninsula segment of the San Andreas fault in 1838 (Topozada and Borchardt, 1998). A series of smaller earthquakes between 1850 and 1865 damaged various sections of the Bay Area, with the 1865 shock centered near the Santa Cruz Mountains being the most damaging (Townley and Allen, 1939).

In 1868, the Hayward fault produced an earthquake having an estimated magnitude of 6.9. Although the effects of this earthquake were poorly documented, surface rupture apparently extended from near Monclair (WGCEP, 2003) southward to the Warm Springs area of Fremont. Significant damage, including liquefaction and settlement in low-lying areas, apparently occurred along the surface rupture between Oakland and Fremont (Lawson, 1908).

During the M<sub>w</sub> 7.9<sup>1</sup> 1906 San Francisco earthquake, the San Andreas fault ruptured from Shelter Cove near Cape Mendocino southward to near San Juan Bautista. Maximum lateral displacements of 15 to 20 feet [4.6 to 6.1 m] occurred north of the Golden Gate at Olema in Marin County (Lawson, 1908). Landslides, liquefaction, and ground settlement occurred throughout the Bay Area and in the vicinity of the surface rupture as result of this earthquake.

Earthquakes in the region during the past 50 years include the 1957 Daly City earthquake on the San Andreas fault (M<sub>L</sub> 5.3); the two Santa Rosa earthquakes of 1969 on the Healdsburg-Rodgers Creek fault (M<sub>L</sub> 5.6 and 5.7); the Coyote Lake and Morgan Hill earthquakes of 1979 and 1984 on the Calaveras fault (M<sub>L</sub> 5.9 and 6.1, respectively); the 1980 Livermore earthquake on the Greenville fault (M<sub>L</sub> 5.8); the 1989 M<sub>w</sub> 6.9 Loma Prieta earthquake in the southern Santa Cruz Mountains; the 1999 M<sub>L</sub> 5.0 earthquake near Bolinas; and the 2000 M<sub>L</sub> 5.2 Yountville earthquake.

<sup>1</sup> M<sub>w</sub> – Moment magnitude; M<sub>L</sub> – Local or Richter magnitude.



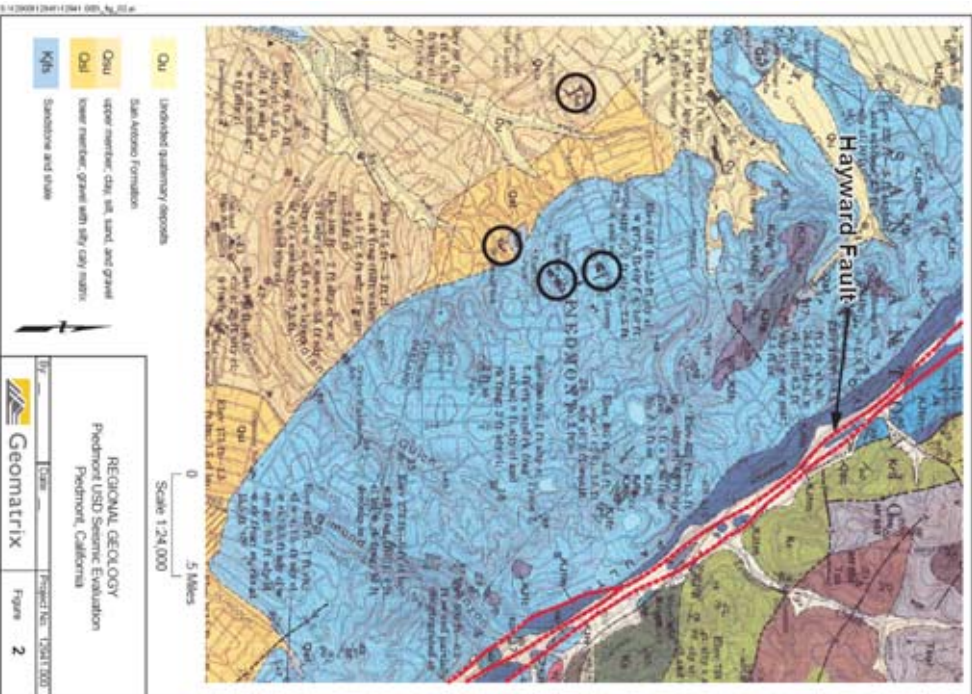
The October 1989 Loma Prieta earthquake, that ruptured on or near the San Andreas fault zone approximately 75 km [47 mi] south of Piedmont, caused significant damage in areas of fill and soft soils, such as in the Marina District of San Francisco and at the Port of Oakland. Little damage occurred to structures founded on rock or stiff alluvium in Oakland or San Francisco. We note that ground shaking was recorded at the Piedmont Middle School during the earthquake. That recorded ground shaking was characterized by peak horizontal ground accelerations (PGA) of 0.07g to 0.08g (Shakal and others, 1989). Modified Mercalli Intensity (MMI) effects of VII were reported for Piedmont for this event.

Based on the estimates of MMI reported for the Piedmont vicinity, significantly stronger ground shaking than was experienced in 1989 was quite likely experienced by the school sites during at least the two historic Bay region events mentioned above. The  $M_w$  6.9 Hayward earthquake in October 1868 produced MMI VIII effects in the Piedmont area; to the south, MMI IX+ effects were experienced in near-fault areas of San Leandro (Toppozada and others, 1981; 1982a). The great  $M_w$  7.9 San Francisco earthquake in April 1906 also produced MMI VIII effects in the Piedmont area (Toppozada and Parke, 1982b). Both of these events likely also produced substantially longer ground shaking durations than was experienced during the Loma Prieta earthquake.

The Working Group on California Earthquake Probabilities (WGCEP, 2003) concluded that there is a 62 percent probability that a major ( $M_w$  6.7 or larger) earthquake will occur in the greater Bay region during the 30-year time period between 2003 and 2032. The report also concludes that there is an 80 percent probability that a large ( $M_w$  6.0 to 6.7) earthquake will occur during the same period. The implications of this study are that there is a high likelihood that ground motions stronger than those recorded during the 1989 Loma Prieta earthquake will occur at the PUSD school sites during the next 25 to 30 years.

#### SITE CONDITIONS

Geologic maps (i.e., Radbruch, 1969; Dibblee, 2005), our site reconnaissance, and available logs of borings drilled by others at the school sites (Harza, 1994; 1995a,b,c,d; 1997a,b) indicate that subsurface conditions at the school sites typically consist of a thin veneer of fill or Pleistocene-age soil deposits overlying Franciscan formation sandstone and/or shale rock at relatively shallow depths (see Figure 2). Given these conditions, it is our opinion that ground motion attenuation relationships developed for rock site conditions are appropriate to characterize the potential ground shaking at the school sites. For this study, we have utilized the published empirical attenuation relationships developed by Abrahamson and Silva (1997), Boore and others (1997), Campbell (1997), Sadigh and others (1997), and Idriss (1995). These attenuation relationships describe the variation of peak ground acceleration and response spectral accelerations at specific structural periods of vibration and damping ratios with earthquake magnitude and distance and were developed on the basis of statistical analyses of ground motions recorded during earthquakes at many locations in California, as well as in other parts of the western United States and foreign countries having similar tectonic environments.





## EARTHQUAKE GROUND SHAKING

As mentioned previously, we have considered results from both probabilistic ground motion analyses (PSHA) and deterministic ground motion analyses (DSHA) in developing design-level response spectra for this project.

**School Sites' Hazard Comparisons.** Based on our evaluations and experience with other sites near the Hayward fault and in the general vicinity, as well as elsewhere in the Bay region, we expect that differences in the ground motion hazard amongst the school sites are not significant. We therefore are of the opinion that a single, common set of design-level response spectra (BSE-2 and BSE-1) is appropriate to all of the sites for conducting seismic safety and retrofit evaluations of the school buildings.

PSHA results presented by the California Geological Survey (CGS) (Cao and others, 2003) for each of the schools' site coordinates, corresponding to a 10% probability of exceedance in 50 years (475-year return period) and firm rock site conditions, are summarized in Table 1.

**TABLE 1**  
**SUMMARY OF CGS HAZARD RESULTS FOR THE PUSD SCHOOL SITES**

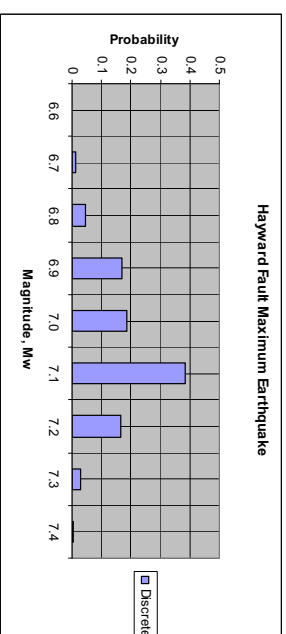
| School        | Closest Distance to Hayward Fault (km) | Ground Motion Hazard for $P_E=10\%$ in 50 Years and Firm Rock Site Conditions (5%-damped) |                   |                 |
|---------------|--|---|-------------------|-----------------|
|               |  | PGA (g)   | $S_a(g) @ T=0.2s$ | $S_a(g) @ T=1s$ |
| Havens        | 1.7                                    | 0.779   | 1.811             | 0.686           |
| High School   | 1.8                                    | 0.779   | 1.809             | 0.685           |
| Middle School | 1.9                                    | 0.777   | 1.807             | 0.684           |
| Wildwood      | 2.2                                    | 0.774   | 1.800             | 0.681           |
| Beach         | 2.7                                    | 0.772   | 1.794             | 0.679           |

We note that these results demonstrate the very small difference in estimated ground shaking hazard (less than 1%) amongst the sites.

Deterministic estimates of possible horizontal peak ground accelerations and response spectral accelerations at the PUSD school sites were developed assuming the occurrence of possible maximum magnitude earthquakes rupturing through the closest point on the Hayward fault zone from the sites. The WGCEP (2003) defines three segments for the Hayward-Rodgers Creek fault zone: the south Hayward, north Hayward, and Rodgers Creek. The boundary between the south and north Hayward segments has been taken by the WGCEP (2003) to lie at Montclair, or approximately the closest point on the Hayward fault from the PUSD school sites; the Rodgers Creek fault segment lies north of San Pablo Bay. The WGCEP (2003) has characterized five possible rupture scenarios ruptures involving either the south Hayward or north Hayward segments, individually or in combination, each associated with a likelihood of that rupture

scenario occurring and probabilistic distributions for characteristic maximum earthquake magnitudes for that scenario. These scenario likelihoods and magnitude distributions were incorporated in conducting the deterministic ground motion analyses to estimate the ground shaking characteristics representative of the possible range of maximum earthquake capability of the Hayward fault near Piedmont; this possible range of maximum earthquake capability is illustrated on Figure 3.

**FIGURE 3**



The ground motion attenuation relationships mentioned previously were used in these deterministic analyses. The results of deterministic analyses indicate a median response spectrum characterized by median peak horizontal ground accelerations of 0.67g; this ground motion level corresponds to the BSE-1 design-level in the structural design criteria being implemented by the PUSD for this project. To obtain the MCE or BSE-2 design-level ground shaking response spectrum in accordance with these structural design criteria, the median deterministic response spectrum was multiplied by a factor 1.5.

## RECOMMENDED DESIGN-LEVEL RESPONSE SPECTRA

Based on the considerations mentioned previously and results from probabilistic and deterministic ground motion analyses for the sites, we recommend the response spectra presented in Table 2 and Figure 4 below to represent the design levels BSE-2 and BSE-1 for use in seismic safety and retrofit evaluations being conducted for the PUSD schools.

**Near-Field Effects Considerations.** Although the sites are situated in relatively-close proximity to the Hayward fault zone, we understand, based on discussions with the design/evaluation team, that the school buildings are relative short-period structures (i.e.,  $T \leq 1$  sec.); so, we anticipate that potential near-field rupture directivity and fault normal/parallel effects that can be significant to longer period horizontal-component ground motions will be small or insignificant at the

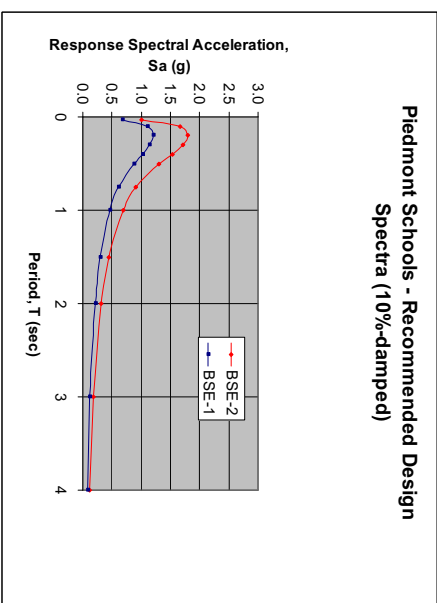
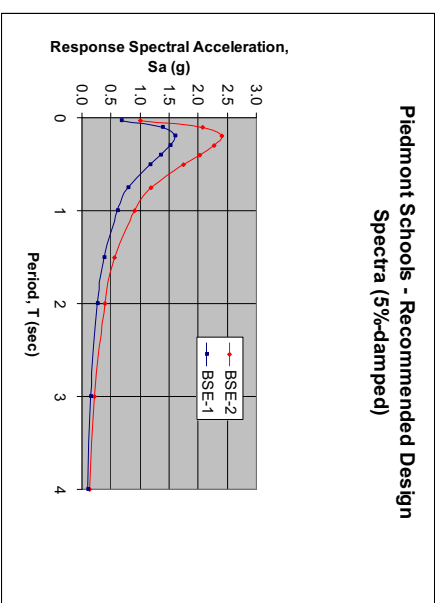
periods of the buildings. We have not, therefore, included explicit evaluation of these effects in our analyses.

**Vertical Response Spectra Considerations.** As mentioned previously, the Piedmont school sites are situated in close proximity to the Hayward fault, which dominates ground motion hazard at the sites. Near-field strong motion recordings obtained from earthquakes that have occurred over the past three decades have exhibited vertical motions equal to or exceeding the horizontal motions (e.g., Egan and others, 1994; Abrahamson and Silva, 1997; Campbell and Bozorgnia, 2003). Of relevance to the Piedmont school sites, examination by these and other authors of available ground motion data from moderate to large ( $M_w \geq 6.5$ ) California earthquakes indicates: (1) within about 15 km of fault ruptures, peak ground accelerations and higher frequency ( $T < 0.2$  sec) response spectral ordinates for the vertical component are approximately equal or exceed those of the horizontal components; and (2) there appears to be little distance dependence for longer period motions ( $T > 0.3$  sec), with average vertical to horizontal ratios for spectral ordinates of about one-half or less for all distance ranges examined.

**TABLE 2**  
**RECOMMENDED DESIGN-LEVEL, BSE-2 AND BSE-1 HORIZONTAL-COMPONENT RESPONSE SPECTRA FOR THE PUSD SCHOOL SITES.**

| Period, T<br>(sec) | Response Spectral<br>Acceleration, $S_a$ (g)<br>5%-damped |       | Response Spectral<br>Acceleration, $S_a$ (g)<br>10%-damped |       |
|--------------------|---|-------|--|-------|
|                    | BSE-2   | BSE-1 | BSE-2  | BSE-1 |
| PGA                | 1.005   | 0.670 | 1.005  | 0.670 |
| 0.03               | 1.005   | 0.670 | 1.005  | 0.670 |
| 0.1                | 2.071   | 1.381 | 1.657  | 1.105 |
| 0.2                | 2.404   | 1.603 | 1.803  | 1.202 |
| 0.3                | 2.281   | 1.521 | 1.711  | 1.141 |
| 0.4                | 2.035   | 1.357 | 1.526  | 1.017 |
| 0.5                | 1.747   | 1.165 | 1.310  | 0.873 |
| 0.75               | 1.192   | 0.794 | 0.905  | 0.603 |
| 1                  | 0.913   | 0.609 | 0.699  | 0.466 |
| 1.5                | 0.565   | 0.376 | 0.443  | 0.296 |
| 2                  | 0.390   | 0.260 | 0.312  | 0.208 |
| 3                  | 0.218   | 0.145 | 0.181  | 0.121 |
| 4                  | 0.139   | 0.093 | 0.120  | 0.080 |

**FIGURE 4**



## GEOLOGIC HAZARDS

Geologic hazards considered during this study for the PUSD school sites include the potential for surface fault rupture, soil liquefaction, and slope instability.

**Surface Fault Rupture.** There have been no active or potentially active faults identified in the immediate vicinity of the PUSD school sites according to the California Geological Survey and the site is not located within a State of California Special Fault Studies Zone. The nearest active fault is the Hayward fault, situated no closer than approximately 1½ km [1 mile] to any of the school sites (see Figure 2). Additionally, reconnaissance observations of the sites and surrounding areas do not indicate the presence of geologic conditions, geomorphic features or lineaments suggestive of active or inactive faulting crossing the sites. Based on this information, we are of the opinion that surface fault rupture hazard to the PUSD school sites is negligible.

**Liquefaction.** Liquefaction is a soil behavior phenomenon in which a soil loses a substantial amount of strength due to high excess pore-water pressure generated by strong earthquake ground shaking. Recently deposited (geologically) and relatively unconsolidated soils and artificial fills located below the ground water surface are considered susceptible to liquefaction (Youd and Perkins, 1978). Typically, susceptible soils include relatively clean, loose, uniformly graded silt and sand deposits (National Research Council, 1985).

As discussed previously in this report, the geologic and geotechnical data gathered during this study indicate that the surficial soils, if present, are Pleistocene-age deposits. These soils are considered to have very low susceptibility to earthquake-induced liquefaction. We note that no evidence of liquefaction and/or related effects was reported for the PUSD school sites or vicinity for the 1868 Hayward earthquake or the great 1906 San Francisco earthquake (Lawson, 1908; Youd and Hoose, 1978), nor for the 1989 Loma Prieta earthquake (Tinsley and others, 1998). We are of the opinion, therefore, that the hazard due to potential soil liquefaction to the PUSD school sites is negligible.

**Site Stability.** Lateral spreading, which is the lateral displacement of surficial soils, is usually associated with the liquefaction of underlying soils. With the potential liquefaction hazard at the site judged to be negligible, we expect that the potential for lateral spreading to occur and affect the school buildings to be of similar hazard level. The soil deposits and rock materials underlying the school sites are considered to be quite competent and not susceptible to significant strength changes that would affect site stability. No ground cracking, hummocky topography, displaced flintwork, slope creep affecting tree growth, or other significant evidence of ground deformation or site instability was observed at the school sites or in slopes adjacent to the school sites during our ground reconnaissance. We do note that at Beach Elementary School, the retaining wall along the Linda Avenue (west) side of the playground and the retaining wall along Howard Avenue at the top of the slope on the west side of the school are cracked and some portions of the walls have rotated outward about the base of the wall. It is our opinion that this localized wall

distress represent long-term wall maintenance and repair/replacement issues, rather than being indicative of global site instability. In addition, there are no mapped landslides (Nilsen, 1975) nor reports of ground failure at the sites or in their immediate vicinities during historical earthquakes (Youd and Hoose, 1978), and Miles and Keefe (2001) map the relative seismic landslide hazard for the Havens, Wildwood, Middle School, and High School sites as negligible to low, with the Beach site as moderate. We are of the opinion that hazard to the PUSD schools due to site instability is very low.

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## **6. MATERIALS TESTING & INVESTIGATION REPORT**



APPLIED MATERIALS & ENGINEERING, INC.  
980 41st Street  
Oakland, CA 94608

Tel: (510) 420-8190  
FAX: (510) 420-8186  
e-mail: info@apptmteeng.com

May 4, 2007

Mr. John Nelson  
MURAKAMI & NELSON  
100 Filbert Street  
Oakland, CA 94607

Project No. 107213C

Fax Transmittal: 510-893-5244

Subject: Exploration At Wildwood Elementary School  
301 Piedmont Avenue, Piedmont, CA

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. (AME) has conducted explorations and documentation for the 1930's portion of the Wildwood Elementary School structure, located at 301 Piedmont Avenue in Piedmont, California.

As-built information was obtained for the following: a) roof and ceiling framing, b) wall framing and covering materials, c) floor framing, d) cripple wall construction, and e) concrete wall locations and dimensions.

## PROCEDURES & RESULTS

### a) Roof And Ceiling Framing

Documentation of the typical roof and ceiling framing was performed in order to determine roof rather size and spacing, roof sheathing, ceiling joist size and spacing, ceiling materials, and connection at walls.

Results of this documentation are shown in Figure 1, and details A, B & C. Note: only limited access was available between column lines R to X. Photos 1 and 2 show suspended ceiling in this area, which is different to other "typical" areas explored.

### b) Wall Framing And Covering Materials

Explorations were conducted at twenty four (24) wall locations (W1 through W24) by drilling small holes through wall finishes and viewing the wall construction using a fiber optic borescope. Locations (approximate) of wall explorations are shown in Figure 2.

Results of the wall exploration are given in Table 1. Note: data for wall covering was recorded as "near" side and "far" side, indicating the orientation with respect to the arrow pointing to

Mr. John Nelson

MURAKAMI & NELSON  
Exploration At Wildwood Elementary School  
May 4, 2007

Page 2

exploration locations on Figure 2. In addition, no anchor bolts were observed in sill plates at locations of our borescope explorations.

### c) Floor Framing

Documentation of the typical floor framing was performed in order to determine floor joist size and spacing, and floor sheathing information.

Results of this documentation are shown in Figure 2, and Detail D.

### d) Cripple Wall Construction

Cripple wall construction was observed at two locations; one location was framing supporting stairs at grid lines D to F, 5 and 2 to 3, and the other was typical cripple framing between ceiling joists and roof rafters.

Results of the cripple wall documentation for framing at stairs are shown in Figure 2, and Detail E, and documentation of typical cripple walls at ceiling to roof are shown in Figure 1, and Detail C.

### e) Concrete Wall Locations And Dimensions

Documentation of the location, thickness, and height of concrete walls, below the main floor level, was performed. Access below the auditorium was limited during our investigation, and is not included in this report.

Results of the concrete wall documentation are given in Table II and Figure 2.

Please call if you have questions regarding the above.

Sincerely,

APPLIED MATERIALS & ENGINEERING, INC.

Reviewed by:

*Dean Wilson*

Dean Wilson  
Project Manager

*Armen Tajirian*  
Armen Tajirian, Ph.D., P.E.  
Principal

Cc: Ron Gallagher, R.P. GALLAGHER ASSOCIATES (fax: 510-893-2452)

TABLE I

## WALL FRAMING AND COVERING MATERIALS EXPLORATIONS RESULTS

Wildwood Elementary School, Piedmont, CA

AME Project No. 107213C

| ID  | Stud Size<br>(Nominal)  | Stud Spacing<br>(In. on center) | Wall Covering<br>"Near" Side     | Wall Covering<br>"Far" Side                    |
|-----|-------------------------|---------------------------------|----------------------------------|--|
| W1  | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W2  | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W3  | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Horizontal sheathing w/ stucco                 |
| W4  | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ plaster                  |
| W5  | 2 x 6 w/ 2 x 4 Build-Up | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W6  | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Metal lath w/ plaster                          |
| W7  | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W8  | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Metal lath w/ plaster                          |
| W9  | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ plaster                  |
| W10 | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | 1 x 3 horizontal bead board, behind blackboard |
| W11 | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ plaster                  |
| W12 | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W13 | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ stucco                   |
| W14 | 2 x 10                  | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ stucco                   |
| W15 | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Metal lath w/ plaster                          |
| W16 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W17 | 2 x 10                  | 16                              | ¾" plaster w/ metal lath         | Diagonal sheathing w/ plaster                  |
| W18 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W19 | 2 x 6                   | 16                              | ¾" plaster w/ metal lath         | Metal lath w/ plaster                          |
| W20 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W21 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W22 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W23 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |
| W24 | 2 x 6                   | 16                              | ¾" plaster w/ diagonal sheathing | Diagonal sheathing w/ plaster                  |

TABLE II

## CONCRETE FOUNDATION WALL DOCUMENTATION RESULTS

Wildwood Elementary School

AME Project No. 107213C

| Wall   | Below Room   | Thickness At Top | Thickness At Bottom | Height |
|--------|--------------|------------------|---------------------|--------|
| A      | Girl's       | 12 ½"            | 12 ½"               | 6'-11" |
| C-1    | Girl's       | 9"               | 9"                  | 5'-3"  |
| F-1    | Girl's       | 7 ½"             | 10"                 | 5'-0"  |
| 3-B    | Landing      | *                | *                   | 5'-2"  |
| 3-D    | Landing      | *                | *                   | 4'-10" |
| E      | Classroom 12 | *                | *                   | 7'-6"  |
| 4-E    | Storage 3    | 10"              | 16 ½"               | 7'-9"  |
| H      | Classroom 13 | *                | *                   | 6'-4"  |
| K      | Classroom 13 | *                | *                   | 4'-0"  |
| 2-F    | Corridor 3   | 7 ½"             | 21 ½"               | 3'-7"  |
| D      | Corridor 3   | 8 ½"             | 11"                 | 8'-0"  |
| 3      | Corridor 3   | 8 ½"             | 20 ½"               | 5'-0"  |
| 3-F-2  | Corridor 3   | *                | *                   | 7'-2"  |
| L      | Corridor 3   | *                | *                   | 3'-11" |
| F-1    | Classroom 11 | 6"               | 10"                 | 9'-5"  |
| F-2    | Classroom 11 | 6"               | 9"                  | 6'-10" |
| J-1    | Classroom 11 | 5 ½"             | 10"                 | 5'-0"  |
| J-2    | Classroom 11 | 5 ½"             | 10"                 | 5'-2"  |
| J      | Classroom 10 | 5 ½"             | 10"                 | 4'-0"  |
| L-1    | Classroom 10 | 5 ½"             | 11"                 | 4'-2"  |
| L-2    | Classroom 10 | 5 ½"             | 11"                 | 3'-11" |
| 2-L    | Corridor 2   | *                | *                   | 4'-2"  |
| 2-L-2  | Corridor 2   | *                | *                   | 4'-3"  |
| L-1    | Storage 2    | 5 ½"             | 11"                 | 4'-5"  |
| M-8    | Storage 2    | *                | *                   | 5'-0"  |
| M-7    | Classroom 9  | 8 ½"             | 11 ½"               | 4'-6"  |
| M-8    | Classroom 9  | 8 ½"             | 11 ½"               | 4'-2"  |
| O-7    | Classroom 9  | 6 ½"             | 10"                 | 3'-10" |
| O-8    | Classroom 9  | 6 ½"             | 10"                 | 3'-9"  |
| 7      | Classroom 8  | 12 ½"            | 12 ½"               | 3'-9"  |
| O-7    | Classroom 8  | 6 ½"             | 10"                 | 3'-11" |
| O-8    | Classroom 8  | 6 ½"             | 10"                 | 3'-8"  |
| O-7    | Classroom 8  | 6                | 10 ½"               | 3'-4"  |
| O-8    | Classroom 8  | 6                | 10 ½"               | 3'-4"  |
| Q-7    | Classroom 7  | 6                | 10 ½"               | 2'-9"  |
| Q-8    | Classroom 7  | 6                | 10 ½"               | 3'-3"  |
| Q-7    | Classroom 7  | 6                | 10 ½"               | 2'-8"  |
| R-7    | Classroom 7  | 5 ½"             | 11 ½"               | 2'-8"  |
| R-8    | Classroom 7  | 5 ½"             | 11 ½"               | 2'-3"  |
| R-7-1  | Storage 1    | 5 ½"             | 11 ½"               | 2'-9"  |
| S-15-9 | Storage 1    | 5 ½"             | 12"                 | 2'-4"  |
| S-15-2 | Storage 1    | 5 ½"             | 12"                 | 2'-2"  |
| S-15   | Corridor 1   | *                | *                   | 2'-3"  |
| S-16   | Office       | 5 ½"             | 12"                 | 2'-7"  |
| S-15-2 | Office       | 5 ½"             | 12"                 | 2'-4"  |
| V-15-1 | Office       | *                | *                   | 2'-2"  |
| V-16   | Office       | 16"              | 23"                 | 2'-5"  |
| V-15   | Office       | 16"              | 23"                 | 2'-8"  |
| 12-T   | Auditorium   | *                | *                   | 4'-9"  |
| 13-S   | Auditorium   | *                | *                   | 2'-6"  |

\* To be determined during subsequent investigation.



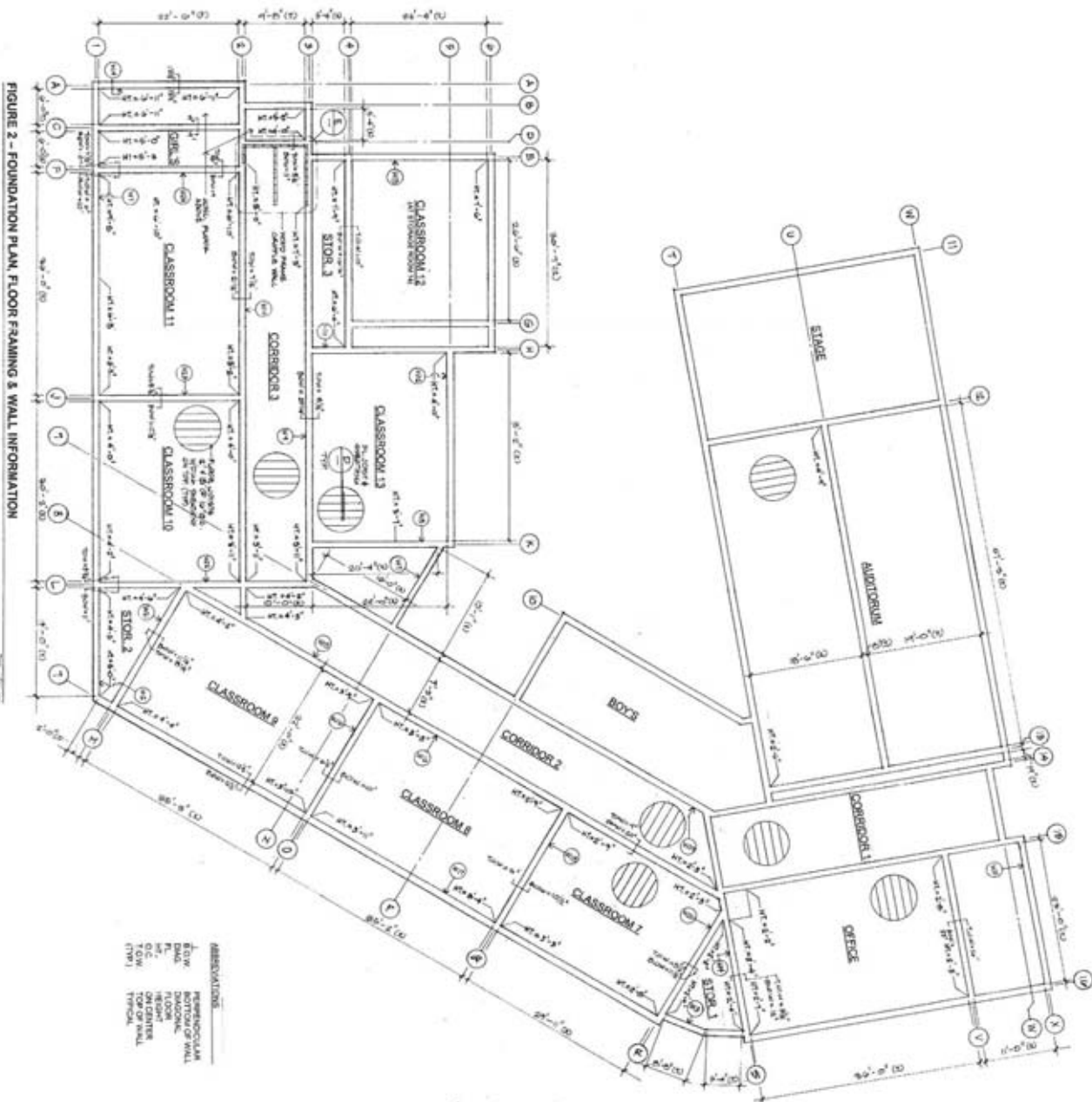
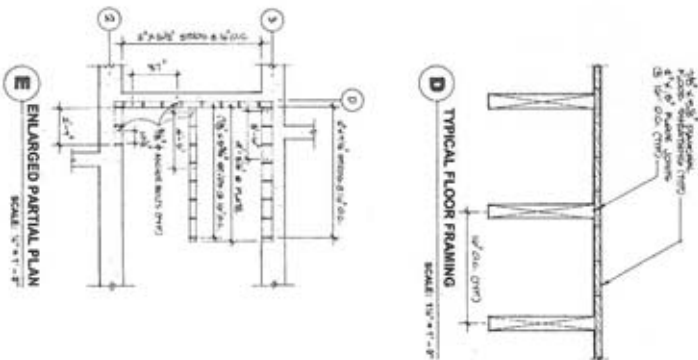
Photo 1. Suspended ceiling viewed from grid line R, looking towards grid line X.



Photo 2. Suspended ceiling view from grid line R, looking towards grid line S.











**APPLIED MATERIALS & ENGINEERING, INC.**  
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August 3, 2007

Project No. 107405C

Mr. John Nelson  
**MURAKAMI & NELSON**  
100 Filbert Street  
Oakland, CA 94607

[Email: jnelson@murakaminelson.com](mailto:jnelson@murakaminelson.com)

Subject: Exploration at Wildwood Elementary School  
301 Wildwood Avenue, Piedmont, CA

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. (AME) has conducted explorations and documentation of pre-selected materials at the Wildwood Elementary School structure. This report supplements our previous report dated May 4, 2007.

As-built information was obtained for the following: a) roof and ceiling framing, b) timber truss construction, c) wall framing and covering materials, d) floor construction, e) concrete compressive strength, f) roof tie.

#### **PROCEDURES & RESULTS**

##### **a) Roof and Ceiling Framing**

Documentation of typical ceiling framing and roof framing was performed in order to determine roof rafter size and spacing, roof sheathing, ceiling joist size and spacing, ceiling materials, and connection at walls.

Results of this documentation are shown in Sheets Ex-1, Ex-2, Ex-3, and Ex-4.

##### **b) Wall Framing and Covering Materials**

Explorations were performed at twenty two (22) locations (1 through 22) by drilling small holes through wall finishes and viewing the wall construction using a fiber optic borescope. Locations (approximate) of wall explorations are shown in Sheets Ex-5 and Ex-6.

Results of the wall exploration are given in Table I. It should be noted that data for wall covering was recorded as "near" side and "far" side, indicating the orientation with respect to the arrow pointing to exploration locations on Sheets Ex-5 and Ex-6.

Mr. John Nelson  
**MURAKAMI & NELSON**  
301 Wildwood Avenue

August 3, 2007

Page 2

##### **c) Timber Truss Construction**

Documentation of typical Auditorium truss member dimensions, including truss support at walls, was performed. In addition, a M-100 metal detector was used to non-destructively survey the truss for bolts or steel rods.

Results and locations of our timber truss documentation are shown in Sheet Ex-3 (Details 3 and 9). Based on our non-destructive survey, we were able to detect metal rods in vertical web members.

##### **d) Floor Construction**

Exploration of floor construction was performed in order to determine whether floors had been constructed of wood or concrete, and documentation of member sizes, spacing, and thicknesses.

Results and locations of the typical floor construction are shown in Sheet Ex-2 (Details F and G).

##### **e) Concrete Core Compressive Strength**

A total of six (6) concrete core samples (C1 through C6) were removed from foundation walls and tested for compressive strength per ASTM C42 (dry). Locations (approximate) of the removed cores are shown in Sheet Ex-6.

Compressive strength test results are given in Table II. Based on these results, the average compressive strength of the wall concrete is 3970 psi.

##### **f) Roof Tie**

The method of attachment and weight of roof ties was performed at two (2) locations (RT1 and RT2). Locations (approximate) of roof tie exposures are shown in Sheet Ex-1.

Based on our examination, the method of attachment was the same at both locations and is as follows:

Pan Attachment: 0.19" diameter x 1.50" long, copper nail

Cap Attachment: 0.065" diameter copper wire

Tile Length: 18"

Tile Width: 7.5"

Tile Lap: 4"

Weight of Roof Tiles:

RT1 5.87 lbs

RT2 6.17 lbs

Avg. 6.02 lbs

Mr. John Nelson  
MURAKAMI & NELSON  
301 Wildwood Avenue  
August 3, 2007  
Page 3

Please call if you have any questions regarding the above.

Sincerely,

APPLIED MATERIALS & ENGINEERING, INC.      Reviewed by:

Dean Wilson  
Project Manager

Armen Tajirian, Ph.D., P.E.  
Principal

Cc: Ron Gallagher, R.P. GALLAGHER ASSOCIATES, INC. (email)

**TABLE I**  
**WALL FRAMING AND COVERING MATERIALS EXPLORATION RESULTS**  
**301 Wildwood Avenue, Piedmont, CA**  
**AME Project No. 107405C**

| ID* | Wall Type   | Stud Size<br>(Nominal) | Stud Spacing<br>(in. on center) | Wall Covering "Near" Side                               | Wall Covering<br>"Far" Side                        |
|-----|-------------|------------------------|---------------------------------|---|--|
| 1   | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/horizontal sheathing                     | Diagonal sheathing, (slopes up on left) w/stucco   |
| 2   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/diagonal sheathing (slopes up on left)   | Diagonal sheathing, (slopes up on right) w/plaster |
| 3   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on right) | Diagonal sheathing, (slopes up on left) w/plaster  |
| 4   | Wood Framed | 2 x 6                  | 16                              | 3/4" pilaster w/horizontal sheathing                    | Diagonal sheathing, (slopes up on right) w/plaster |
| 5   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on left)  | Diagonal sheathing, (slopes up on right) w/plaster |
| 6   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on left)  | Diagonal sheathing, (slopes up on right) w/plaster |
| 7   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on left)  | Diagonal sheathing, (slopes up on right) w/plaster |
| 8   | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on right) | Diagonal sheathing, (slopes up on left) w/plaster  |
| 9   | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on right) | Diagonal sheathing, (slopes up on left) w/stucco   |
| 10  | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on right) | Diagonal sheathing, (slopes up on left) w/stucco   |
| 11  | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/metal lath                               | Diagonal sheathing, (slopes up on left) w/plaster  |
| 12  | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/horizontal sheathing                     | Diagonal sheathing, (slopes up on right) w/stucco  |
| 13  | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/horizontal sheathing                     | Diagonal sheathing, (slopes up on left) w/stucco   |
| 14  | Wood Framed | 2 x 10                 | 16                              | 3/4" plaster w/ diagonal sheathing (slopes up on left)  | Diagonal sheathing, (slopes up on left) w/stucco   |
| 15  | Concrete    | -                      | -                               | -   | -  |
| 16  | Concrete    | -                      | -                               | -   | -  |
| 17  | Concrete    | -                      | -                               | -   | -  |
| 18  | Concrete    | -                      | -                               | -   | -  |
| 19  | Concrete    | -                      | -                               | -   | -  |
| 20  | Concrete    | -                      | -                               | -   | -  |
| 21  | Concrete    | -                      | -                               | -   | -  |
| 22  | Concrete    | -                      | -                               | -   | -  |
| 23  | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/metal lath                               | Diagonal sheathing, (slopes up on left) w/stucco   |
| 24  | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/metal lath                               | Diagonal sheathing, (slopes up on left) w/stucco   |
| 25  | Wood Framed | 2 x 4                  | 16                              | 3/4" plaster w/metal lath                               | Metal lath w/plaster                               |
| 26  | Wood Framed | 2 x 6                  | 16                              | 3/4" plaster w/metal lath                               | Diagonal sheathing, (slopes up on right) w/stucco  |

\*See Sheets Ex-5 and Ex-6 for plan locations.

TABLE II

CONCRETE CORE COMPRESSIVE STRENGTH TEST RESULTS

301 Wildwood Avenue, Piedmont, CA

AME Project No. 107405C

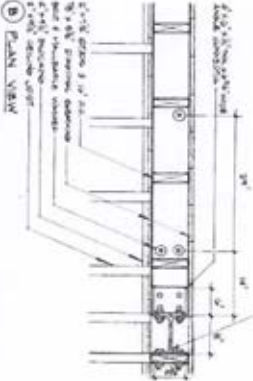
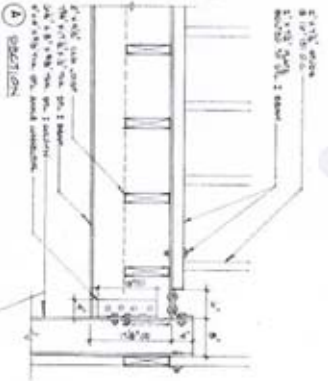
| Core ID* | As Received Height (in.) | Diameter (in.) | Capped Height (in.) | Area (in. <sup>2</sup> ) | Correction Ratio | Ultimate Load (lbs) | Ultimate Compressive Strength (psi) |
|----------|--------------------------|----------------|---------------------|--------------------------|------------------|---------------------|-------------------------------------|
| C1       | 5.93                     | 2.74           | 5.57                | 5.90                     | 1.000            | 19,100              | 3240                                |
| C2       | 5.38                     | 2.74           | 4.38                | 5.90                     | 0.967            | 29,700              | 4870                                |
| C3       | 5.17                     | 2.74           | 4.64                | 5.90                     | 0.975            | 27,590              | 4560                                |
| C4       | 6.11                     | 2.74           | 4.77                | 5.90                     | 0.979            | 24,310              | 4040                                |
| C5       | 5.10                     | 2.74           | 4.34                | 5.90                     | 0.966            | 20,600              | 3380                                |
| C6       | 5.82                     | 2.74           | 4.60                | 5.90                     | 0.974            | 22,380              | 3700                                |
| Average  |                          |                |                     |                          |                  | 39770               |                                     |

\*See Sheet Ex-6 for plan locations.

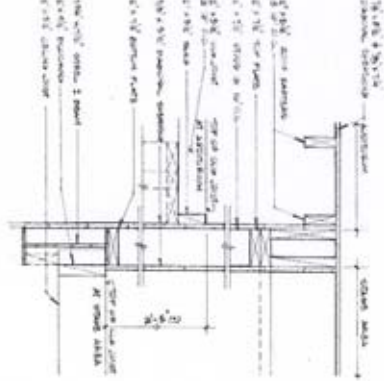
| №   | № п/п |
|-----|-------|
| 1   | 1     |
| 2   | 2     |
| 3   | 3     |
| 4   | 4     |
| 5   | 5     |
| 6   | 6     |
| 7   | 7     |
| 8   | 8     |
| 9   | 9     |
| 10  | 10    |
| 11  | 11    |
| 12  | 12    |
| 13  | 13    |
| 14  | 14    |
| 15  | 15    |
| 16  | 16    |
| 17  | 17    |
| 18  | 18    |
| 19  | 19    |
| 20  | 20    |
| 21  | 21    |
| 22  | 22    |
| 23  | 23    |
| 24  | 24    |
| 25  | 25    |
| 26  | 26    |
| 27  | 27    |
| 28  | 28    |
| 29  | 29    |
| 30  | 30    |
| 31  | 31    |
| 32  | 32    |
| 33  | 33    |
| 34  | 34    |
| 35  | 35    |
| 36  | 36    |
| 37  | 37    |
| 38  | 38    |
| 39  | 39    |
| 40  | 40    |
| 41  | 41    |
| 42  | 42    |
| 43  | 43    |
| 44  | 44    |
| 45  | 45    |
| 46  | 46    |
| 47  | 47    |
| 48  | 48    |
| 49  | 49    |
| 50  | 50    |
| 51  | 51    |
| 52  | 52    |
| 53  | 53    |
| 54  | 54    |
| 55  | 55    |
| 56  | 56    |
| 57  | 57    |
| 58  | 58    |
| 59  | 59    |
| 60  | 60    |
| 61  | 61    |
| 62  | 62    |
| 63  | 63    |
| 64  | 64    |
| 65  | 65    |
| 66  | 66    |
| 67  | 67    |
| 68  | 68    |
| 69  | 69    |
| 70  | 70    |
| 71  | 71    |
| 72  | 72    |
| 73  | 73    |
| 74  | 74    |
| 75  | 75    |
| 76  | 76    |
| 77  | 77    |
| 78  | 78    |
| 79  | 79    |
| 80  | 80    |
| 81  | 81    |
| 82  | 82    |
| 83  | 83    |
| 84  | 84    |
| 85  | 85    |
| 86  | 86    |
| 87  | 87    |
| 88  | 88    |
| 89  | 89    |
| 90  | 90    |
| 91  | 91    |
| 92  | 92    |
| 93  | 93    |
| 94  | 94    |
| 95  | 95    |
| 96  | 96    |
| 97  | 97    |
| 98  | 98    |
| 99  | 99    |
| 100 | 100   |

[illegible]

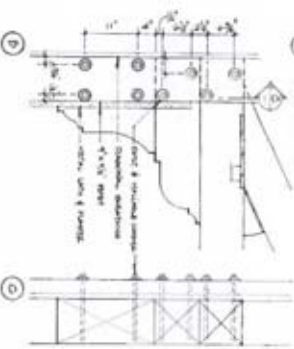
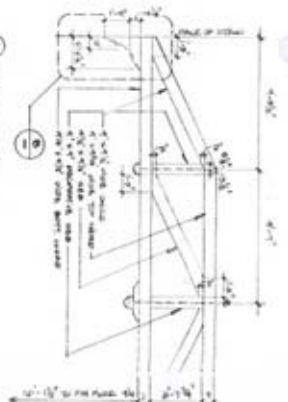




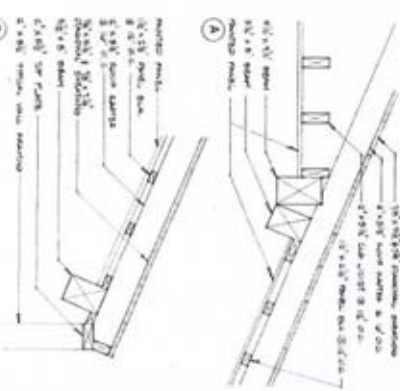
**11 STEEL BEAM AND COLUMN AT PROSCENIUM**  
SCALE: 1/4" = 1'-0"



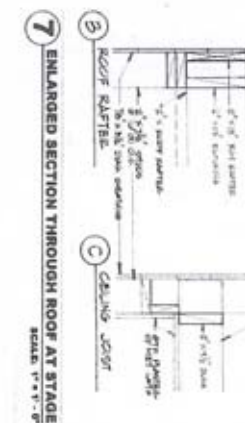
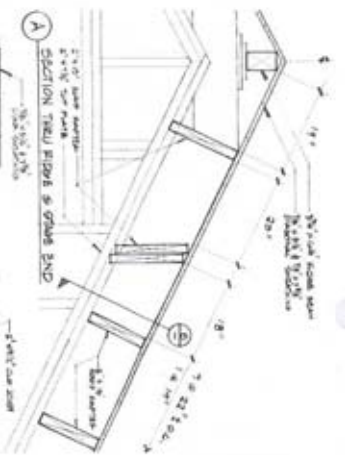
**10 SECTION AT ROOF BET. STAGE & AUDITORIUM**  
SCALE: 1/4" = 1'-0"



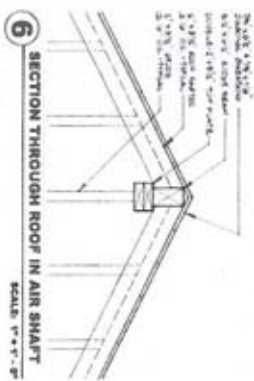
**9 SECTION THROUGH TRUSS**  
SCALE: 1/4" = 1'-0"



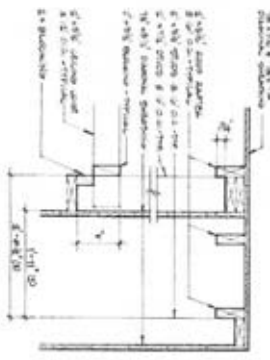
**8 BEAM AT AUDITORIUM CEILING**  
SCALE: 1/4" = 1'-0"



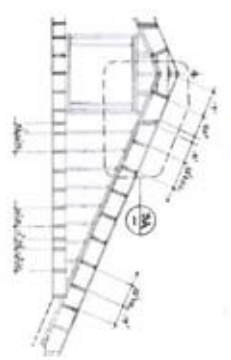
**7 ENLARGED SECTION THROUGH ROOF AT STAGE**  
SCALE: 1/4" = 1'-0"



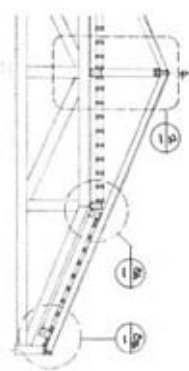
**6 SECTION THROUGH ROOF IN AIR SHAFT**  
SCALE: 1/4" = 1'-0"



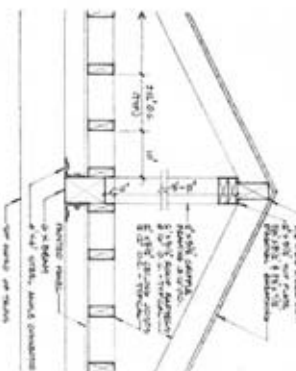
**5 SECTION THROUGH ROOF AT AIR SHAFT**  
SCALE: 1/4" = 1'-0"



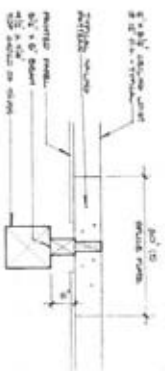
**4 SECTION THROUGH ROOF AT STAGE**  
SCALE: 1/4" = 1'-0"



**3 SECTION THROUGH ROOF AT AUDITORIUM**  
SCALE: 1/4" = 1'-0"



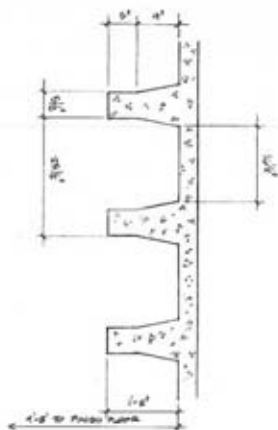
**2 ENLARGED SECTION THROUGH AUDITORIUM ROOF**  
SCALE: 1/4" = 1'-0"



**1 CEILING JOIST SPLICE**  
SCALE: 1/4" = 1'-0"

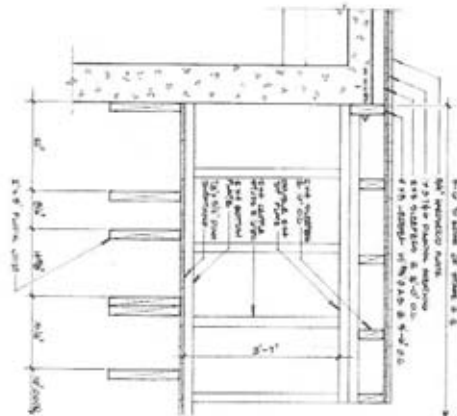
14 MECHANICAL ROOM CEILING

SCALE: 1" = 1'-0"



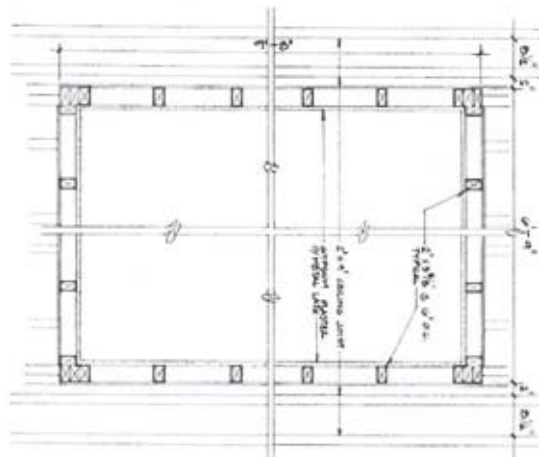
12 SECTION AT STAGE

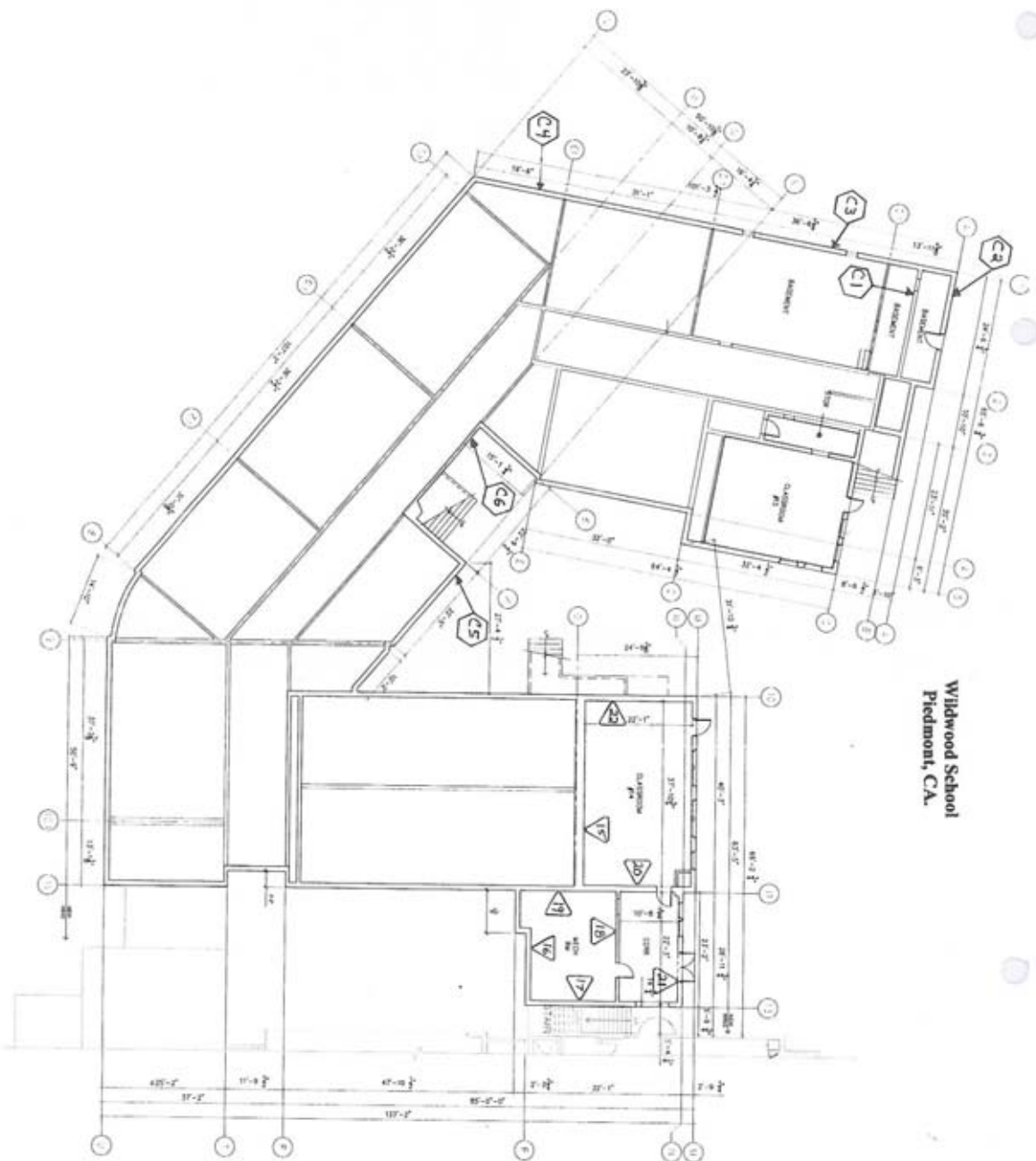
SCALE: 1" = 1'-0"



13 FRAMING PLAN - SMOKE VENT AT STAGE

SCALE: 1" = 1'-0"






Wildwood School  
Piedmont, CA.

Sheet Ex-6. Lower floor plan showing approximate core and wall explorations.



- LEGEND**
- ▽ WALL FRAMING EXPLORATION
  - CONCRETE CORE SAMPLES

|             |      |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 64<br>SHEET | Ex-6 | DATE: 08/18/07<br>SCALE: AS SHOWN<br>DRAWN: J. GARCIA<br>CHECKED: J. GARCIA |  APPLIED MATERIALS & ENGINEERING, INC.<br>301 1st Street<br>Costa, CA 95026<br>Tel: (214) 433-8100<br>Fax: (214) 433-8100<br>e-mail: ameng@ameng.com | <b>WILDWOOD ELEMENTARY SCHOOL</b><br>301 WILDWOOD AVENUE, PIEDMONT, CALIFORNIA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**Wildwood School**  
Piedmont, CA.

**LEGEND**

|   |                             |
|---|-----------------------------|
|  | WALL FRAMING<br>EXPLORATION |
|  | CONCRETE CORE<br>SAMPLES    |

[illegible]



**APPLIED MATERIALS & ENGINEERING, INC.**  
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e-mail: info@appmateng.com

February 5, 2008

Mr. John Nelson  
MURAKAMI & NELSON  
100 Filbert Street  
Oakland, CA 94607

Project No. 107405C

Subject: Supplemental Report

Exploratory Field Work - Phase 3  
Wildwood Elementary School  
301 Wildwood Avenue, Piedmont, CA

Fax Transmittal: 510-893-5244

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. (AME) has conducted explorations and documentation of pre-selected materials at the Wildwood Elementary School structure. This report supplements our earlier report dated August 3, 2007.

The following is provided in response to the request for documentation of information, which had been provided to the structural engineers verbally:

1. Sketches of Sections a through e showing information verified.
2. Revised Drawing Ex-1, showing roof framing over office and office corridor, and Rooms 12, 12A, 13 and 13A is attached.
3. Based on our investigation, it appears that the floors at both the Girls and Boys bathrooms are suspended concrete slabs approximately 5 inches thick.
4. 4 x 4 studs were not documented at line 3.0 of Room 13.
5. Revised drawing Ex-2, showing main floor construction over corridor area north of mechanical room, under teachers lounge, is attached.
6. Sketches of footing exposures indicating footing depths.
7. Using a M-100 metal detector, we were able to detect metal rods in vertical web members, as indicated on Revised Drawing Ex-3 Section 9. Note: Roof truss investigated is located nearest to the front of the stage.

Please call if you have questions regarding the above.

Sincerely,

APPLIED MATERIALS & ENGINEERING, INC.

Reviewed by:

Dean Wilson  
Project Manager

Armed Tahirian, Ph.D., P.E.  
Principal

Cc: Ron Gallagher, R.P. GALLAGHER ASSOCIATES (fax: 510-893-2452)

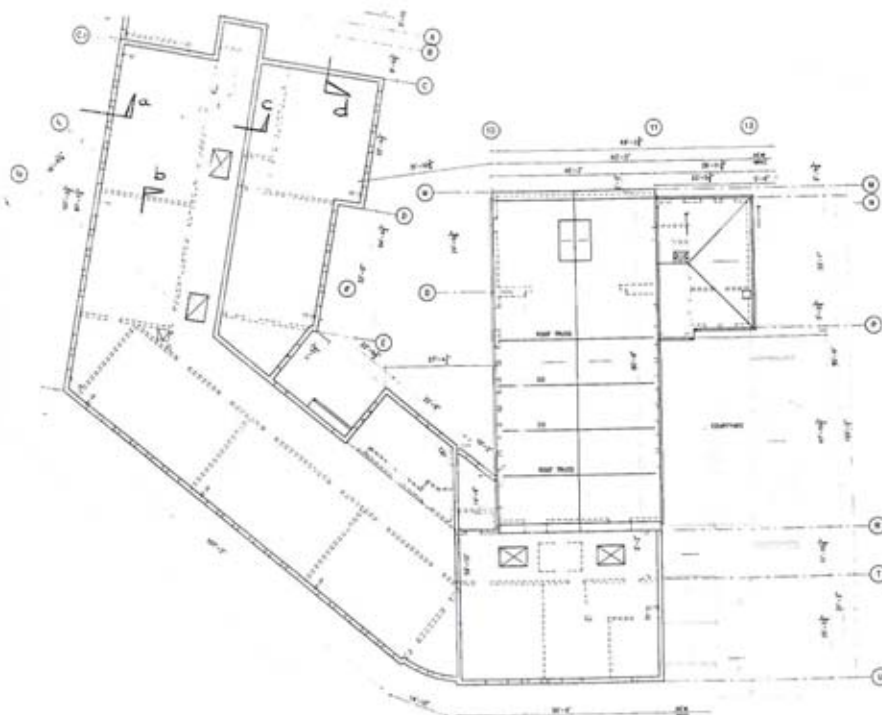
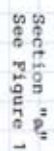
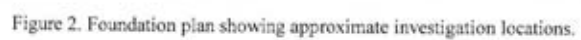
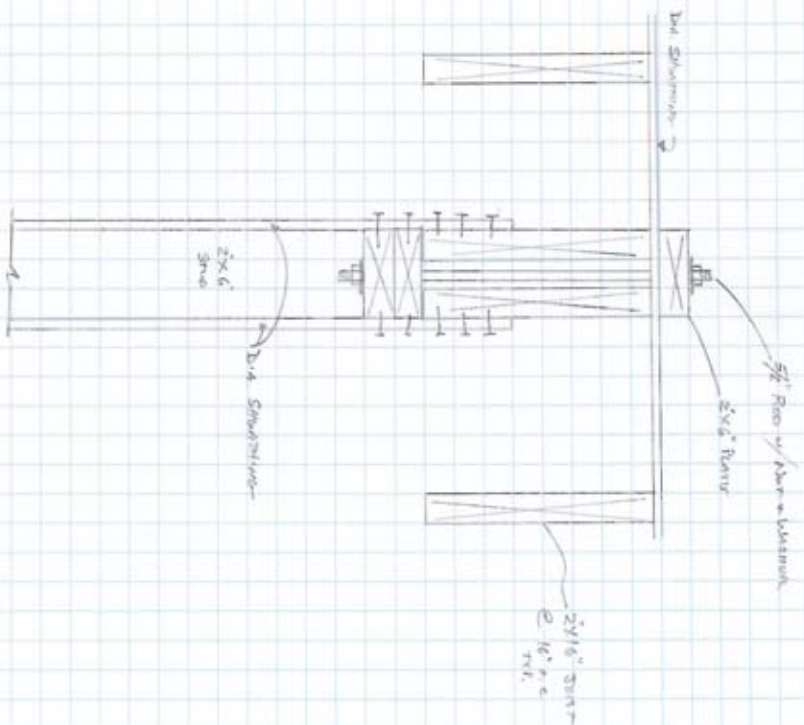


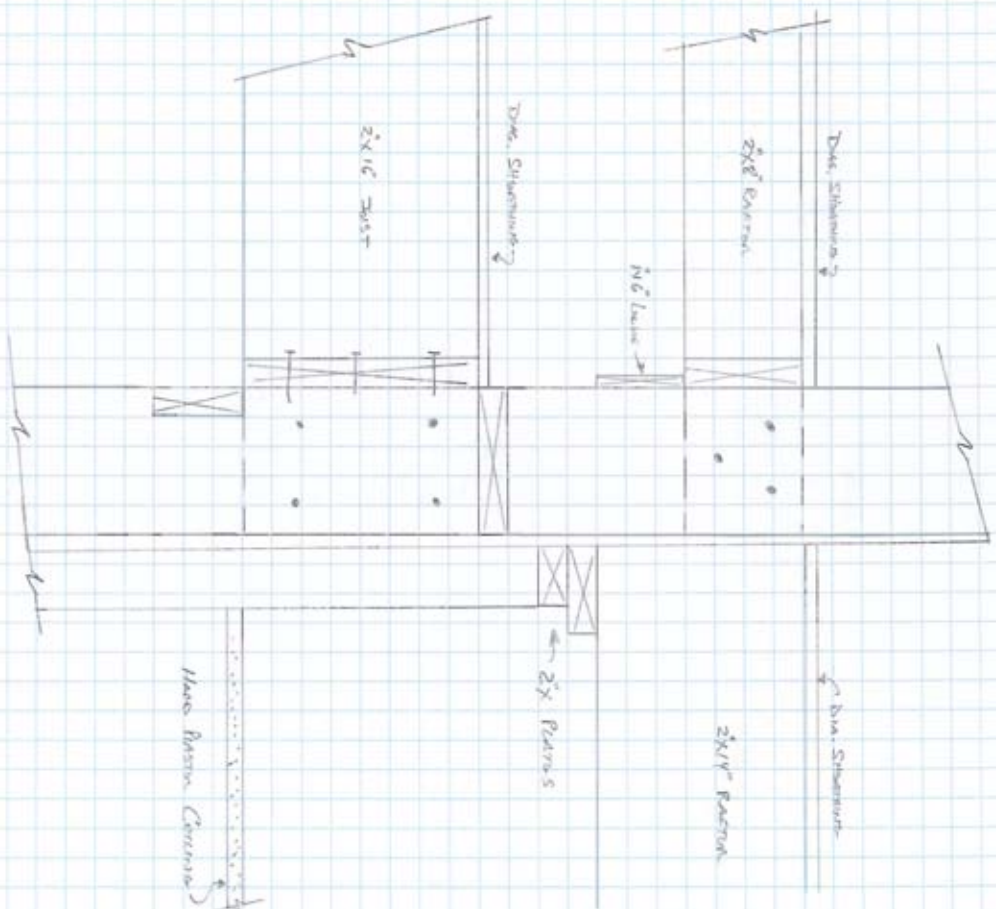
Figure 1. Roof plan showing approximate ceiling explorations.







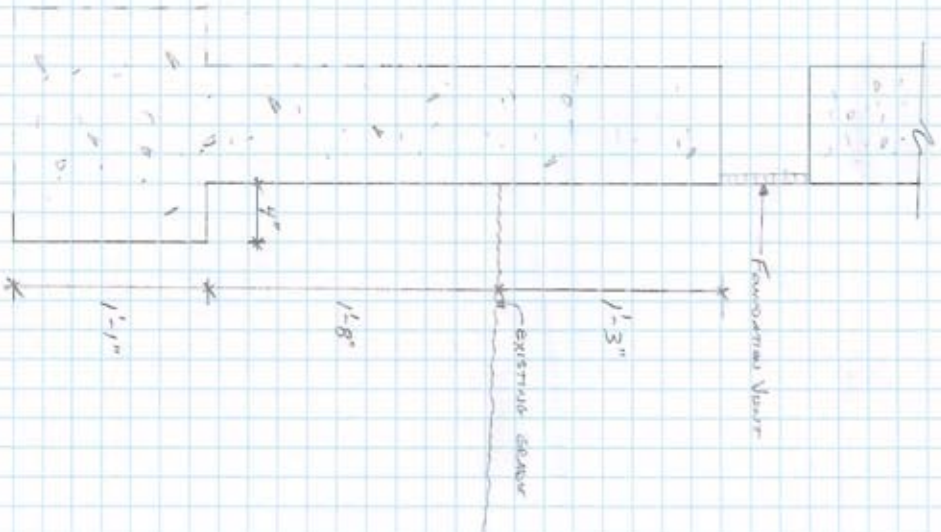
Section "b"  
See Figure 1



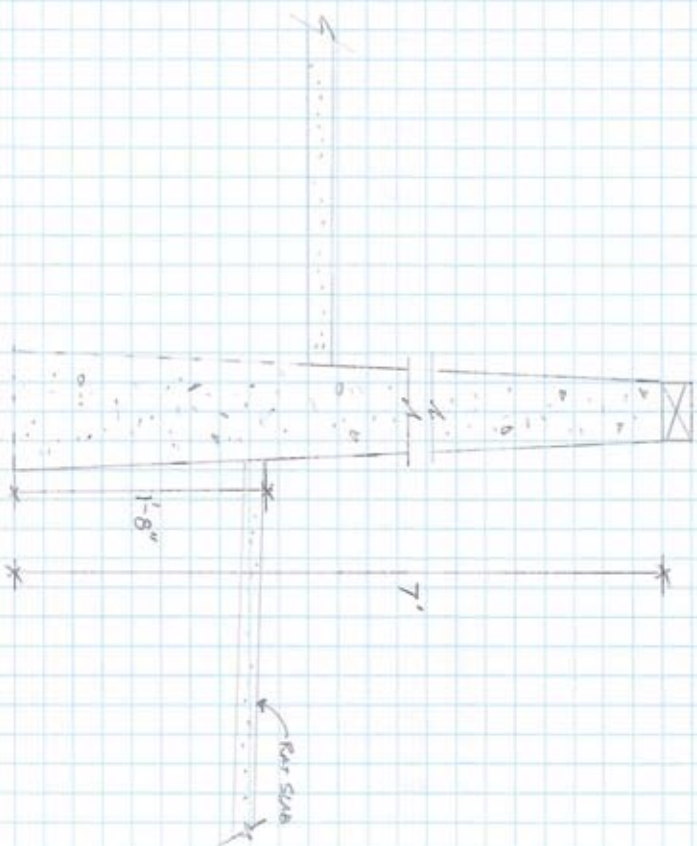
Section "c"  
See Figure 1







Section F1  
See Figure 2



Section F2  
See Figure 2



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January 25, 2008

Mr. John Nelson

**MURAKAMI & NELSON**

100 Filbert Street  
Oakland, CA 94607

Project No. 107927C

Fax Transmittal: 510-893-5244

Subject: Exploratory Fieldwork - PHASE 4

Wildwood Elementary School  
301 Wildwood Avenue, Piedmont, CA

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. (AME) has completed an investigation of roof, ceiling, and wall framing of Building A and Building B, located at 301 Wildwood Avenue in Piedmont, California. Access was provided by us for documentation of existing structural details by the structural engineer (R.P. Gallagher Associates, Inc).

In addition, explorations in the crawl space were performed in order to document framing detail at top of foundation walls, including anchor bolt size and spacing.

#### PROCEDURE & RESULTS

##### Crawl Space

At two (2) locations (F3 and F4), 2 x 16 side members (floor joists) were removed at interior foundation walls to verify nailing between 2 x 8 flat member and top edge of 2 x 16. In addition, size and spacing of anchor bolts was determined. Figures 1 and 2 show locations examined.

Based on our examination of the above mentioned framing at both foundation walls, we have determined the following:

##### Location F3

Nail Spacing (down through flat 2 x 8): 12" o.c.

Nail Size: 3.93" long x 0.188" diameter

Anchor Bolt Spacing: 1' - 1" o.c.

Anchor Bolt Size: 5/8" diameter bolt x 12" long (not "J" bolt)

Mr. John Nelson

**MURAKAMI & NELSON**

Materials Testing and Investigation  
January 25, 2008

Page 2

##### Location F4

Nail Spacing (down through flat 2 x 8): 12" o.c.

Nail Size: 3.94" long x 0.188" diameter

Anchor Bolt Spacing: 2' - 5" o.c.

Anchor Bolt Size: 5/8" diameter bolt x 12" long (not "J" bolt)

##### Roof, Ceiling and Wall Framing

Exposures were performed by AME and the data was gathered and recorded by the structural engineer.

Please call if you have questions regarding the above.

**APPLIED MATERIALS & ENGINEERING, INC.**

**Reviewed by:**



Dean Wilson  
Project Manager



Armen Tajirian, PhD., P.E.  
Principal

Cc: Ron Gallagher, R.P. GALLAGHER ASSOCIATES, INC. (fax: 510-893-2453)







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February 29, 2008

Project No. 108110C

Mr. John Nelson  
MURAKAMI & NELSON  
100 Filbert Street  
Oakland, CA 94605

Email: jnelson@murakamnelson.com

Subject: Wildwood Elementary School  
Phase 5 Observations  
301 Wildwood Avenue, Piedmont, CA

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. has conducted Phase 5 observations of pre-selected materials at the Wildwood Elementary School structure in Piedmont, California. This work was performed February 19<sup>th</sup> through February 22<sup>nd</sup>, 2008.

The following tasks are as requested by the Structural Engineer. The response/ "answer" indicate conditions found.

**I. Wildwood Phase 5 Observations February 19<sup>th</sup> - 22<sup>nd</sup>, 2008**

1. Determine wall Line 3.0 Framing at room 13 and 13A. Determine wall Line G framing at Room 13A. Is there stucco on the exist side of the 2 x 10 studs?

ANSWER:

*Three exposures (1A, 1B, 1C) reveal 4 x 4 stud framing on the east side of Line 3.0 and north-east side of Line G, painted stucco was found on the east and northeast sides of 2 x 10 walls. Locations of exposures are shown in Figure 2.*

2. Provide size and location of openings in Building A foundations, (except those previously completed by RP Gallagher Associates).

ANSWER:

*Size of foundation openings are found in Table 1 and locations are shown in Figure 1.*

Mr. John Nelson  
MURAKAMI & NELSON  
Phase 5 Observations  
February 29, 2008  
Page 2

3. Locate the 3 - 2x ceiling joists (in the corridor) relative to the walls on Line 9. Determine framing from 3 - 2x to top of parapet.

ANSWER:

*We were able to determine that the 3 - 2x ceiling joists on the south end do not align with the wall on Line 9. However, we could not determine the framing condition on the north end of the 3 - 2x ceiling joists. The wall framing on top of the 3 - 2x ceiling joists consisted of 2 x 6 studs at 16" o.c. with a 1 x 6 sole plate nailed to 1 x 6 diagonal sheathing which runs over the 3 - 2x ceiling joists. The wall has diagonal sheathing and the height measurement from the top of the sole plate to the underside of the top plate (or block?) was 3' - 11".*

*Location (3A) of inspection shown in Figure 3. Photos 1 & 2 show conditions found.*

4. Verify continuity of wall studs along Line R.

ANSWER:

*Horizontal plate was found at approximately 16' from floor level.*

5. Locate skylight openings in corridor in front of the office.

ANSWER:

*Measurements showing location of skylight openings are shown in Figure 3.*

6. Anchor bolt observation in Building B stage.

ANSWER:

*Exposures were made along wall at lines M and 10 (at the stage). We determined 5/8" diameter anchor bolts at 48" o.c.*

7. Determine connection between 6 x 10 and 6 x 8 purline in the attic (over auditorium).

ANSWER:

*We were unable to determine connection type.*

8. Determine roof framing above Girl's bathroom ceiling.

ANSWER:

*Roof framing does exist above ceiling framing. 2 x 8 rafters were found. See Photo 3.*

9. Determine if there are back-to-back foundations at Line 3.

ANSWER:

*Inspection of an existing foundation opening along Line 3 revealed two back-to-back foundations with a 7/8" stucco layer sandwiched in between. It appears that these were an original foundation 11 1/2" wide on the west side of Line 3 and an added foundation 9" wide on the east side of Line 3.*

*Location (9A) of inspection is shown in Figure 1. See Photo 4.*

10. Determine roof framing at teachers' lounge

ANSWER:

*Roof framing found is shown in SK-1 and SK-2. See Photos 5 through 9.*

11. Drill through wood ledger directly under main floor along Line D between Lines 3.2 and 4 to determine if underlying construction is wood or concrete.

ANSWER:

*Holes were drilled at approximately 7 1/2" up from the bottom of the ledger (due to spacing of joists). Concrete was found behind ledger board. See Photo 10.*

12. Plot the location of smoke shaft at stage.

ANSWER:

*Measurements showing location of smoke shaft are shown in Figure 3.*

## II. CEILING DIAGONAL SHEATHING

13. Along Lines 2.0 & H: Remove 2 x 4 PL on top of diagonal sheathing between 2 studs at one location along each wall. Record the number of nails in each fully exposed diagonal sheathing board to continuous blocking along the wall. Record the number of boards visible at each location.

ANSWER:

*At location (13A) along Line 2.0, three nails were found in one sheathing board out of four exposed; only one of the nails was into blocking over wall, other nails were into ceiling joists. At location (13B) along Line H, one nail was found out of four boards exposed, nail was into ceiling joist not into blocking over wall.*

*Locations (13A & 13B) are shown in Figure 3. See Photos 11 & 12.*

14. Along Lines D.1 and 6.1: Remove 2 x 6 PL between 2 bolts and record diagonal sheathing nailing to wall 2 - 2 x 16's as shown on attached sketch. Also record size and spacing of bolts. Measure more that one bolt space if possible. Does the spacing of bolts appear consistent along the length of the wall?

ANSWER:

*Two locations (14A & 14B) were inspected; at both locations we found 5/8" diameter bolts spaced at 16" o.c. (typical). Two nails were found per diagonal sheathing board out of three boards exposed.*

*Locations (14A & 14B) are shown in Figure 3. See Photos 13 & 14.*

15. At two separate locations, locate butt splices in individual diagonal sheathing board occurring at a ceiling joist. Record the number of nails in each board at the splice. One location should be north of Line E.1 and one south of E.1. At these same areas record the number of nails between 3 diagonal sheathing boards and the underlying joists at locations where the boards are continuous across the joist.

ANSWER:

*At both locations inspected, we determined three nails at the end of each sheathing board butt joint. Nails were found typically to be two nails in each sheathing board at joists (in the field).*

*Locations were as required. See Photo 15.*

16. At approximately Line E.1, over the corridor: Record the number of nails between the diagonal sheathing and the underlying framing at the butt splices where the direction of the sheathing changes. Are the boards on opposite ends of the splices nailed to the same framing member or to separate adjacent framing members?

ANSWER:

*We found three nails in each sheathing board at butt splices, where the direction of the sheathing changed. Nails were into separate adjacent framing members. See Photo 16.*

17. Make a note of any areas of missing diagonal sheathing observed, with approximate location. Small holes less than 1ft x 1ft may be ignored.

ANSWER:

*Three areas (17A, 17B & 17C) with missing diagonal sheathing were observed. Two (17A & 17B) areas were located between skylights and wall Line 3, both approximately 8' x 3'. The third location (17C) was approximately 2' x 2' and located near the attic access. Locations are shown in Figure 3. See Photo 17.*

Mr. John Nelson  
MURAKAMI & NELSON  
Phase 5 Observations  
February 29, 2008  
Page 5

18. At the existing hole at Line 1.0, Room 11, verify the number of end nails at the diagonal sheathing.

Answer:  
*We were unable to verify (due to the limited time).*

Please call if you have any questions regarding the above.

Sincerely,

APPLIED MATERIALS & ENGINEERING, INC.

Reviewed by:

  
Dean Wilson  
Project Manager

  
Armer Tajirian, Ph.D., P.E.  
Principal

Cc: Gary P. Austin, R.P. GALLAGHER ASSOCIATES, INC. (email: [gary.austin@rgallagher.com](mailto:gary.austin@rgallagher.com))

APPLIED MATERIALS & ENGINEERING, INC.

**TABLE I**  
**SIZE OF FOUNDATION OPENINGS**  
301 Wildwood Avenue, Piedmont, CA  
AME Project No. 108110C

| ID* | Opening Dimensions |                 | Distance From Top of Opening to Underside of Floor Sheathing (ft-in.) |
|-----|--------------------|-----------------|---|
|     | Width (ft-in.)     | Height (ft-in.) |   |
| 1   | 2-6                | 2-6             | 3-3   |
| 2   | 2-6                | 2-6             | 2-5   |
| 3   | 2-6½               | 2-6             | 2-4½  |
| 4   | 2-3                | 1-4½            | 3-6½  |
| 5   | 2-3                | 1-4½            | 4-3   |
| 6   | 2-6                | 2-7             | 6-0   |
| 7   | 2-6                | 2-6             | 4-2½  |
| 8   | 2-6                | 2-6             | 3-1   |
| 9   | 2-6                | 2-6             | 3-1   |
| 10  | 2-7                | 2-6             | 1-9½  |
| 11  | 2-5                | 2-6             | 2-4   |
| 12  | 2-6                | 2-6             | 2-2½  |
| 13  | 2-6                | 2-6             | 2-1   |
| 14  | 2-6½               | 2-1             | 2-2   |
| 15  | 2-6                | 1-9½            | 2-6   |
| 16  | 2-6                | 2-1             | 2-1   |
| 17  | 2-6                | 2-0             | 2-3   |
| 18  | 2-6                | 2-6             | 1-7   |
| 19  | 2-6                | 2-0             | 2-2½  |
| 20  | 2-6                | 2-0             | 2-2½  |
| 21  | 2-6                | 2-0             | 1-6   |
| 22  | 2-6                | 1-10            | 2-4   |
| 23  | 2-3                | 1-4             | 2-4   |
| 24  | 2-3                | 1-4             | 2-3   |
| 25  | 2-3                | 1-4             | 2-1   |
| 26  | 2-3                | 1-4             | 2-1   |
| 27  | 2-3                | 1-4             | 2-1   |
| 28  | 2-3                | 1-4             | 2-1   |
| 29  | 2-3                | 1-4             | 2-1   |

\*See Figure 1 for plan locations.





Photo 1.  
South end of 3-2x  
ceiling joists.

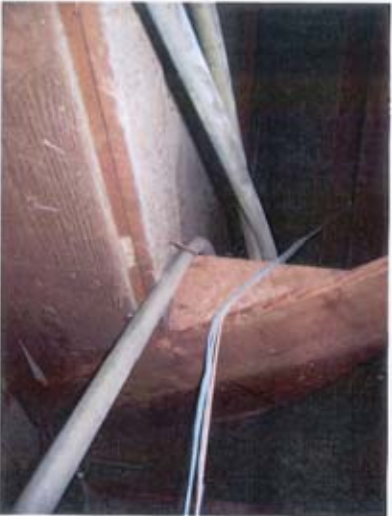


Photo 2.  
Note 1 x 6 bottom plate of  
parapet wall.



Photo 3.  
Cut-out of ceiling joist  
sheathing exposed roof  
rafters above.



Photo 4.  
Stucco layer between  
two foundations.



Photo 5.  
Framing of ridge to  
auditorium wall, above  
teachers lounge/stage  
side entry door.



Photo 6.  
Intersecting cripple  
walls of hip framing,  
at ridge.



Photo 7.  
Sole plate of "hip"  
cripple wall.  
Note: Blocking of  
ceiling joists below  
wall.



Photo 8.  
Rafters at wall Line N  
Note: Joists held back  
from wall.



Photo 9.  
Rafters at wall Line 3  
Note: Out-rigger  
nailed to side of rafter.



Photo 10.  
Hole drilled through  
ledger.  
Note: Location of  
anchor bolt, right side  
of drilled hole.



Photo 11.  
Nails found in  
diagonal sheathing at  
Line 20.



Photo 12.  
Nails found in  
diagonal sheathing at  
Line H.





Photo 13.  
Nails found in  
diagonal sheathing at  
Line D.1



Photo 14.  
Nails found in  
diagonal sheathing at  
Line 6.1



Photo 15.  
Typical butt joint  
nailing

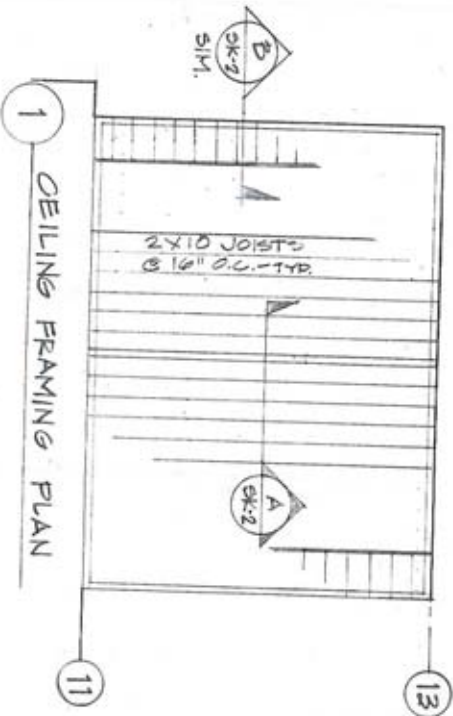
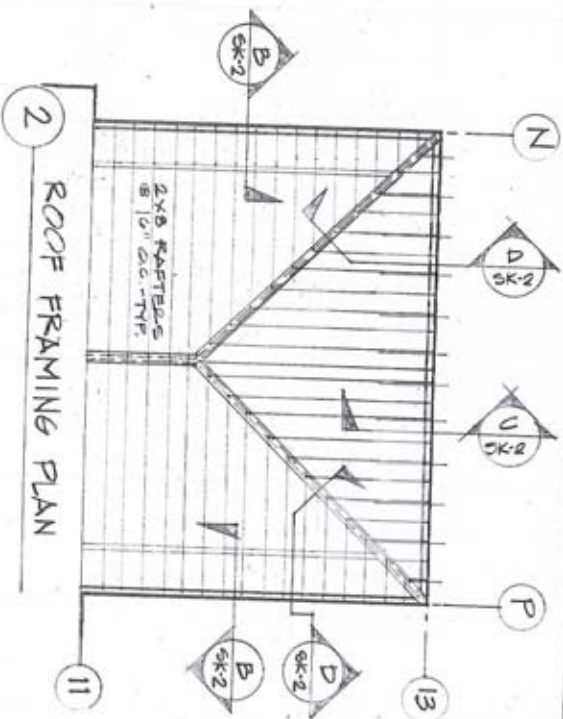


Photo 16.  
Nailing at diagonal  
sheathing where the  
direction changes.

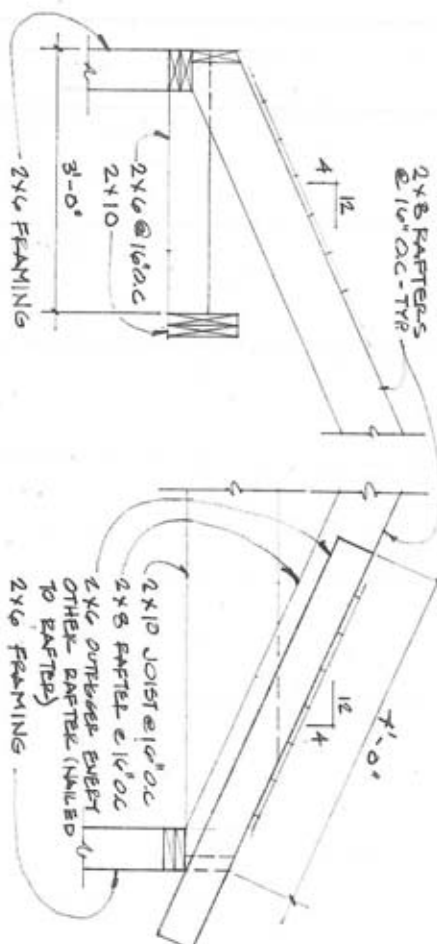


Photo 17.  
Note missing diagonal  
sheathing adjacent to  
skylight, along wall  
Line 3.

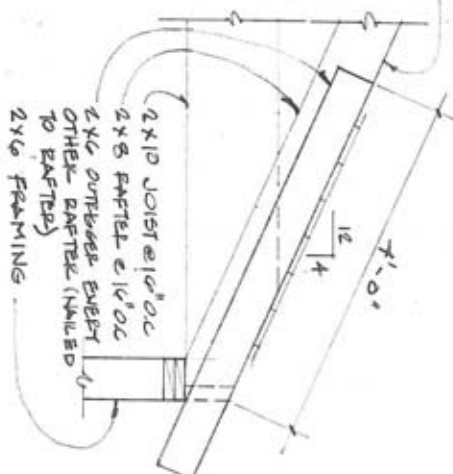
|                      |                   |      |          |             |         |
|----------------------|-------------------|------|----------|-------------|---------|
| PROJECT              | WILDWOOD SCHOOL   | BY   | AWJ      | DRAWN       | SK-1    |
| LOCATION             | 301 PIEDMONT AVE. | DATE | 03-03-05 | DESIGNED    |         |
| CLIENT               | MUKAKAMI & NELSON | DATE |          | PROJECT NO. | 105110C |
| PHASE 5 OBSERVATIONS |                   |      |          |             |         |



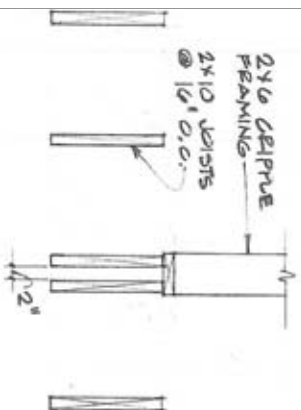
|                      |                   |      |          |             |         |
|----------------------|-------------------|------|----------|-------------|---------|
| PROJECT              | WILDWOOD SCHOOL   | BY   | AW       | DRAWN       | SK-2    |
| LOCATION             | 301 WILDWOOD AVE. | DATE | 03-03-08 | DESIGNED    |         |
| CLIENT               | MUKAKAMI & NELSON | DATE |          | PROJECT NO. | 105110C |
| PHASE 5 OBSERVATIONS |                   |      |          |             |         |



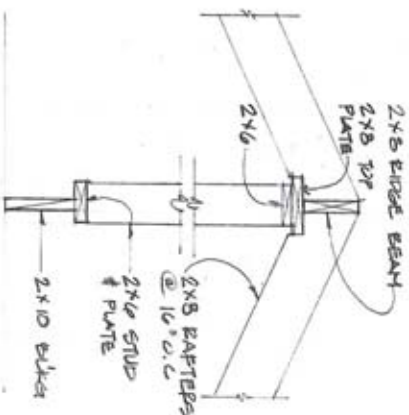
B



C



A



D

[illegible]

Architectural floor plan of a building, likely a school or institutional structure, showing various rooms and structural details. The plan includes numerous numbered callouts (1-31) pointing to specific features. Key areas labeled include 'CLASSROOM', 'LABORATORY', and 'STORAGE'. Dimensions and structural details are indicated throughout the drawing.



**WILDWOOD ELEMENTARY SCHOOL**  
Piedmont, California.

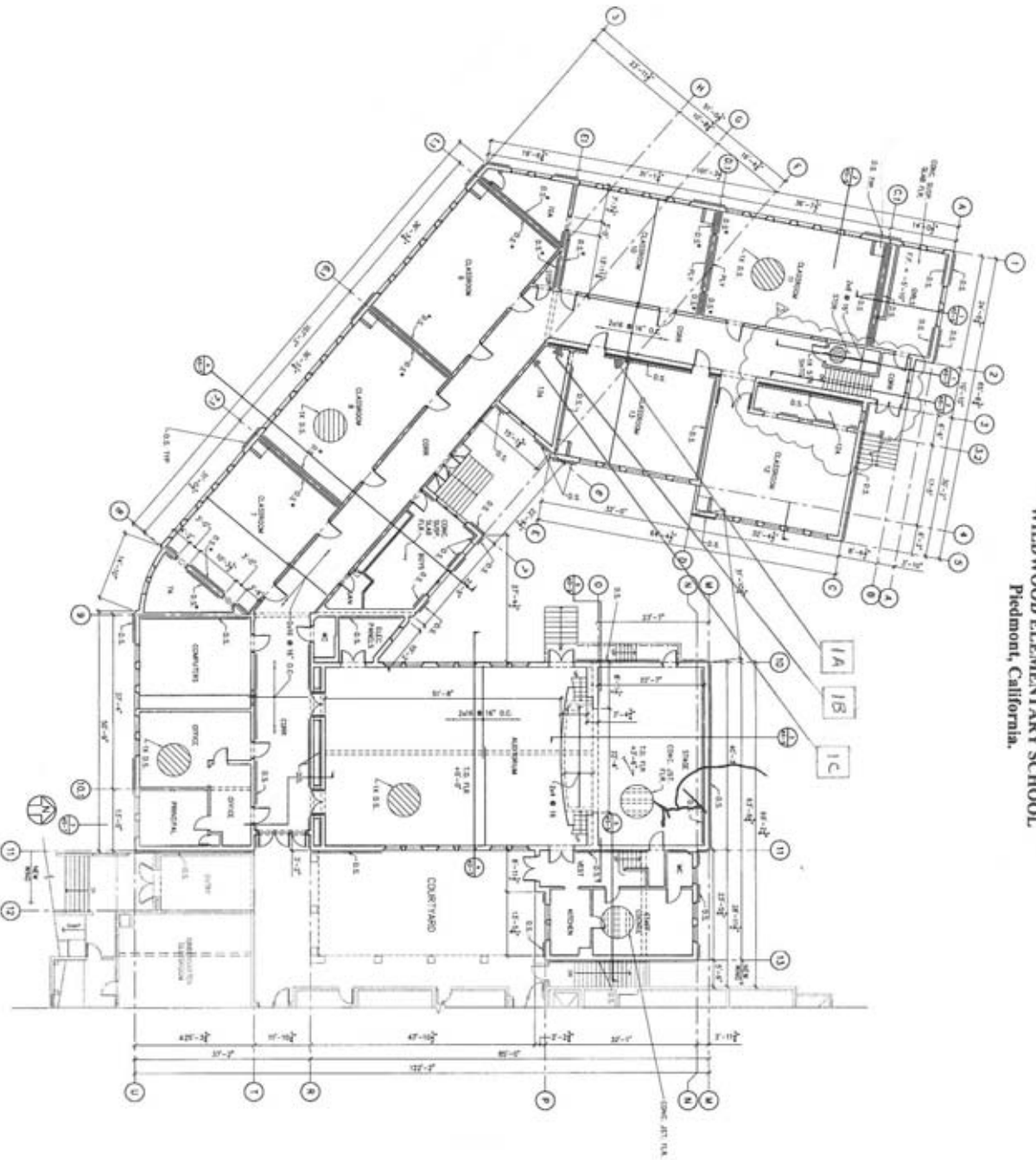


Figure 2. Main floor plan showing observation locations.

WILDWOOD ELEMENTARY SCHOOL  
Piedmont, California.

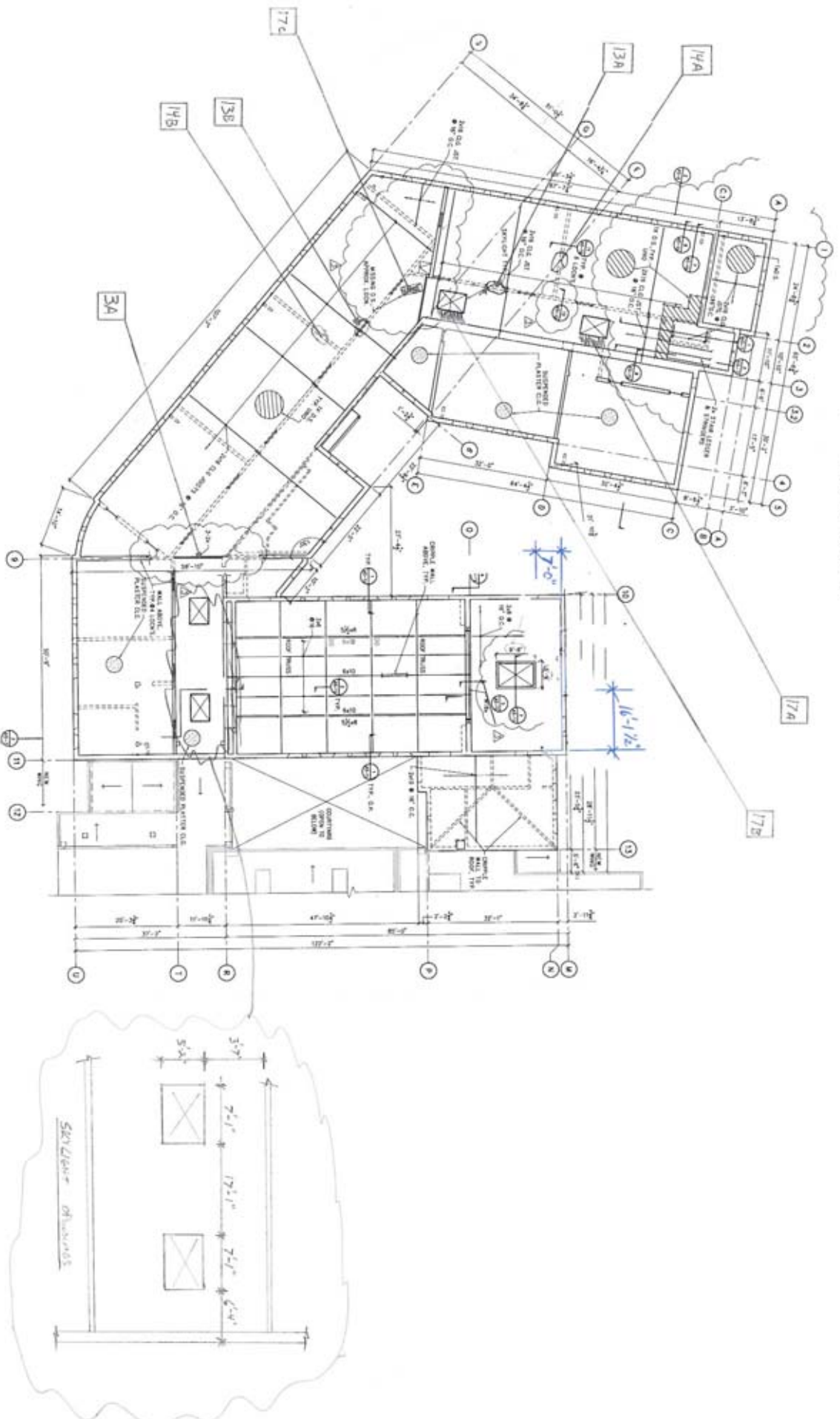


Figure 3. Ceiling plan showing observation locations.

## ***7. APPENDIX***

murakamiNeison Architectural Corp.  
Job No.: 0629 - PUSD Seismic

**LEGEND**

- NEEDED/IN PROGRESS
- YES / OK / COMPLETE
- DO NOT HAVE
- NON CONCLUSIVE
- NOT NECESSARY
- Pending Authorization
- NO

Shaded Area Indicates  
Tier 2 Scenario Analysis.

## APPENDIX B: BUILDING CODE ANALYSIS

### Calculation of Building Area

#### Original 1930's School (A & B):

Classrooms and related spaces: 11,318 sf  
 Auditorium and Stage: 3,605 sf  
 Administration: 2,642 sf  
 Total Area for 1930's school: 17,565 sf

#### New 1995 Addition (C, D, & E):

Classrooms and related spaces: 10,071 sf  
 Multi-Purpose Room: 2,461 sf  
 Total Area for 1995 addition (C, D, & E): 12,532 sf

Note: These areas may be treated as two separate buildings since there are existing two-hour area separation walls between the original school and the 1995 addition, installed as part of the addition.

### Chapter 3: Use or Occupancy

#### Original 1930's School (A & B):

Major Occupancy Group: **E-1** (Sec 305)  
 Accessory Occupancy Groups: **A-2** Assembly with Stage (Table 3A)  
 Auditorium **B** Office (less than 25% of Building)  
 Administrative

✓ No occupancy separation required between **E** and **A-2** Occupancy. (Table 3-B)

✓ No occupancy separation required between **E** and **B** Occupancy.  
 CBC 302.1. Exception 2.2: "Administrative and Clerical offices & similar rooms which do not exceed 25 percent of the floor area of the major use."

#### New 1995 Addition (C, D, & E) :

Major Occupancy Group: **E-1** (Sec 305)  
 Accessory Occupancy Group: **A-3** Assembly without Stage (Table 3A)  
 Multi-purpose Room

✓ No occupancy separation required between **E** and **A-3** Occupancy. (Table 3-B)

### Chapter 5: Building Limitations

#### Original 1930's School (A & B):

Construction Type: Type V-1 (Table 5-B)  
*(Type V-N is not permitted for A-2 occupancy)*  
 Allowable Height: 50 feet, 2 stories (Table 5-B)

#### Allowable Floor Area: (Table 5-B)

- Occupancy Group E-1 15,700 sf
- Occupancy Group A-2 10,500 sf
- Occupancy Group B 14,000 sf

#### Allowable area increases:

- Separation on 2 sides, over 60' on 2 sides (Sec 505)  
 50% increase
- Multi-stories (Sec 504.2, 504.5, Table 5-B)  
 100% increase. *(Note: Floor area for a single story must not exceed that permitted for a one-story building.)*

#### Mixed Occupancy Ratio Calculation: (Sec. 504.3)

|                 |                            |                               |                      |
|-----------------|----------------------------|-------------------------------|----------------------|
| Occupancy Group | Actual Area (main level) / | Allowable Area (main level) < | 1.00                 |
| E-1 Occupancy:  | 9,058 sf / 23,550 sf       | =                             | .38                  |
| A-2 Occupancy:  | 3,605 sf / 15,750 sf       | =                             | .23                  |
| B Occupancy:    | 2,642 sf / 21,000 sf       | =                             | .13                  |
|                 |                            |                               | <b>.74 &lt; 1.00</b> |

|                 |                             |                                |                      |
|-----------------|-----------------------------|--------------------------------|----------------------|
| Occupancy Group | Actual Area (total bldg.) / | Allowable Area (total bldg.) < | 1.00                 |
| E-1 Occupancy:  | 11,318 sf / 31,400 sf       | =                              | .36                  |
| A-2 Occupancy:  | 3,605 sf / 21,000 sf        | =                              | .17                  |
| B Occupancy:    | 2,642 sf / 28,000 sf        | =                              | .09                  |
|                 |                             |                                | <b>.62 &lt; 1.00</b> |

✓ Ratio of Actual Floor Area divided by Allowable Floor Area does not exceed one. The building meets code limits for Allowable Floor Area for Type V-1 construction.

#### Exterior Wall and Opening Protection (Table 5-A)

Walls: Two-hour less than 5 ft.  
 Walls: One-hour elsewhere

✓ Openings: *(Walls at original bldg. are non-rated, but resemble a rated assembly.)*  
 Protected less than 10 ft., not permitted less than 5 ft.

#### New 1995 Addition (C, D, & E) :

#### Allowable Floor Area: (Table 5-B)

- Occupancy Group E-1 15,700 sf
- Occupancy Group A-3 10,500 sf

#### Allowable area increases:

- Separation on 2 sides, over 60' on 2 sides (Sec 505)  
 50% increase
- Multi-stories (Sec 504.2, 504.5, Table 5-B)  
 100% increase. *(Note: Floor area for a single story must not exceed that permitted for a one-story building.)*

**Mixed Occupancy Ratio Calculation:** (Sec. 504.3)

|                 |  |           |                      |
|-----------------|--|-----------|----------------------|
| Occupancy Group | Actual Area (main level) / Allowable Area (main level) |           | < 1.00               |
| E-1 Occupancy:  | 5,790 sf /   | 23,550 sf | = .25                |
| A-2 Occupancy:  | 2,461 sf /   | 15,750 sf | = .16                |
|                 |  |           | <b>.41 &lt; 1.00</b> |

|                 |  |           |                      |
|-----------------|--|-----------|----------------------|
| Occupancy Group | Actual Area (total bldg.) / Allowable Area (total bldg.) |           | < 1.00               |
| E-1 Occupancy:  | 10,071 sf /  | 31,400 sf | = .32                |
| A-2 Occupancy:  | 2,461 sf /   | 21,000 sf | = .12                |
|                 |  |           | <b>.44 &lt; 1.00</b> |

✓ Ratio of Actual Floor Area divided by Allowable Floor Area does not exceed one. The building meets code limits for Allowable Floor Area for Type V-1 construction.

**Exterior Wall and Opening Protection (Table 5-A)**

- ✓ Walls: Two-hour less than 5 ft.
- ✓ Walls: One-hour elsewhere
- ✓ 1-Hour rated walls at new addition.
- ✓ Openings: Protected less than 10 ft., not permitted less than 5 ft.

**Chapter 9: Fire Protection Systems**

Fire sprinklers requirements for Group E Occupancy (Section 904.2.4.1.2) are as follows:

- ✓ Fire sprinklers are required throughout if area is greater than 20,000 sf.  
(Note: School is separated into two separate areas, each area is under 20,000 sf.)
- ✓ Fire sprinklers are required at floors below the level of exit discharge.

**NC** Sprinklers are required at stages and accessory spaces contiguous to stage, for Group A-2 Occupancy (Section 904.2.3.7).

**Chapter 10: Means of Egress**

**Exits Required:** See plans for room exiting requirements. Cumulative occupant load exiting requirements will be calculated during future concept design phase.

- ✓ Hallway width shall be two feet wider than required by Sec. 1003, but not less than 6". Except when less than 100 occupants 44" min. (Section 1007.3.5).
- ✓ Stair width shall not be less than 5". Except when less than 100 occupants 44" min. (Section 1007.3.6).
- ✓ Panic hardware required where occupant load is over 50.

THEODORE C. ZSUTTY Ph.D.

STRUCTURAL ENGINEER  
1579 PEREGRINO WAY  
SAN JOSE, CALIFORNIA 95125  
—  
TELEPHONE (408) 265-8518

September 25, 2007

Constance Hubbard  
Superintendent  
Piedmont City Unified School District  
760 Magnolia Avenue  
Piedmont, CA 94611

Subject: Peer Review of Tier 2 Evaluation of Wildwood Elementary School

Dear Ms. Hubbard:

I have completed my peer review of the Draft Report: Tier 2 Evaluation of Wildwood Elementary School as prepared by R.P. Gallagher Associates (RPGA). This letter describes the scope of this review of the evaluation along with my conclusions and recommendations.

**Conduct of Peer Review**

This peer review was conducted according to the applicable independent peer review requirements of the 2001 CBC Division VI-R Section 1649A and Exhibit "A" of my PUSD service agreement.

The following documents, communications and activities served as a basis for this review:

- Draft Report, dated 9/5/07
- Tier 2 calculations, dated 9/5/07
- Preliminary set of 5 as-built drawings
- Draft copy of 4 drawings by Applied Materials & Engineering Inc.
- Site visit with RPGA (Gary Austin) on August 7, 2007.

The site visit was conducted to observe and identify the type, quality, and condition of Building A (classroom wing) and Building B (auditorium). In Building A, the West

segment attic space and basement were accessed, along with the roof for Building A with overlook of the Building B roof. In Building B, the procelium steel frame anchorage was observed. The adjacent staff lounge was included in the plan visit. The buildings appear to be of good construction and condition.

Calculations were generally reviewed to determine compliance with the ASCE 31 Tier 2 methodology.

**Peer Review Findings**

The seismic evaluation was performed using ASCE Standard 31-03 "Seismic Evaluation of Existing Buildings". This is judged to be acceptable for the Wildwood School type of building construction.

The Tier 2 evaluation for Life Safety performance using the Linear Static Procedure with 2/3 Maximum Considered Earthquake is acceptable for the identification of deficient elements in terms of demand to capacity (D/C) ratios. It is recommended that the strengthening concept studies use the Geomatrix BSE-1 Site Spectrum.

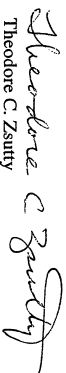
Since the investigation of the as-built structures is not yet complete, it was necessary to base the evaluation on certain assumed properties common to the Beach and Havens school construction. There are important items (such as roof and ceiling diaphragm details, anchor bolts, etc.) that still remain to be investigated, however the results of this evaluation are judged to be sufficient to establish the need for and general nature of the seismic retrofit for these buildings.

When the structural investigation and detail verification process is complete, the specific strengthening concepts can be developed for cost estimation.

**Responsibility**

This peer review was undertaken to provide a second opinion regarding the structural evaluation of the Wildwood Elementary School. The responsibility for evaluation the remains fully with R.P. Gallagher and Associates, Inc. This review does not include the Nonstructural Hazard Survey.

Sincerely,



Theodore C. Zsutty

Copies:

R.P. Gallagher, John Nelson, Priscilla Meckley-Archuleta, Janiele Maffei



Order Number : NCS-318380-SAC1  
Page Number : 1

**First American Title**  
**3721 Douglas Blvd., Suite 151**  
**Roseville, CA 95661**

Sandis Humber Jones, Civil Engineers Surveyors Planners  
605 Castro Street  
Mountain View, CA 94041-2011

Escrow Officer: Judy Harlan  
Phone: (916)677-8005

Title Officer: Timothy Dugan  
Phone: (916)218-6632

Borrower: **Piedmont Unified School District**  
Property: 200 WILDWOOD AVENUE, PIEDMONT, CA 94610

**PRELIMINARY REPORT**

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage of said Policy or Policies are set forth in Exhibit A attached. Copies of the Policy forms should be read. They are available from the office which issued this report.

**Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.**

**It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.**

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

*First American Title Insurance Company*

Order Number : NCS-318380-SAC1  
Page Number : 2

Dated as of September 07, 2007 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

ALTA Extended Owner's Policy 1402.06 (6-17-06)

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

PIEDMONT SCHOOL DISTRICT, ALSO KNOWN AS PIEDMONT SCHOOL DISTRICT OF ALAMEDA COUNTY, ALSO KNOWN AS PIEDMONT UNIFIED SCHOOL DISTRICT OF ALAMEDA COUNTY, A PUBLIC CORPORATION OF ALAMEDA COUNTY, CALIFORNIA

The estate or interest in the land hereinafter described or referred to covered by this Report is:

A FEE.

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2007-2008, a lien not yet due or payable.
2. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.
3. An easement shown or dedicated on the map filed or recorded MAY 11, 1922 in BOOK 3, PAGES 37 AND 38 of MAPS  
For: SEWER and incidental purposes.  
AFFECTS: THE REAR 5 FEET OF LOTS 15 AND 16

*First American Title Insurance Company*



4. General plan limitations, covenants, conditions, restrictions, reservations, exceptions, terms, liens or charges, but deleting any covenant, condition or restriction indicating a preference, limitation or discrimination based on race, color, religion, sex, handicap, familial status, national origin, sexual orientation, marital status, ancestry, source of income or disability, to the extent such covenants, conditions or restrictions violate Title 42, Section 3604(C), of the United States Codes, contained in deeds of other lots in said tract, an example of which can be found in the deed from ANGLO-CALIFORNIA TRUST COMPANY, A CORPORATION, recorded JULY 10, 1923 in BOOK 480, PAGE 155 of Official Records. Lawful restrictions under state and federal law on the age of occupants in senior housing or housing for older persons shall not be construed as restrictions based on familial status.
5. The lien of special tax assessed pursuant to Chapter 2.5 commencing with Section 53311 of the California Government Code for Community Facilities District No. 1, as disclosed by Notice of Special Tax Lien recorded MAY 16, 1991 as INSTRUMENT NO. 91-125127 of Official Records.
6. Any facts, rights, interests or claims which would be disclosed by a correct ALTA/ACSM survey.
7. Prior to the issuance of any policy of title insurance, the Company will require:  
  
An ALTA/ACSM survey of recent date which complies with the current minimum standard detail requirements for ALTA/ACSM land title surveys.
8. Rights of parties in possession.

#### INFORMATIONAL NOTES

1. This report is preparatory to the issuance of an ALTA Loan Policy. We have no knowledge of any fact which would preclude the issuance of the policy with CLTA endorsement forms 100 and 116 and if applicable, 115 and 116.2 attached.  
  
When issued, the CLTA endorsement form 116 or 116.2, if applicable will reference a(n) UNKNOWN PROPERTY TYPE known as 200 WILDWOOD AVENUE, PIEDMONT, CALIFORNIA 94610.
2. General and special taxes and assessments for the fiscal year 2006-2007 are exempt. If the exempt status is terminated an additional tax may be levied.
3. This preliminary report/commitment was prepared based upon an application for a policy of title insurance that identified land by street address or assessor's parcel number only. It is the responsibility of the applicant to determine whether the land referred to herein is in fact the land that is to be described in the policy or policies to be issued.
4. Should this report be used to facilitate your transaction, we must be provided with the following prior to the issuance of the policy:
  - A. WITH RESPECT TO A CORPORATION:
    - a. A certificate of good standing of recent date issued by the Secretary of State of the corporation's state of domicile.
    - b. A certificate copy of a resolution of the Board of Directors authorizing the contemplated transaction and designating which corporate officers shall have the power to execute on behalf of the corporation.
    - c. Requirements which the Company may impose following its review of the above material and other information which the Company may require.
  - B. WITH RESPECT TO A CALIFORNIA LIMITED PARTNERSHIP:
    - a. A certified copy of the certificate of limited partnership (form LP-1) and any amendments thereto (form LP-2) to be recorded in the public records;
    - b. A full copy of the partnership agreement and any amendments;
    - c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;
    - d. Requirements which the Company may impose following its review of the above material

and other information which the Company may require.

C. WITH RESPECT TO A FOREIGN LIMITED PARTNERSHIP:

- a. A certified copy of the application for registration, foreign limited partnership (form LP-5) and any amendments thereto (form LP-6) to be recorded in the public records;
- b. A full copy of the partnership agreement and any amendment;
- c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;
- d. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

D. WITH RESPECT TO A GENERAL PARTNERSHIP:

- a. A certified copy of a statement of partnership authority pursuant to Section 16303 of the California Corporation Code (form GP-1), executed by at least two partners, and a certified copy of any amendments to such statement (form GP-7), to be recorded in the public records;

- b. A full copy of the partnership agreement and any amendments;

- c. Requirements which the Company may impose following its review of the above material required herein and other information which the Company may require.

E. WITH RESPECT TO A LIMITED LIABILITY COMPANY:

- a. A copy of its operating agreement and any amendments thereto;
- b. If it is a California limited liability company, a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) to be recorded in the public records;
- c. If it is a foreign limited liability company, a certified copy of its application for registration (LLC-5) to be recorded in the public records;
- d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, such document or instrument must be executed in accordance with one of the following, as appropriate:
  - (i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such documents must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;

- (ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.

- e. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

F. WITH RESPECT TO A TRUST:

- a. A certification pursuant to Section 18500.5 of the California Probate Code in a form satisfactory to the Company.
- b. Copies of those excerpts from the original trust documents and amendments thereto which designate the trustee and confer upon the trustee the power to act in the pending transaction.
- c. Other requirements which the Company may impose following its review of the material require herein and other information which the Company may require.

G. WITH RESPECT TO INDIVIDUALS:

- a. A statement of information.

The map attached, if any, may or may not be a survey of the land depicted hereon. First American Title Insurance Company expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

# LEGAL DESCRIPTION

Real property in the City of PIEDMONT, County of ALAMEDA, State of CALIFORNIA, described as follows:

## PARCEL ONE:

LOT NUMBERED FIFTEEN (15) IN BLOCK LETTERED "E" AS THE SAME ARE DELINEATED AND DESIGNATED ON THAT CERTAIN MAP ENTITLED "LOWER PIEDMONT PARK, PIEDMONT CALIFORNIA", IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF ALAMEDA, STATE OF CALIFORNIA, FILED MAY 11, 1922 IN BOOK 3 OF MAPS AT PAGES 37 AND 38.

## PARCEL TWO:

BEING A PORTION OF LOT NUMBERED FOURTEEN (14) IN BLOCK LETTERED "E" AS THE SAME ARE DELINEATED AND DESIGNATED ON THAT CERTAIN MAP ENTITLED "LOWER PIEDMONT PARK, PIEDMONT CALIFORNIA", IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF ALAMEDA, STATE OF CALIFORNIA, FILED MAY 11, 1922 IN BOOK 3 OF MAPS AT PAGES 37 AND 38, DESCRIBED TO-WIT:

BEGINNING AT A POINT ON THE NORTHEASTERN BOUNDARY LINE OF LOT NO. 14 IN BLOCK "E", WHERE INTERSECTED BY THE SOUTHWESTERN BOUNDARY LINE OF SAID LOT, AS SAID LOT AND BLOCK ARE SHOWN ON THE MAP OF THE LOWER PIEDMONT PARK TRACT, RUNNING THENCE WESTERLY ALONG THE SOUTHERLY BOUNDARY LINE OF SAID LOT NO. 14, 55.30 FEET TO THE SOUTHWESTERN CORNER OF SAID LOT NO. 14, BEING THE CORNER COMMON TO LOTS NOS. 13, 14, 15 AND 16 IN SAID BLOCK AND TRACT; THENCE FROM SAID COMMON CORNER NORTHEASTERLY 45.02 FEET, MORE OR LESS, TO THE NORTHEASTERN BOUNDARY LINE OF SAID LOT NO. 14 ON A LINE DRAWN AT RIGHT ANGLES TO SAID NORTHEASTERN BOUNDARY LINE OF SAID LOT NO. 14, THENCE SOUTHEASTERLY ALONG THE NORTHEASTERN BOUNDARY LINE OF SAID LOT NO. 14, 32.11 FEET TO THE MOST SOUTHERN CORNER OF SAID LOT NO. 14 AND TO THE POINT OF BEGINNING.

## PARCEL THREE:

LOT NUMBERED SIXTEEN (16) IN BLOCK LETTERED "E" AS THE SAME ARE DELINEATED AND DESIGNATED ON THAT CERTAIN MAP ENTITLED "LOWER PIEDMONT PARK, PIEDMONT CALIFORNIA", IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF ALAMEDA, STATE OF CALIFORNIA, FILED MAY 11, 1922 IN BOOK 3 OF MAPS AT PAGES 37 AND 38.

## EXCEPTING THEREFROM THAT PORTION OF SAID LOT 16 DESCRIBED TO-WIT:

BEGINNING AT THE MOST WESTERN CORNER OF LOT NUMBERED 16, IN BLOCK LETTERED "E", RUNNING THENCE ALONG THE NORTHERN BOUNDARY LINE OF SAID LOT NO. 16, NORTH 85° 00'EAST TWENTY-EIGHT AND 97/100; THENCE LEAVING THE SAID NORTHERN LINE OF LOT NUMBERED 16, SOUTH 66° 27' WEST, TWENTY-SIX AND 40/100 FEET TO A POINT ON THE SOUTHWESTERN BOUNDARY LINE OF SAID LOT NUMBERED 16; THENCE ALONG THE LAST MENTIONED LINE, NORTH 30° 08' WEST, NINE AND 28/100 FEET TO THE POINT OF BEGINNING.

## PARCEL FOUR:

First American Title Insurance Company

BEING A PORTION OF LOT NUMBERED THIRTEEN (13) IN BLOCK LETTERED "E" AS THE SAME ARE DELINEATED AND DESIGNATED ON THAT CERTAIN MAP ENTITLED "LOWER PIEDMONT PARK, PIEDMONT CALIFORNIA", IN THE OFFICE OF THE COUNTY RECORDER OF THE COUNTY OF ALAMEDA, STATE OF CALIFORNIA, FILED MAY 11, 1922 IN BOOK 3 OF MAPS AT PAGES 37 AND 38, DESCRIBED TO-WIT:

BEGINNING AT THE MOST EASTERN CORNER OF SAID LOT 13, RUNNING THENCE ALONG THE SOUTHERN BOUNDARY LINE OF SAID LOT 13, SOUTH 85° 00' WEST, THIRTY AND 07/100 FEET; THENCE LEAVING THE SOUTHERN BOUNDARY LINE OF LOT 13, NORTH 66° 27' EAST, TWENTY-FIVE AND 59/100 FEET TO A POINT ON THE NORTHEASTERN BOUNDARY LINE OF SAID LOT 13; THENCE ALONG THE LAST MENTIONED LINE, SOUTH 40° 32' EAST TEN FEET TO THE POINT OF BEGINNING.

APN: 051-4662-002

First American Title Insurance Company

#### NOTICE I

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

If you have any questions about the effect of this new law, please contact your local First American Office for more details.

#### NOTICE II

As of January 1, 1991, if the transaction which is the subject of this report will be a sale, you as a party to the transaction, may have certain tax reporting and withholding obligations pursuant to the state law referred to below:

In accordance with Sections 18662 and 18668 of the Revenue and Taxation Code, a buyer may be required to withhold an amount equal to three and one-third percent of the sales price in the case of the disposition of California real property interest by either:

1. A seller who is an individual with a last known street address outside of California or when the disbursement instructions authorize the proceeds be sent to a financial intermediary of the seller, OR
2. A corporate seller which has no permanent place of business in California.

The buyer may become subject to penalty for failure to withhold an amount equal to the greater of 10 percent of the amount required to be withheld or five hundred dollars (\$500).

However, notwithstanding any other provision included in the California statutes referenced above, no buyer will be required to withhold any amount or be subject to penalty for failure to withhold if:

1. The sales price of the California real property conveyed does not exceed one hundred thousand dollars (\$100,000), OR
2. The seller executes a written certificate, under the penalty of perjury, certifying that the seller is a resident of California, or if a corporation, has a permanent place of business in California, OR
3. The seller, who is an individual, executes a written certificate, under the penalty of perjury, that the California real property being conveyed is the seller's principal residence (as defined in Section 1034 of the Internal Revenue Code).

The seller is subject to penalty for knowingly filing a fraudulent certificate for the purpose of avoiding the withholding requirement.

The California statutes referenced above include provisions which authorize the Franchise Tax Board to grant reduced withholding and waivers from withholding on a case-by-case basis.

The parties to this transaction should seek an attorney's, accountant's, or other tax specialist's opinion concerning the effect of this law on this transaction and should not act on any statements made or omitted by the escrow or closing officer.

The seller may Request a Waiver by Contacting:

Franchise Tax Board  
Withhold at Source Unit  
P.O. Box 651  
Sacramento, CA 95812-0651  
(916) 845-4900

First American Title Insurance Company

### Privacy Policy

#### We Are Committed to Safeguarding Customer Information

In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information - particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our parent company, The First American Corporation, we have adopted this Privacy Policy to govern the use and handling of your personal information.

#### Applicability

This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its *Fair Information Values*, a copy of which can be found on our website at [www.fir-stam.com](http://www.fir-stam.com).

#### Types of Information

Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

#### Use of Information

We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

#### Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

#### Confidentiality and Security

We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's *Fair Information Values*. We

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**1. CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990  
SCHEDULE B**

1. The policy does not involve against loss of damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of: Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency or by the public records.
2. Any debts, rights, interests, or claims which are not shown by the public records that which could be ascertained by an inspection of the land or which may be ascertained by persons in possession thereof.
3. Any liens, claims, or interests which are not shown by the public records.
4. Discrepancies in recorded lines, boundaries or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unperfected mining claims, (b) reservations or exceptions in patents or in acts authorizing the issuance thereof, (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

- (1) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the third or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a default, lien or encumbrance has been recorded in the public records at the time of the recording of the mortgage.
- (2) Any governmental police power not excluded by (a) above, except to the extent that a notice of the enforcement thereof or a notice of a default, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
- (3) Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
- (4) Diseases, liens, encumbrances, adverse claims or other matters:
  - (a) not known to the Company, but caused, suffered, assumed or agreed to by the insured claimant;
  - (b) not known to the Company, but recorded in the public records at Date of Policy; but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
  - (c) resulting in no loss or damage to the insured claimant;
  - (d) attaching or created subsequent to Date of Policy; or
  - (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
- (5) Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable "doing business" laws of the state in which the land is situated or any subsequent owner of the indebtedness, with arises out of the transaction evidenced by the insured mortgage or unenforceability by the lien of the insured mortgage, claim thereof, with arises out of the transaction evidenced by the insured mortgage is based upon any use or any consumer credit protection or truth in lending law.
- (6) Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by their policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions of area of the land, or the effect of any violation of any such law, ordinance or governmental regulation.

2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Debts, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not known by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to

### 3. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970 WITH REGIONAL EXCEPTIONS

**SCHEDULE B**

or by making inquiry of persons in possession thereof.

water.

**4. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1976  
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE  
SCHEDULE OF EXCLUSIONS FROM COVERAGE**

## SCHEDULE OF EXCLUSIONS FROM COVERAGE

Date of Policy.

insured claimant; (d) attaching or created subsequent to Date of Policy (except to the extent insurance is afforded herein as to any statutory

## 5. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970 WITH REGIONAL EXCEPTIONS

**WITH REGIONAL EXCEPTIONS**

## SCHEDULE B

## Part One

3. Easements, claims of easement or encumbrances which are not shown by the public records

water.

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## 6. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992

**WITH A.L.T.A. ENDORSEMENT FORM 1 C  
EXCLUSIONS FROM COVERAGE**

restricting, regulating, p

defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date

(a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;

(d) attaching or created subsequent to Date of Policy (except

4. Unenforceability of the lien of the insured mortgage because of the

insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.

federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:

(b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor

(b) of such recordation to impart notice to a purchaser

## 7. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992 WITH REGIONAL EXCEPTIONS

**WITH REGIONAL EXCEPTIONS**

## SCHEDULE B

1.

4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other factor.

*First American Title Insurance Company*

2. Rights of enforcement unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not extending from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
  - (a) created, suffered, assumed or agreed to by the insured claimant;
  - (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
  - (c) resulting in no loss or damage to the insured claimant;
  - (d) attaching or created subsequent to Date of Policy; or
  - (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws that is based on:
  - (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
  - (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
    - (a) to timely record the instrument of transfer; or
    - (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

Covered Risks 14 (Subdivision Law Violation), 15 (Building Permit), 16 (Zoning) and 18 (Encroachment of boundary walls or fences) are subject to Deductible Amounts and Maximum Dollar Limits of Liability

## 9. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992 WITH REGIONAL EXCEPTIONS

## SCHEDULE B

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.

- ## 10. AMERICAN LAND TITLE ASSOCIATION RESIDENTIAL

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees and expenses resulting from:



1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.

1. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
2. Easements, claims of easement or encumbrances which are not shown by the public records.
3. Discrepancies, conflicts in boundary lines, storage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
4. Unpermitted mining claims, reservations or exceptions in patents or in acts authorizing the issuance thereof, water rights, claims or title to water.
5. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.
- Part Two:
1. Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise: NONE

Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise : NONE

records.

records.